

Geography and Environment For Rwanda Schools

Senior 3

Teacher's Guide

© 2020 Rwanda Education Board

All rights reserved

This book is property of the Government of Rwanda.
Credit must be given to REB when the content is quoted.

Table of Contents

PART ONE

Introduction	1
Rationale of teaching and learning Geography and Environment	1
Methods, techniques and strategies of teaching Geography and Environment	1
Teaching techniques	2
Developing a scheme of work	6
Teaching and learning resources	7
Ordinary level Geography and Environment Syllabus units	8
Competences at the end of Senior Three	8
Planning to teach	8
Scheme of work	8
Senior 3 Geography and Environment Content map	11
Lesson Plan	26

PART TWO

Topic Area: Practical Geography

sub-topic Area: Map reading and photographic interpretation

Unit 1: Map work interpretation	30
---------------------------------------	----

Topic area: Physical Geography

Sub-topic Area: Relief

Unit 2: Relief in Africa and the world.....	43
---	----

Sub-topic Area: Rocks, weathering and soils

Unit 3: Soils in Africa and the world.....	55
--	----

Sub-topic Area: Weather and climate

Unit 4: Climate in Africa and the world	69
---	----

Sub-topic Area: Vegetation

Unit 5: Vegetation of Africa and the world.....	84
---	----

Sub-topic Area: Drainage

Unit 6: Drainage in Africa.....97

Sub-topic Area: Man and his environment

Unit 7: Environmental conservation.....115

Topic Area: Human and economic Geography

Sub-topic Area: Population and settlement

Unit 8: Population in Africa..... 132

Unit 9: Urban settlement in Africa..... 152

Sub-topic Area: Economic activities and development studies

Unit 10: Agricultural systems in Africa170

Unit 11: Forestry in Africa.....198

Unit 12: Fishing in Africa.....214

Unit 13: Mining in Africa230

Unit 14: Power and energy in Africa.....248

Unit 15: Industrial development in Africa.....263

Unit 16: Transport, communication and trade in Africa.....281

Unit 17: Tourism in Africa.....296

Unit 18: Development case studies311

References.....428

PART ONE

Introduction

Geography is the study of the earth including all the phenomena which make up the physical and human environment. Geography and Environment helps the learners to understand physical and social environment in order to build unity in diversity.

This teaching syllabus is intended to promote uniformity and continuity of content coverage for ordinary level Geography and Environment.

Geography and Environment is one of the disciplines that are concerned with the real world in which learners live. It aims to help them solve problems and develop knowledge, skills, attitudes and values which are relevant to their present and future lives.

Geography and Environment competence based curriculum motivates learners to find out about the real world and enables them to recognise the importance of sustainable development for the future.

Geography competence based curriculum enables learners to develop generic competence skills, literacy and numeracy skills to interpret human and physical phenomena, maps, photographs and diagrams.

Rationale of teaching and learning Geography and Environment

The new curriculum is outcomes based and focuses on results rather than on goals, aims and objectives. It places emphasis on observable and measurable knowledge, skills and values to be acquired by learners at specific levels of their schooling. The new curriculum emphasises learner centredness and provides for increased learner-teacher contact time.

Continuous assessment is another prominent feature of the new curriculum. This allows for regular monitoring of individual learning process, diagnosis of learning difficulties and provision of remedial teaching.

In addition, the curriculum integrates cross-cutting issues and themes such as HIV and AIDS, Life Skills, Gender, Human Rights, Reproductive Health, Good Governance, Environmental Education and Water and Sanitation across the curriculum to ensure holistic development of the learner. Throughout the learning process, the curriculum will lead to the development of entrepreneurship skills.

In view of the magnitude of what is to be accomplished, there will be need for firm commitment by learners, teachers, educational administrators, parents and other stakeholders to the achievement of the changes designed to make the education system responsive to individual, community and national needs.

Methods, techniques and strategies of teaching Geography and Environment

The particular technique that may be appropriate in the teaching and learning process can be influenced by several factors such as:

- The particular group of learners in the class
- The skills, attitudes and knowledge to be learned
- Learning and teaching aids available
- The local environment

- The teacher's personal preference
- The prevailing weather
- The requirements of the Science syllabus

Methods

Teaching methods are the approaches that the teacher employs during a lesson. The two main teaching methods are teacher-centred and learner-centred.

In a competence based curriculum, the *learner-centred method* is the opposite of teacher-centred method. In this method, the learners are required to examine, find out, determine, give their opinions (in discussions), draw maps (sketches), participate in debates and project among others. Learning is all about the learner. The teacher's role in this method is to find out whether the learner has acquired the required skills. He or she observes the learner's participation and evaluates them after the lesson. The teacher may also come in to help the learner understand a concept or assist in explaining some concepts.

Techniques

Techniques are basically the specific activities that the learners are involved in during a lesson. These activities depend on whether the lesson is teacher-centred or learner-centred.

Some of the teacher-centred activities giving notes, lecturing, listening to a resource person or students watching a video. Learner-centred activities may include group discussions, role playing, questions-answer approach, drawing of maps or dramatising. The teacher should use the most appropriate technique during a lesson to enhance learning and acquisition of knowledge and skills.

Strategies

Apart from the methods and techniques that can be used to teach Geography a teacher can also change his or her strategy to aid further understanding of the subject. Strategies are the sequences or procedure that can be applied to make the lesson interesting. The strategy to be adopted is mainly indicated in the lesson plan. The teacher indicates the activities to be performed both by the learner and the teacher from the start of the lesson till the end. This kind of arrangement helps the teacher to consistently refer to the activity or strategy that best suits a particular lesson or topic.

Teaching techniques

Methods, techniques and strategies are usually confused to mean the same. These terms, though related, refer to different activities in the course of teaching. Below are some of the teaching techniques that teachers can use in teaching Geography. They include, but not limited to:

- a) Group discussions
- b) Education tours to relevant Geographical sites
- c) Enquiry

- d) Debate
- e) Projects
- f) Research
- g) Simulation
- h) Demonstration
- i) Case studies
- j) Role-playing
- k) Questions and answers
- l) Lecturing
- m) Resource persons
- n) Oral reports

a) Group discussion

Holding a class discussion is one of the most effective techniques of teaching Geography and Environment for Senior 3. The role of the teacher is that of a facilitator. The teacher can divide the students into groups of manageable members and assign each group a discussion topic. The teacher can also hold a whole class discussion topic. The teacher can also hold a whole class discussion where each student is encouraged to participate by giving opinions, asking questions and contributing to the discussion fully. When holding discussions on say possible solutions to natural environment hazards, the teacher should encourage students to give local examples and provide solutions they can identify with in their local areas.

b) Education tours

Organising an educational tour to relevant Geographical sites is a very important technique that teachers can use to ensure effective learning, especially for practical topics. Students get to learn and understand better what the teacher explains in class. Moreover, the students will be able to break the monotonous class lessons. Such tours will enable the students to collect information for themselves and this will enhance first-hand information collection.

Fieldwork can be useful in Physical Geography, for example in collecting information on weathering and mass wasting, hydrological cycle, natural environment hazards and the river systems.

Before leading the students to an education trip, the teacher should prepare adequately for the trip, treating it as a lesson like any other. It is advisable that the teacher is aware of the places of field work, having visited the places previously. This is necessary because it enables the teacher to identify the areas or points of interest and therefore development of the lesson or objectives. If it is a visit to a nearby farm, the teacher must first ask permission from the farmer and prepare the farmer on the question the students are likely to ask. The teacher should then agree with the farmer on the actual time and day of visit. The teacher needs to prepare them on the areas of visit. The students also require to be prepared in terms of their expected behaviour, the questions they should ask and the activities they will be involved in, such as observing, drawing sketches, making notes, collecting specimens

or samples, measuring, classifying, listening and interviewing among others. After the visit, the teacher should give the students opportunity to report on what they saw and their opinion about the trip and areas of the study.

The following are some of the advantages of using fieldwork:

- The students learn to be independent in gathering information.
- It exposes the students to real life situations.
- The learners develop the skill of leadership and the spirit of teamwork.
- It enables the learners to develop the skills of observation, data collection, note-taking, interviewing and analysis among others.
- It is a valuable break from the classroom monotony.

c) Inquiry

This is a quest to find out more about a given issue. In this technique, the student attempts to carry out further investigation on a topic of learning for purposes of getting a solution to a given problem. The investigation may involve reading several sources in order to analyse the information. After carrying out an inquiry, the students should make their findings known to the rest of the members of the class. For instance, the students may be asked to find out from the local environment how human activities are influencing the environment.

d) Debates

The use of debates in class are encouraged because they enable the students to defend a particular line of thought, thereby learning from one another. The students prepare adequately as they gather the points for debate. The teacher should identify appropriate topics for debate, which have sufficient points for and against, to allow the learners enough time to give their points. There are adequate topics that can generate issues for debate, such as significance of weathering to physical and human environment, effects of mass wasting to the environment among others.

A class debate should only be organised after the students have gained some knowledge on a given issue, in order to apply or recall the knowledge they have acquired.

e) Simulation

This is the use of games to reinforce what has already been covered in class. The teacher can identify a topic with several points, needed for scoring, such as characteristic features of upper course and lower course of the river. The teacher can then divide the class into 2 or 3 groups to compete in a game of scoring points. For instance, the group that names and locates the highest number of features in the river's course wins the game. This game helps the students to remember the features found in the upper and lower course of the river.

f) Projects

The use of projects is appropriate in Geography, more so to emphasise the skills learnt in class. The students are assigned specific activities after a given topic, so as

to reinforce their rate of learning and also to provide them with an opportunity to apply the knowledge and skills acquired. Projects may be in form of investigation, modelling the long profile of a river, types of mass movement or identifying local features resulting from river erosion. The teacher should visit each group to find out what they are doing and provide the necessary guidance and assess the participation of individual students and grade them.

g) Role-playing and dramatisation

This involves the students acting out a given situation to imitate its occurrence. The teacher is called upon to identify suitable topics that can be acted out by more than three students, such as a market scene. The students are assigned specific roles, of which they need to be given time to memorise the words and actions. This technique works better if the topic to be acted out has already been taught, since the students already have some prior knowledge about the topic.

These techniques assist the students to express themselves thus enabling them to remember more of what they learn in class.

h) Questions and answers

The use of questions and answers is the most commonly used teaching technique. The questions asked by the teacher in the course of the lesson should assist the teacher to gauge the level of understanding of the students. It also allows the students to participate in the lesson, as they ask questions. The teacher should ask guiding or leading questions that involve all members of the class. The questions asked by the teacher should vary from low order questions that require students to recall knowledge gained, to high order questions that require the students to analyse or synthesise information before responding to the questions asked. The questions should be short and clear and relevant to the topic of discussion. The teacher should distribute the questions to all members of the class, without relying on those students whose hands are up.

The teacher needs to reinforce the students so as to encourage them to participate actively in the lesson. The teacher should correct incorrect responses by the students. The teacher should not answer all the questions asked during the lesson. He or she can ask the students to respond to a question asked by the other students, but clarify the responses given by the students.

i) Lectures

Although lecturing is a teacher-centred technique, it becomes appropriate when used for five minutes to introduce or summarise a lesson or discussion. A lecture should be kept brief and interesting so as to act as a stimulus to a class discussion or debate. A lecture should not contain information the students can acquire from books or other sources, but contains information that is either new to them or difficult to obtain. A good lecture should be accompanied by thought-provoking questions. A good example of lecture points is effects of natural environmental hazards.

j) Use of resource persons

This is the use of experts in certain fields of Geography to come and offer a talk to the students. For instance, in the area around the school, there exist knowledgeable persons on pollution who can be invited to share their knowledge with the students. After identifying the resource person, agreeing on the areas of discussion and the time of the lesson, the resource person will talk to the students.

After confirming with the resource person, the teacher should prepare the students by telling them who the resource person is, the day and time of the talk and how they are expected to conduct themselves during the talk. The teacher should encourage the students to ask the resource person questions, so as to clarify issues which they do not understand. They should also make notes from the talk. After the resource person has left, the teacher should go over the points raised with the class, to clarify or correct any errors that may have been pointed out.

Developing a scheme of work

A scheme of work is the arrangement of teaching and learning activities the teacher plans to cover with the students, within a term or year. It is derived from the syllabus for Geography, and indicates the lessons, terms, year and level of teaching.

It is recommended that teachers develop their schemes of work from the syllabus topics, and not from a textbook of Geography. This gives the teacher the opportunity to break the sub-topics into units that can appropriately be taught in a lesson, taking into consideration the level of the class and their ability to take in the content in one lesson.

It is necessary that a teacher of Geography develops a scheme of work because it:

- Helps the teacher to prepare adequately for each lesson.
- Assists the teacher to make lesson plans.
- Assists when a new teacher takes over the class.
- Enables the teacher to gather the teaching and learning resources in advance.
- Assists the teacher to know the learners' ability to grasp the lesson content.
- Enables the teacher to correct the syllabus topics systematically.
- Assists the teacher to gauge the pace of content coverage.

Components of a scheme of work

A scheme of work has the following components:

Week: This is the week of the term the lessons are being taught.

Topic: This is a major theme or unit derived from the syllabus, for example: Map Work.

Sub-topic: This is a breakdown of the topic into manageable teaching units for each lesson, for example Map Reading and Interpretation.

Specific outcomes: These are statements that indicate what the learner should gain during the lesson. This shows the teacher the expected behaviour, skills and attitudes that are expected from the learners during the lesson.

Teaching and learning aids: These are materials that are used by the teacher and the students to support the teaching and learning process. The teacher should use as many resources as possible in order to have adequate information and examples. Resources include photographs, charts, maps, newspaper cuttings, real objects, local environment textbooks and others.

References These are sources of information used or to be used by the teacher and students. These include the Student's Book, relevant textbooks, journals, newspapers and magazines. It is advisable to quote the actual title, a page and author of a book.

Teaching and learning materials resources

- a) Physical, human and economic wall maps of Rwanda, different continents and the world.
- b) Textbooks, reference books, newspapers, maps, atlas, charts and globes.
- c) Software materials: computer, video clips, projector and Internet.
- d) Photographs ground, aerial and oblique).
- e) Models from local environment (rocks, minerals, soils samples, ...).
- f) Ordinary survey maps (O.S.M).
- g) Measuring instruments like rain gauge, thermometer, barometer, hygrometer, wind vane, anemometer, compass, clinometers and GPS;
- h) Stationary like manila papers, flip charts, etc.
- i) Adaptive materials like tactile and talking materials like talking globe, tactile maps, tactile illustrations, brailed equipment and materials.

Human resource

For effective and efficient teaching of this geography syllabus, it is to be noted that:

- a) Teachers should have at least a diploma in geography from a recognised teaching Institution of Higher learning.
- b) The teacher should have proven ability to use text books, teachers' guide, geographical magazines and other sources of geographical information that are in line with this Ordinary Geography curriculum.
- c) Teachers should be fluent in English which is the language of instruction.
- d) Teachers should have some basics skills and knowledge in special needs Education like Rwandan sign language, Braille reading and writing.
- e) The teacher should be able to modify the methodology to accommodate the needs of learners in class including those with special educational needs and those who are gifted.

Ordinary level Geography and Environment syllabus units

These Learning Objectives are actually considered to be the ones targeted by the present reviewed curriculum.

- i) Each Unit has a Content which indicates the scope of coverage of what a teacher should teach and learner should learn in line with stated learning objectives.
- ii) Each Unit suggests Learning Activities that are expected to engage learners in an interactive learning process as much as possible (learner-centered and participatory approach).
- iii) Finally, each Unit is linked to Other Subjects, its Assessment Criteria and the Materials (or Resources) that are expected to be used in teaching and learning process.

In all, the Syllabus of Geography for ordinary level has got 3 Topic Areas (Practical Geography, Physical Geography and Human and Economic Geography).

Competences at the end of Senior Three

At the end of Senior Three, the learner will be able to:

- (a) Analyse the earth's external processes and resultant relief features.
- (b) Evaluate the consequences associated with the physical, human and economic aspect of Africa, China and suggest possible solutions.
- (c) Compare the economics development of Africa to the USA, Brazil, Netherlands, Switzerland, Germany and Japan.
- (d) Read and interpret physical and human features on maps and photographs.

Planning to teach

The two most important documents in planning to teach are the schemes of work and the lesson plan.

Schemes of Work

A scheme of work is a collection of related topics and subtopics drawn from the syllabus and organised into lessons week by week for every term. It is also a forecast or plan that shows details under these subheadings:

- *Week*
- *Key unit competency*
- *Lesson*
- *Learning objectives*
- *Learning resources and reference materials*
- *Teaching methods and techniques*
- *Observations/self evaluation*
- *Comments from school director*

In addition, the schemes of work shows the day when a specific lesson will be taught and how long it is intended to take.

Week: Refers to the week in the term, for example, 1,2,3, and so on.

Key unit competency: Gives the competence learners are expected to achieve at the end of the unit.

Lesson: Refers to the lesson being taught in that week, for example, lesson 1,2,3 and 4. This shows which is a single and which is a double lesson.

Date: The day when the lesson will be taught.

Sub-topic: A subset of the topic which is a smaller component of the unit, for example, under the topic plants, one could have 'parts of a plant' as a sub-topic.

Objective: What pupils are expected to achieve at the end of the lesson.

Learning resources: Any materials that will be used by the pupil and the teacher for learning and teaching.

References: Books or other materials that will be consulted or used in the teaching process. Books that pupils will use should also be shown here; indicating the actual pages.

Observations/self evaluation: This should be a brief report on the progress of the lesson planned in the scheme of work. Such reports could include: *Taught as planned;* *'Not taught due to abrupt visit by Country Director of Education;* *Children did not follow the lesson* or *It will be repeated on... (specific date).*

Comments from director of school – Space left for comments by the school director.

Lesson Plan

A lesson plan is a detailed outline of how the teacher intends to carry out a specific lesson.

Important sub-headings of a Lesson Plan

1. **Administrative details:** These include:
Date..... Subject..... Class.....
Time..... Number of Students.....
2. **Topic area:** Broad area that is to be studied, taken from the syllabus.
3. **Sub-topic area:** A smaller topic of the topic about which a lesson will be taught.
4. **Key unit competence:** This is/ are the competence(s) that the learner is expected to achieve at the end of the unit.
5. **Learning Objectives:** These represent what the teacher anticipates pupils to achieve by the end of the lesson. Objectives should be clear and specific. They should also be stated in behavioural terms, that is, in a way that the outcome can be seen, displayed or measured.
6. **Learning/ teaching resources:** Any materials and apparatus that the pupils and the teacher will use during the lesson.
7. **References:** Any resources consulted or used by the teacher to prepare the lesson as well as any books that the pupils will use during the lesson.
8. **Introduction:** This is the start of the lesson. The teacher should motivate the learners by creating learning situations that interest learners e.g. posing a problem, telling an amusing but relevant story or episode, showing an object or picture that arouse their interest. The introduction should link what the learners have already learnt with what they are going to learn.

9. **Presentation/ lesson development:** *This should mainly include the activities that pupils and the teacher will perform in order to achieve the stated objectives, as well as the questions that learners will answer as they do the various activities. It is convenient to distinguish between the learners' and teacher's activities under two columns.*
10. **Summary/ conclusion: (Consolidation):** *This is the step in which the lesson activities are tied up or consolidated to emphasise the main points, summarise the lessons or make conclusions. The summary should correspond to the objectives stated for that lesson.*
11. **Comments/ self-evaluation:** *Teacher should write remarks on whether the objectives were achieved or not and what he or she intends to do to improve on the weak points noted during the lesson.*

TEMPLATE OF A COMPETENCE-BASED GEOGRAPHY LESSON PLAN

School Name:

Teacher's name:

Term	Date	Subject	Class	Unit N°	Lesson N°	Duration	Class size
I	15/01/2018	Geography	S3	1	4 of 4	40 minutes	38 learners
Type of Special Educational Needs to be catered for in this lesson and number of learners in each category							
1 learner with visual impairment, 1 learner with hearing difficulty							
Unit title							
Map work Interpretation							
Key Unit Competence:							
By the end of the unit, the learner should be able to interpret the relationship between physical and human features on maps and draw sketch diagrams of maps.							
Title of the lesson							
Reduction and enlargement of a map							
Instructional Objective							
<p>Given a map showing a place, the learner should be able to:</p> <ul style="list-style-type: none"> Draw correctly a sketch diagram of a map on a scale of 1:2 (or enlarge a map to twice its original size) and a sketch diagram of a map on a scale of 1:0.5 (or reduce a map by half of its original size). 							
Plan for this Class (location: in / outside)							
In class							
Learning Materials (for ALL learners)							
Learner's Book Topographical maps Rulers Plain papers (A4 size)							
References							
Essentials of Map Work by Winfred Williams (2006), Unique Publishers; <i>Senior Secondary Geography Book 6</i> by Safari S. Et Al (2012), MK Publishers; <i>Map Reading for East Africa</i> , D. N. McMaster (2000), Edinburgh, Longman; Geography by Jane Dove Et Al (2008), Edinburgh, Pearson Education Limited.							

Timing for each step	Description of teaching and learning activity		Generic competences and cross cutting issues to be addressed + a short explanation
	Teacher activities	Learner activities	
Introduction 5 min	<p>The teacher guides learners through stages followed in the drawing of sketches of enlarged and reduced maps. The learners draw sketches of enlarged and reduced maps following the procedure given in the Learner's Book.</p> <p>Put learners in pairs, ask them to discuss about what they learnt in the previous lessons on how to draw sketch diagrams of photographs and how to reduce or enlarge photographs. Indicate to learners procedure followed to enlarge or reduce photographs is not different from the procedure used to enlarge or reduce a map.</p>	<p>Discuss on how to draw sketch diagrams of photographs and how to reduce or enlarge photographs. The following key procedures should be raised from their discussions: - Identify the dimension of the photograph. - Identify the main features to be shown on the sketch. - Give the key and the title of the sketch enlarged or reduced at a certain scale.</p>	<p>Cooperation: Cooperation and communication skills are addressed through working in groups on the procedure of drawing sketch maps.</p>

<p>Development of the lesson 25 minutes</p>	<p>Refer learners to the Learner's Book, pages 12 – 14 to conduct a class discussion in detail the ways used in reduction and enlargement. At random, let the learners working in pairs to explain their understanding of reduction and enlargement by use of the method of squares or similar triangle (pages 12 – 14 of the Learner's Book).</p> <p>As they follow the procedure given in the learner's Book, guide their presentation while correcting their language and pronunciation to promote good communication skills.</p> <p>Reinforce understanding of the concepts intended for them to learn.</p> <p>Ask learners to identify features that can affect the environment and how to overcome their effects.</p>	<p>1. Draw a sketch of a map provided using the procedure given in the Learner's Book on Reduction of Maps on pages 12-14.</p> <p>2. Draw a sketch of a map provided using the procedure given in the Learner's Book on Enlargement of Maps on pages 12-14.</p> <p>Using a different type of map, demonstrate how the sketch complies to the standards of a good sketch.</p> <p>3. Present the explanation of how you arrived at each of the two sketches you will have come up with.</p> <p><i>Identify features that can affect the environment and how to overcome their effects.</i></p>	<p>Critical thinking: This will be achieved when learners are left to study the procedure for enlarging or reducing maps. They should try and draw sketches afterwards.</p> <p>Cooperation and communication skills: Cooperation and communication skills are also addressed through working in groups on the procedure of reducing or enlarging a sketch map.</p> <p>Communication skills: Communication skills are addressed through presentation on the method followed to enlarge or reduce a sketch map.</p> <p>Environment and sustainability: This will be addressed in locating features that can affect the environment on the map and how to overcome their effects.</p>
<p>Conclusion: 10 minutes - Summary</p>	<p>Help the learners to come up with the outline on what they have learnt and underline the procedure followed to reduce or enlarge a sketch diagram of a map.</p>	<p><i>Prepare brief notes on the procedure to follow when reducing and enlarging maps for class presentation:</i></p> <ul style="list-style-type: none"> - Trace the same part of the map the way it is on a plain piece of paper. This is the actual size of the map according to its scale. - Draw grid squares on the map. - Draw another similar net work of squares, enlarged or reduced as you desire. 	<p>Communication skills: Communication skills are addressed through presentation on the method followed to enlarge or reduce a sketch map and presentation of the answers to the activities.</p>
<p>- Assessment</p>	<p>Assign learners activities 1.14 and 1.15 in the learner's Book.</p>	<p>Do the activities 1.14 and 1.15 in the learner's book.</p>	
<p>Teacher self-evaluation</p>	<p>Lesson well covered. To proceed to the next topic in the next lesson. Learners with special needs require further exercises to fully understand the concept of sketching and presenting their final sketches.</p>		

This teacher's book has been written to help you guide learners to learn Geography in the most enjoyable and captivating manner. You are reminded to always arouse the curiosity of learners as you teach. Some things that you may do before you go for a lesson include:

- *Go through the expected learning outcomes – this should help guide the manner of teaching.*
- *Read through the unit for the lesson in advance to get an overview of the content required.*
- *Form a mental picture of the teaching situation and the ways in which you will interact with pupils when dealing with the suggested activities.*
- *Collect the materials that will be needed during the lesson in advance.*
- *In some cases, try out the suggested activities/experiments in advance to avoid embarrassments like - the experiment failing to work during the lesson.*

Remember: The suggested teaching activities in this book are just a guide. You may not need to follow them to the letter! Feel free to incorporate other innovative teaching methods that will help in delivering the intended content optimally.

PART TWO

Unit 01

MAP WORK INTERPRETATION

Key Unit Competence

By the end of this Unit, the learner should be able to interpret the relationship between physical and human features on maps and draw sketch diagrams of a map.

Prerequisite of this unit

In Senior One, learners studied about *Map Reading and Photographic Interpretation (Unit 1)*. With knowledge on the elements of a good map, they should be able to apply it in identifying features shown on a map.

In Senior Two, *Map Work Interpretation* taught under *Unit 1* equipped learners with knowledge on how to locate places and features on maps. They also learnt about direction and bearing, use of grid references, measuring distances and areas on a map and description of relief on a map.

At this level, learners are expected to build on the knowledge as they study identification of human and physical features on a map, relationships between different features (human and physical aspects), drawing sketch maps and diagrams and reduction and enlargement of maps. This knowledge is covered under this *Unit 1 (Map Work Interpretation)*.

Cross-cutting issues to be addressed

Map reading and interpretation is a study of the environment around us using a map as a tool. It enables us to learn the concepts of the environment that leads us to understand the importance of *environment conservation and sustainability*. We must bear in mind that when we conserve the environment around us, we conserve the resources that support our livelihood.

As you teach human aspects in map reading, it is important to mention the issue of *financial education and awareness* as most human activities involve finances.

This unit involves to a large extent a lot of practical activities that at times will involve interaction among learners. As you teach it, you are free to help learners to diversify their thinking and this will enable you to address other cross cutting issues.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>This competence will be acquired when learners will be working together to interpret the relationship between human and physical features on maps.</i>
Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>This competence is when learners will be required to apply knowledge learnt to reduce and enlarge maps they will be provided with. The methods outlined in the Learner's Book have different ways of application which learners are expected to adopt.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>Learners are expected to perfect this competence by during presentation of their different finds done in pairs or group discussions.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. <i>To realise this competence, encourage learners to work in groups or pairs for the assignments you will give them. They can also co operate while working on the activities or revision question given in the Learners Book.</i>

Vocabulary/key words/concepts

Relief	This refers to the horizontal and vertical dimensions of the land's surface, also known as terrain .
Contours	These are lines drawn on maps that join places of the same height. <i>Contour</i> lines on maps represent lines of constant height, and that all the points on a given line are at the same height.
Cliff	A cliff is an area on the earth's surface that rises very high and is almost vertical, or straight up and down.
Range	A mountain range is a series of mountains that are connected together generally to form a long line of mountain.
Saddle	Saddles are dips between mountains and hills and along the crests of ridges

Guidance on problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) Which ways are used to identify human and physical features on a map?
- (ii) What is the relationship between different features (human and physical aspects) on a map?
- (iii) What is the procedure of drawing sketch maps or sketch diagrams?
- (iv) Which steps are used in reduction and enlargement of maps?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Learners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them learn with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Identification of human and physical features on a map
Lesson 2	Relationships between different features (Human and physical aspects)
Lesson 3	Drawing sketch maps and sketch diagrams
Lesson 4	Reduction and enlargement of maps

LESSONS DEVELOPMENT

LESSON 1: LESSON TITLE: IDENTIFICATION OF HUMAN AND PHYSICAL FEATURES ON A MAP

Learning objective

By the end of this section, the learner should be able to differentiate human and physical features on a map with the help of a key.

Introduction

In Senior 1, you learnt how to draw a map of your school or home. In your map you inserted relief features such as hills, rivers and other physical features such as school buildings or classrooms.

In Senior 2, you learnt how to locate features on maps as well as describing the relief from the map using contours.

By now, the learners have realised that the key to a map carries all the information on the features that are shown on the map. The ability to identify symbols and signs used is vital to quick and easy map interpretation. It is therefore important that learners are able to identify and recognise the different conventional signs and symbols used on the key and be able to match them with those on the map. Thus, the learner has to know what each symbol and sign stands for. In addition, learners are expected to understand the use of different colours which are used to represent different physical and human features on a map.

Teaching aids

- Recommended text books
- Topographical maps
- Pencils and rulers
- Atlases
- Local environment

The teaching aids will be found relevant if used alongside the following teaching and learning methods:

- Observation
- Discussion
- Question and answer

Learning activities

Introduce the lesson with a question and answer session which will remind learners of the knowledge gained about map work in previous years – Senior 1 and Senior 2 respectively. For example, you can randomly choose two learners; one to define a map and the other to explain the meaning of map work interpretation.

Ensure you acquaint yourself with the information on map work that the learners have done in the lower classes as this forms the foundation on which you build your teaching of this and other sections on this unit.

Prepare guiding notes and questions based on what the learners know to enable logical flow of the lesson. In addition, you need to identify a suitable topographical map for use during the lesson. You also must prepare possible answers to the activities in the section so that you are able to guide class discussions. For example, you can use **Activity 1.2** in the **Learner's Book** to help them identify both human and physical features on a map. Organise a class discussion on the various ways as geographer can use to identify physical features on a topographic map. This information is well detailed in the **Learner's Book**. Guide learners on how to identify some of the physical features on a map such as relief, drainage and vegetation.

Synthesis

Using **Activities 1.4, 1.5, 1.6, 1.8, 1.9** and **1.10** in the **Learner's Book**, ensure that the intended objective of the lesson is achieved. To do this, group learners according to their abilities to tackle this activity. Allow them to present their findings in the next lesson. Each group should be given time to present their findings. As they do this, ensure that you help them acquire the relevant **basic competencies** including **numeracy, literacy** and **digital competencies**.

This Activity is appropriate in helping you gauge the understanding of the learners because it summarises all the information that learners need to learn from this lesson.

Use question and answer method to introduce a class discussion on map work and ensure all learners are actively involved, including slow learners.

Note: In general terms, incorporate the following teaching and learning activities in lesson delivery:

- Reading and interpreting information on topographical maps
- Observing the features in the local environment
- Measuring distances on the map
- Taking notes

Assessment

Provide the learners with a topographical map and ask them to identify and make a list of the physical and human features indicated for discussion.

LESSON 2: RELATIONSHIPS BETWEEN DIFFERENT FEATURES (HUMAN AND PHYSICAL ASPECTS)

Learning objective

By the end of this section, the learner should be able to interpret the relationship between human and physical features on maps.

Introduction

In this section you will apply the knowledge acquired in the first section to actualise map interpretation practically. The best approach is use of different topographical maps so that learners get exposure to different symbols signs and colours used on different maps. The second stage is to relate the human and physical features. For instance what human activities are likely to be practised in hilly areas, mountain areas and in low lands? This concept will best be learned using the local environment. Considering the varied relief of Rwanda.

Teaching Aids

- Recommended textbooks
- Topographical maps
- Local environment

The teaching aids will be found relevant if used alongside the following teaching and learning methods:

- Map interpretation
- Observation
- Discussion
- Question and answer

Learning Activities

Identify suitable topographic maps, apart from those given in the **Learner's Book**, respectively for use in this section.

Divide the class into groups to work on **Activities 1.8, 1.9 and 1.10** in the **Learner's Book** respectively. Guide their discussions as this will form the basis for the teaching and learning during this lesson.

Proceed to distribute to the learners other different maps and then you can organise a discussion session. Ensure you have comprehensive notes and questions to guide class discussion. Hold a brainstorming session with the learners in an effort to help them draw a relationship between different features – Human and physical aspects.

Synthesis

Consider an out of class session, within the school compound where the learners can see areas near the school, to help them draw a relation between these features from the actual environment. As a matter of safety, ensure that learners are safe by avoiding steep areas as you take them out to view the local environment. In addition, you must pay special attention on the safety of learners with special needs.

Note: In general terms, ensure that use the question and answer method to introduce class discussions while ensuring all learners are actively involved. Ensure that slow learners are actively participating. Organise the class into groups ensuring that learners of mixed ability are part of each group.

Asking and answering questions, field sketching and taking notes are additional activities that may also add value in the teaching and learning process.

Assessment

Ask the learners to attempt **Activity 1.11** in the Learner's Book in groups. Ensure that you attend to each group as you guide them through their responses.

You should also give them further exercises on ways through which one can draw a relationship between different features on a map for practice purposes.

LESSON 3: DRAWING SKETCH MAPS OR SKETCH DIAGRAMS

Learning objective

By the end of this session the learner should be able to draw sketches from the map

Introduction

Sketch maps are maps that are drawn without considering the scale of the area being represented. Sketch maps can be drawn during teaching using the existing topographic maps. For instance one can draw a sketch map to show the location of human and physical features that exist in an area. In this section it will be important for learners to learn how to draw sketch maps using the topographic maps which they used to identify various features so that they can plot the features at the appropriate geographical position on the sketch map.

Like any other map, a sketch map must have a title, compass direction and a key to make it possible to interpret the map. It is also important to draw a sketch map that is large enough to enable labelling where possible. However, a sketch map is drawn to show only selected features as it is not possible to show everything that is in the original map.

Teaching Aids

- Recommended textbooks
- Topographic maps
- Sample sketch maps showing different features

The teaching aids will be found relevant if used alongside the following teaching and learning methods:

- Map interpretation
- Discussion
- Question and answer

Learning Activities

Introduce the lesson by reminding learners that the lesson is related to drawing sketch diagrams and photographs they learnt in Senior 2. Brainstorm on the procedure they used to draw the sketches in the previous year.

Proceed to identify a suitable topographic map that you will use to guide the learners in drawing their sketch maps.

The following procedure can be useful in guiding you draw a sketch map with the learners:

- a) Identify the area of the map that you need to sketch.
- b) Highlight the main features shown in the area to be sketched.
- c) Using a ruler, draw a box within which you will fit the contents of your sketch.
- d) Using clear pencil lines, draw the main features within the area to be sketched. Pay attention to the proportionality of each feature to be included in the sketch. Try as much as possible to fit the contents within the frame as accurately as possible.
- e) Devise an appropriate key, with symbols to explain the features shown on your sketch.
- f) Give your sketch a title. Do not forget to show the compass.

Also ensure you have guiding notes to help you teach the concept.

Synthesis

Using questions 1 and 2 of **Activity 1.13** in the **Learner's Book**, let learners practice drawing sketch maps using the procedure in small groups. Ensure that the groups share some of the resources, as this will help them acquire **interpersonal skills** as well as **sharing**.

Use question and answer while guiding them through the activity, while paying special attention to learners with special needs. Introduce class discussion and encourage the learners to have group discussions. Ensure that all learners are actively involved.

The following additional activities may also add value the teaching and learning process:

- Interpreting features on maps
- Drawing sketch maps
- Discussing
- Asking and answering questions
- Taking notes

Assessment

Ask the learners to work on question 3 of **Activity 1.13** in the **Lerner's Book** .They should also complete drawing sketches on their own.

LESSON 4: REDUCTION AND ENLARGEMENT OF MAPS

Learning objective

By the end of this section the learner should be able to apply knowledge to reduce and enlarge the maps.

Introduction

An enlarged or reduced map retains its original shape since the shape is not affected by the size of the map. However, in a reduced map, some details may be omitted or simplified to only capture more of the information that is required. On the other hand, one may decide to indicate all the details on an enlarged map since there is sufficient space. Names of places and features need not be reduced or enlarged proportionally.

There are different methods used when enlarging or reducing maps. They include the method of squares and the method of similar triangle. There is need to have appropriate illustrations for learners to copy before they are given a map to reduce or enlarge.

Learning Activities

Ensure you guide the learners in drawing reduced and enlarged maps on a manila paper. You need to obtain the suggested maps in **Activity 1.14** in the **Learner's Book** that is necessary for this lesson. This will help learners practice the processes of reduction and enlargement.

Before starting the lesson, ensure you have a sketch you will have drawn earlier to guide them in the entire process of drawing reduced and enlarged sections of a map.

Take learners through the procedure of enlargement and reduction given in the **Learner's Book** respectively.

Plan to divide the class into groups if need be especially if they have to share some of the resources.

Teaching Aids

- Recommended text books
- Topographic maps
- Sample sketch maps illustrating reduction and enlargement of maps
- Manila papers, rulers and felt pens

The teaching aids will be found relevant if used alongside the following teaching and learning methods:

- Demonstration
- Discussion
- Taking notes
- Drawing maps
- Question and answer

Synthesis

Divide learners into two groups. To one group, provide a map from which they will choose an area to show how reduction can be done. To the other group, provide a map from which they will choose an area to show how enlargement can be done. To both groups, let them follow the steps used to achieve reduction or enlargement.

Assessment

Using **Activity 1.15** in the **Learner's Book**, find out from learners how they have understood the process of reduction and enlargement using a topographic map you will provide them with. Also ensure that all learners are able to draw the maps irrespective of their learning difficulties.

Prepare notes ensuring you capture the advantages and disadvantages of using sketch maps.

Synthesis

Divide learners into two groups. To one group, provide a map from which they will choose an area to show how reduction can be done. To the other group, provide a map from which they will choose an area to show how enlargement can be done. To both groups, let them follow the steps used to achieve reduction or enlargement.

END OF UNIT

Summary of the unit

Map work involves map reading and map interpretation. Map reading refers to the identifying, interpreting and analysing geographic information on maps. The kind of maps used in map reading are known as survey topographical maps. These maps show both the physical and human features in an area. A good map should have a title, a key, a compass direction, a frame and scale. A number of colours and symbols are used to show different features on the map extract.

In this unit, we have studied how to identify human and physical features on a map, relationships between different features (human and physical aspects), drawing sketch maps and sketch diagrams as well as reduction and enlargement of maps.

Additional information

This unit is linked to Unit 2 of Senior 1 on the **elements of a map** and Unit 3 of Senior 2 particularly on **drawing sketch diagrams** and **reduction and enlargement of photographs**. It is important that you remind learners the basics they learned in those previous classes because this information is key in setting the foundation for this unit. These basics include elements of a good map, most of which are also applicable to drawing sketches. These include a title, frame and key. Each learner can write a brief explanation about the importance of each of these elements. This exercise will promote **recall** and prompt learners to research, especially those who may not easily recall each of these elements.

Activity 1.2 in the **Learner's Book** is appropriate in summarising the knowledge gained from lesson 1 on how to identify physical features on a map. It is important that you mention some of the physical features that can be identified on a map such as hills, mountains, steep slopes, valleys, cliffs, ranges, ridges and saddles. Proceed to mention drainage features such as rivers, lakes, dams, reservoirs and swamps. Refer to one of the maps in the learner's book from which they should identify these features.

Explain that human features that can be shown on a map are those constructed by people, including roads, bridges, buildings, schools, churches, mosques, colleges, stadiums among others. Vegetation types that can be shown on a map may be natural (including natural forests, papyrus, bamboo and mangrove forests) or planted (including crop plantations and planted forests).

Using **Activity 1.11** in the **Learner's Book**, draw a relationship between different features, citing human and physical aspects. Initiate a discussion on settlement patterns near or around certain features such as hills, mountains, forests, lakes and roads. Use the map extract of Karongi provided in the **Learner's Book** to lead the discussion. Discussions, especially when carried out in groups, promote interpersonal skills and sharing. In the long run, learners realise that each of their opinion is important.

Drawing sketches requires learners to keep practising using the **procedure** given in the **Learner's Book**. This activity requires learners to **cooperate** as they will be working in groups.

Lastly, reduction and enlargement requires learners to follow the procedure outlined in the **Learner's Book** under **Activity 1.15**. As remedial work, assign learners in groups different maps to use in drawing reduced and enlarged maps using the method of squares and the method of similar triangle.

End unit assessment

1. Using the map of **Karongi** in the **Learner's Book**, name the main means of transport likely to be used in the area covered by the map.
2. Study carefully the map of **Akagera** in the **Learner's Book** then list the types of vegetation shown.
3. Discuss the effects of vegetation on human settlement.
4. Explain why steep and hilly areas are sparsely populated.

Answers to end unit assessment

1.
 - a) Road transport
 - b) Water transport
2.
 - i) Forests
 - ii) Swamp vegetation
 - iii) Savannah or pasture
3.
 - People settle away from swamps because of insect and disease vectors such as mosquitoes and snails.
 - Pastoralists settle near pastures to have easy access to feeds for their animals.
 - Wild animals that inhabit extensive forested areas make it difficult for people to settle near such areas.

- Some people depend on herbs from some plants in forested areas making it good for them to settle near such areas.
 - Forests attract rainfall making areas near them habitable because they support agriculture.
 - The cooler, forested areas on mountain slopes support dairy farming while the drier areas with extensive grassland support ranching. These two opposite areas attract sparse settlement as the former may be too cold and the later too dry, both being unable to support dense settlement.
- 4.
- They are unsuitable for crop cultivation as they are susceptible to erosion.
 - Most of such areas are not well served with road networks because such infrastructure is expensive to build, making them not to be preferred for settlement.
 - Forested hilly or mountainous areas may be too cold to support settlement.
 - Some of these areas are prone to landslides when there are long rains persist.

Remedial activities (for slow learners)

1. Explain the feature on a topographic represented by:
 - a) Contours appearing close to each other
 - b) Contours spread over a large area
2. From your local environment, identify both the drainage features and types of vegetation that would be shown on a topographic map if one was to be drawn to represent your area.
3. Describe the procedure to be followed in drawing a sketch map of an area on a topographic map.

Answers to remedial activities

1.
 - a) Contours appearing close to each other – Cliff or Steep slope
 - b) Contours spread over a large area – Flat area or extensive plain
2. Responses could include the following, depending on the local environment surrounding the school:
 - Drainage features: Rivers, dams, swamps
 - Types of vegetation: Forests, grasslands, plantations
3.
 - i) Identifying the area to be sketched.
 - ii) Identifying the important features that need to be shown on the sketch.
 - iii) Drawing the frame into which to fit the features to be shown.
 - iv) Positioning the features in the frame relative to their actual position on the map.
 - v) Developing a key to show each the feature represented on the sketch.
 - vi) Drawing the compass point and giving the sketch a suitable title.

Extended activities (for gifted and talented learners)

1. Briefly explain how relief features are usually represented on topographical maps.
2. Discuss four major economic activities that are carried out in your local environment and how each can be shown on a topographic map.
3. Discuss the suitability of a sketch map as compared to an ordinary map.

Answers to extended activities

1. Relief features on topographic maps are usually represented by contour lines and trigonometric stations.

Contours are lines drawn on a map joining areas of the same height above sea level. When they appear close to each other, they represent a steep slope while those evenly spread represent a flat area.

Trigonometric stations on the other hand are given in areas that significantly rise above surrounding areas, mostly being mountains and hills. Some are given as small circles with a dot in the middle or an inverted triangle, with a dot in the centre. The altitude, or actual height above sea level, is usually given as a figure alongside the circle or triangle.

2. Major economic activities in most areas will include trade, transport, agriculture and fishing.

Evidence of each is as follows:

- i) Trade – Shopping centre or market
- ii) Transport – Road network, airstrip, railway line, harbour, marine port
- iii) Agriculture – Paddocks, crop plantations, cattle dips, agroforestry farms

3. A sketch map is much better than an ordinary map because:
 - It gives specific details that the map reader may require for a particular purpose.
 - It is easy to read and interpret as it contains specific details.
 - It does not require special skill to develop as long as the qualities of a good map are adhered to.
 - It is economical to develop as compared to an ordinary map that may need to be bought.

Unit 02

RELIEF IN AFRICA AND THE WORLD

Key Unit Competence

By the end of this unit, the learner should be able to analyse the impact of different relief features on climate and human activities in Africa and the world.

Prerequisite of this unit

In Senior One, learners studied about *Forms of Relief (Unit 5)*, with specific focus on what relief is, notion of slope, altitude and contours, forms of relief and the relationship between relief and human activities.

In Senior Two, learners were introduced to a more specific study of relief, by being taught the *Relief of Rwanda (Unit 6)*. In this unit, they explored the general presentation of Rwanda, the major forms of relief and the relationship between relief and human activities or land use in Rwanda.

In this unit, learners will be expected to learn more about relief, but on a wider scale – *Relief in Africa and the World*. Under this unit, learners are expected to learn more about the relief of Africa and the world. In addition, they are expected to explore the impact of relief features on the environment.

Cross-cutting issues to be addressed

The awareness of the varied environment in Africa and the impact that human activities have on it leads to the recognition that young people have to learn the importance of *environmental conservation and sustainability*. It will enable them to appreciate the concepts of the environment and how to care for it. We must bear in mind that when we conserve the environment around us, we conserve the resources that support our livelihood.

As you teach human activities in this unit, it will be possible to mention the issue of *financial education and awareness* as most human activities have financial implications.

Learning some of the concepts in the unit will involve practical activities and group work and interaction among learners. As you teach it, you are free to help learners to diversify their thinking and this will enable you to address the issue of *Inclusivity in learning processes*. As learners interact in practical class activities you may find it possible to deal with issues to do with *Peace and moral values* in the course of teaching this unit.

Generic competences

Generic competence	Explanation
Cooperation, interpersonal management	This will help the learners to cooperate as they work in groups and teams on different tasks and assignments. It will enable them learn to relate with one another as members of group which will eventually translate into cooperation in the communities where they come from and to create national unity and integration. <i>This competence will be acquired when learners will be tasked to work in groups or pairs to describe:</i> (a) <i>The size, position and population of Africa in relation to other continents.</i> (b) <i>The relationship between different forms of relief and human activities in Africa and other continents.</i>
Research skills	Learners are able to take initiative, and become resourceful in finding out answers to new concepts and phenomena they come across in life. It enables one to make sound judgement and get viable solutions. <i>Learners will develop this competence when conducting a research to find out the different forms of relief in Africa and other continents.</i>
Lifelong learning	This skill will help learners to cope with new knowledge and information acquired in life under new situations and environments. <i>This unit aims at helping the learners appreciate the beauty of the physical environment and importance of the various relief forms of the world. By so doing, they will develop life-long skills especially on how to cope or deal with the impact of human activities on relief features and climate of the world.</i>

Vocabulary and key words and concepts

Delta	This is a type of a river mouth where the river divides into two or more channels called distributaries as it enters the sea or lake.
Estuary	This is a type of a river mouth where a river becomes deep and wide as it drains into the sea or lake.
Coral reef	These are diverse underwater ecosystems held together by calcium carbonate structures secreted by corals .
Basin	This is a broad and shallow depression on the earth's surface.

Guidance on problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) Introduction to Africa: (How can we describe the location, area and population of Africa in comparison to other continents of the world?)
- (ii) What are the major relief forms of Africa, their location and description?
- (iii) What are the major relief forms of other continents? (Europe, America, Asia, Oceania)
- (iv) What is the impact of relief features on the environment?

Attention to learners with special needs

It is important to ensure that learners with special needs are provided with the appropriate learning resources so that they are not disadvantaged. Braille and recorded materials should be available for learners with visual impairment while for the hearing impaired learners there should be an interpreter as well as books with sign symbols. The physically challenged should be given special attention during lessons that require moving from one place to another.

List of lessons

Lesson 1	Introduction to Africa: (location, area, population in comparison to other continents of the world).
Lesson 2	Major relief forms of Africa: location and description
Lesson 3	Major relief forms of other continents (Europe, America, Asia, Oceania).
Lesson 4	Impact of relief features on environment

LESSON DEVELOPMENT

LESSON 1: INTRODUCTION TO AFRICA: (LOCATION, AREA, POPULATION IN COMPARISON TO OTHER CONTINENTS OF THE WORLD)

Learning objective

By the end of this section the learner should be able to describe the size, position and population of Africa in relation to other continents.

Introduction

In **Senior 1 unit 5**, learners learnt about the different forms of relief, while in **Senior 2 unit 6** they learnt about relief in Rwanda. Therefore, relief is not a new concept at this level and learners should be able to grasp the topic easily.

It is important that the information learnt in the earlier classes are linked to the one in this unit so that learners understand the relationship and link to what they are about to embark on. To be able to effectively teach about the location, area and population of Africa in comparison to other continents of the world, you will be expected to have resources including an atlas and maps of other all the continents. This will enable learners to identify the location of Africa and be able to compare the size by simply looking at the map of the world with all the continents. Then you will require statistics on area and population of the continents.

In handling this section ensure that you are able to help learners to identify key features on the map such as latitudinal positions of the north most, south most east most and west most parts of the continent. Also features such the water mass that separates Africa from the other continents.

Teaching and learning resources

- Recommended textbooks
- Pencils and rulers
- Atlas maps
- Sketch map of Africa

The following teaching methods are appropriate in teaching this section but any other appropriate method can be employed.

- Observation
- Discussion
- Question and answer

Learning activities

Identify suitable maps of the world that have comprehensive information on position and size of Africa. You will also need a map showing population of Africa as well as statistics on sizes of continents and population. For **Activity 2.1** in the learner's book, ensure that learners have atlases to be able to locate Africa and other continents for comparison. Assist them to come up with correct answers to the questions. Use the Internet and other sources to find out and assist the learners as they respond to **Activity 2.2** in the learner's book on the population of the continent. You should specifically check the distribution of the population so that you will be able to relate with the relief of the continent. Ensure you have a sketch map of Africa with key features like the latitudes, longitudes and names of the four cape areas that mark the extreme points of the continent. This will be drawn in the learners' notebooks.

Prepare questions to guide class discussion and ensure you have notes on the section. Ensure you have worked out the answers to the activities in the section.

Introduce the lesson by asking questions that will enable the learners to link the new topic with what they had learnt in Senior 1 and 2. Use question and answer method to introduce class discussion and ensure that all learners are actively involved. Ensure that slow learners are fully involved.

Synthesis

Referring to **Activities 2.1 and 2.1** in the Learner's Book ensure that the intended objective for this section is achieved. Allow the learners to work on the activities then ask them to discuss the answers during the lesson. This will enable you gauge their level of understanding of the section and whether they have acquired the intended **competences** which includes **reading the maps and identifying features, drawing sketch maps reading and comparing statistics of the continents population and taking notes**

Assessment

As you take learners through the lesson, you must apply formative assessment to ensure that each part is understood before you move to the next. It is important that learners have atlases as the work on **activities 2.1, 2.3 and 2.4**. Ensure the learners have completed working on all the activities and the answers have been discussed. Guide the learners and keep checking the progress of their work.

LESSON 2: MAJOR RELIEF FORMS OF AFRICA: LOCATION AND DESCRIPTION

Learning Objective

By the end of this section, the learner should be able to describe the different forms of relief in Africa and other continents.

Introduction

It is important to ensure that you link the information in this section with that in section 1 which shows the relief of the continent.

Africa has varied relief with high mountains of volcanic origin, the Great Rift Valley plateaus and water features. Descriptions of these features will not only involve where they are located but also how they were formed.

You will have to help learners to identify, name and locate key relief features on the map of Africa such as the high mountains, the lakes the rift valley and the plateaus and for each they can describe the formation. They should also be able to name and locate the oceans and seas that surround the continent.

Teaching aids

- Recommended textbooks
- Atlas maps
- Relief map of Africa
- Diagrams of different features
- Pencils and rulers

For the teaching resources to be effectively employed, learners should be actively involved in the following activities.

- Reading the maps
- Identifying features
- Drawing sketch maps and diagrams
- Taking notes

Learning activities

Identify a suitable map of Africa that has comprehensive information on relief features. This is the type of map the learners will need to work on **Activity 2.3** in the learner's book. You should specifically draw a sketch map showing the distribution of features such as mountains, plateaus and the rift valley as you research on their formation. This will be drawn in the learners' notebooks. Divide the class into groups and allocate the

groups' different features as indicated on **Activity 2.4** in the Learner's Book. Let each group research on their location and formation.

Prepare questions to guide class discussion and ensure you have notes on the section. You will also need to work out the answers to the activities in the section so that you guide the learners in discussion.

Synthesis

As you appoint groups, ensure learners of all abilities are represented. Let the groups work on **Activities 2.4 to 2.7** in the Learner's Book. Use question and answer method to introduce class discussion and ensure that all learners are actively involved.

You could employ the following teaching methods to make learning more learner centred.

- Observation
- Discussion
- Question and answer

Assessment

Ensure the learners have completed their answers to all the activities and drawing of diagrams and have made group presentations and these have been discussed. This will enable you identify the areas where learners need more of your assistance.

LESSON 3: MAJOR RELIEF FORMS OF OTHER CONTINENTS (EUROPE, AMERICA, ASIA, OCEANIA)

Learning objective

By the end of this section, the learner should be able to describe the major relief forms of other continents.

Introduction

This section will involve studying the distribution of various features in all the other continents. Each continent has varied relief such as high mountains, rivers valleys, basins, plateaus and water. For each continent you will require a relief map so that you are able to identify the features and note their distribution. As you study each continent you should note any similarities and differences in the features found.

Teaching aids

- Recommended text books
- Relief maps of different continents
- Photographs of features such as mountains

For these teaching aids to be relevant during the lesson, you have to ensure that learners are involved in:

- Discussion
- Question and answer
- Drawing
- Photograph reading.

Learning activities

Introduce the lesson by using question and answer method to establish how much the learners remember what they learnt last.

Use a suitable map of each continent that has comprehensive information on relief features. You should outline the features for each continent for ease when comparing the different continents. Learners will require your assistance as they work on **Activities 2.8 to 2.10** in the Learner's Book where they are working individually. You could divide the class into groups and allocate the groups different continent, to research on their features if you find it necessary.

Prepare notes and questions to guide class discussion. You will also need to work out the answers to the activities in the section so that you guide the learners in discussion as they present their findings.

Synthesis

Use question and answer method to introduce class discussion and ensure all learners are actively involved. As you appoint groups, ensure learners of all abilities are represented.

The following teaching methods would enrich the teaching and learning process:

- Observation
- Discussion
- Question and answer

Assessment

This involves evaluating the effectiveness of the teaching and learning process. You have to apply formative assessment as the learning progresses. The effectiveness is evident if the learners have grasped the concept involved. Ensure the learners have completed their group work and answers to the activities for presentation and discussion. Check what they have come up with before they make their presentations. Before you move to the next section, you should be satisfied that the intended competence has been achieved.

LESSON 4: IMPACT OF RELIEF FEATURES ON ENVIRONMENT

Learning objective

By the end of this section, the learner should be able to describe the relationship between different forms of relief and human activities in Africa.

Introduction

This section will involve studying the effect of relief features on human activities. This is not new to the learners as they had come across **relationship between relief and human activities** in **Senior 2 unit 6**. Some relief features have negative effect on how the land is utilised while others have positive effects that attract human activities. The following are some of the examples: Alluvial plains are suitable for farming because of the fertile soils deposited by rivers when they flood. Plateaus are suitable for mechanised farming because of the leveled nature of the land. Gentler slopes of volcanic mountains are also suitable farming lands because of their fertile volcanic soils. Mountains, wide valleys and escarpments are a barrier to construction of transport infrastructure. They can also be an obstacle to air transport. A large variety of relief features form beautiful scenery for tourists to visit. These bring the much needed foreign exchange into the country they visit. Tourists also engage in other activities such as mountain climbing and skiing on the snow-covered slopes.

As you teach this section ensure you use local examples which the learners can easily identify. Remember also to give examples from the wider African continent so that learners are able to apply what they are familiar with to Africa.

Learning activities

Identify suitable maps of a country where relationship between relief and human activities is easily notable. Prepare comprehensive notes on the expectations of the section. Prepare questions based on the situations in Rwanda to guide class discussion on the impact each type of relief has on human activities.

Divide the class into groups and let them work on **Activity 2.11** in the learner's book. You will also need to work out the answers to the activity in the section so that you guide the learners in discussion as they present their findings. Parts of the activities can be given as assignment to ensure all the parts are answered. Ensure the learners are also involved in class activities including:

- Reading the maps and identifying features and human activities
- Discussing
- Asking and answering questions
- Taking notes

Teaching aids

For effective teaching and learning, use appropriate teaching resources such as:

- Recommended textbooks
- Maps showing different human activities side by side with maps of relief map for comparison.

Alongside the teaching aids suggested you need to apply the following teaching methods among any other that may make teaching effective:

- Observation
- Discussion
- Question and answer

Synthesis

Use question and answer method to introduce class discussion and ensure all learners are actively involved. This will enable you to assess the level of understanding to ensure that the learners have acquired the intended competences. Ensure you identify the areas that may require remedial teaching.

Give assignments based on some of the activities and ensure that the learners have completed their answers in time for presentation and discussion.

END OF UNIT

Summary of the Unit

In this unit, learners are expected to locate Africa as one of the continents of the world noting its location in relation to the other continents of the world. They then learn about the distribution of population in Africa also comparing it to the other continents. The unit also requires identification of the major relief regions of Africa. As learners study Africa, they are expected to examine the other continents to identify their relief and this should enable them note how similar or different these are in the various continents. Lastly, the unit has a section on the impact of relief to the environment. This entails how relief influences mainly human activities such as farming and settlement.

Additional information

This unit is linked to **unit 5 in senior 1** and **unit 6 in Senior 2**. Learners are expected to realise that the relief features and landforms they learnt about in Senior I and 2 are not unique to Rwanda but are replicated in Africa and in the rest of the world. For instance, the rift valley in Rwanda is an extension of a much larger system that is found in other parts of the continent. In addition, there is also a rift valley system in Europe although much smaller than the African system. Mountains, plains, coastal features and plateaus exist in all the continents. Thus it is expected that comparison is between the continents to establish what is similar or different.

The learner's book has some activities where group work is specified. For instance, **Activities 2.4, 2.8 and 2.9**. These are only guidelines. It is important to assess the learning process to establish whether learners are better off working in groups or not. The teacher is free to adjust on the activities and if there are other areas where an activity could be appropriate the teacher can go ahead and introduce one.

End unit assessment

1. Africa occupies a central position among the continents. Explain this statement using examples.
2. Draw a sketch map of Africa and on it mark and label:
 - (a) The fold mountains
 - (b) Lake Victoria
 - (c) The great rift valley
3. Identify two lava plateaus in Africa and one in Asia.
4.
 - (a) Explain six positive impacts of relief, two on the physical and four on human environment.
 - (b) Suggest three negative impacts of relief on the environment.

Answers to end unit assessment

1. To the east of Africa is Australia, to the North East is Asia, and to the North is Europe while to the West are the Americas.
2. Use the map provided for **Activity 2.3** for the features.
3.
 - (a) East African Plateau
 - (b) Nyika Plateau (in Malawi and Zambia)
 - (c) Kwahu Plateau (in southern Ghana)
 - (d) Ouatchi Plateau in south central Togo
4. a) Impacts of relief on human environment

Promotes agriculture. People carry out agriculture on plains, plateau, slopes of hills and valleys. Some of these places have fertile soils good for crop cultivation.

Promote tourism: Physical features like mountains and lakes attract tourists. Many foreign and domestic tourists visit our physical features for pleasure.

Influences climate: Lakes and rivers release moisture into the atmosphere through evaporation. This moisture leads to formation of clouds which bring rainfall. The type of rainfall is called convectional rainfall. Hills, highlands and mountains lead to formation of relief rainfall. It is also known as orographic rainfall.

Source of water: Lakes, rivers and swamps provide us with water. We use water at home and in industries. We also use water to irrigate our crops.

Sources of fish: Lakes, rivers and swamps provide us with fish. People catch fish from these water bodies. Most people eat fish. It is a rich source of protein.

Supply of hydro-electric power: Rivers provide water that we use to generate hydro electricity. We use hydro electricity for lighting, cooking and in factories.

Facilitates means of transport: We use boats, canoes, ferries and ships to travel through lakes and rivers.

Provides raw material: We get fish from lakes and rivers. Fish is a raw material in fish processing industries.

Acts as boundaries: Some physical features are located at border points

between countries. We use them to tell where each of the neighbouring countries ends. Mt Karisimbi is on the border between Rwanda and The Democratic Republic of Congo.

Filters water and prevents flooding: Swamps help us remove harmful substances from water. We call this filtering water. They also absorb water. This helps prevent flooding in the area.

Provides materials for making crafts: We get reeds, papyrus and clay from swamps. We use them to make different items such as baskets, mats and pots.

Provides materials for construction: We get stones from rocks on hills and mountains. This is what we call stone quarrying. We get sand from the banks of shores of lakes and banks of rivers. We also get sand from swamps. We use stones and sand to build houses.

Provides land for settlement: The plains, plateaus, slopes of hills and mountains are good areas for settlement.

- b) i) Steep slopes are susceptible to land and mud slides especially those whose vegetation has been cleared.
ii) Valleys with rivers are prone to flooding in the event of heavy rains.
iii) High mountains may be too cold for human settlement.
iv) Extensive plateaus may be infested with insects such as tsetse flies making human and animal habitation difficult.
v) Steep slopes sometimes experience erosion making crop farming difficult.

Remedial activities for slow learners

1. Name six major landforms in Africa.
2. Which regions in Africa have the highest plateaus?
3. Name four countries through which the great rift valley passes.

Answers to the remedial activities

1. Six major landforms in Africa.
 - Coastal plains
 - High plateau lands
 - Mountains
 - Low plateau lands
 - Basins
 - The rift valley
2. Eastern and Southern Africa
3. Ethiopia, Kenya, Malawi, Mozambique

Extended activities for gifted and talented learners

1. Name the mountain chains in North and South America and explain their position in each continent.
2. Why is it that the Eastern part of Africa has the highest highlands on the continent?
3. Find out the continents where you will find the Deccan and Tibetan plateaus?

Answers to extended activities

1. The Rocky Mountains in North America and the Andes in South America. Both systems are found in the western parts of the two continents.
2. Eastern Africa experienced volcanic eruptions and uplifting resulting into formation of high mountains and highlands unlike the other parts of the continent.
3. Asia

Unit 03

SOILS IN AFRICA AND THE WORLD

Key Unit Competence

By the end of this unit, the learner should be able to investigate the major types of soils in Africa and the world.

Prerequisite of this unit

Unit 7 of **Senior One** introduced the study of **Soil** to the learners. They started by defining soil, then exploring the various soil formation processes. They also learnt about the various factors that influence soil formation, soil properties, soil structure, types of soils and importance of soils/the relation between soil types and human activities.

Unit 8 of **Senior Two** provided a specific study on **Soils in Rwanda**. Using their familiar environments and Rwanda in general, they learnt about the various types of soils in Rwanda, their characteristics and importance in relation to human activities. They also studied about soil erosion and impoverishment, their causes, effects and conservation methods.

In this unit, learners will study **Soils in Africa and the World**. Specific areas of study will be on the major types of soils in Africa, factors for soil formation in Africa and major types of soils in other continents.

Cross-cutting issues

Soil is an important natural resource that must be carefully managed to sustain its usefulness. As you teach this unit, you must emphasise on the need for *environmental sustainability* because to sustain life on earth we need soils that can support plant growth. We cannot avoid to keep in mind that failure to care for soils has led to desert expansion, poverty and famine in various parts of the world.

Financial education is yet another cross cutting issue that is closely linked to the study of soil. As indicated earlier, misuse of soil could lead to poverty. This is because if soil is misused, crop yields go down, farmers have little or no food and income. For farmers to have sound financial strength they must have sufficient farm produce for sale.

Generic competences

In this unit, it is expected that you will be able to achieve one or a combination of the following generic competences:

Critical thinking and problem solving	The learner should become innovative to be able to find solutions for challenges encountered in life. <i>They will acquire this competence when explaining the main factors influencing soil formation in Africa.</i>
Creativity and innovation	Ability for the learners to take initiative and use imagination beyond knowledge provided in the classroom to generate new ideas and construct new concepts. <i>This competence will be developed when learners suggest creative ways that can be used to control soil erosion and degradation. You can also identify an area near the school where their skills can be put to practical use.</i>
Research skills	To enable learners to find answers by gathering information from documents and surrounding environment and use these to explain phenomena. <i>This competence will be developed when learners carry out a research on the location of the major soil types of Africa. They will also be required to research on the various types of soils in other continents and compare them to those in Africa.</i>
Lifelong skills	Skills that would help learners to update knowledge and be able to cope with emerging situations for personal fulfilment. <i>Soils are an important component in peoples lives. Help learners understand this by teaching them how they can engage in various economic activities that directly depend on soil. this may include Agriculture and mining.</i>

Vocabulary, key words and concepts

Leaching	Soluble mineral salts that are near the surface are carried by rain water seeping into the ground and moved to the lower layers of soil leaving the top soil as a hard layer.
Illuviation	Minerals in the lower layers of the soil move up towards the top soil as a result of evaporation.
Organic sorting	This is when the living organisms in the soil sort out soil materials into different particle sizes.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the major types of soils in Africa?
- (ii) What are the factors for soil formation in Africa?
- (iii) What are the major types of soils in other continents? (Europe, North America, South America, Asia, Oceania)

Attention to learners with special needs

It is important to ensure that learners with special needs are provided with the appropriate learning resources so that they are not disadvantaged. Those with low vision should sit close to the chalk board so that they are able to read writings on the board.

Braille and recorded materials should be available for learners with visual impairment while for the hearing impaired learners there should be an interpreter as well as books with sign symbols. When conducting outdoor learning activities, the physically challenged should be given special attention to ensure they are comfortable and are able to participate.

List of lessons

Lesson 1	Major types of soils in Africa.
Lesson 2	Factors for soil formation in Africa
Lesson 3	Major types of Soils in other continents (Europe, North America, South America, Asia, Oceania)

LESSON DEVELOPMENT

LESSON 1: MAJOR TYPES OF SOILS IN AFRICA

Learning objective

By the end of this section, the learner should be able to outline and locate different soil types of Africa.

Introduction

The topic on soil is not new to learners in Senior 3 because in Senior 1 they were introduced to the topic in **Unit 7 of senior 1** learner's book and in Senior 2 they again came across it in **Unit 8 of senior 2** learner's book. It is necessary therefore to link the knowledge acquired earlier with what is to be learnt at this level.

This unit requires that you are fully conversant with the different types of soils in different parts of Africa and their characteristics. Africa is a vast continent. For it to be divided into soil zones means there is extreme generalisation as soils can vary within very short distances. It would be impossible to interpret the map if each and every locality with unique soils were to be mapped. For instance, the whole of Southern West Africa, Central Africa, Rwanda, Central Tanzania, Parts of Angola and Eastern parts of The Democratic Republic of Congo is under the Latosols/Lateritic soils zone. Thus information on the type of soils on steep slopes, valleys and volcanic highlands is obscured because we are dealing with a very large area.

Some of the major types of soils found in Africa include:

1. *Latosols or Lateritic soils* – These soils are found within the tropics. They are found in areas that have humid conditions as a result of heavy rainfall and high evaporation. They are found in Southern West Africa, Central Africa, Rwanda, Central Tanzania, parts of Angola and Eastern parts of Democratic Republic of Congo. The vegetation found here is mainly tropical rainforests that are evergreen.
2. *Ferrallitic soils* - They are red soils of Tropical rain forested areas. These soils are highly leached. They are mainly found within the Congo basin and Eastern parts of Madagascar.
3. *Regosols* – These are desert soils that are made up of rock debris and sand. In Semi-arid regions such as the areas between Sahara desert and the Sahel region and Kalahari semi desert have **brown soils**. The soils are mainly of sand texture and contain much salt because of the absence of leaching. The vegetation here is very scarce.
4. *Ferruginous soils* are found within the savannah regions within the tropics. They are rich in iron. The type of vegetation found here is Savanna grassland.
5. *Vertisols* are also known as tropical block soils. They are mainly found in Sahel savannah region, Western Ethiopia, Chad basin, Southern part of Lake Victoria in Tanzania and part of Kenyan Coast. They are sticky when wet and crack when dry. These areas have Savanna grasses.
6. *Fluvisol* also known as alluvial soils are found along river valleys or basins and at the mouth of some rivers that have a delta. They are as a result of deposition of silt along the river profile. Found along main rivers of Africa.
7. *Volcanic soils* - These are very recent and young soils found in areas that have experienced volcanicity activity in Africa. They are rich in plant nutrient. They are sometimes referred to as **andosols** which means soils derived from volcanic deposits.
8. *Mountain soils* - They are also referred to as scree soils. They are deep at the foot of the mountain and they thin up towards the top of the mountain. These soils are formed as a result of both physical and chemical weathering on the rocks. Depending on the location of the mountain, the soils may be leached. The vegetation varies from the foot of the mountain which is tropical forests and grasses to top of the mountain which is heath and mosses.

NOTE: Compare information with that provided in S1 Agriculture, Unit 2.

Teaching aids

For effective delivery of the lesson you should ensure you have the following and any other appropriate resources:

- Recommended text books
- Pencils and rulers
- Atlases
- Soil map of Africa
- Internet

In addition to the teaching resources, effectiveness of the lesson is attained only when appropriate teaching methods are applied. These include:

- Observation
- Discussion
- Question and answer

Learning activities

Ensure you are well acquainted with the map of Africa showing the soil zones. For each zone you need to learn the soil characteristics so that you are familiar with the differences between one soil type and another. It is important to draw a sketch map (**See fig. 3.1 in the Learner's Book**) simplified for the learners to be able to follow.

Prepare comprehensive notes and guiding questions based on what the learners know to enable logical flow of the lesson. Organise the class into groups to work on **activity 3.1** in the Learner's Book. You also must prepare possible answers to the activity so that you are able to guide class discussions.

Involve the learners in activities such as:

- Reading and interpreting information on maps
- Asking and answering questions
- Discussing
- Taking notes

Synthesis

When teaching about different soil types you need samples of what is available locally. Therefore you have to have collected and labelled the various samples of soils for this lesson. Ensure that all learners are actively involved in sample analysis to identify the differences in the soil samples.

Use question and answer method to introduce a class discussion as you take the learners through the map. Ensure that slow learners are fully involved as well.

Assessment

Ask the learners to copy the map of Africa on soil types and carry out research on each zone. Assess the participation of the learners in the group activities and throughout the lesson to identify those who may require remedial teaching.

LESSON 2: FACTORS FOR SOIL FORMATION IN AFRICA

Learning objective

By the end of this section, the learner should be able to explain the factors that influence soil formation in different parts of Africa.

Introduction

Briefly review the previous section to find out whether learners were able to comprehend the information on soil zones in Africa. It is important that as you take the learners through the factors that influence soil formation in Africa, you use local. For instance you could use the hill sides and valleys in Rwanda to demonstrate the influence of relief on soil formation. This will make the understanding of the factors easier as learners discuss what they are familiar with. The factors should include climate, topography, parent rock, living organisms and time.

Weathering: This is where soil is formed as a result of weathering of rocks through physical, chemical and biological weathering where the rocks break down into loose particles that form **soil**. As the process of weathering continues the soil depth increases and more minerals are released into the soil.

Organic accumulation: This occurs when tissues of dead plants and animals are broken down by soil micro-organisms (bacteria) to produce simple organic substances known as **humus** that forms part of the soil.

Leaching: This is common in areas of high rainfall and low evaporation. Minerals near the surface are moved far deep into the soil. These minerals form another layer of '**Soil**' known as **hard pan** or **hard layer**.

Eluviation: This is where soluble materials (minerals) are moved downward by water at a lower level of the soil profile.

Illuviation: This occurs in areas where rainfall is lower than the rate of evaporation. This leads to redeposition of the soil minerals from the lower horizon of the soil profile.

Organic sorting: This is whereby organisms in the soil such as earthworms are able to sort out materials into different particle sizes and re-organise matter and minerals into horizons (layers).

Topography: Topography especially relief features determines the rate of weathering of the parent rock. Some slopes are exposed to the sun and rainfall and vice versa. The lee ward side may have more of physical weathering and the windward side may have more of chemical weathering. In such type of topography the speed at which the weathered material move down the slope will depend on the steepness of the slope. This may lead to mass wasting.

If time allows, you could visit a local area to apply the knowledge learned to real soil type. Remember learners are able to retain knowledge gained through practical work for a long time.

Teaching and learning aids

Ensure you have availed the following resources among any other that you may find suitable for the lesson.

- Recommended text books
- Other relevant resources
- Soil map of Africa
- Internet and atlases

Learning activities

You will need to organize the class into groups to work on **Activity 3.2** in the **Learner's**. You will also need to organise them in pairs for **Activity 3.3**. In addition, learners should be actively involved in the following learning activities:

- Discussing in groups
- Observing the local environment
- Asking and answering
- Taking notes

You may apply the following teaching methods for effective teaching:

- Observation
- Discussion
- Question and answer

Synthesis

You could consider analysing the local soils for learners to identify the factors that lead to formation of soil practically. Prepare comprehensive notes on each of the factors and where applicable indicate local examples. Prepare questions to guide the flow of the lesson.

Assessment

Assessment should be a continuous process throughout the lesson. You may use question and answer method to assess the understanding of the learners so that you would repeat a section if the learners are having difficulties understanding a concept. Ask the learners to copy Fig. 3.2 in the **Learner's Book**, on the interrelationship of the factors that influence soil formation. In addition, assess the participation of the learners in the group activities and throughout the lesson to identify those who may require remedial teaching.

Learners should work on the activities in the section as assignment. They should also complete the group work for presentation and class discussion.

LESSON 3: MAJOR TYPES OF SOILS IN OTHER CONTINENTS (EUROPE, NORTH AMERICA, SOUTH AMERICA, ASIA, OCEANIA)

Learning objective

By the end of this section, the learner should be able to identify the relationship that exists between soil types in Africa and those of other continents.

Introduction

Africa extends 37° north of the Equator and 35° south of the equator. The continent therefore lies within the tropics and subtropical climates. This means that the soils found in Africa are formed under the influence of tropical and subtropical climates. Other continents that are within the same latitude as Africa therefore have soils with similar or near similar characteristics where the dominant formation factor is climate. That means that the soils found in Africa also occur in some parts of other continents. Desert soils, volcanic soils, Mountain soils and alluvial soils are found both in Africa and other continents.

However, other continents like Europe, parts of America and Asia which experience temperate and cold climates have soils that are different from the ones found in Africa. The vegetation is different and the rate of decomposition of organic matter is slow because the climate has long cold seasons. Soils such as Tundra, Podzols, and Chestnut, Chernozems, and Prairies soils are found in areas that experience long cold climates. For for instance, Tundra soil is found in the Polar Regions. The map of the world that is given in the learner's book shows the distribution of soils in other continents.

When teaching this section, it is important to study the map of soils thoroughly and find out the dominant factors in the formation of different soils.

Teaching aids

- Recommended text books
- Map of other continents showing soil types
- Pencils and rulers
- Atlases

The teaching resources would be very useful if used alongside the following teaching methods:

- Observation
- Discussion
- Question and answer

Learning activities

You will notice that the content of this lesson has a lot of application of knowledge learnt about soil in Africa as you take the learners through the other continents. **Activities 3.4 and 3.5 on pages 36 of the Learner's Book** requires application of knowledge. Learners require guidance as they work on these activities. Make a comparison of the soils found in Africa and those in other parts of the world. You could draw a table to illustrate the similarities and differences.

Draw a sketch map of the continents as in the learner's book for use as you discuss the soil types.

Prepare comprehensive notes on each of the soil type to bring out the differences among them. Prepare guiding questions based on what the learners know to enable logical flow from known to unknown. You also must prepare possible answers to the activities in the section so that you are able to guide class discussions.

Synthesis

Use of the atlas maps and any other map that shows soils in the other continents will be very useful for the learners to grasp the concepts. In addition, you need to have a soil map of Africa all the time for comparison.

Use question and answer method to introduce class discussions on soil map interpretation and ensure that all learners are actively involved. Ensure that slow learners are fully involved.

Learners should be involved in reading and interpreting information on soil types in the maps, drawing maps, asking and answering questions, taking notes.

Assessment

Activity 3.6 in the Learners Book will enable you assess learners, ability to apply what they have learnt. In addition, you will ask them to work on the end of unit assessment questions in the learners Book which summarises the unit. Learners should draw the map showing soils in other continents and research further on these soils. Learners should also work out answers to the activities in the section for discussion.

END OF UNIT

Summary of the unit

This unit covers the types of soil found in Africa and those found in other continents. It is important to note that soils in Africa vary from place to place depending on the dominant factor influencing formation of soil in any particular area.

It is intended that learners not only cover soil types but also the general factors that influence soil formation. These factors are general in that they apply to any type of soil regardless of the location. It is noted that the factors are interdependent. None of them can operate on its own. The last part of the unit covers types of soils found in other parts of the world. Learners are expected to note the similarities and differences between these soils and those found in Africa. They should also note the reasons why soils differ from place to place.

Additional information

Some of the major types of soils found in Africa include:

1. *Latosols or Lateritic soils* – These soils are found within the tropics. They are found in areas that have humid conditions as a result of heavy rainfall and high evaporation. They are found in Southern West Africa, Central Africa, Rwanda, Central Tanzania, parts of Angola and Eastern parts of The Democratic Republic of Congo. The vegetation found here is mainly tropical rainforests that are evergreen.
2. *Ferrallitic soils* - They are red soils of Tropical rain forested areas. These soils are highly leached. They are mainly found within the Congo basin and Eastern parts of Madagascar.
3. *Regosols* – These are desert soils that are made up of rock debris and sand. In Semi-arid regions such as the areas between Sahara desert and the Sahel region and Kalahari semi desert have **brown soils**. The soils are mainly of sand texture and contain much salt because of the absence of leaching. The vegetation here is very scarce.
4. *Ferruginous soils* are found within the savannah regions within the tropics. They are rich in iron. The type of vegetation found here is Savanna grassland.
5. *Vertisols* are also known as **tropical block soils**. They are mainly found in Sahel savannah region, Western Ethiopia, Chad basin, Southern part of Lake Victoria in Tanzania and part of Kenyan Coast. They are sticky when wet and crack when dry. These areas have Savanna grasses.
6. *Fluvisol* also known as alluvial soils are found along river valleys or basins and at the mouth of some rivers that have a delta. They are as a result of deposition of silt along the river profile. They are found along main rivers of Africa.
7. *Volcanic soils* - These are very recent and young soils found in areas that have experienced volcanicity activity in Africa. They are rich in plant nutrient. They are sometimes referred to as **andosols** which means soils derived from volcanic deposits.
8. *Mountain soils* - They are also referred to as scree soils. They are deep at the foot of the mountain and they thin up towards the top of the mountain. These soils are formed as a result of both physical and chemical weathering on the rocks. Depending on the location of the mountain, the soils may be leached. The vegetation vary from the foot of the mountain which is tropical forests and grasses to heath and mosses.

Soils found in other continents include the following:

1. **Tundra soils:** These are soils that are found at the pola regions. They are referred to as soils of the cold zones where Polar Tundra climate is found. The type of vegetation found here are mosses, lichens and shrubs heath.
2. **Podzols:** These include Peat soils and grey-brown podzolic soils. They are found in areas that experience very cold winters and short mild summers. Vegetation found here is coniferous forests and broad leafed deciduous forests to the immediate south of Tundra regions.
3. **Chestnut soils (clay loams):** Found in areas that experience tropical hot steppe and mid-latitude steppe climate. Vegetation experienced here is short grasses and shrub.

4. **Chernozems soil:** Are found in warm temperature continental climate – hot summers and cold winters. These areas have tall grasses that grow throughout the year.
5. **Prairie soils:** Found in areas that experience humid continental climate which are cold to warm winter and warm to hot summers. The area is covered by tall grasses.
6. **Desert soils:** Are also known as **Aridisols**. They are found in areas that experience desert type climate that experience desert type of climate that are either hot and dry or cold climates. In hot desert evaporation is very high. Leading to high evaporation leaving the soil saline. Plants that survive here are dwarf acacia and sparse grasses.
7. **Latosols:** These soils include Ferrisols or lateritic and Ferruginous soils or Ultisols. They are found in areas that experience savanna type of climate. Where there is marked summers and winter seasons. These areas have plenty of grasses and scattered trees.
8. **Ferralitic soils** are also known as Oxisols are found within the equatorial climates of the world. The vegetation found here is the evergreen tropical rain forest.
9. **Vertisol:** They are also known as black cotton soils (clay) found in areas that experience wet and dry season. Much of the vegetation is Savanna grasses.
10. **Volcanic soil:** They are derived from the ash and lava deposits found in areas that receive heavy rainfall and areas that experienced volcanic activities. They are recently formed.
11. **Mountain soils:** They are sometimes referred to as Scree soils. They are deep at the foot of the hill or mountain and thin at the top. They are as a result of physical and chemical weathering in hilly areas.

End unit assessment

1. Explain the main factor that leads to the formation of latosols.
2. Describe the distribution of chernozems in Asia and South America.
3. Analyse the similarities of the soils found within the tropics.
4. Explain why we should conserve our soil.

Answers to the end of unit assessment

1. Factor that leads to the formation of latosols.

- Rapid breakdown of organic material due to the very hot and very wet climate causing low humus content.
- Intense leaching, leading to iron and aluminium compounds to remain within the soil thus giving it a red colour.
- Fast and rapid decomposition makes the nutrient cycle short.
- It has a deep soil profile, with Horizon B being the deepest due to intense leaching. Horizon A experiences rapid decomposition.
- The soil forms when the top loose soil is eroded, exposing iron and aluminium layers. The exposed layers are then baked into a hard brick-like surface which cannot be cultivated.

2. Distribution of chernozems in Asia and South America

Chernozem soils are important in the United States and Canada, where they form a north-south belt starting in Alberta and Saskatchewan and running through the Great Plains of the United States to central Texas. A similar area lies in Argentina. Other areas are mapped in Australia and Manchuria.

Climate has long been thought to be a determining factor in the development of chernozem soils. Comparison of soil and climate maps shows that the middle-latitude chernozems, in the Americas and Europe, lie on the more arid western side of the humid continental climates and with decreasing latitude extend over into the middle-latitude steppe climates. Aridity is therefore a definite contributing cause. The continental location of chernozem areas makes for hot summers and cold winters. Drought periods with strong evaporation dry out the soil, and forests cannot exist. Instead, grasses, which can withstand drought readily and which are tolerant to soils with excesses of mineral salts, flourish on chernozem soils. Steppe grasslands and prairies are the natural vegetation of the middle-latitude chernozem soils.

Where forests invade the chernozem soil grasslands, some influence of podzolization is felt and there develops a faint A horizon. Such soils are known as degraded chernozem soils. They are transitional to the gray-brown podzolic soils and occupy a geographical position adjacent to them. One particularly large region of degraded chernozem soils lies northwest of the Black Sea and extends from the Danube River of Romania to southern Ukraine.

3. Similarities of the soils found within the tropics

In many tropical regions, the bedrock is very old and weathered, and, consequently, depleted in minerals and nutrients. Mineral release is also inhibited by the acidic nature of many tropical soils. The soil types derived from the bedrock underlying tropical forests are mainly soils called oxisols and ultisols. Oxisols have a high aluminum and iron oxide content and low silica content. Ultisols are highly-weathered, acidic soils and are less frequently found than oxisols. These two types of soils, generally of low fertility, comprise about 43% of the soils under tropical rainforests. Another 40% consists of variably fertile soils, some of which are suitable for agriculture, but many of which have low pH, poor physical structure, low phosphorus and other nutrient deficiencies, or high salt or aluminum levels.

Many tropical soils are acidic and depleted in weatherable minerals such as calcium, potassium and magnesium, essential for plants. Many lowland forests are limited by a lack of phosphorus, or sometimes calcium and magnesium; others, on spodosols (periodically-flooded sands) seem to be limited by low nitrogen levels.

Many essential elements such as calcium and potassium are easily leached out by the heavy tropical rainfall, further reducing soil nutrient levels. There are few nutrients more than 5cm (2 inches) below the surface of the soil in tropical rainforests.

Since many tropical soils are already heavily weathered, they are highly vulnerable to nutrient loss and this is why many tropical soils are difficult arenas for the establishment of agriculture. Only about 20% of tropical soils are suitable for conventional agriculture, and

many of these are found in alluvial plains and volcanic highlands. The organic materials contained in the nutrient-rich food crops are removed from the fields, not recycled as in a forest, and so are lost to the soil. Only the “refuse” or nonconsumable parts of the plants remain after harvesting to be decomposed and return to the soil as nutrients.

4. Why we should conserve our soil

Soil conservation is important because soil is crucial for many aspects of human life as it provides food, filters air and water and helps to decompose biological waste into nutrients for new plant life. Soil can be drained away or contaminated, destroying it for use.

Soil is the foundation of plant life. A tree will not be a tree without soil. While there are some plants that can live in water or air, most plants need to be rooted to the ground. It is the soil that provides nutrition to this plant life. It is through this vegetation that nourishes the humankind and the animal kingdom. Plants are important resources of food and fuel and of wood and other by-products that make other life functions possible.

Soil additionally supports the animal kingdom. Our agriculture also relies on soil, for its location and for other functions to be derived from its existence. It will be almost impossible to support the animal and human life without land. Biodiversity relies on soil at all times.

Soil is necessary for water supply. Soil and water co-exist. So do we and soil co-exist. Taking good care of our soil equates to taking care of our water supply.

Remedial activities (for slow learners)

1. Why is it that large areas in eastern Africa have volcanic soils?
2. Which are the dominant soils in the Sahara?
3. Name the five factors that influence soil formation.

Answers to the remedial activities

1. The areas have experienced large scale volcanic activities.
2. Desert soils
3. Parent rock, living organisms, climate, topography and time.

Extended activities (for gifted and talented learners)

1. Draw a map of Africa showing the distribution of desert soils.
2. Explain how each of the following factors influences soil formation.
 - (a) Parent Rock
 - (b) Living organisms
 - (c) Time

Answers to the extended activities

1. Expected response

Map of Africa showing Sahara, Kalahari and Namib deserts.

Africa, which is the second largest continent in the world, is also home to the largest desert in the world - the **Sahara**. In fact, there are three deserts on the continent - The **Sahara**, the **Namib** and the **Kalahari**. Together these three amazingly vast and diverse landmasses cover a large portion of Africa.

NOTE: The map learners will draw should indicate these three major desert areas.

2. Factors influencing soil formation

Parent rock: This is the origin of most of the soils. This is the underlying rock which is weathered to form soil. The weathered material influences the chemical and physical composition of the soil. It also determines the soil depth, drainage, texture, colour and the amount of nutrient. Most of the weathered parent rocks have big particles (coarse texture) that form sand stone that gives rise to sand soil that has a large amount of iron and magnesium. Basalt rock weather to give rise to fine texture soils. Weathering of the rocks is fast in areas within the tropics where temperatures and rainfall are high.

Living organisms: The main organisms that influence soil formation include plants, animals, bacteria and fungus. Through decay and decomposition of plants, organisms such as earthworms, termites, rodents assist in the mixing of inorganic matter (minerals) and organic matter (humus).

Human activities in a region helps to accelerate soil formation through breaking down the parent rock as well as tilling the land.

Time: Time is very important in soil formation. The time required for any soil to be formed will depend on all the other factors such as softness of the parent rock, the type of climate anywhere in the world, the living organisms in the ground or on land and their activities and the topography – the nature of the landscape (relief).

Soil formation takes time to mature. Some soils have taken more than millions of years while others have only formed a few thousands of years ago. Therefore soils can be referred to as mature, immature and young soils according to the time they have taken to be formed.

Unit 04

CLIMATE IN AFRICA AND THE WORLD

Key Unit Competence

By the end of the unit the learner should be able:

to investigate the climate of Africa and the rest of the world and its impact on human activities

Prerequisite of this unit

Learners first studied about *Climate* in *Unit 8* of **Senior 1**. They covered many aspects on climate, including definition of atmosphere, weather and climate; the atmosphere; elements of weather and climate; the weather station and elements of weather. It is at this level that they also studied in detail the virtuous weather elements, factors influencing climate; climatic zones and the impact of weather and climate on human activities.

Senior Two was about understanding more about *Climate in Rwanda*, as presented in *Unit 9*. They studied types of climate and seasons in Rwanda, the concept of change, effects of climate change and climate change adaptation and mitigation in Rwanda.

In this unit, learners are expected to understand *Climate in other countries in Africa and the world* at large. Specifically, they need to study climatic regions in Africa (zones, types, location and characteristics); climate of other continents (zones, types, location and characteristics) and relationship between climate and human activities.

Cross-cutting issues to be addressed

In this topic learners will appreciate the importance of *environmental conservation* as it will be evident especially as they learn about the effects of human activities that bring about global warming and climate change. Sometimes very heavy rainfall occurs while other times the dry season extends longer than expected. You also need to help learners relate *financial education* to the processes involved in the efforts being put in place to ensure human activities are controlled to avoid *global warming*.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>Ask learners to suggest various ways people in the county and across the continent have been working against climate change. Let them also think critically and suggest in their own way how they can assist in fighting climate change and its effects.</i>
Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>To help learners acquire this competence, ask them to suggest ways in which people can adopt to various types of climate. They should also suggest how people have found unique ways to surviving in different climates.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain a phenomena from gathered information. <i>Learners will acquire this competence by carrying out a research on the major world climate zones.</i>
Cooperation and inter-personal skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>This competence will be acquired by learners when working in groups to explain the relationship between climate and human activities.</i>
Lifelong learning	The acquisition of such skills will help learners to update knowledge and skills with minimum external support. Learners will be able to cope with evolution of knowledge advances for personal fulfilment in areas that are relevant to their improvement and development. <i>This competence will be acquired from their desire to protect the environment in order to minimise the dangers of climate change.</i>

Vocabulary, key word and concepts

Climatic zone	A large area with similar climatic characteristics.
Diurnal range of temperature	The difference between the highest and the lowest temperature within a day (24 hours).
Annual range of temperature	The difference between the highest and the lowest temperature within one year
Rainfall regime	Pattern of rainfall in a place

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) How can we describe the climate of Africa? What are the climatic regions of Africa? What are the types and characteristics of climate in Africa?
- (ii) Climate of other continents (zones, types, location and characteristics)
- (iii) What is the relationship between climate and human activities?

Attention to Special Education Needs

You are expected to give special attention to the learners with special needs so that they are not disadvantaged. Ensure you have the appropriate learning materials such as braille and large print for those with visual impairment. Short sighted learners should sit near the chalk board so that they are able to follow when information is written on the board. Those who have hearing impairment should be provided with a sign language interpreter and books written in sign language.

List of lessons

Lesson 1	Climate of Africa (regions, types and characteristics)
Lesson 2	Climate of other continents (zones, types, location and characteristics)
Lesson 3	Relationship between climate and human activities

LESSON DEVELOPMENT

LESSON 1: CLIMATE OF AFRICA (REGIONS, TYPES AND CHARACTERISTICS)

Learning objective

By the end of this section the learner should be able to classify the climatic regions of Africa.

Introduction

Like most other units that senior 3 will be covering, they will be building on the knowledge that they acquired in senior 1 and 2. In Senior 1, they studied Weather and Climate in unit 8 of the senior 1 learner's book. In senior 2, they covered Climate and Climate Change in Rwanda in Unit 9 of Senior 2 learner's book. Therefore it is important to ensure that this unit is linked to what the learners already know so that the concepts are not disjointed. Briefly therefore, make a review of what the learners know about climate from their related studies in the lower classes.

It is important that as you take the learners through the factors that influence climate in Africa, you use local examples for application. For instance you could use the climate experienced in the highlands as opposed to the lowlands as you discuss the influence of relief. This will make them understand the factors easier as they discuss what they are familiar with.

Note that the climate of Africa can be divided into three broad categories which are further subdivided into specific types within the broad region. The three are, hot climates such as equatorial, warm temperate climates and mountain climates.

Tropical desert climate

Location: Sahara, Namib and Kalahari

Characteristics of topical desert climate

- High mean annual temperature of 27°C.
- Annual range of temperature reach 28°C.
- Diurnal range of temperature is large.
- Very low annual rainfall, less than 250mm.
- Rainfall is erratic and unreliable.
- Humidity is very low.
- Frequent strong winds.

Mediterranean climate (Warm temperate western margin)

Location: Northern Africa bordering the Mediterranean Sea South-west tip of South Africa around Cape Town

Characteristics of Mediterranean climate

- Hot summers, temperatures of about 21°C.
- Mild winters, with temperatures of about 10°C.
- Moderate annual range of temperature, about 11°C.
- Mean annual rainfall between 500 – 900mm.
- Rainfall is cyclonic, falling in showers during winter.
- Trade winds are offshore in summer.
- Westerlies dominate during winter and are onshore.
- Hot and cold winds are also common.

Warm temperate continental climate

Location: The high Veld of South Africa

Characteristics of warm temperate continental climate

- Hot summers, with average temperature of 26°C.
- Mild cool winters with temperatures of about 10°C.
- Annual range of temperature is moderate, about 16°C.
- Mean annual rainfall low to moderate, between 380 – 700mm.
- Rainfall is convectional type and falls mainly in summer.

Use of relevant maps both sketch maps and atlas maps is very important in this section. Remember learners are able to retain knowledge gained through practical work for a long time.

Teaching aids

Ensure you have the following resources and any other that you may find useful for delivery of the content in the section.

- Recommended text books
- Other relevant resources
- Atlas map of Africa
- Internet and a sketch map

These resources will be well utilised and effective if the following teaching methods are employed:

- Map study
- Observation
- Discussion
- Question and answer

Learning Activities

Identify relevant map of Africa showing the climatic regions and also a map of Rwanda on climate for comparison. This will make it easier for the learners to understand the concept of climate. Prepare comprehensive notes on each of the factors and where applicable indicate the local examples. Prepare questions to guide the flow of the lesson. **For Activity 4.1; Activity 4.2; Activity 4.3 and Activity 4.4**, divide the class into groups and assign each group an activity to research on. Ensure you work out answers to each activity to be able to guide the class during the presentations and discussions.

Synthesis

Use question and answer method to introduce the section. Ensure that all learners are actively involved. Ensure you constitute groups with learners of different abilities.

You must take keen interest on the participation of learners both in the group work and

during the open discussions.

Map sketching and note taking should be an integral part of the teaching and learning process.

Assessment

Assess the level of understanding of individual learners as they take part in discussing in groups, drawing sketch maps, asking and answering questions and taking notes. This will guide you to identify if there is need for remedial teaching for slow learners.

You may prepare simple questions based on this lesson and ask the learners to work on the answers for further discussion as part of revision work.

LESSON 2: CLIMATE OF OTHER CONTINENTS (ZONES, TYPES, LOCATION AND CHARACTERISTICS)

Learning objective

By the end of this section, the learner should be able to analyse the climatic regions of the world.

Introduction

As you teach this section, you will require specific climatic maps of each continent. You could only use the map of the world to enable learners to see the similarities and differences in climate in areas at different latitudes. Teaching each continent separately will make it easier for the learners to identify specific regions which may not be clear if you use climatic map of the world. However, regions that are located on the same latitude in most cases have similar climatic conditions. For instance the high Veld of South Arica experiences warm temperate continental type of climate. The Veld is on similar latitude as Western Oklahoma into Texas in North America, Central Argentina and Paraguay in South America and Murray-Darling basin in Australia.

For every climatic region ensure you identify which parts of other continents have a similar climate. Use of relevant maps both sketch maps and atlas maps is very important in this section.

Teaching aids

The following Teaching and learning resources may be appropriate for this lesson. You could improvise or use any other resources that you may find useful whenever necessary.

- Recommended text books

- Other relevant resources
- Atlas map of the world showing climatic regions
- Internet and a sketch maps

You are advised to employ teaching methods such as the following to ensure the teaching aids are well utilised:

- Map study
- Discussion
- Question and answer

Learning activities

Divide the class into groups and assign each group a type of climate to research on. Thus, the types of climate whose characteristics are outlined in the Learner's Book should be used as an example as learners work on **Activity 4.5** in their book. They must have clear instructions that they trace all the areas in all the continents that have a similar type of climate.

Ensure you work out model answers to the **activities 4.9, 4.10, 4.11, 4.12 and 4.13** to enable you guide the learners as they work on the same and during the presentation sessions. Prepare comprehensive notes on each type of climate and also indicate the location of each region on the map of the world. Prepare questions to guide the flow of the lesson.

The following are some activities you would involve the learners in as a way of promoting learning:

- | | |
|------------------------|-----------------------|
| • Discussing in groups | • Drawing sketch maps |
| • Asking and answering | • Taking notes |

Synthesis

Ensure you constitute groups with learners of different abilities. Use question and answer method to introduce the section then proceed to hold discussions. Ensure all learners are actively involved. Ensure that groups share the available resource to promote sharing and cooperation.

Assessment

Ask the learners to draw a map of the world to show climatic regions. Check their work to establish where they may require assistance. They could work on the **activities 4.6 and 4.7** as assignments and also complete the group work for presentation and class discussion. As you mark their work and listen to their presentations, you should be able to identify those who are fast in grasping the concepts and those who may require remedial work.

LESSON 3: RELATIONSHIP BETWEEN CLIMATE AND HUMAN ACTIVITIES

Learning objective

By the end of this section, the learner should be able to explain the relationship between climate and human activities.

Introduction

The influence of climate on human activities can be both positive and negative. Settlement, agriculture and forestry are some of the activities that are directly influenced by climate. On the other hand, human beings also have an impact on climate, through their activities. For instance when people clear forests, they influence the climate in that rainfall may reduce and temperatures increase in the area. This leads to change in the type of climate prevailing in a region.

The key concern of this section is the total rainfall and its distribution, the temperatures in different areas, the seasons and the associated economic activities

Learners will need to recap on the different types of climate each with its characteristics so as to be able to relate the characteristics to human activities. Different parts of the world are under different economic activities that are closely related to the type of climate experienced. Most people who engage in rain fed agriculture live in areas cool or warm with sufficient rainfall.

As you teach this section, you will require specific examples to ensure learners can relate the knowledge to a specific area and activities. The following is a guide on how you can achieve this:

- (a) **Agriculture:** *Crops, like other plants are adapted to particular climates. The distribution of agricultural activities is to a large extent determined by climate. There are crops that grow well in hot places, others in warm areas and yet others in cool regions. For this reason, crops that are grown in temperate regions can be planted in tropical regions but at high altitude where the climate is as cool as that of the cool temperate areas.*

In a similar way the type of livestock reared in a region is determined by climate. Certain pure breeds of cattle and sheep are adapted to particular climatic conditions. Friesian cows that are reared in Denmark, for example, can only survive in the tropics in high altitude areas where the climate is cool. Certain exotic breeds of sheep that are imported into East Africa from Europe are reared within the highlands where the climate is cooler.

- (b) **Tourism:** *Climatic conditions can promote tourism in a variety of ways. Large herds of a variety of animals are found in the hot and warm parts of the world where rainfall is abundant to support a variety of plant species. Big forest trees are abundant and a variety of animals like baboons, elephants, buffaloes and many species of birds and butterflies exist in such areas.*

Low rainfall results in extensive grasslands on which a large variety of herbivores live. Carnivores such as lions and cheetahs which prey on the herbivores are therefore found in plenty in the grasslands. The arid areas have limited plant cover and

therefore few wild animals. The high and cold mountain regions are inhabited by a limited number of animals e.g. the mountain gorilla.

It is this flora and fauna that is supported by varying climatic conditions that attract tourists, and in turn, making the tourism industry to thrive.

The warm and sunny climate of the tropics attracts tourists from Europe and North America visiting regions like East Africa and the Caribbean to escape the cold winter at home. The snow-covered mountain slopes of southern Europe attract tourists that are interested in winter sports such as skiing, ice skating, mountain climbing and viewing the scenery of snow-capped mountain peaks.

Teaching aids

The following are recommended for use while teaching this lesson:

- Recommended text books
- Atlas map
- Internet and a sketch maps
- Other relevant resources

Alongside these resources the following teaching methods can be employed:

- Map study and analysis of climatic regions
- Discussion
- Question and answer

Learning activities

Prepare comprehensive notes backed by maps that illustrate climate and human activities. Your notes should have specific examples especially those that learners are familiar with. Ensure you work out answers to the activities in the section. Prepare guiding questions to use to ensure the flow of the lesson.

Synthesis

Use question and answer method to introduce the section then proceed to hold discussion ensuring that all learners are actively involved.

Guide the learners to be able to apply the knowledge they have on Rwanda to the relationships between climate and human activities. Involve the learners in the following teaching and learning activities:

- Discussing drawing sketch maps
- Asking and answering questions
- Taking notes

Assessment

Ask the learners to carry out research on different areas where human activities have altered the climate. They should work on **activity 4.14** in the Learner's Book as an assignment for class discussion. As you mark their work and listen to their presentations, you should be able to identify those who are fast in grasping the concepts and those who may require remedial work. You will be able to do further assessment when the learners answer the **End Unit Assessment**.

END OF UNIT

Summary of the unit

In this unit, learners are expected to learn about climate in Africa and the rest of the world. World climatic conditions are classified into four broad types, namely, hot climates, warm climates, cool climates and cold climates. The variations occur in the specific characteristics of the climate within each category because some climatic types are influenced by large water bodies while others are continental. For instance, we have Warm Temperate Eastern Margin which is a coastal climatic zone and Warm Temperate Continental Climate which is far in the interior of a continent. They are both warm but their other characteristics differ due to the location of the zones.

In this unit there is expected a lot of comparison between Africa and the rest of the continents. In addition, it is prudent to teach the unit using the “**known to unknown**” approach. This means the climate of Rwanda should feature from time to time where applicable for application of knowledge.

The last part of the unit is relating climate to human activities. This requires applying what the learners know from their experience in their own country. Human activities such as agriculture and forestry are influenced by climate unless there is intervention such as irrigation.

Additional information

Details about some climatic zones have been omitted in the learner's book because they may not be easy for the young minds to comprehend and they are very close in characteristics to the neighbouring zones. Examples are:

Tropical monsoon climate

Location: Southern Senegal, Guinea, Sierra Leon and Liberia

Characteristics of tropical monsoon climate

- Mean annual temperature is high, between 25°C (in the cool season) and 32°C (during the hot season).

- Annual range of temperature is about 7°C.
- Seasonal reversal of winds.
- Winds are onshore when the sun's overhead position is in the northern hemisphere and offshore when the sun is position is in the southern hemisphere.
- Onshore winds bring rain.
- Rainfall is very high like in equatorial climate but most of it falls in a few months during the hot season. Freetown (Sierra Leone) receives an average of 3 500mm annually and only 65mm falling during December to March.
- India's Hot and wet season is from June and October.

Other continents

Location: **Asia** (India sub-continent, South-East Asia, southern China) and **Australia** (Northern region)

Tropical maritime climate

Location: The coastal region of eastern Africa from Kenya to Mozambique; The eastern side of Madagascar

Characteristics of tropical maritime climate

- Mean annual temperature is high, about 25°C.
- Annual range of temperature about 8°C.
- Mean annual rainfall between 1100 – 2000mm.
- Rainfall throughout the year.
- High humidity all year.
- Trade winds are the prevailing winds.
- Tropical cyclones common at end of the hot season.

Other continents

North America: Central America Guatemala to Panama, The Caribbean islands of Jamaica, Cuba, Puerto Rico and Haiti.

South America: Northern coast from Colombia to Surinam, east coast of Brazil.

Asia: Philippines islands.

Australia: east coast of Queensland.

End unit assessment

1. In your notebook, draw a neat sketch map of Africa and on it mark and name the major climatic zones.
2. Outline the ways in which Rwanda's climate is similar to some of the global climatic zones.

3. Explain the similarities between the tropical continental climate and warm temperate continental climate.
4. Explain the differences in characteristics between the warm temperate western margin and the cool temperate western margin.
5. With reference to Rwanda, explain the relationship between climate and human activities.

Answers to end unit assessment

1. Refer to the **map** in the Learner's Book that shows the major climatic region of Africa.
2. In Geography, **temperate latitudes of the earth lie** between the tropics and the Polar Regions. The temperatures in these regions are generally relatively moderate, rather than extremely hot or cold, and the changes between summer and winter are also usually moderate. The *North Temperate Zone* extends from the Tropic of Cancer (approximately 23.5° north latitude) to the Arctic Circle (approximately 66.5° north latitude). The *South Temperate Zone* extends from the Tropic of Capricorn (approximately 23.5° south latitude) to the Antarctic Circle (at approximately 66.5° south latitude).

Countries that lie within the tropical region of the world, including Rwanda, experience Temperate Tropical Highland Climate. However, in Rwanda, there are lower temperatures than are typical for equatorial countries because of its high elevation. Kigali, in the centre of the country, has a typical daily temperature range of between 12 and 27 °C, with little variation throughout the year. There are some temperature variations across the country - the mountainous west and north are generally cooler than the lower-lying east.

There are two rainy seasons in the year; the first runs from February to June and the second from September to December. These are separated by two dry seasons the major one from June to September, during which there is often no rain at all, and a shorter and less severe one from December to February.

Rainfall varies geographically, with the west and northwest of the country receiving more precipitation annually than the east and southeast. Global warming has caused a change in the pattern of the rainy seasons. Change in climate has reduced the number of rainy days experienced during a year, but has also caused an increase in frequency of torrential rains. Both changes have caused difficulty for farmers, decreasing their productivity. Rwanda is also a fast warming country, with an increase in average temperature of between 0.7 °C to 0.9 °C over fifty years.

3. Continental climate

Continental climate characteristics include **cold winters** and **hot summers** and little rainfall. Continental climate areas are transitional zones between polar and mild climates that experience extreme annual variations in temperature and seasonal changes. These areas don't have large water bodies nearby.

A continental climate is usually found in the interior of continents. **Cold summer, warm summer** and subarctic regions are the three types of continental climates, and

they only exist in the Northern Hemisphere. Wet-summer seasons occur in the warm-summer region, which is why it is called the humid continental region. Most parts of Eastern Europe, including Georgia and Romania have a humid continental climate.

Cool-summer regions have **winters with snow** and low temperatures.

A cold-summer climate is characterised by cold winds that flow from the Arctic. The subarctic regions are in the north of the **cool-summer climate regions**. They include Siberia and Northern Scandinavia, which experience long, cold winters without rainfall. They are also called taiga or boreal climate regions.

The continental climate regions are spectacular because of their wide range of weather phenomena. For example, they have vast forests in autumn and later experience powerful tornadoes and thunderstorms. Parts of the Northern Hemisphere continents such as Asia and North America also fall within the continental climate.

4. Humid continental climate

A *humid continental climate* is a climatic region characterised by large seasonal temperature differences, with **warm to hot summers** and **cold winters**. Rainfall is usually well distributed through the year.

The definition of this climate regarding temperature is as follows: the mean temperature of the coldest month must be below -3°C and there must be at least four months whose mean temperatures are at or above 10°C . Some climatologists prefer to use the 0°C isotherm as it is more commonly used. In addition, the location in question must not be semi-arid or arid.

Humid continental climates tend to be found between latitudes 40°N and 60°N , within the central and northeastern portions of North America, Europe and Asia. They are much less commonly found in the Southern Hemisphere due to the larger ocean area at that latitude and the consequent greater maritime moderation. In the Northern Hemisphere some of the humid continental climates, typically in Scandinavia, Nova Scotia and Newfoundland are heavily maritime-influenced, with relatively **cool summers and winters** being **just below the freezing mark**. More extreme humid continental climates found in southern Siberia and the American Midwest combine hotter summer maxima and colder winters than the marine-based variety.

4. a) Warm temperate western margin

- i) Hot summers, temperature of about 21°C .
- ii) Mild winters, with temperatures of about 10°C .
- iii) Moderate annual range of temperature, about 11°C .
- iv) Mean annual rainfall between 500 – 900mm.
- v) Rainfall is cyclonic, falling in showers during winter.
- vi) Trade winds are offshore in summer.
- vii) Westerlies dominate during winter and are onshore.
- viii) Hot and cold winds are also common.

b) Cool temperate western margin

- i) Summers are warm with temperature between 13° - 15°C.
- ii) Winters are cool, between 2°C - 7°C.
- iii) Moderate mean annual range of temperature.
- iv) Rainfall varying between moderate to very high, that is 760 – 2000mm.
- v) Rainfall is well distributed throughout the year with a winter maximum.
- vi) Prevailing winds are the westerlies all year round.
- vii) Temperate depressions and anticyclones are common.
- viii) High humidity especially in winter.

Remedial activities (for slow learners)

1. Name three climatic zone in Africa and for each name the region where it is experienced.
2. Give three characteristics of equatorial climate.
3. Which climatic zone is near the North and South poles?

Answers to remedial activities

1. Equatorial climate – the lowlands along the equator.
2. Tropical continental climate – The areas between the deserts and the equatorial regions.
3. Tropical desert climate – Sahara and Kalahari deserts.

Extended activities (for gifted and talented learners)

Describe the features of **Arctic (very cold) climate** under the following sub-headings:

- a) Types
- b) Location
- c) Characteristics

Answers to the extended activities

Arctic (very cold) climates

These are experienced in regions beyond the Arctic Circle ($66\frac{1}{2}^{\circ}$) in both hemispheres. These climates are also referred to as **Polar desert climates**. They are two of types namely **Tundra climate** and **Polar climate**.

1. Tundra climate

Location: *North America* (along the coast bordering the Arctic Ocean, from Alaska, northern Canada including Baffin Island and south coast of Greenland) and *Eurasia* (along the Arctic ocean coast from Scandinavia to the north-eastern coast of Russia).

Characteristics of tundra climate

- Short and cool summers, with average temperatures of 20°C.
- Long and very cold winters, temperatures varying between -29°C and -40°C.
- Annual range of temperature is very large.
- Mean annual rainfall is little, about 380mm.
- Most rain falls in summer while snow falls in winter.
- Rainfall is convectional.

2. Polar climate

Location: *North America* (interior of Greenland and the neighbouring islands as well as Iceland) and *Antarctica* (the whole continent).

Characteristics of polar climate

- Very cold with temperatures below 0°C throughout the year.
- Precipitation is in the form of snow.
- Blizzards are very common.

Unit 05

VEGETATION OF AFRICA AND THE WORLD

Key Unit Competence

By the end of the unit, the learner should be able to demonstrate an understanding of different vegetation types of Africa and the world.

Prerequisite of this unit

Learners first learnt about *Vegetation* in Senior One, where they defined what vegetation is and went on to explain the various types of vegetation. Other important things about vegetation were on factors influencing the natural types of vegetation, importance of natural vegetation and relationship between vegetation types and human activities.

In Senior Two, they learnt about *Vegetation in Rwanda*. Using the local environment and Rwanda at large, they identified and explained the types of vegetation in Rwanda, factors that influence vegetation distribution in Rwanda, importance of different vegetation types, impact of man's activities on vegetation in Rwanda and measures to conserve natural vegetation in Rwanda.

Vegetation of Africa and the world as presented in this unit will help learners to understand vegetation distribution in Africa. They are also expected to learn more about major types of vegetation in other continents and the relationship between the different types of vegetation and human activities.

Cross-cutting issues

While teaching this topic it will be prudent to consider discussing *environmental conservation and sustainability*. This is because if there is no control over how people exploit forests, the original vegetation disappears and is replaced with farms and settlement and some planted trees. Environmental conservation includes protection and rehabilitation of whatever makes up the environment that may easily be affected by human activities. For instance vegetation that has been destroyed will require replanting and whatever exists must be protected from destruction. It is important to conserve vegetation because human beings and animals rely on vegetation for food and shelter. You also need to help learners relate the unit to *financial education* because vegetation is a source of wealth in that plants such as trees are cut to generate income.

Generic competences

Research	This will help learners to find answers to questions based on existing information and concepts and use it explain phenomena from gathered information. <i>Encourage learners to carry out a research in order to correctly categorise the major types of vegetation in other continents</i>
Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>Learners will develop this competence when assessing the relationship between vegetation and human activities in Africa.</i>
Cooperation and inter-personal skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>This unit dwells on the environment that learners interact with. As they discuss in pairs or groups about it, encourage sharing. At the same time, allow them adequate time to co-operate which will help them learn how to be interdependent.</i>
Lifelong learning	The acquisition of such skills will help learners to update knowledge and skills with minimum external support. The learners will be able to cope with evolution of knowledge advances for personal fulfilment in areas that are relevant to their improvement and development. <i>This competence will be developed when you help them learn more about effective utilisation of resources provided by vegetation around them. They should also strive to learn more about new concepts about conservation.</i>

Vocabulary, key words and concepts

Natural vegetation	Plant cover that exists in a place without the influence or modification by human beings.
Semi-natural vegetation	Plant cover that is partly modified or interfered with by human beings.
Planted vegetation	Plant cover that has been planted by people.
Veld region	The treeless grassland found in the interior part of South Africa.
Mid-latitudes	The lands that lie between the Tropic of Cancer and the Arctic Circle and also between the Tropic of Capricorn and the Antarctic circle.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) How can we describe the vegetation distribution in Africa? (location, reasons for their distribution and characteristics)
- (ii) What are the major types of vegetation in other continents?
- (iii) What is the relationship between the different types of vegetation and human activities?

Attention to Special Education Needs

For the special needs learners, it is important to prepare learning resources that are adapted for their use to ensure they are not disadvantaged. For the visually impaired, have braille materials and recorders. For the hearing impaired, you need to have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be able to participate in class.

- a) **Learners with low vision** need to be appropriately positioned in the class to see the writings on the chalk board. They should be on front seats. Long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- b) **Physically challenged Learners** should be handled according to their unique disability. They may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be positioned strategic enough to allow them freely to mingle with the rest of the learners.
- c) **Slow learners** are have special need because they are unable to grasp concepts fast enough. They should be given time to internalize whatever is being taught.

List of lessons

Lesson 1	Vegetation distribution in Africa (location, reasons for their distribution and characteristics)
Lesson 2	Major types of vegetation in other continents
Lesson 3	The relationship between the different types of vegetation and human activities

LESSON DEVELOPMENT

LESSON 1: VEGETATION DISTRIBUTION IN AFRICA (LOCATION, REASONS FOR THEIR DISTRIBUTION AND CHARACTERISTICS)

Learning objective

By the end of this lesson, the learner should be able to describe the distribution of major vegetation types in Africa.

Introduction

Briefly review what learners know about vegetation from their related studies in lower classes.

For instance:

Natural vegetation is the group of plants growing in a place as a result of natural factors without any interference by human beings. **Semi-natural vegetation** (also known as **secondary** or **derived** vegetation) is plant cover that grows on its own but has been interfered with by people. This may be, for example, by burning it occasionally or through grazing of domestic animals. **Planted vegetation** on the other hand are plants, other than crops, which have been planted by people. Examples include forests and plantations.

The world's major types of vegetation can be grouped into:

- Forests
- Grasslands
- Semi-arid and arid vegetation
- Mountain vegetation

It is important that as you take the learners through the factors that influence vegetation distribution in Africa (or reasons for their distribution). Ensure you use local examples for application. This will make them understand the factors easier as they discuss what they are familiar with.

Natural vegetation in Africa can be divided into four broad categories namely tropical rainforests, Mediterranean forests, savannah grasslands, semi-desert and desert vegetation and mountain vegetation. However, natural vegetation in Africa has been greatly altered by human activities such as cultivation and forestry and settlement. There are only a few areas where there are true natural forests and grasslands.

Tropical vegetation	Mediterranean vegetation	Savannah grasslands	Desert vegetation
<p>Closely growing trees with three canopies.</p> <p>Trees belonging to the lowest canopy reach up to 15 metres; the middle canopy up to 30 metres and the tallest can reach 50 metres.</p> <p>Most trees are hardwoods with smooth and straight trunks.</p> <p>Trees have broad leaves and buttress roots.</p> <p>Ferns, epiphytes and thick-stemmed creepers grow or entangle on the stems of the trees.</p> <p>The forest is evergreen and dense.</p> <p>There is little undergrowth because sunlight does not reach the ground.</p>	<p>Open forests resembling woodlands.</p> <p>The trees have adaptation to the long hot and dry summers.</p> <p>Some trees are evergreen.</p> <p>Many have long taproots.</p> <p>Many tree species are of deciduous type.</p>	<p>Some areas are dominated by open grasslands.</p> <p>Trees are of medium height and grow wide apart.</p> <p>Space between the trees is either occupied by grass or shrubs.</p> <p>Many trees have umbrella-shaped crowns.</p> <p>Most trees are deciduous and shed their leaves in the dry season.</p> <p>Trees have deep roots and thick barks.</p> <p>Grasses can grow up to 3 metres tall in wetter areas.</p> <p>The elephant grass variety grows up to 4.6 metres.</p> <p>Grasses dry off during the dry season but sprout at the onset of rains.</p> <p>Regions that receive rainfall below 750mm have much shorter grass and low growing trees and shrubs.</p>	<p>There are few varieties of plants in tropical deserts.</p> <p>Some plants are perennial and have succulent stems with spines but no leaves.</p> <p>The stems are used as breathing surfaces as well as for water storage.</p> <p>Shrubs and short stunted trees are evergreen with hard leaves.</p> <p>There are drought resistant deciduous shrubs.</p> <p>In areas of poor drainage, there are salt-tolerant plants.</p> <p>There are also short-lived plants that complete their life cycle during the short rainy period.</p> <p>Date palms are common where there are oases.</p>

Mountain areas in Africa are dominated by mountain vegetation, which varies from the top of the mountain downwards. This is **called succession of vegetation on a mountain**. The arrangement of vegetation on a mountain follows the following pattern:

- Snow and bare rock.
- Bamboo forest
- Tropical rainforest
- Heath and moorland
- Temperate rainforest
- Woodland

Use of relevant maps both sketch maps and atlas maps is very important in this section. Ensure that the learners are able to draw a map of Africa showing the main types of vegetation.

Teaching aids

The following Teaching and learning resources are recommended for this lesson but you could use any other resource that you may find appropriate for effectiveness of learning.

- Recommended textbooks
- Other relevant resources
- Atlas map of Africa
- Internet and a sketch map

In addition, you may employ the following teaching methods in the teaching and learning process:

- Map study
- Discussion
- Question and answer

Learning activities

Identify relevant maps on vegetation types in Africa. Prepare comprehensive notes on each vegetation type. Prepare questions to guide the flow of the lesson. Divide the class into groups in readiness for **Activity 5.1** in their textbooks, as you will need to involve the learners soon after the introduction part. For **Activities 5.2** and **5.3**, the learners may work individually or in groups then make presentations for class discussion. Ensure you work out answers to the activities in the section so that you will guide the learners as they discuss the answers. Other activities that require grouping of the learners are **5.4** and **5.6** in the Learner's Book.

As the lesson progresses, the following activities should be integrated in the learning process:

- Discussing in groups
- Drawing sketch maps
- Asking and answering questions
- Taking notes

Synthesis

Ensure you constitute groups with learners of different abilities so that the slow learners may benefit from the fast learners as they work out the answers. Ensure all learners are actively involved both at class and at group levels.

Assessment

As the learners to prepare a table similar to the one shown above for the characteristics of the following types of vegetation in Africa, which have been discussed in the Learner's Book:

- i) Mangrove forests
- ii) Temperate evergreen forests
- iii) Tropical grasslands
- iv) Temperate grasslands

LESSON 2: MAJOR TYPES OF VEGETATION IN OTHER CONTINENTS

Learning objective

By the end of this lesson, the learner should be able to categorise the major types of vegetation in other continents.

Introduction

World vegetation is classified into four main groups namely: forests, grasslands, semi-desert and desert type and mountain vegetation. In temperate areas, coniferous forests grow. This is in areas such as North America, South America, Europe and Asia, within latitudes 45° and 75° . The types of each group vary from place to place and may have sub-groups depending on the climate. These groups are reflected in every country though some groups may not exist where they are expected due to interference by human activities.

As you teach this section, you will require specific vegetation maps of each continent. You could only use the map of the world to enable learners to see the similarities and differences of types of vegetation regions in areas at similar latitudes. Teaching each continent separately will make it easier for the learners to identify specific regions that may not be clear on a world map. However, regions that are located on the same latitude in most cases have similar natural vegetation types. For instance the high Veld of South Africa has temperate grassland that is similar to Central Argentina and Paraguay in South America and Murray-Darling basin in Australia that also have temperate grasslands.

For every vegetation region, ensure you identify which parts of different continents have similar vegetation.

Teaching aids

The following Teaching and learning resources are recommended for this lesson but you could use any other resource that you may find appropriate for effectiveness of learning.

- Recommended textbooks
- Other relevant resources
- Atlas showing vegetation in Africa and beyond
- Vegetation maps for the other continents
- The Internet and a sketch maps

In addition, you may employ the following teaching methods in the teaching and learning process:

- Map study
- Discussion
- Question and answer

Learning activities

Introduce the lesson with the study of maps for vegetation. Ensure that learners are appropriately grouped for this section. In each group, ensure that they have access to an atlas or map showing vegetation zones beyond Africa.

Pair work should involve answering the following questions:

- i) Second question of **Activity 5.11** in the Learner's Book
- ii) Third question of **Activity 5.12** in the Learner's Book
- iii) Second question of **Activity 5.15** in the Learner's Book

Each pair should prepare a brief explanation of their findings for comparison with other pairs. However, make sure you check through their findings to confirm that what they are sharing is correct information.

Individual research should focus on **Activity 5.14** in the Learners Book. This should be done in their notebooks for you to check after the lesson.

Synthesis

Divide the class into groups and assign each group a continent to research on. They must have clear instructions that they trace all the areas in all the continents that have various types of vegetation.

For example:

Using the information given in the Learner's Book let the learners, working in groups, draw sketch maps of the countries each type of climate covers. Under each sketch, they should provide a summary of the characteristic of the type of vegetation shown. This is a requirement for **Activity 5.16** in the Learner's Book.

Each group should have a group leader who should ensure that their findings are documented for class presentation.

Ensure you work out answers to the activities in the section. Prepare comprehensive notes on each continent to guide the learners as they discuss each continent. Prepare questions to guide the flow of the lesson.

Assessment

In a table similar to the one provided below, learners are expected to summarise the areas where each of the following types of climate is found.

Tropical vegetation	Mangrove vegetation	Mediterranean vegetation	Temperate evergreen vegetation	Tropical monsoon forests	Coniferous forests	Temperate deciduous vegetation	Mixed forests

SECTION 3: THE RELATIONSHIP BETWEEN THE DIFFERENT TYPES OF VEGETATION AND HUMAN ACTIVITIES

Learning objective

By the end of this section, the learner should be able to assess the relationship between vegetation and human activities in Africa.

Introduction

There is a relationship between human activities and different types of vegetation. Settlement, agriculture and forestry are some of the activities that directly influence the type of vegetation in an area.

On the other hand, the type of vegetation influences human activities. For instance a forested area will encourage forestry while a grassland area may encourage animal rearing and also cultivation since it is easy to clear grasslands to enable cultivation. The key concern of this section is to ensure that the learners are able to relate the various human activities and the natural vegetation that existed in those areas.

Learners will need to recap on the different types of vegetation each with its characteristics so as to be able to relate the characteristics to human activities.

As you teach this section, you will require specific examples to ensure learners can relate the knowledge to a specific area and activities.

Teaching aids

- Recommended textbooks and other relevant resources
- Atlas map
- Internet
- Photographs
- Sketch maps

Learning activities

Ask learners to look for photographs showing the various relationships between the following types of vegetation and human activities:

- a) Forests (Refer to the Learner's Book)
- b) Grasslands (Refer to the Learner's Book)
- c) Desert vegetation (Refer to the Learner's Book)

For general reference, learners can try to show these relationships using the photographs given in the Learner's Book. You can as well identify additional suitable photographs that demonstrate the relationship between vegetation and human activities. For instance, activities related to forestry or building and construction using wood will depict exploitation of vegetation.

During class discussions on how vegetation influences different human activities, ensure that learners will be preparing short notes (backed by maps where necessary) that illustrate how vegetation relates to human activities. Your notes should have specific examples especially those that learners are familiar with. It is important that you prepare guiding questions to use to ensure flow of the lesson. Other suitable teaching activities for this part of the unit are:

- Discussing
- Studying photographs and maps
- Taking notes
- Drawing sketch maps
- Asking and answering questions

Teaching and learning methods

- Photograph analysis
- Question and answer

Synthesis

You may consider an out of class session for learners to identify the local human activities as related to vegetation. Encourage the learners to take notes while out door learning is in progress.

Use question and answer method as well as involving the learners in discussions ensuring that all learners are actively involved.

Assessment

Ask the learners to carry out research on specific vegetation regions and associated human activities. They should work on the **Activity 5.13** in the section as assignment for class discussion.

END OF UNIT

Summary of the unit

In this unit, learners are expected to learn about vegetation of Africa as well as the major types of vegetation found in the rest of the world. Natural vegetation of any place is mainly a product of the type of climate experienced. The other major factors that influences vegetation types is human activities. Other factors include the soil type and topography.

The natural vegetation zones in Africa vary with latitude. The lowlands along the equator have equatorial forests. Generally, Africa has tropical vegetation in most areas. As one moves away from the equator there is a gradual change from forests to woodlands then grasslands with tall grass and scattered trees. Gradually, the grass becomes short and finally gives way to semi-desert then desert. After the deserts, there is Mediterranean vegetation which is found along the coast of Mediterranean sea at southern tip of the continent.

The type of vegetation in the rest of the world differs from that found in Africa where the continents lie far from the tropics. There are mid-latitude grassland such as the prairies of Canada, temperate forests such as the coniferous forests of Canada and Russia, and polar vegetation which is found in the cold areas near the poles.

The unit also explores the relationship between vegetation and human activities. It is noted that forest areas encourage forest related activities while grasslands are mainly used as farming areas.

In this unit there is expected a lot of comparison between vegetation in Africa and the rest of the continents. It is prudent to teach the unit using specific local examples of vegetation and human activities.

Additional information

This unit is linked to unit 5 in Senior 1 on Vegetation and unit 10 in Senior 2 on Vegetation in Rwanda. It is important that learners are made to link the knowledge acquired in the lower classes to what is contained in this unit. As you teach this unit, you should use local examples of natural and planted vegetation as well as areas where vegetation has been influenced by human activities.

Natural vegetation in the world is limited to few areas because much of the land has been used for human activities such as farming and settlement. Many forests have also been cut down to provide timber, wood for fuel such as firewood and charcoal. Overgrazing has also affected many of the natural grasslands reducing some areas into semi-deserts. Some areas have planted vegetation which has replaced what used to exist naturally.

End unit assessment

1. Explain the characteristics of the tropical rainforest.
2. Compare the characteristics of the temperate deciduous and coniferous forests.
3. Draw a sketch map of Africa and on it mark and name the major vegetation zones.
4. Explain the extent to which climate has influenced the distribution of vegetation in Africa.
5. Discuss how vegetation has influenced the human activities in Africa.

Answers to End Unit Assessment

1. Characteristics of tropical rainforests

Because of the lack of seasonal differences, due to the geographical location of the forests, and the high humidity level the vegetation is luxuriant here. The recurring features of rainforests are basically the following:

- High animal and vegetal biodiversity
- Evergreen trees
- Dark and sparse undergrowth interspersed with clearings
- Scanty litter (organic matter settling on the ground)

- Presence of “strangler” creepers (e.g. *Ficus* spp.)
- Presence of “buttresses” (i.e. large winged ribs at the base of trunks) and spindly roots in trees living in often-flooded areas.

2. Comparison between the different characteristics of the temperate deciduous and coniferous forests.

Temperate deciduous forests	Coniferous forests
Trees are hardwoods.	Most tree species are fast-maturing softwoods.
Trees shed their leaves in autumn and remain bare in winter.	Most trees are evergreen but a few shed their leaves in winter.
Broad-leaved deciduous trees.	Most trees have thin needle-like leaves.
Some areas have mixed tree species while other areas may have pure stands.	Trees occur in big pure stands.
Leaf buds appear in spring and in summer trees are green with foliage.	The leaves have tough and waxy skin.
Trees grow in different proportions.	The leaves and branches form a conical shape.
The forests are quite open hence a rich undergrowth of smaller plants.	Trees have widely spread shallow root system, with little or no undergrowth in some places.

3. Refer to the **Learner’s Book** for a sketch map of Africa showing the major vegetation zones.

4. Effect of climate on the distribution of vegetation in Africa

The climate of an area determines the kind of vegetation in that area. The vegetation of Africa is divided into different zones.

All these vegetation zones in Africa are affected by the climate. The weather condition affects the climate and climate also affects the vegetation zone. Favourable weather such as moderate rainfall, moderate sun light intensity and temperature will help plants grow well. The prolonged good weather will have a positive effect on the climate. When the climate is good the vegetation in that particular area will be affected thus, they will grow well.

The plant community in an area is the most sensitive indicator of climate. Areas with moderate to high temperatures and abundant rainfall throughout the year are heavily forested (unless humans have cleared the land for agriculture!). Areas with somewhat less rainfall are mainly grasslands.

Even in areas with high yearly rainfall, trees are scarce if there is not much rainfall during the warm growing season. Regions with not much rainfall and scarce vegetation are called deserts, or arid regions. Areas with somewhat greater rainfall are called semiarid regions.

5. Influence of vegetation on human activities in Africa

- a) Relationship between forests and human activities in Africa (Refer to Learner’s Book)

- b) Relationship between grasslands and human activities in Africa (Refer to Learner's Book)
- c) Relationship between desert vegetation and human activities in Africa (Refer to Learner's Book)

Remedial activities (for slow learners)

1. State three characteristics of temperate evergreen forests
2. Differentiate between tropical grasslands and temperate grasslands

Answers to remedial activities

1.
 - The forests are evergreen.
 - Trees have broad leaves.
 - Some trees are deciduous.
 - Many of the trees are hardwood.
2. Tropical grasslands are found in regions within the tropics while temperate grasslands are found in mid-latitudes.

Extended activities (for gifted and talented learners)

1. Explain why the areas under equatorial forest in Africa are small.
2. Draw a map of Africa and show the distribution of vegetation types.
3. Suggest the measures that can be taken to increase the areas under forests in Africa.

Answers to extended activities

1. Equatorial forests are only found in areas that experience equatorial type of climate. These are the lowlands that are found along the equator. The climate in the rest of the continent cannot support equatorial type of forests.
2. Copy the map in the Learner's Book.
3. People should be encouraged to avoid cutting down the existing forests plant. Trees in areas that have been deforested. They should also carry out afforestation in any areas that can support trees.

Unit 06

DRAINAGE IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to explain the importance of water bodies and wetlands in Africa.

Prerequisite of this unit

Drainage was discussed in Senior One in *Unit 10* under *General Organisation of Hydrography*. In this unit, they defined the term drainage, explained different water bodies, major rivers of the world, major parts of a river profile, drainage patterns and the relationship between water bodies and human activities.

In Senior Two, *Drainage in Rwanda* was discussed in *Unit 11*. In this unit, learners got to appreciate the major types of rivers in Rwanda, major rivers, swamps and lakes in Rwanda, mode of formation of lakes in Rwanda, importance of water bodies in Rwanda, challenges to obtaining sustainable and clean water in Rwanda and conservation and management methods of water bodies in Rwanda.

This unit explores drainage in Africa, with focus on major rivers in Africa, major lakes of Africa according to their mode of formation, features related to rivers in Africa (erosion and depositional features), importance of rivers, lakes and wetlands in Africa and challenges to obtaining sustainable clean water in Africa (scarcity, pollution and siltation or sedimentation).

Cross-cutting issues

The study of drainage is basically a study of a major environmental component. If we misuse our sources of water, life on earth will cease to exist. As such, this study will to a large extent include *environment conservation and sustainability* in general. This is because drainage affects such environmental aspects like soils and vegetation. In addition, as we study drainage we have to consider how to undertake conservation *of water*. In addition, learners will appreciate this unit as preparation for career in the field of Hydrology. As such the study touches on *Inclusive education* in that all categories of learners can opt to pursue this field.

The unit will touch on *financial education* in that we shall cover issues such as building of dams, harvesting rain water, irrigation all which have financial implications or are undertaken for a country to generate income.

Generic competences

Critical and problem solving skills	<p>The acquisition of such skills will help learners to think imaginatively, innovative and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>This competence is to be developed when learners will be examining the challenges faced in obtaining sustainable and clear water in Africa. For each, let them suggest possible solutions. Using their local environment, let them explain how the challenge:</i></p> <p><i>(a) Has been solved</i></p> <p><i>(b) can be handled</i></p>
Research	<p>This will help learners to find answers to questions based on existing information and concepts and use it explain phenomena from gathered information. <i>Encourage learners to carry out a research on different water harvesting techniques used in different parts of Africa. let them compare with what happens in their locality.</i></p>
Communication in official languages	<p>Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>Important to note is that this competence can be developed amongst the learners from their various group discussions and pair work, for example, when describing different water bodies found in Africa.</i></p>
Cooperation, Inter-personal management and life skills	<p>This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>Working together to provide answers to activities given in the Learner's Book and other suggested in this guide will help them cultivate a sense of belonging, co-operation and interpersonal relationships. This will build their co-operation, interpersonal management and life skills.</i></p>

Vocabulary/key words/concepts

Drainage	<p>Lay out of water features on the earth's surface. Can also be defined as the removal of surface and sub-surface water from an area either naturally or by using artificial means.</p>
Crustal warping	<p>Earth movement that causes downward shifting of rocks of the earth's crust creating a depression on the surface of the earth.</p>
Ribbon lake	<p>Long and narrow finger-shaped lakes usually found in glacial troughs</p>

Lagoon lake	A shallow body of water at the coast, separated from the larger sea by islands, sand bars or coral reef
Meteorites	Solid materials in form of a large stones or rocks that have fallen on to the earth's surface from other heavenly bodies
River braids	A network of river channels that split then after some distance, they converge downstream to become one stream.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the major rivers and lakes in Africa?
- (ii) What are the major lakes of Africa according to their mode of formation?
- (iii) What features are related to rivers in Africa? (Erosion and depositional features)
- (iv) What is the importance of rivers, lakes and wetlands in Africa?
- (v) What are the challenges to obtaining sustainable clean water in Africa? (Water scarcity, pollution, silting or sedimentation)

Attention to Special Education Needs

You are expected to give special attention to the learners with special needs so that they are not disadvantaged. Ensure you have the appropriate learning materials such as braille and large print for those with **visual impairment**. For learners with **low vision**, you should ensure that they sit near the chalk board so that they are able to read when information is written on the board. Those who have **hearing impairment** should be provided with sign language interpreter and books written in sign language.

If you have to organise for outdoor learning, you must ensure that learners with **physical disabilities** are well taken care of especially those who have difficulties in movement.

List of lessons

Lesson 1	Major rivers and lakes in Africa and their mode formation.
Lesson 2	Features related to rivers in Africa (Erosion and depositional features)
Lesson 3	Importance of rivers, lakes, and wetlands in Africa.
Lesson 4	Challenges to obtain sustainable clean water in Africa (Water scarcity, pollution, silting/sedimentation)

LESSON DEVELOPMENT

LESSON 1: MAJOR RIVERS AND LAKES IN AFRICA AND THEIR MODE OF FORMATION

PART I: MAJOR RIVERS AND LAKES IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to identify the major rivers and lakes in Africa and explain their mode of formation.

Introduction

In Senior 2, learners looked at the major rivers, swamps and lakes in Rwanda. In this unit, they will now move further to find out the same concept but in the entire continent of Africa. It will be important to compare the magnitude of the size of rivers and lakes in Rwanda which is part of Africa and those in other parts of the continent.

For each of the major rivers in Africa, it is important to know the source and where they drain. Each of the rivers has their major tributaries that should be included as they are part of the river system. Learners should be able to identify these sources including the countries where they are found.

The major rivers of Africa include the Rivers Nile, Senegal, Volta, Niger, Congo, Orange, Limpopo and Zambezi. There are numerous smaller rivers along the Western parts of the continent which include Rivers Gambia, Bandama, Ogooué, Cuanza and Cunene. The Eastern part of Africa has relatively smaller rivers such as rivers Ruvuma, Rufiji, Pangani, Athi/Galana, Tana, Juba and Shabeelle.

Teaching aids

Among the appropriate teaching resources that would make the learners understand the concepts easily the following may be useful but you may also use any other resource that may add value to the lesson.

- Recommended learners book
- Wall maps
- Sketch map of Africa showing river systems,
- Atlases.

To make the lesson more learner centred, you could use the following teaching methods alongside the resources:

- Observation
- Map analysis
- Discussion method and presentation
- Question and answer.

Learning activities

As alluded to earlier, learning becomes more effective when learners are engaged to make the process learner centred. For this reason there are several activities in the learner's book that require them to find out the information by themselves but with your guidance.

In **Activity 6.1** in their books, they will work in groups. Ensure that the groups are all inclusive, with learners with various difficulties appropriately catered for. Each group also needs a group leader who will compile a report for presentation in class. Working in groups promotes **cooperation** and **teamwork**.

Avail to each group additional reference materials such as atlases or display a large wall map showing drainage features in Africa for all to refer to especially during the presentations.

After presentations, task each learner to tackle **Activity 6.2** on **page 90**. The final table each needs to complete is as shown below:

River	Origin	Countries it passes through	Destination

It is important to check learners' work in order to guide them accordingly. In selected cases, help learners with learning materials for further reference especially those with learning difficulties.

Synthesis

The starting point of this lesson is by understanding a detailed meaning of the term **drainage**.

Since it is not the first time learners are being introduced to this concept of drainage, let them attempt to define drainage, with reference to Rwanda. Be keen to help them relate this information on the larger scale, that is, in reference to the African continent. Using **Activity 6.3**, guide learners to find out the meaning of a **drainage basin** and **area of internal drainage**.

A better understanding of this section also requires that you build on learners' information from the known to the unknown. This means that you start with what they learned in Senior Two then progress to what they need to learn in this class.

Ask learners to identify the main rivers in Rwanda. For each river, let them describe its course from the source to where it empties its waters. For slow learners, task them to identify a river in the local environment, which they will describe from the source to the end, with the help of a resource person.

Assessment

Learners to draw a map of Africa showing major rivers and the countries they drain. Ask them to ensure that they keep in mind all the qualities of a good map, which they should show on their sketch. Check their work to confirm correct answers.

PART II: MAJOR LAKES OF AFRICA ACCORDING TO THEIR MODE OF FORMATION

Learning objective

By the end of this lesson, the learner should be able to identify major lakes in Africa.

Introduction

For each of the major lakes in Africa, it is important to know the source of its water if possible and the country where it is found. Some of the lakes are fresh water lakes. Ensure you identify the rivers that flow out of such lakes. For all the lakes note any rivers that flow in or out of the lake.

Africa has many large lakes some of which are fresh water lakes while the others are salty water lakes. Where a lake has a river flowing out, the water is fresh but if a lake has no outlet, it has saline water because of the accumulation of mineral salts brought by the rivers that flow into the lakes. Some examples of the large lakes in Africa are Lake Victoria which is the largest with an area of 69 485 km². Lake Tanganyika covers 32 893 km² while Lake Malawi is 30 044 km². Other large lakes are Chad, Turkana, Lakes Albert and Kyoga.

Teaching aids

Among the appropriate teaching resources that would make the learners understand the concepts easily, the following may be useful but you may also use any other resource that may add value to the lesson.

- Recommended learners' books
- Sketch map of Africa showing river systems
- Wall maps
- Atlases

To make the lesson more learner centred, you could use the following teaching methods alongside the resources:

- Observation
- Discussion method and presentation
- Map analysis
- Question and answer

Learning activities

Introduce the lesson with a brainstorming session where learners will identify lakes in Rwanda. They can refer to S2 Learner's Book for this opening activity.

Ask a volunteer to read through the information provided in the Learner's Book aloud.

In groups, learners should attempt **Activity 6.4**

As they go through the notes given in the Learner's Book, they should be filling in the following table:

Mode of formation			Examples	Countries where they occur
Natural causes	Earth movements	<ul style="list-style-type: none"> • Faulting • Crustal warping 		
	Erosion	<ul style="list-style-type: none"> • Wind erosion • Glacial erosion • Solution lakes 		
	Vulcanicity	<ul style="list-style-type: none"> • Crater lakes • Lava dammed lakes 		
	Deposition	<ul style="list-style-type: none"> • River deposition • Wave deposition • Glacial deposition • Mass movement 		
	Meteoritic lakes			
Human causes	Dams on rivers			

Each group should then prepare a wall hanging of their finding to be displayed in the learning corner of the class.

Synthesis

Individual work to gauge learners' understanding can be derived from **Activity 6.6** and **Activity 6.7** which should be done in their notebooks.

Assessment

Learners' understanding will be gauged by **Activities 6.7** and **6.8**. These two should be done in Learner's books, as they work in groups. It is your responsibility to check learners' work to ensure that they give correct answers. Guide those with learning difficulties.

It is important to note that you can vary the way the learners are organised since you are the one interacting with them and you know them well to determine when they can work in groups and when they can work individually. You could also introduce other activities if time allows.

Ensure you involve the slow learners and those with other challenges in class activities.

Learners should be asked to draw a map of Africa showing major lakes and the countries where they are found. In addition, they should work out the answers to all the activities in the section either as assignment for class discussion or for scoring for individual learner records.

LESSON 2: FEATURES RELATED TO RIVERS IN AFRICA (EROSION AND DEPOSITIONAL FEATURES)

Learning outcome

By the end of this lesson, the learner should be able to describe the various physical features resulting from river erosion and deposition.

Introduction

Rivers are some of the main agents of erosion and deposition on the earth's surface. As they erode and deposit materials, the surface of the earth is modified with new features gradually forming. Examples of features resulting from erosion are valleys formed as the river excavates along its channel. The numerous rivers in Africa flow through these valleys. Other features include gorges, rapids and waterfalls.

As the river deposits its load in the lowland areas new features are created. Such features include flood plains, meanders, ox-bow lakes, alluvial fans and river braids. At the mouth of a river it may form a delta or an estuary.

As you teach this section ensure you guide learners to give examples from their local environment and Rwanda in general before leading them to other areas in Rwanda.

Teaching aids

The following are appropriate teaching resources that would make the learners understand the concepts easily. You may also use any other resource that may add value to the lesson.

- Recommended learners book,
- Atlases and wall maps,
- Map of Africa showing major rivers
- Diagrams of the different features formed through river erosion and deposition.

Learning activities

Learners are required to identify or draw diagrams of the various features and for each include a description of the process involved in its formation. It is important to plan for sufficient time for the learners to participate in the discussion as they also draw the diagrams.

To achieve this, arrange learners in groups for this lesson. Each group will then have a specific task to perform, for example:

Group I – Discussing features formed by river erosion

Groups II and III – Discussing features formed by river deposition

Each group will then be expected to prepare a table similar to the one given below, which will summarise all the features to be discussed in this lesson.

Features related to rivers in Africa

GROUP I		
Features formed by river erosion		
Feature	Mode of formation	Examples
Stream cut valleys		
Gorges		
Water falls		
Rapids		
GROUP II		
Features formed by river deposition		
Alluvial fans		
Flood plains		
Meanders		
GROUP III		
Ox-bow lakes		
River braids		
Deltas		

In addition, avail to them illustrations and supporting diagrams that will help them explain each feature better, as well as demonstrate how each feature looks like.

It is also important that before this lesson, you ask them to read ahead and prepare for this presentation, because it involves research from other geographical materials other than their learner's Book as well as the Internet.

As a guide, ensure that you have an appropriate map of Africa showing the major rivers especially those with deltas as features that learners are able to identify on a map.

Note:

Work out the answers to the activities within this section in the learners' book. Plan your time so that you have time for the learners to answer the questions and to discuss in class. In addition, ensure you involve the learners in the following activities among any other that you may deem effective:

- Using the Atlas to identify rivers,
- Drawing diagrams on features formed by river erosion
- Asking and answering questions,
- Class discussions and presentations,
- Learners taking notes

Synthesis

From their local environment and using Rwanda as a case study, learners are to be tasked to show the major rivers so that they can use them to identify those places where there are certain features formed by rivers. Ensure that you carry out a research before hand with an intention of guiding them through this section.

Assessment

With the help of diagrams, each learner should complete the following table.

Feature	Formed due to Erosion	Formed due to deposition
River braids		
Deltas		
Stream cut valleys		
Flood plains		
Meanders		
Gorges		
Water falls		
Flood plains		
Meanders		
Ox-bow lake		
Rapids		

LESSON 3: IMPORTANCE OF RIVERS, LAKES AND WETLANDS IN AFRICA

Learning objective

By the end of the lesson, the learner should be able to evaluate the importance of water bodies in Africa.

Introduction

Many African governments recognise the value drainage systems such as rivers, lakes and wetlands as resources that are important especially for a developing economy. The management and conservation of drainage systems is as a result of this recognition. Water resources must be properly managed to sustain water supply for industrial and domestic use as well as for irrigation. In some countries, rivers are a source of hydroelectric power.

Learners should give some of the key uses of rivers, lakes and wetlands and for each use they should give examples in Africa.

Learning activities

Before this lesson, ask learners to obtain photographs showing the importance of rivers, lakes and wetlands.

Start the lesson with a brainstorming session where learners will mention some of the things directly obtained from rivers, lakes and wetlands. Proceed to arrange learners into groups to discuss the following question:

With examples from your local environment and Rwanda in general, discuss reasons why rivers, lakes and wetlands are important.

Ensure that as they discuss, they take notes that one of them will use to present to the entire class.

It is also important that you ask learners to obtain appropriate maps and photographs showing utilisation of rivers and lakes in Africa. This can be from the library, the Internet, available geographical sources as well as other relevant reference materials.

Let one of the learners lead the class in studying and interpreting these photographs. You also need to have comprehensive notes and questions on the importance of rivers and lakes to use as you introduce the topic to the class.

Next, organise the class into groups to work on **Activity 6.8** of their books and guide them to write down correct points for discussion. You could assign each group a task to research on for class presentation to avoid repetitions.

In addition, ensure you they look for information on how different countries use their rivers, lakes and other water resources so that you can compare with Rwanda.

Let them work out answers to the activities in this section and ensure you plan on how much time the learners will take to answer the questions and discuss them in class.

As the lesson progresses you will also find it necessary to use the following learning activities and any other that you may find appropriate:

- Asking and answering questions
- Identifying rivers and lakes and features showing their exploitation,
- Studying photographs,
- Group and class discussions,
- Learners taking notes

Teaching aids

To deliver this lesson effectively, the following may be appropriate teaching resources that would make the learners understand the concepts easily. You may also use any other resource that may add value to the lesson.

- Recommended learners book
- Atlases and wall maps
- Map of Africa showing major rivers, lakes and wetlands
- Diagrams and photographs showing various activities along rivers, on lakes and in swamps

Synthesis

With examples, ask learners to discuss the negative influence of water bodies to people.

They should develop further the points on importance of lakes, rivers and wetlands in Africa of the Learner's Book and provide more examples where possible. Maps, illustrations, newspaper cuttings and photographs should extensively be used to demonstrate that they have fully understood the concept intended for learning.

Assessment

Each learner is supposed to demonstrate an understanding of the importance of water bodies to people in Africa. To assess this, each is expected to divide the content under the following sub-headings:

- Importance of rivers in Africa
- Importance of lakes in Africa
- Importance of wetlands in Africa

For each, appropriate examples need to be cited, and illustrations, photographs and newspaper cuttings with photos or articles as well.

For example, photos of HEP stations and dams, irrigation schemes, reclaimed wetlands and fishing grounds.

LESSON 4: CHALLENGES TO OBTAIN SUSTAINABLE CLEAN WATER IN AFRICA (WATER SCARCITY, POLLUTION, SILTING/SEDIMENTATION)

Learning objective

By the end of this lesson, the learner should be able to explain the challenges faced in obtaining sustainable and clean water in Africa.

Introduction

The challenges to obtaining sustainable clean water is not a new topic to the learners. These are common problems in most of the African countries.

Water resources in most of the African countries are highly contaminated leading to scarcity of clean water. The contamination could be as a result of poor sanitation and careless discharge of sewage into rivers and lakes. Industrial and other forms of waste also are carried to rivers and lakes making the water dangerous to human health. Increased use of chemical fertilisers also leads to water contamination.

Although many African governments recognise the value of ensuring availability of clean water for their citizens, it is not easy to control the way people use the available water. As a result countries find themselves without clean water and this could continue to the future unless strict rules and other measures are taken to regulate the way water is used.

Teaching aids

Used the suggested teaching/learning resources in addition to any other that you may find appropriate:

- Recommended learners' books
- Atlases and wall maps
- Sketch map of Africa
- Photographs

For effective use of the teaching resources you may vary teaching methods including question and answer, research method, discussion method, photograph and map analysis.

Learning activities

Start the discussion with **Activity 6.9** in the Learner's Book.

Working in groups, let learners suggest the steps that various African governments have taken to provide clean water to the people.

The learners' book outlines eleven challenges facing provision of sustainable clean water in Africa. Divide the class into 4 groups, with each group tasked to explain in detail at least three points, with appropriate examples in each case. Divide the class into groups and assign each group a task to research on for class presentation. You may task a group to research on issues such as use of fertilisers, industrial pollution, poor sanitation and other related challenges.

Encourage learners to obtain appropriate photographs showing improper utilisation of rivers, lakes and wetlands in Africa. Let the learners study the photographs as you guide them by asking questions. You also need to prepare guiding points and questions on the challenges that African countries face in connection of clean water supply.

In groups, learners should work on **Activity 6.10** of their book. Task gifted learners to work out answers to the activities in this section and ensure they share with the rest of the class afterwards. During the period of sharing, ensure the rest of the class takes notes, especially after you have confirmed that what they have come up with is correct.

From time to time, involve the class in question and answer and discussions to ensure that all members are actively involved in the learning process. Organise groups consisting of learners of different abilities. Other recommended activities include the following:

- Field visits

- Asking and answering questions
- Identifying misuse of rivers and lakes and features showing their poor ways of exploitation
- Studying photographs
- Group and class discussions
- Taking notes

Synthesis

Provide learners with photos showing challenges facing sustainable and clean water supply in Africa. For each challenge identified, learners should suggest possible solutions. Other photos should be provided by learners themselves.

Assessment

With Rwanda as a reference point, ask learners to discuss some of the ways the government has used to address some of the challenges to obtaining sustainable and clean water in Rwanda.

END OF UNIT

Summary of the Unit

In this unit, learners will learn about drainage in Africa with specific attention to the major rivers, major lakes and how they were formed, and river features, importance of rivers and lakes and challenges experienced in obtaining sustainable clean water.

In Africa there are many large rivers which includes River Nile the longest river in the world. Other large rivers are the Niger, Congo Zambezi and Limpopo.

Major lakes include Lake Victoria which is approximately 68,800 square kilometres in size. It is the second largest fresh water lake in the world. The other lakes are Lake Chad and the rift valley lakes such as Tanganyika, Malawi, Kivu, Edward and Albert among others.

Rivers form numerous features along their valleys as they erode and deposit sediments. They include water falls, meanders and ox-bow lakes, flood plains and deltas. Rivers in Africa have such features in various points along their courses. For instance River Nile and Niger have large deltas and while river Zambezi has the Victoria Falls.

The importance of rivers lakes and wetlands in Africa is also included in the unit. Uses of these water resources include providing water for domestic and industrial use, irrigation, production of hydro-electric power, transport and fishing activities. Although not all the rivers are utilised to maximum in Africa, many countries have fairly large scale commercial activities that rely on the rivers.

Finally the unit looks at the challenges faced in obtaining sustainable clean water, pollution of water resources and siltation. Sustainability of clean water is a challenge in Africa especially due to climate change that has resulted into less rainfall and extended dry seasons.

Additional information

In Africa there are many rivers and lakes and wetlands. These water resources are supplied with water from rain, snow melt and springs. Many of the rivers in Africa are seasonal such that during the dry seasons they are dry valleys but in wet seasons they have large volumes of water.

Africa's water resources are slowly becoming smaller as the annual rainfall received keep decreasing. This is associated with global warming which not only affecting Africa but also the entire world.

Rivers are agents of land sculpture resulting into formation of a variety of features some of which are small while others are very large. As they erode and transport and deposit their load, the rivers form features of erosion and deposition along the valleys. The features formed are significant to the physical and human environment.

A lake is a mass of water which occupies a basin or depression. Lakes are classified according to their mode of formation. Some are formed due to earth movement, vulcanicity, erosion, deposition and human activities. Africa has lakes formed through each of the processes.

In Africa, there are many lakes formed through human activities and have been created for various purposes. Lake Volta in Ghana (8 502 km²) is the largest human-made lake in the world. Lake Kariba (5 580 km²) in Zimbabwe is fourth largest in the world while Lake Nasser (5 248 km²) is partly in Sudan and a larger part in Egypt, ranks sixth in the world. Other notable lakes include Kainji, Cabora Bassa, Masinga and Lake Kossou. There are many reservoirs that have formed along Africa's rivers as a result of damming these rivers.

There are also sizeable lakes called pans, besides Lake Chad, which are areas of inland drainage. They include Etosha Pan in Namibia, Lake Ngami and Makgadikgadi in Botswana.

End unit assessment

- What is a drainage basin?
 - Name three major drainage basins in Africa.
- Explain how the following lakes were formed:
 - Lake Victoria
 - Lake Tanganyika

For each of the lakes named above, name two examples of other lakes in Africa that were formed in a similar way.
- Draw a sketch map of Africa and on it mark and label the following rivers: Nile, Niger, Zambezi, Orange and Volta. On each one of the rivers, mark and name the position of a major H.E.P. station.
- Explain the causes of water pollution in Africa.
- What role can you play as an individual in managing and conserving water in your locality?
 - Suggest what individual governments should do to manage water resources in Africa.

Answers to End unit assessment

1. (a) Meaning of a drainage basin.

A **drainage basin** is an area of land **drained** by a river and its tributaries (river system). It includes water found in the water table and surface run-off.

(b) **Major drainage basins in Africa**

- Chad basin
- Western Tanzania basin
- Okavango basin
- Lake Turkana basin

2. Explain how the following lakes were formed:

a) **Lake Victoria**

It was formed by down warping.

It was formed when westward-flowing rivers were dammed by an upthrow crustal block. The lake lies within an elevated plateau in the western part of Africa's Great Rift Valley. After formation, the following rivers changed course to drain into the depression, creating a lake in the long run: Sio, Nzoia, Yala, Nyando, Sondu Miriu, mogusi and Migori. Combined, these rivers contribute far more water to the lake than does the largest single river entering the lake from the west, the Akagera River.

Other lakes formed in a similar way are Muhazi, Kyoga, Kachira, Wamala, Bangweulu, Mweru and Chad.

b) **Lake Tanganyika**

Tension forces that led to the formation of the rift valley are thought to have been responsible for the formation of the depression in which this lake occupies. Located within the Albertine Rift Valley in the western branch of the East African Rift Valley, it is confined by the mountainous walls of the valley. After formation, Rivers Rusizi and Malagarasi changed course to flow into the depression formed, filling it up to form the lake. More water came in from rainfall.

It is the largest rift valley in Africa and the second largest lake by volume in the world. It is the deepest lake in Africa and holds the greatest volume of fresh water, accounting for 18% of the world's available fresh water.

Other lakes formed in a similar way are Kivu, Malawi, Albert, Turkana and Stephanie.

3. Draw a **sketch map of Africa** and on it mark and label the following rivers: Nile, Niger, Zambezi, Orange and Volta. On each one of the rivers mark and name the position of a major H.E.P. station.

Refer to the map given in the Learner's Book

4. **Some of the causes of water pollution in Africa:**

- a) Industrial liquid discharges
- b) Poor land use methods causing erosion that results into siltation

- c) Use of chemicals on farms that are washed into rivers when it rains
 - d) Some people bathe, urinate and defecate in water bodies, polluting them. Others wash clothes, cars and other household items in them making them dirty.
 - e) When livestock drinks directly from these sources, they step into the water, polluting them in the long run.
 - f) Oil spillages during transportation also pollutes water sources
 - g) Destroying drugs using explosives while still aboard water vessels also causes pollution
 - h) Accidents, such as aircrafts, motor vehicles and people drowning in water also causes pollution
 - i) Natural hazards such as tsunamis and floods upstream collects dirt into water bodies polluting it in the long run.
5. (a) **Roles we can play as individual to manage and conserve water in our locality**
- Avoid bathing, urinating and defecating in water bodies.
 - We should avoid washing clothes, cars and other household items in water bodies.
 - We can avoid throwing dirt and disposing wastes into water bodies
 - Advise farmers on safer farming practices
 - Educating others on using water sources safely.
- (b) **Suggest what individual governments should do to manage water resources in Africa.**
- Setting up water conservancies to protect water sources
 - Harnessing the potential on water sources such as HEP and constructing transport routes. To benefit from such projects, governments will need to conserve the water sources first.
 - Enacting laws to protect water sources from encroachment
 - Setting in place punitive measures to punish those who use water sources irresponsibly
 - Working with other countries in the use of water sources sustainably especially for shared water bodies such as rivers and lakes.

Remedial activities for slow learners

1. Briefly describe what a drainage basin is.
2. Give two rivers in Africa which have deltas and for each name the country where the delta is found.
3. Differentiate between a meander and an ox-bow lake.

Answers to remedial activities

1. A drainage basin is a depression into which rivers in the surrounding areas flow.
2. River Nile in Egypt and River Niger in Nigeria.
3. A meander is a bend on a river that is formed due to lateral erosion on the river bank. An ox-bow lake is a shallow lake formed when a meander cuts off from the main river due to deposition of silt on the meander neck.

Extended activities for gifted and talented learners

1. Study the table below, and using an atlas, other reference materials and the Internet, identify the names of the dams and rivers over which these lakes have formed. Copy the table in your notebook and fill in the missing information.
- 2.

Human-made lake	Name of dam	Name of river	Name of country
Volta			
Kariba			
Nasser			
Kainji			
Cabora Bassa			

3. Explain how lake Victoria was formed

Answers to extended activities

- 1.

Human-made lake	Name of dam	Name of river	Name of country
Volta	Akosombo	Volta	Ghana
Kariba	Kariba	Zambezi	Zambia and Zimbabwe
Nasser	Aswan High Dam	Nile	Egypt
Kainji	Kainji	Niger	Nigeria
Cabora Bassa	Cabora Bassa	Zambezi	Mozambique

2. There was large scale down warping which resulted into formation of a large basin. It also affected the direction of flow of rivers in the region with many rivers draining into the basin. This led to the formation of Lake Victoria.

Unit 07

ENVIRONMENTAL CONSERVATION

Key Unit Competence

By the end of the unit, the learner should be able to evaluate the methods of environmental conservation.

Prerequisite of this unit

This unit, *Environmental conservation*, was introduced as a subset of many other units in Senior One. Issues relating to environmental conversation were handled when addressing the relationship between:

- Relief and human activities (Unit 5)
- Soil types and human activities (Unit 7)
- Weather and climate and human activities (Unit 8)
- Water bodies and human activities (Unit 10)
- Effects of hazards and man's response to hazards (Unit 11)

In Senior Two, this Environmental conservation was narrowed down to be a study of the measures Rwanda has taken to achieve absolute conservation milestones, including:

- Differentiation between environmental resources and environmental degradation.
- Types of environmental resources in Rwanda.
- Ways of exploiting environmental resources
- Causes and consequences of over-exploitation of environmental resources
- Environmental conservation measures

This unit consolidates this information and presents it under the following sections for ease of understanding:

- Definition of environmental conservation
- Effects of environmental degradation
- Reasons for environmental conservation
- Conservation measures for environmental resources
- Challenges faced in the implementation of environmental conservation measures

Cross-cutting issues

This unit provides the learner with critical information on *environmental conservation*. This is the gist of the unit and will enable the learner to appreciate the dangers of environmental degradation and thus the reason for conservation measures to be applied.

Genocide studies cannot be avoided in this unit because there was massive degradation of the environment during and soon after the 1994 genocide against the Tutsi. There was extensive destruction of forests since there was no government in place to monitor what the

people were doing. As people returned to the country from exile, they had to find places to settle.

Peace and values education is a component of what will be taught in this unit because the genocide was as a result of absence of peace. The importance of maintaining peace in a country is very critical because lack of peace leads to loss of life and property.

Financial education/awareness is relevant in this unit because conservation of the environment involves use of financial resources. Governments and private sector spend large sums of money to ensure conservation of environment is undertaken.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. They will also be able to cope with the evolution of knowledge and technology advances for personal fulfilment. <i>It is expected that learners will acquire this competence from examining the effects of environmental degradation and suggesting practical solutions to each challenge.</i>
Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>Learners need to be encouraged to propose environmental conservation ways not mentioned in class during the normal learning process They can also read widely to find out how they can combine some of the methods to achieve the most from what is readily available to them.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it explain phenomena from gathered information. <i>In carrying out a research on the effects of environmental degradation, learners will understand more about ways in which the environment is destroyed. They can proceed to find out how each problem can be handled to ensure sustainability.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>While preparing presentation from various class activities, encourage learners to use grammatically correct language. They should also be guided on presentation skills, pronunciation and general communication skills.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned an to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>This will be achieved through pair and group work.</i>

Vocabulary/key words/concepts

Environment	All that is around us is our environment. It includes such things as air, vegetation, land and people.
Environmental conservation	Protection and proper utilisation of the natural things found around us such as forests, water, land and air.
Environmental degradation	Processes that lead to damaging or destroying the environment
Endangered species	Species of animals and plants that are threatened with extinction due to misuse of the environment.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What is the definition of environmental conservation?
- (ii) What are the effects of environmental degradation?
- (iii) What are the reasons for environmental conservation?
- (iv) What are the conservation measures for environmental resources?
- (v) What challenges are faced in implementation of environmental conservation measures?

Attention to Special Education Needs

It is important to give special attention to the learners with special needs so that they are not disadvantaged. Ensure you have the appropriate learning materials such as braille and large print for those with **visual impairment**. For learners with **low vision**, you should ensure that they sit near the chalk board so that they are able to read when information is written on the board. Those who have **hearing impairment** should be provided with sign language interpreter and books written in sign language.

If you have to organise for outdoor learning, you must ensure that learners with **physical disabilities** are well taken care of especially those who have difficulties in movement.

List of lessons

Lesson 1	Definition of environmental conservation and effects of environment degradation
Lesson 2	Reasons for environmental conservation and conservation measures for environment resources
Lesson 3	Challenges faced in implementation of environmental conservation measures

LESSON DEVELOPMENT

LESSON 1: DEFINITION OF ENVIRONMENTAL CONSERVATION AND EFFECTS OF ENVIRONMENT DEGRADATION

PART I: DEFINITION OF ENVIRONMENTAL CONSERVATION

Learning objective

By the end of this lesson, the learner should be able to apply knowledge to explain various components of the environment.

Introduction

The environment around us has numerous resources that sustain life on the earth. The earth is made of the land on which we live, the sea that hosts millions of living things and the atmosphere from where we get air and rain water. Just as we care for the homes where we live, the earth as the home of all the living things must be taken care of for it to continue supplying the resources that sustain life on it. Environmental conservation entails caring for these resources around us by ensuring that there is no misuse, mismanagement or depletion of the same resources that we depend on.

Careless exploitation of forests, poor methods of cultivation, pollution of water and the atmosphere leads to environmental degradation. To recover from these situations, conservation measures must be employed.

As you teach this section, ensure that the learners are able to enumerate the various components of the environment, apply knowledge to explain these components using the local environment and appreciate the importance of various environmental resources.

Teaching aids

To achieve the best learning outcomes, the following teaching/learning resources are recommended:

- Recommended learner's books
- Local environment
- Relevant photographs and maps
- Internet

Learning activities

Start this lesson by reminding learners that this topic is related to Unit 12 of Senior 2 Learner's Book. It is important that they obtain their senior 2 books for ease of reference.

Start the learning process with **Activity 7.1**. Representatives from each group should list the points discussed on board. Ensure that all the points listed are correct. With reference to knowledge gained from senior 2, ask learners to work in the same groups they worked in for the first activity to attempt **Activity 7.2**.

They can prepare a simple table, in one column showing renewable resources and the other showing non-renewable resources. The groups can then exchange their findings then get representatives to present correct responses.

Using suitable maps of Rwanda showing resources, explain how important each of the resource shown is to the people. They may also identify relevant photographs on utilisation and conservation measures.

Afterwards, ask them to prepare notes on what they understand by environmental conservation.

At random, allow for class presentations to ascertain the accuracy of the information collected.

Synthesis

For this lesson to be understood better, learners are required to understand how people use the resources in the environment to satisfy their needs. The absence of these resources therefore means loss of livelihoods and in some cases, difficulties in survival in other instances.

To gauge learners understanding, ask them to form five groups, with each tackling one of the following units in reference to Senior 2 Learner's Book:

Unit 8: Soils in Rwanda

Unit 16: Forestry in Rwanda

Unit 17: Fishing and fish farming in Rwanda

Unit 18: Mining and quarrying in Rwanda

Unit 22: Tourism in Rwanda

Each group should show how Rwanda benefits from each resource discussed in those units then prepare a class presentation from it.

Assessment

Learners should, on individual basis, try to analyse some of the problems people will encounter in the absence of the resources discussed in their respective groups.

Let them write their points in summary to be presented in the next class.

PART II: EFFECTS OF ENVIRONMENTAL DEGRADATION

Learning objective

By the end of this lesson, the learner should be able to identify and explain the effects of environmental degradation.

Introduction

The environment around us has numerous resources that sustain life on the earth. The earth is made of the land on which we live, the sea that hosts millions of living things and the atmosphere from where we get air and rain water. Just as we care for the homes where we live, the earth as the home of all the living things must be cared for to continue supplying the resources that sustain life on it. Environmental conservation entails caring for these resources around us by ensuring that there is no misuse, mismanagement or depletion of the same resources that we live on.

Careless exploitation of forests, poor methods of cultivation, pollution of water and the atmosphere lead to environmental degradation. To recover from these situations, conservation measures must be employed.

As you teach this section, ensure that the learners are able to enumerate the various components of the environment, apply knowledge to explain these components using the local environment and appreciate the importance of various environmental resources.

Teaching aids

To achieve the best learning outcomes, the following teaching/learning resources are recommended:

- Recommended learner's books
- Local environment
- Relevant photographs and maps
- Internet

Lesson activities

Start the lesson by asking learners to state what they understand by the term '**Environmental Degradation.**' This will lead them to question 1 of **Activity 7.3**

.

Ask them to collect photos from the local environment showing the environmental degradation. You may also help them by providing additional photographs on environmental degradation and conservation measures. Prepare notes and guiding questions to ensure the flow of ideas is logical to ensure learners' attention is focused. Acquaint yourself with the activity in the section to ensure you have points that you can use to guide the learners as they discuss their findings. Be keen on how the learners interpret the photographs for **Activity 7.3** and **7.4** in the learner's book. Other recommended activities for the lesson are:

- Map and photograph analysis
- Map and diagram sketching
- Note taking
- Asking and answering questions

If you to take the class for outdoor learning, ensure you take precaution by avoiding such areas as steep slopes and other areas where learners may get injured. You must more cautious with the safety of learners with special needs.

Synthesis

In order to achieve the intended objective of the lesson, ensure the learners read through the text and work on the activities provided in the section. With proper guidance and ideal learning environment, they will be able to synthesise the information for proper understanding of the concept. Ensure they achieve the **competencies of observation** as they view the local environment and **photograph interpretation** as they work on **activities 7.3 and 7.4**.

Assessment

Learners to carry out a research on the effects of environmental degradation. They can use the guiding notes given on effect of environmental degradation in the Learner's Book, which they will explain further. Each learner should then write a comprehensive report to be presented in the next class.

LESSON 2: REASONS FOR ENVIRONMENTAL CONSERVATION AND CONSERVATION MEASURES FOR ENVIRONMENTAL RESOURCES

PART I: REASONS FOR ENVIRONMENTAL CONSERVATION

Learning objective

By the end of this lesson, the learner should be able to explain the reasons for conserving the environment.

Introduction

It is wise to begin this section by drawing learners' attention to the state of the environment in the local area and in Rwanda in general. It is from their experience and observations that you will be able to effectively teach on the reasons for the need to conserve the environment. Under this subunit you will ensure you include in your teaching discussions on the beauty of the natural environment, effects of global warming, environmental and natural resources sustainability, threat on endangered species among other reasons for conservation.

This sub-unit is quite wide and requires that learner get fully aware why natural resources especially those in their local environment must be conserved. As indicated in the learners' book, unless resources whether renewable or not are used sustainably, they will get depleted and people will suffer. Some of the resources like water and air are so crucial to live that no living organism can survive without them yet they are either polluted or mismanaged.

Resources must be exploited with a lot of care for sustainability. The various ways that have been suggested in the learners' book may not be exhaustive and so learners must be engaged to make suggestions and to research for more. This will enable them focus on what can be done in Rwanda to ensure the resources are well utilised.

Teaching aids

To achieve the best learning outcomes, the following teaching/learning resources are recommended:

- Recommended learner's books
- Local environment
- Newspaper articles highlighting environmental conservation
- Relevant photographs and maps
- Internet

Learning activities

Ask learners before the lesson to identify areas within the local environment or any other areas in Rwanda that are suitable for teaching/learning this lesson.

It is important that in this lesson, you emphasise **environmental conservation** as a **cross cutting issue**. **Learners should understand that environmental conservation is a collective responsibility involving all people. Its therefore neither for the selected few in the society nor the government.**

Form groups in advance, with the group leader in each case tasked to help members of the group tackle the activities in the section to ensure that they have points that they can use during their discussions. Remember, group discussions promote **teamwork** and **cooperation**.

Let learners make appropriate during class discussions, especially when **Activity 7.5**. On your part, ensure you have sample answers to all the questions in the Activities and any other relevant questions to guide class discussions.

Where possible, organise field visit so that the learners may view practical examples of an area where environmental conservation has been undertaken. Other activities to include:

- Locating areas on maps
- Identifying activities undertaken
- Class presentations
- Drawing of maps
- Taking notes

It is important to ensure that care is taken as the learners walk to areas away from the school compound. Avoid steep areas where accidents could easily occur.

Synthesis

In order to achieve the intended objective of the lesson, ensure the learners read through the text and work on the activities provided in the section. With proper guidance and ideal learning environment, they will be able to synthesise the information for proper understanding of the concept. Ensure they achieve the **competencies of observation** as they view the local environment and **photograph interpretation** as they work in groups on **Activities 7.5**.

Assessment

The reasons for environmental conservation are outlined. For each reason, ask learners, working in pairs, to give examples and look for photographs from the Internet, magazines and other geographical sources to support their further explanations. Ensure you check their work before the next lesson to ensure that what they have come up with is according to the expectations.

PART II: CONSERVATION MEASURES FOR ENVIRONMENTAL RESOURCES

Learning objective

By the end of this lesson, the learner should be able to identify and describe different measures for environmental conservation.

Introduction

This section requires use of examples from the local environment and from the rest of Rwanda. You may need to discuss the conservation of wetlands some of which have dried up or polluted. How are they being conserved? There is extensive soils erosion especially on the slopes of hills where farming is carried out. What conservation measures are in place? Forests resources are on very high demand in Rwanda. What has been done to control over-exploitation and re afforestation? Talk about wildlife conservation in the national parks and reserves. All these resources have been threatened or degraded in Rwanda and currently measures are employed to ensure the environment is sustainably used.

Teaching aids

To achieve the best learning outcomes, the following teaching/learning resources are recommended:

- Recommended learner's books
- Local environment
- Relevant photographs and maps
- Internet

Learning activities

Introduce the lesson with **Activity 7.6**. For this activity, they are expected to work in groups. Each group is to prepare a class presentation.

After presentations, learners should group environmental conservation measures into individual responsibilities, society's responsibilities (including the work of NGOs) and government responsibilities. For each of the groups mentioned, they should state ways they can actively be involved in the conservation process.

It is equally important for learners to identify suitable maps and photographs of the local environment or of Rwanda showing areas where different forms of environmental conservation have been employed. Examples are afforestation, contour farming and

conservation of wildlife. They may also identify relevant photographs on environmental conservation measures for use during the lesson. Prepare notes and guiding questions to ensure the flow of ideas is logical and to ensure learners' attention is focused. Involve the learners in the following activities:

- Group discussion as they work on **Activity 7.6** in their book.
- Class presentations
- Viewing of local environment
- Note taking
- Map and photograph analysis
- Map sketching
- Asking and answering questions

Ensure that the learners have worked on the activities in the section so that they are all fully involved in class discussion and answering questions.

Synthesis

Environmental conservation was a common point of discussion for most topics of Senior 2, including Soils in Rwanda, Vegetation in Rwanda, Drainage in Rwanda, Forestry in Rwanda, Fishing in Rwanda and Mining and Quarrying in Rwanda. In different groups, ask learners to revisit some of these units then prepare a brief explanation of how environmental conservation was tackled in each case. Afterwards, they should prepare a comprehensive report to be read aloud in class.

Assessment

Learners are expected to complete the following table with conservation measures in Rwanda that you will mark afterwards:

Water conservation	Forest conservation	Soil conservation	Land conservation

LESSON 3: CHALLENGES FACED IN IMPLEMENTATION OF ENVIRONMENTAL CONSERVATION MEASURES

Learning objective

By the end of this lesson, the learner should be able to analyse the challenges faced in the implementation of conservation measures.

Introduction

This is yet another part of the unit that can be taught effectively using the local environment. This is because the challenges faced in implementation of environmental conservation measures may vary from one area to another. The ones outlined in the learners' book are very general and may not apply to all the districts or local areas. It is advisable to find out and include the specific challenges that are faced in specific the local areas that learners may be familiar with and include them for discussion. You could use an officer working with the relevant ministry or department as a resource person to get more information on this part of the unit.

Teaching aids

For better delivery of this lesson, the following are the suggested teaching/learning resources learners can use:

- Local environment
- Resource person
- Atlas, maps and photographs
- Recommended text books

Synthesis

Learners of different abilities should be included in each group as they work on **Activity 7.7** in the Learner's Book. All learners should take part during class presentations and any other activities.

Ensure you have improvised learning materials and appropriate learning environment for use by learners with special needs to do their research.

Learning activities

Introduce the lesson with **Activity 7.7** in the Learner's Book. This activity can be done in a similar way the one they did in the assessment section of the previous lesson was done. Using the following table, ask learners to complete the following table:

Challenges to water conservation	Challenges to forest conservation	Challenges to soil conservation	Challenges to land conservation

Through pair work, they can read the points given in the Learner's Book on the challenges faced in implementation of environmental conservation measures, then fill the table appropriately. Where necessary, they can cite examples from their local environment. Better still, they can use the Internet and newspaper cuttings to support their responses.

Let them make appropriate notes to guide them during class. In addition, learners can be involved in:

- Question and answer sessions
- Researching to identifying challenges of conservation
- Class presentations and discussions
- Note taking

In case you wish to take the learners for outdoor learning, ensure they are well guarded during any outdoor learning sessions. Avoid steep areas and any other areas where accidents could easily occur.

Assessment

In groups, learners should discuss the consequences of failure to conserve the environment. They should then prepare comprehensive notes for class presentation during remedial learning. Ensure that you vet their work prior to presentations to ensure that only correct responses are explained by the different presenting groups.

END OF UNIT

Summary of the unit

This unit deals with conservation of the environment. The specific concepts captured are definition of environmental conservation, effects of environmental degradation, reasons for environmental conservation, conservation measures for environmental resources, and the challenges faced in implementation of environmental conservation measures.

Environment refers to our surroundings. It consists of all living and non-living things that we see around us. Conservation on the other hand refers to protection, preservation and proper utilisation of natural resources that make up the environment. This is done in order to avoid misuse, destruction and wastage. Conservation can be done in small scale by individuals as well as on large scale through organised process undertaken by groups of people or through government efforts. Effects of environmental degradation include depleted forests, soil erosion reduced and pollutes water resources and polluted air among other effects.

Reasons for environmental conservation as alluded to earlier is to protect the resources and so that they are available for our use whenever we need them. Conservation measures that are employed depend on the resources being conserved.

This section requires use of examples from the local environment and from the rest of Rwanda. You may need to discuss conservation of wetlands some of which have dried up or are badly polluted. How are they being conserved? There is extensive soils erosion especially on the slopes of hills where farming is carried out. What conservation measures are in place? Forests resources are on very high demand in Rwanda. What has been done to control over-exploitation and re afforestation? Talk about wildlife conservation in the national parks and reserves. All these resources have been threatened or degraded in Rwanda and currently measures are employed to ensure the environment is sustainably used.

Additional information

This unit is linked to sub-topic area 6: Man and his Environment (unit 11, Hazards) in Senior 1 and unit 12, Environmental Conservation I Rwanda, in senior 2. As you teach this unit, it is important to identify a suitable photographs showing effects of environmental degradation and areas where different forms of environmental conservation measures have been employed. Examples are afforestation, contour farming and conservation of wildlife. You may also identify relevant photographs on environmental conservation measures for use during the lesson. Prepare notes and guiding questions to ensure the flow of ideas is logical and to ensure learners' attention is focused.

Rwanda has many areas where degradation and conservation of environment are evident. It would be more effective to achieve the objective of the unit if learners are taken out on a field study so that they obtain first-hand information on all that is covered in this unit.

If you to take the class for outdoor learning, ensure you take precaution by avoiding steep slopes and other areas where learners may get injured. You must more cautious with the safety of learners with special needs.

End of unit assessment

1. Explain the meaning of environmental conservation
2. Discuss four effects of environmental degradation
3. In groups, analyse the reasons for conserving the environment
4. In pairs, explain three environmental conservation measures
5. In pairs, explain challenges faced in implementation of environmental conservation measures.

Answers to the end of unit assessment

1. **Meaning of environmental conservation:** Environmental conservation refers to the protection and preservation of natural resources from destruction, wastage and loss. **It is also** an umbrella term that defines anything we do to protect our planet and **conserve** its natural resources so that every living thing can have an improved quality of life.

2. **Effects of environmental degradation**

The following are some effects of environmental degradation:

- i) Reduction in the quality of water due to discharge of harmful waste and toxic waste into water bodies.
- ii) Reduction in the quality of air due to pollution.
- iii) Loss of soil fertility due to soil erosion.
- iv) Poor crop production due to soil erosion.
- v) Destruction of natural habitats which disrupts wild animals.
- vi) Climate change leading to rise in temperatures and change in rainfall patterns.
- vii) Increased chances of flooding due to loss of vegetation cover.
- viii) Reduced water flow in some rivers due to deforestation.

3. **Reasons for conserving the environment**

- a) *To sustain human life* - The environment contains all the resources that sustain human life. For example it is important to conserve soils on which crops grow. Without good soils there would be scarce food.
- b) *To protect endangered species* - some species of animals and plants are being threatened with extinction due to environmental destruction. To ensure continuous survival of these species, conservation is necessary.
- c) *To make efficient use of resources* - There are a variety of natural resources for our use. We use these resources in different ways. There is need to control the way we use these resources to avoid wastage and destruction. Some of these resources are renewable and others are non- renewable.
- d) *For the benefit of future generations* - The resources in the environment were handed over to us by those who lived before us. It is therefore important for us to use the resources carefully. We should also improve them for future generations.
- e) *For aesthetic value* - Human beings appreciate beauty. The environment contains features that people admire. It should therefore be conserved.

- f) *For economic value* - A lot of environmental resources are of economic importance to us. The wealth of a nation is measured in terms of the amount and value of resources found within its borders. It is therefore important to avoid over exploitation of the resources. The resources earn the country some revenue.
- g) *To curb global warming* - Global warming is the general increase in average temperatures around the world. This increase causes climate change.

4. **Examples of environmental conservation measures**

- (i) *Creating public awareness* - People are made aware of the need to conserve the environment. This is carried out through the mass media, public gatherings and seminars.
- (ii) *Participation in tree planting* - People are encouraged to plant trees. Farmers are encouraged to practice agro-forestry.
- (iii) *Introduction of environmental education* - Learners acquire knowledge about environmental issues. They also acquire skills to enable them solve the problems facing environmental resources. This can include introduction of environmental clubs in schools. Through these clubs, learners are encouraged to appreciate their environment. Learners also participate in conservation of the environment.
- (iv) *Enacting laws that govern environmental conservation* – These laws help in enforcing proper use of the environment. The laws help in enforcing protection of endangered resources and conservation of natural resources.
- (v) *Recycling of waste materials* – In order to keep the environment clean and healthy, waste materials such as scrap metal, paper and some types of plastics are being recycled.
- (vi) *Rehabilitating land after mining activities* – People involved in quarrying and mining activities are being encouraged to rehabilitate such land. The piles of waste rock are flattened. Sometimes grass and trees are planted in such areas.
- (vii) Setting up organisations and institutions to deal with matters related to environmental conservation. United Nations Environment Programme (UNEP) is an international body which coordinates all matters related to environmental management and conservation. Some Non-governmental Organisations (NGOs) are also involved in the conservation of the environment.

5. **Challenges faced in implementation of environmental conservation measures**

- (i) *Creating public awareness* - People are made aware of the need to conserve the environment. This is carried out through the mass media, public gatherings and seminars.
- (ii) *Participation in tree planting* - People are encouraged to plant trees. Farmers are encouraged to practice agro-forestry.
- (iii) *Introduction of environmental education* - Learners acquire knowledge about environmental issues. They also acquire skills to enable them solve the problems facing environmental resources. This can include introduction of environmental clubs in schools. Through these clubs, learners are encouraged to appreciate their environment. Learners also participate in conservation of the environment.

- (iv) *Enacting laws that govern environmental conservation* – These laws help in enforcing proper use of the environment. The laws help in enforcing protection of endangered resources and conservation of natural resources.
- (v) *Recycling of waste materials* – In order to keep the environment clean and healthy, waste materials such as scrap metal, paper and some types of plastics are being recycled.
- (vi) *Rehabilitating land after mining activities* – People involved in quarrying and mining activities are being encouraged to rehabilitate such land. The piles of waste rock are flattened. Sometimes grass and trees are planted in such areas.
- (vii) *Setting up organisations and institutions to deal with matters related to environmental conservation.* United Nations Environment Programme (UNEP) is an international body which coordinates all matters related to environmental management and conservation. Some Non-governmental Organisations (NGOs) are also involved in the conservation of the environment.

Remedial activities (for slow learners)

1. Identify two examples of renewable resources
2. Briefly explain why soil is a useful resource
3. Explain three measures used in Rwanda to conserve wildlife

Answers to remedial activities

1. Forests and animals
2. Soil supports plants that in turn provide food to humans and animals
3.
 - National parks have been set up to protect wild animals
 - Game rangers are employed to protect the animals from poachers
 - Forest guards are employed to protect forests from illegal felling of trees and from forest fires.

Extended activities for gifted and talented learners

1. Energy consumption is linked to environmental conservation. Explain how sustainable use of energy resources in Rwanda can contribute to environmental conservation.
2. Discuss the interventions that the government has put in place to conserve the environment in Rwanda.

Answers to the extended activities

1. How energy consumption is likely to impact on environmental conservation in Rwanda

Energy consumption is intricately linked to environment and natural resources. It is for this reason that there is need for alternative, renewable energy sources, as a means of reducing tremendous pressure on woody biomass. This can be achieved through:

- Improved environment management through more efficient energy use.

- Providing adequate and affordable energy that is essential for eradicating poverty, improving human welfare, and raising living standards
- Promotion of Compact Fluorescent Lamps (CFL) to households and commercial users will provide opportunities for enhanced efficiencies with real benefits for environmental protection.
- Energy efficiency in the transport sector
- Implement a wood and charcoal efficiency and substitution strategy to counter the deforestation crisis. The application of tools such as Strategic Environmental Assessment (SEA), the Environment Impact Assessment (EIA);
- Energy system Rwanda requires technological breakthroughs that radically alter how the country produces and uses energy. Institutional co-operation and co-ordination is imperative to achieve this goal.
- Promote and to improve mass transport systems to reduce fuel consumption, traffic congestion and pollution.
- Explore and Encourage possibilities of fuel switch to other energy forms.
- Promotion of environmentally friendly technologies in energy and agriculture sectors such as renewable energy/technologies usage in rural areas.
- Create awareness and understanding of available renewable technologies, practices and resources.
- Promote efficient conversion and end-use energy technologies and practices in order to minimise health hazards primarily affecting women and children, and environmental degradation.
- Resolve the issue of fuel wood imbalance through planting of more trees

2. Interventions that the government has put in place to conserve the environment in Rwanda

i) Establishment of the Gishwati-Mukura National Park

This is one of the major actions that Rwanda has taken to preserve and conserve nature. Turning the Gishwati and Mukura forests into a National Park aims to protect the country's ancient rainforests known for a wide range of flora and fauna, including primates, chimpanzees and mammals among others. Gishwati-Mukura is the fourth National Park in Rwanda and it boasts of about 60 species of trees, including indigenous hardwoods and bamboo.

ii) Launch of IUCN Regional Hub in Kigali

The International Union for Conservation of Nature and Natural Resources (IUCN) launched the Forest Landscape Restoration (FLR) Hub for Eastern and Southern African Region in Kigali. The launch of this hub was in line with Bonn Challenge goals in the region. The hub is expected to cover over 24 countries of the region with the mandate of providing resources in terms of financing and the technical capacity to restoration projects and programmes. The Bonn Challenge is a global effort to restore 150 million hectares of the world's deforested and degraded land by 2020 and 350 million hectares by 2030.

iii) *Ratification and Entry into Force of the Paris Agreement*

Before the Climate Change Conference (COP22), in Marrakesh, Morocco, Rwanda joined more than 80 nations to ratify the Paris Agreement on Climate Change – a treaty that aims to limit global temperature increases to 2 degrees Celsius with an ambition to keep increases below 1.5 degrees.

iv) *Joining Climate and clean air coalition*

In Morocco, Rwanda also joined the Climate and Clean Air Coalition (CCAC); a voluntary international coalition of governments, international organisations, the private sector and non-governmental organisations that aims to: reduce emissions of SLCPs, including black carbon, methane and hydro fluorocarbons (HFCs), which are responsible for a substantial proportion of greenhouse gases (GHGs) in the atmosphere and, thus, warming; avoid millions of premature deaths; promote food and energy security; and address near-term climate change created in 2012.

v) *Adoption of the air pollution law*

This law was adopted in 2016 with an intention to govern the preservation of air quality and prevention of air pollution in Rwanda.

vi) *Other efforts to conserve the environment include:*

- Systematic monitoring of development projects to enforce the implementation of environmental management plans for projects that have environmental impact assessments and environmental audits certificates
- Putting in place an air pollution monitoring system among others.
- Conducting environmental audits on public buildings to promote resource efficiency and cleaner production.

Unit 08

POPULATION IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to analyse population problems and solutions in Africa and the rest of the world.

Prerequisite of this unit

Population and settlement is a broad topic whose initial discussion started in Senior One. Areas that learners discussed include definition of population, population structure and composition, population distribution and density, population growth, types of settlement and migration.

In Senior Two, learners got a better understanding of population trends and characteristics by studying population in Rwanda. Areas of discussion were as follows:

- Factors influencing population distribution and density in Rwanda
- Population structure in Rwanda (composition, age and sex)
- Population movements (or migrations) in Rwanda, their causes and effects
- Measures for population control in Rwanda
- Impact of early sex, health risks, HIV and Aids, STDs in Rwanda and possible prevention measures
- Demographic problems in Rwanda and their solutions.

At this point, learners already have the background information of the various factors affecting and influencing population. However, the knowledge they have will now need to be applied on a much large scale (beyond Rwanda), to other countries in Africa.

It is your duty to help learners build on the knowledge gained from the previous classes and come up with correct conclusions on various aspects of the population.

It is also important to emphasise the need for research and specificity especially when needed to cite examples from some countries across Africa.

Cross-cutting issues

Population studies is all about people. In this unit therefore cross cutting issues of *peace, gender and value of education* will be highly applicable. This is because people are expected to coexist in peace. At the same time population structure is viewed from the point of view of gender distribution. Education is valuable when considering issues such as family planning as people should understand the advantages and disadvantages of small and large families vis a viz their income and the country's economy. Population studies are closely tied to social and economic resources of the country. This unit will therefore touch on *financial education*, as it will look at issues of how population relates to levels of income and economic development. *Comprehensive sexuality education* will be touched on when leaning

about birth rates, fertility rates and death rates. Also related to population is *environment, climate change and sustainability* as these are directly influenced by human activities and how much people care about the environment.

Generic competencies

Critical thinking and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>Population studies reveal a number of problems related to population decrease or increase. Learners are expected to think critically about the implication of these changes and suggest possible solutions to each.</i>
Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>This competence will be cultivated when learners come up with suggestions on how to deal with population change in terms of housing, healthcare, education and environmental impact.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>In analysing population structures of selected countries and causes and consequences of over-population in Africa, learners will be required to carry out an extensive research in order to come up with correct conclusions.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>This will be practiced when learners prepare their findings for class presentations.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned an to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>This will be achieved when learners work in groups to deliver on common activities and assignments.</i>

Vocabulary/key words/concepts

Population distribution	How people are spread out in an area such as a country
Population density	Number of people living within a unit area. For instance, number of people per square kilometre.
Population structure	Composition of population by age and gender
Dependant ratio	The ratio of the number of people who are unproductive (children below 15 year and old people over 65 years) in relation to the number of the working population

Birth rate	Number of children born in a year per 1000 people in a population
Death rate	Number of deaths in a year per 1000 people in a population
Fertility rate	This is the average number of children a woman would bear during her lifetime
Growth rate	The average annual percentage change in a population resulting from surplus births over deaths and surplus immigration over emigration

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What is the meaning of population distribution and density? (Africa and rest of the world)
- (ii) What are the factors influencing population distribution?
- (iii) What is the meaning of population structure? (composition, age, and sex)
- (iv) What is population growth and population explosion (birth rate, fertility rate, death rate, growth rate) and its effects in Africa?
- (v) What are the possible ways to control rapid population growth in Africa?
- (vi) What are the types of migration, their causes and effects in Africa?
- (vii) What are population problems (HIV and AIDS, poverty, overpopulation, famine, illiteracy, rural-urban migration, unemployment) and their possible solutions?

Attention to Special Education Needs

Special education needs refers to the needs that learners with various challenges may require to enable them participate fully in the learning process. Such learner require support in learning materials, general learning environment and emotional support.

It is therefore important that special attention is given to these learners with special needs so that they are not disadvantaged. Those who have **hearing impairment** should be provided with sign language interpreter and books written in sign language Ensure you have the appropriate learning materials such as braille and large print for those with **visual impairment**. For learners with **low vision**, you should ensure that they sit near the chalk board so that they are able to read when information is written on the board.

If you have to organise for outdoor learning, you must ensure that learners with **physical disabilities** are well taken care of especially those who have difficulties in movement. **Slow learners** also require attention because they take time to grasp concepts. They require more time and guidance to avoid being disadvantaged.

List of lessons

Lesson 1	Population distribution and density (Africa and rest of the world) and factors influencing population distribution
-----------------	--

Lesson 2	Population structure (composition, age and sex) and population growth/explosion (birth rate, fertility rate, death rate, growth rate) and its effects in Africa
Lesson 3	Possible ways to control rapid population growth in Africa.
Lesson 4	Migrations in Africa (types of migration, causes and effects of migration)
Lesson 5	Population problems (HIV and AIDS, poverty, overpopulation, famine, illiteracy, rural-urban migration, unemployment) and possible solutions

LESSON DEVELOPMENT

LESSON 1: POPULATION DISTRIBUTION AND DENSITY (AFRICA AND THE REST OF THE WORLD) AND FACTORS INFLUENCING POPULATION DISTRIBUTION

PART I: POPULATION DISTRIBUTION AND DENSITY (AFRICA AND THE REST OF THE WORLD)

Learning objective

By the end of this lesson, the learner should be able to describe the population distribution in Africa and the rest of the world.

Introduction

Introduce the subject to the learners by reviewing the knowledge of population studies done in the lower classes. Ask them to generally describe some of ideas they have in relation to the concepts to be learnt concerning the population of the villages where they come from. Remember that population distribution and density in any part of the world are influence by a combination of a variety of factors. Some of the factors are physical, others social-economic, others are political and historical factors. Climate, soils vegetation and relief are examples of the physical factors. Economic factors include availability of job opportunities and productivity of an area.

Population distribution in Africa is very uneven with some of the countries such as Nigeria having very high population while the countries in the unproductive regions such as Mali and Niger, which have large areas of the Sahara Desert, have scanty population. The specific difference between Africa and the rest of the world is the level of development. For the developed world the main population clusters are the large industrial cities and conurbations.

Teaching aids

For better delivery of this lesson, the following are the suggested teaching/learning resources learners can use:

- Local environment
- Resource person
- Statistical Abstract of Rwanda
- Newspaper cuttings showing articles on population
- Atlas, maps and photographs
- Recommended text books

Learning activities

Introduce the lesson with a recap of what learners learned in Senior 2 Unit 13. In a brainstorming session, ask learners to define the following terms as previously learned:

- | | |
|----------------------------|--------------------------------|
| a) Population distribution | b) Population density |
| c) Population structure | d) Population growth/explosion |

Ensure that the definitions given are correct, as this is the basis of the lesson and all the other lessons in this unit.

In groups, ask learners to use the map of Rwanda provided in Senior 2 Learner's Book to identify areas with low population and those with high population. Similarly, they should suggest reasons why some areas have low population while others have high population.

In a class presentation, let the learners discuss their findings. Relate the points generated to the factors influencing population distribution in Africa. This will usher them to **Activity 8.1** in the Learner's Book.

Within the same groups, ask them to attempt this activity, as they compile their responses for further discussions.

During the class discussions, ensure that all members participate. Encourage the **slow learners** to participate in the discussion. It is also important that the groups constituted be representative of all learners, to demonstrate to the learners that **cooperation** and **sharing** is important in the learning process.

Synthesis

Give learners **Activity 8.2** on **page 115** and **Activity 8.3**. From these activities, learners will be involved in calculating population density in various countries. This is important because it is a way of acquiring **numeracy competence**.

Assessment

Using the Internet, ask learners to find out the population density of Rwanda. Using the local environment let them give reasons that explain whether they are in a low, medium or high populated area.

For fast learners, ask them to suggest some of the reasons why the inhabitation in their local environment is as they have found out.

For slow learners, ask them to suggest things or activities that may be responsible for attracting people in the area they are staying.

Thereafter, let them present their findings for corrections.

PART II: FACTORS INFLUENCING POPULATION DISTRIBUTION

Learning objective

By the end of this lesson, the learner should be able to identify factors influencing the density and distribution of population in Africa.

Introduction

In any country, the distribution of the population is influenced by both physical and human factors. Among the physical factors are relief, climate, soils, drainage and vegetation. Those parts of Africa that have cool and wet climate and those with fertile volcanic or alluvial soils have dense population. This explains why the cool highlands of East Africa and the Nile valley are among the most densely populated parts of the continent. Human factors such as urbanisation and industrialisation lead to clusters of population in some areas such as Johannesburg in South Africa and Cairo in Egypt. The less productive desert areas have very low population.

Teaching aids

For better delivery of this lesson, the following are the suggested teaching/learning resources learners can use:

- Local environment
- Resource person
- Map of Africa showing population areas of low population and high population
- Photographs showing densely and sparsely populated areas
- Atlas, maps and photographs
- Recommended text books

Learning activities

Start the lesson by organising learners into groups to discuss the population distribution in the areas around the school and establishing why there are settlements in some areas and not others. Afterwards, ask them to work on the **Activity 8.4** in the learner's book as they apply the knowledge on the local area and Rwanda as a whole.

Ask one of them to read through the content given in the Learner's Book, then apply the same logic to explain how this has influenced population distribution in Africa. During the discussions, let them write brief notes on each factor influencing population distribution then present their findings in a report form to you for correction.

It is important as well for learners to refer to a map of Africa and also a map of Rwanda showing population distribution to enable them locate the areas of high population and those with low population.

It is the responsibility of the learners to prepare notes on population distribution. Working in groups, ensure that the class is divided into groups, each with a task to research on specific factors and present their findings.

Synthesis

To gauge their understanding, ask learners to attempt **Activity 8.5** in the Learner's Book on an individual basis then prepare their answers for class presentation in the next lesson. It is important for you to have proposed answers in order to correct them during their presentations. Also keep in mind that it is your responsibility to guide their grammar, pronunciation and public speaking skills during presentations because such forums enable them to develop such skills further.

Assessment

Learners to find out from their parents or guardians reasons why they are settled in areas where they currently live. They should then relate these factors to the one discussed in class then prepare a presentation.

LESSON 2: POPULATION STRUCTURE IN AFRICA AND THE REST OF THE WORLD; AND POPULATION GROWTH AND EXPLOSION AND ITS EFFECTS IN AFRICA

PART I: POPULATION STRUCTURE IN AFRICA AND THE REST OF THE WORLD

Learning objective

By the end of this lesson, the learner should be able to analyse the population structure in Africa and the rest of the world using population figures.

Introduction

Structure of population is the characteristic of population in terms of age and sex (gender). The structure can be represented graphically using population pyramids that show proportions of males to females in each age group. The bars can represent absolute population or percentages. Each population cohort is represented by a bar where the bars for males is to the left and those for females to the right. Make a brief review of what the class learnt about population structure in lower classes and build on this knowledge. Use question and answer method to find out how much they can remember.

Introduce the topic by asking the learners to describe what structure of population is then use statistics for a given country to explain and to draw a pyramid. Ensure they are able to differentiate between population structures for developed and those representing developing countries. For each structure, discuss the features that contribute to the shape of the pyramid ensuring that you apply to the Rwanda situation.

Teaching aids

For better delivery of this lesson, the following are the suggested teaching/learning

resources learners can use:

- Population pyramids of selected countries drawn on charts
- Atlas, maps and photographs
- Recommended text books
- Internet
- Map of Africa showing population areas of low population and high population
- Photographs showing densely and sparsely populated areas

Learning activities

In lesson 1, learners defined some of the terms related to population. Against this background, ask them to write in their notebooks what they understand by the term population structure. They should then exchange their notebooks then check if what their classmates have written is the correct explanation.

Ask one of the learners (with disability will be more appropriate) to read out the meaning of this term aloud as others crosscheck what they have in their books.

In pairs, ask learners to go through the information given in the Learner's Book then summarise some of the things that contribute to the structure of the population of Africa. They should identify the negative things as well as positive things that different countries derive from the structure of their respective populations.

Synthesis

Using **Activity 8.6** on **page 122**, let learners discuss the differences and similarities between some of the African countries mentioned. Divide them into groups, each to discuss differences between the population structures of Kenya and Nigeria, Egypt and South Africa and Rwanda and Uganda. They should then prepare a class presentation in the next lesson.

This activity is important because it promotes **research skills** as well as **critical thinking** resulting from **analysis** of information in order to arrive at **conclusions**.

Assessment

Activity 8.7 will be important as a yardstick to gauge the understanding of learners for this lesson. They should therefore try their best to explain what can possibly be done to lower the high fertility rate the African continent is experiencing.

For fast learners, ask them to suggest natural factors that can lead to a decline in population as well as human factors that can have the same result.

PART II: POPULATION GROWTH AND EXPLOSION AND ITS EFFECTS IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to explain the causes and consequences of over population in Africa.

Introduction

Population growth in most of the African countries is quite rapid and is generally characterised by large families whose living standards are low. A rapidly growing population exerts pressure on the county's economy unless there is proper planning and an economy that is equally growing rapidly. On the other hand a rapidly growing population is an indication of availability of labour so long as people are in good health. Although some of the African countries do not have very large population, the growth rate is still high compared to the growth of their economies. Population growth rate is closely linked to the birth rate, fertility rate and mortality rate.

In this section you should ensure that learners understand the effects of rapid population growth in Africa and in their own country. This may prompt them to advocate for control measures in later years.

Make a brief review of what the class learnt on population structure as this is closely related to growth. Discuss the factors that lead to rapid and slow population growth.

Introduce the topic by talking about the number of children in the villages where the learners come from to give a picture of population growth. You could use the sizes of the primary schools in terms of population. The more the children the clearer the picture of rapid growth of population.

You may need to compare rural and urban population structure and growth to discover the effect of rural urban migration to the growth of population in urban areas.

Teaching aids

For better delivery of this lesson, the following are the suggested teaching/learning resources learners can use:

- Recommended text books
- Internet
- Map of Africa showing population areas of high population
- Photographs showing densely populated areas

Learning activities

Population growth can either be positive or negative.

In pairs, ask learners to discuss what they understand by positive and negative population growth.

In the introductory activity of this unit, learners defined various terms related to population. They must have defined population growth as well. In their respective groups, let them compare the meaning of **population growth** and **population explosion**.

While studying the information given on page 106 of the learner's book, let them explain what they understand by the term numerical population growth. This will be confirmed by their ability to tackle **Activity 8.8** on **page 123** of the Learner's Book. Using Rwanda as their case study, provide them with the statistics on the population for successive years such as 2012, 2013, 2014, 2015 and 2016 that they will use to calculate the annual population for Rwanda. Allow for class presentation afterwards.

Summarise the lesson with the following group work:

- a) Ask learners to carry out a research on the birth rates, death rates, fertility rates and growth rates of selected countries in Africa. They should then prepare a class presentation from their findings.
- b) For fast learners, ask them to explain the relationship between birth rates and death rates as a process in synthesising population growth concept.

Individual work should be obtained from **Activity 8.9** on **page 125** of the Learner's Book.

From all these activities, each group should prepare a class presentation.

Working in groups during this lesson is important because not all learners are strong in **numeracy**. With the various activities outlined for this lesson, this will enable the learners to **cooperate** in their work, creating dependency and the value of **sharing**.

Synthesis

Slow learners should draw the population pyramid of Rwanda then from it calculate the dependency ratio as a factor of population indicator.

For fast learners, they should draw the population pyramid of Rwanda between two successive censuses (for example in 2002 and 2012). They should then calculate the numerical population increase between the two censuses identified.

Each group should prepare a class presentation from their findings.

Assessment

An understanding of the factors that contribute to population growth in Africa is the first step towards understanding some of the ways of controlling rapid population in Africa.

Using the points outlined in the Learner's Book, ask learners to give examples from Rwanda now has a slower rate of population growth been achieved through a combination of these factors.

They can as well use newspaper cuttings, citations from various Internet sources and other geographical materials.

LESSON 3: POSSIBLE WAYS TO CONTROL RAPID POPULATION GROWTH IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to evaluate the possible solutions to the problems related to over population in Africa.

Introduction

Different countries apply different ways of taking care of rapid population growth. Some countries have used force on families to control the number of children because the consequences are painful to the economy in general as well as to individual families. It would be important to read about India and China to find out what the governments in the two countries have done in attempt to slow down the population growth. This was dictated by a wide range of negative effects on the economy and on individual families. The situations had become desperate and no country wishes to reach that point.

For most of the countries in Africa whose economic growth is so slow, it would be advisable to apply measures that would slow down population growth without hurting or offending individuals. Measures such as creating awareness and using family planning method should be put in place to ensure the population growth is slowed down. The rapidly growing population has exerted pressure on the land, the resources and the governments leading to environmental degradation, poverty and other related consequences yet most people rely mainly on agriculture.

What are the solutions? Briefly review what the class learnt on population growth then introduce the solutions through question and answer discussions.

Teaching aids

For better delivery of this lesson, the following are the suggested teaching/learning resources learners can use:

- Recommended text books
- Internet
- Photographs of some of the tools used in controlling population growth
- Learners environment

Learning activities

Introduce the lesson with a brainstorming session where learners will discuss some of the factors that lead to rapid population growth. As the discussion progresses, ask one of the learners with physical impairment to summarise the points in their notebook to be read out aloud after the discussion.

Proceed to form three groups in which learners will read through the various ways outlined in the Learner's Book. Let them explain how Rwanda has managed her

population through a combination of the factors outlined. Each group will handle three ways discussed and then prepare brief notes for class presentation.

Each group should have one of them to present to the entire class their findings. As they present, guide them so that only correct responses are written in Learner's Book. This is because as presentations will be on going, learners are expected to be taking notes.

Synthesis

Learners to classify the strategies the government uses as well as those used by individuals to manage population growth.

Assessment

Learners to carry out a research on other ways, other than the ones given in the learner's book of managing population growth. Encourage them to carry out a research from various geographical sources, including the Internet, so that they obtain as many points as possible.

After the research, they should prepare a class presentation where other members of class will discuss their findings. Ensure that correct answers are written down by learners for future reference.

LESSON 4: MIGRATIONS IN AFRICA (TYPES OF MIGRATION, CAUSES AND EFFECTS OF MIGRATION)

Learning objective

By the end of this lesson, the learner should be able to identify the types, causes and effects of migration in Africa

Introduction

Population migration is a temporary or permanent change of resident when people move from one place to another. Migration may involve an individual, a family or a whole community. Movement may be voluntary or forced. It may be internal within a country or external where people move to other countries.

Types of migration include internal and external or international migrations. Causes of migration could be either social such as migrating to seek better education or medical opportunities, political such as caused by civil wars or economic such as migrating in search of employment opportunities. The consequences affect the source place or country and the destination socially and economically. The source area is deprived of people while the population in the destination area increases rapidly.

Introduce the topic by talking about the temporary movement of learners as they come to school and go home in the evening or at the start of school holidays. You should then move to daily labour migration to and from work and other forms of migration that learners are

familiar with. Classify these movement as they apply to internal and external migration. Include the refugee migration and the effect it has on the host countries.

Teaching aids

For better delivery of this lesson, the following are the suggested teaching/learning resources learners can use:

- Recommended text books
- Internet
- Photographs showing migration of people
- Newspaper and magazine cutting highlighting in Africa

Learning activities

Let learners read through the introduction of this section in the Learner's Book then role play the following:

- a) Considering a classroom as a country, ask some learners to behave as **immigrants** and others as **emigrants**.
- b) Within the classroom, ask some of them to shift from a section of the class to the other. Some of them can move out of the class, then walk back in afterwards. This is to demonstrate the concept of **internal** and **international migration**.

After the role play, let them try to define each of the four terms used in relation to population migration.

In a brainstorming session, ask one learner to lead the rest in discussing causes of internal migration. As the discussion will be on-going, guide learner in taking notes.

Proceed to form groups in which they will discuss causes of migration. With appropriate examples, they should explain how each cause mentioned could lead to external or international migration. Where possible, as has been provided in the Learner's Book, they can obtain newspaper cuttings and other sources of photographs to back up their explanation.

Summarise the lesson with **Activity 8.11** in the Learner's Book where they will prepare brief notes on other causes of migration in Africa other than the ones given in the Learner's Book. Allow them to use Senior 2 Learner's Book as part of their reference.

Synthesis

Before during and after the Genocide against the Tutsi in 1994 in Rwanda, there occurred much of the explained movements of people.

Using the knowledge gained from this lesson and from their understanding as explained to them during Genocide Memorial in Rwanda, let them suggest some of the effects of migration.

Afterwards, they should write a report to be presented in Rwanda.

Assessment

Using **Activity 8.12** in the Learner's Book, ask learners to work in pairs in order to generate a presentation on the effects of migrations on an individual. They should then be given chance to present their findings in the next class.

LESSON 5: POPULATION PROBLEMS AND POSSIBLE SOLUTIONS

Learning objective

By the end of this lesson, the learner should be able to explain the population problems in Africa and possible solutions.

Introduction

Many African countries have in common serious problems related to the population. Some of these problems are related to each other. For instance HIV/AIDS which has ravaged a large section of the population in Africa has ended up creating the problem of orphans. Poverty is widespread in the continent and part of it can be linked to overpopulation. Famine and poverty are related in that if the rain fails, it is the poor who suffer most since they do not have any other source of livelihood other than farming. Illiteracy still persists especially among the poor who do not take their children to school for reasons such as using the children to help in income generating activities among other reasons. Rural-urban migration is widespread as people move to urban centres looking for jobs. Since many fail to secure jobs, it increases poverty and becomes a vicious cycle.

There are a number of solutions that different countries have employed to solve different problems. Education and creation of awareness is key in reducing future occurrence of given problems. For instance, increasing campaigns on birth control measures, providing education about HIV preventive measures and enhancing training in skills so that people can be self-employed are some solutions to the problems.

Teaching aids

For better delivery of this lesson, the following are the suggested teaching/learning resources learners can use:

- Recommended text books
- Internet
- Photographs showing densely populated areas

Learning activities

Introduce the lesson with an explanation that demographic problems in Rwanda discussed in Senior 2 are not unique to Rwanda only. There exist similar problems across many countries of Africa.

With reference to **Activity 8.13** in the Learner's Book, ask learners to carry out a research from various geographical sources to find out more about each problem mentioned in the activity, and discuss more other from their research finding. As they discuss, let them prepare brief notes on each for class presentation.

Each of the discussion groups should have equal representation of learners with all abilities to ensure that all learners benefit from the discussion. Slow learners should be given roles such as summarising the findings of the group and reading the out aloud during the presentation as fast learners expound on them and give examples where necessary.

Synthesis

Migration is a phenomenon common to everyone in the class. Based on their experiences, those of their friends and even relatives, let them explain reasons why they think migration is likely to be more advantageous than disadvantageous.

Afterwards, allow them to summarise their findings in a short narration, the best of which should be read out to the class.

Assessment

Provide learners with photographs of densely populated areas and sparsely populated areas in Africa. Using the photographs as a basis for case studies, let them discuss the following points:

- Suggest reasons why they are shown in the photograph as shown
- Discuss some of the things that can be done to decongest the place or encourage people to settle there.
- Give examples in Rwanda which are similar to the areas shown in each photograph.

END OF UNIT

SUMMARY OF THE UNIT

This unit has examined a variety of concepts related to population. While exploring population distribution and density, the unit included the case of Africa and made a form of comparison with the rest of the world. Then the factors influencing population distribution are discussed. Study on population structure considered all the aspects related, among them, the composition, age, and the gender aspects of population in various countries in Africa. Some comparison is made between the structure in developed and developing countries

(Population growth/explosion, birth rate, fertility rate, death rate, growth rate) and its effects in Africa has also been examined in the unit. Calculations to demonstrate how the different aspects are arrived at have been provided. The unit also discusses possible ways

to control rapid population growth in Africa. It also examines migrations in Africa delving into the various types of migration. Causes of migrations such as political persecution, pressure on land and natural calamities are discussed. In addition, effects of migration are also examined.

Finally, the unit examines population problems such as HIV/AIDS, poverty, overpopulation, famine, illiteracy, rural-urban migration, unemployment and possible solutions. While learners are expected to research on some of the problems, the rest are given in a tabular form showing each problem and possible solution to each.

END UNIT ASSESSMENT

1. Explain how the following factors influence distribution of population:
 - (a) Climate
 - (b) Soils
 - (c) Human activities
2. Study the **population pyramid of South Africa** as shown in the pyramid in the Learner's Book.
 - (a) Describe the population structure of South Africa.
 - (b) Suggest reasons for the shape of the pyramid.
 - (c) Discuss the differences between the population structure of South Africa and that of Rwanda (given in Figure 8.5 in the Learner's Book).
3.
 - (a) Write brief notes on the causes of high birth rates in Africa.
 - (b) Suggest **four** ways of controlling rapid population growth.
4.
 - (a) Distinguish between **immigration** and **emigration**.
 - (b) With respect to rural-urban migration, identify the *push* and the *pull* factors responsible for this migration.

Answers to end unit assessment

1. How climate, soils and political and government policies influence distribution of population
 - (a) **Climate:** Areas receiving high rainfall attract people to settle and do farming while those with scanty or no rainfall have very few or no people at all. Places that experience extremes of temperature, that is, very hot or very cold, are not attractive for living in while warm to cool areas are preferred.
 - (b) **Soils:** Areas with fertile and well drained soils attract a lot of settlements because they are agriculturally productive. That is why slopes of volcanic mountains such as Kilimanjaro, Kenya and Rwanda highlands have very many people. Areas with infertile soils are unsuitable for agriculture and attract very few people mainly nomads.

- (c) **Political reasons or government policies:** Political unrest in many parts of the world causes people to migrate and take refuge in other parts of a country or even in foreign countries. This reduces populations in parts of a country while increasing the numbers in other parts or countries. If refugees are settled in a particular area, that part of the country becomes densely populated although initially it may have had scanty population.

Some government programmes may require people to move to other places so as to carry out development programmes in such areas. Building of dams results in formation of large water reservoirs that displace people. An area may be found to have valuable minerals and so people are displaced to give way for mineral exploitation.

2. a) - The population between the age of 0 – 9 years is slightly higher than the population between 10 – 19 years.
- The population between 20 - 34 years (youthful and working population) is higher than any other age group.
- Above the age of 35 years, the population declines
- b) • There is likely to be an emphasis on delayed parenthood which explains a smaller base than the bulging youthful population
• Because of improved health care and high standards of living, the transition rate between children born and the youthful population is high.
• The working population is higher than the young population. This may be an indicator of available employment opportunities
- c) – The dependency ratio in Rwanda is higher than that of South Africa because Rwanda has a smaller working population (between ages 20 and 39) as compared to South Africa.
- The transition rate between births into other age groups is much lower than that of South Africa
- The youthful population in Rwanda is less than that of South Africa
3. Causes of high birth rates in Africa
- People have not embraced family planning wholesomely as they consider it a western way of life
 - Death rate is high, which makes people to give birth to many children so that a number of them grow to old age
 - Polygamy
 - People still see large families as a sign of wealth and a source of livelihood. For example, dowry paid for the girl child is a source of wealth to the receiving family
 - Children are seen as a source of labour for rural families who still rely on farming

4. a) **Immigration** – Movement involving people coming into a region or country
Emigration - Movement involving people coming out a region or country
- b) **Push factors** **Pull factors**
- | | |
|-----------------------|-------------------------------------|
| Political intolerance | Availability of employment |
| Religious conflicts | Improved infrastructure |
| Natural calamities | Improved security |
| Warfare | Availability of social amenities |
| Pressure on land | Availability of land for settlement |

Remedial activities (for slow learners)

1. State three reasons why some parts of Africa have high density of population and other have low density.
2. Briefly explain four causes of population migration in Rwanda.

Answers to remedial activities

1. Reasons why some parts of Africa have high density of population and other have low density.
 - a) **Relief:** Very steep slopes are avoided because of possible landslides and are difficult to cultivate. High altitude areas are uninhabited because they are very cold and unsuitable for crop growing and settlement. Gentle slopes attract large populations. While some flat areas have large numbers of people settled on them, others are avoided because they are prone to flooding.
 - b) **Vegetation:** Dense forest areas have few or no inhabitants while some woodlands such as the Miombo woodlands of Tanzania are infested with tsetse flies and therefore unattractive for settlement. Grasslands which are easier to clear attract many people.
 - c) **Drainage:** Well drained soils are suitable for settlement and agriculture. Poorly drained areas such as swamps and bogs are unsuitable because of waterlogging and presence of disease vectors. Areas in river valleys close to the rivers are avoided. People do not settle on ponds and lakes either.
 - d) **Economic activities:** Large tracts of land that are owned by individuals or companies for economic activities such as plantation farming are uninhabited. There are also other extensive areas that are set aside for conservation of wildlife. These too remain without people. In such situations very many people may concentrate on the much smaller areas that are available for settlement. Other economic activities that attract many settlements include mining centres, transport routes and town and industrial centres.
 - e) **Historical events:** Slave traders invaded some areas. Others have had people displaced through tribal conflicts. During colonization, large numbers of people were moved out of their ancestral land to reserved areas. These events are responsible for low population in some regions and high concentrations of people in others.

- f) **Urbanisation:** Establishment of towns attracts large numbers of people because of the amenities there and better lifestyle and jobs. Movement of people to towns grows the population of the town areas.

Other factors are:

- Climate
- Soils
- Political and government policies

2. Reasons for migrations in Rwanda

The following are the reasons learners will be required to explain more about. Let them give examples in each case.

- Search for better employment opportunities
- Need for better social amenities such as schools, hospitals and recreation facilities
- Job transfers
- Government policy to resettle or relocate people
- Need for land for agriculture
- Population pressure on available land in some places

Extended activity for gifted and talented learners

Suggest the possible solutions to the following population problems in Africa

- (a) Rural-urban migration
- (b) Illiteracy
- (c) High incidents of diseases and the HIV/AIDS pandemic
- (d) High population pressure on the land
- (e) Rural to urban migration

Answers to extended activity

Problem	Possible solution
Rural to urban migration	Provision of social amenities in the rural areas and decentralization of industries to rural areas would reduce movement to towns.
High incidents of diseases and the HIV/AIDS pandemic	There is need for massive education of the people on hygiene and preventive measures for such diseases. Governments need to make provision of medical services a priority including mobile clinics. There is need also for proper massive education about HIV and victims to come out in the open and embrace treatment.

Illiteracy	It is necessary to establish adult education classes in all countries. Governments need to strive to provide free primary and secondary education and make it compulsory for everyone to have at least that basic education. Education for all needs to be made a priority, besides health care.
High population pressure on the land	This may be difficult to tackle because people are already settled. Individualism is an obstacle to land consolidation and communal production of crops. May be efforts to lower the birth rate would ease the pressure in the long term.
High fertility and birth rates	People need to accept family planning measures introduced to them so as to lower the fertility and birth rates. Governments should also introduce incentives to those who accept to take these measures.

Unit 09

URBAN SETTLEMENT IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to assess the impact of urban settlement on development in Africa.

Prerequisite of this unit

In Senior One, learners studied about population distribution and density and types of settlement under *Unit 12 (Population and settlement)*.

In Senior Two, *Rural and urban settlement* taught under *Unit 14* equipped learners with knowledge on the following aspects of settlement, both in rural areas and urban areas:

- Types of settlement
- Characteristics of the various types of settlements
- Advantages and disadvantages of rural settlement groups
- Factors influencing the growth of urban centres in Rwanda
- Problems faced by urban centres and their possible solutions
- The environmental protection measures in urban areas in Rwanda

At this level, learners are expected to build on the knowledge as they study more about urban settlement, with a focus on Africa. For this reason, they are expected to extrapolate their understanding to cover a wider area (Africa), with specific examples in some cases. It is important that case studies have been used at the end of the unit, to demonstrate how realistic this information is. Areas of study will include:

- a) Characteristics of urban centres in Africa
- b) Functions and importance of urban centres
- c) Factors responsible for rapid urban growth
- d) Problems and solutions for urban centres in Africa

Cross-cutting issues

The study of urbanisation is equal to studying one form of the ways that people interact with the environment. This interaction more often leads to degradation. This is because urban centres experience more waste generated in a day than in rural areas. Waste management is one of the common problems facing urban centres. If measures are not put in place to control how people dispose the waste, then degradation may occur. Thus *conservation of the environment* becomes a necessity.

In addition, the study of urbanisation is all about people striving to generate income in different ways for survival. This study will help the learners to acquire knowledge on *financial education* as they will be required to more on necessities of life than in any other

place in the country. For example, they will need to pay for housing, transport, buy water and more importantly, food. In rural areas, these things are either freely available or cheaper. Learners need to understand that saving is a culture that needs to be developed, because every aspect of life requires money to be accomplished.

Peace and values education is applicable in the study of urbanisation in that as people of different origins and cultures live together. They have to forget their differences in order to live harmoniously. The other cross cutting issue applicable is *inclusive education* in that mostly, the education offered in urban centres does not discriminate against children of any cultural background.

Generic competences

Critical thinking and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>This competence will be acquired when learners will be working in groups to suggest how to control problems of urbanisation in Africa.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>In this case, learners will be expected to research on unique characteristics of each urban centre apart from common ones for all of them.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>While working to generate content reports and summaries about urban centres, learners will be expected to communicate in official languages and demonstrate understanding of both written and spoken word.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>This competence will be developed when learners work in pairs and groups to generate or learn required information.</i>

Vocabulary/key words/concepts

Urbanisation	This is the growth and spread of towns.
Social amenities	These are facilities that add value to life, make life comfortable and enjoyable. They include things such as hospitals, schools, social halls, churches, mosques, sports centres and police stations
Environmental degradation	This is the gradual negative change in the environment due to indiscriminate human activities such as waste disposal, mining activities and cutting down of trees.

Central business district	This is the most active part of an urban centre, usually the commercial and <i>business</i> centre. In larger cities, it is often synonymous with the city's "financial <i>district</i> ."
Metropolitan	This is as an area, sometimes referred to as a metro area or commuter belt, or region consisting of a densely populated urban core and its less-populated surrounding territories, sharing industry, infrastructure, and housing.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

(a) Introduction

- (i) What are the characteristics of urban centres in Africa?
- (ii) What are the functions or the importance of urban centres?
- (iii) What factors responsible for rapid urban growth?
- (iv) What are the problems and their solutions in urban centres in Africa?

(b) Case studies

Nairobi, Kampala, Cairo, Johannesburg

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lessons commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Leaners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Characteristics and functions of urban centres in Africa
Lesson 2	Factors responsible for rapid urban growth
Lesson 3	Problems and solutions of urban centres in Africa
Lesson 4	Case studies: Nairobi, Kampala, Cairo and Johannesburg

LESSONS DEVELOPMENT

LESSON 1: CHARACTERISTICS AND FUNCTION OF URBAN CENTRES IN AFRICA

PART I: CHARACTERISTICS OF URBAN CENTRES IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to analyse the characteristics of urban centres in Africa.

Introduction

Urbanisation means the growth and spread of towns. How fast are urban centre in Africa growing? There are many towns in Africa and each has its unique characteristics although there are other characteristics that these towns have in common. For example, large urban centres in Africa have some similar characteristics such as having heavy traffic congestion and shortage of social amenities. There is also development of slums due to rapid population increase that surpasses the rate of provision of proper housing facilities among other common characteristics. Many of the learners are familiar with urban settlements in Rwanda and can apply the knowledge to other urban centres. It is necessary that they are able to comprehend the situation in much larger cities than the towns they are familiar with.

Teaching aids

- Learner's book
- Newspaper articles
- Photographs
- Maps
- Local environment

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Expository approach
- Discussion method
- Question and answer
- Viewing local environment

- Photograph and article analysis

Learning activities

This unit is a continuation of the knowledge learners gained from unit 14 of Senior Two about Rural and Urban Settlement in Rwanda. With such a background, introduce the lesson by revisiting the meaning of the word settlement. In a brainstorming session, ask learners to differentiate between rural and urban settlement. Ensure that you get responses from different learners, balancing them between fast and slow learners. Those with any form of challenge should also be actively involved in the session.

Proceed to tackle the discussion of the day on characteristics of urban centres in Africa.

If possible, allow the learners to make a reference to Senior Two work, especially where they learnt about the characteristics of urban centres. They learnt about characteristics of urban centres in Rwanda. Remind them that characteristics of other urban centres in Africa are almost the same.

Using specific urban areas, compare the characteristics of urban centres across Africa with those of Africa. To achieve this, use **Activities 9.1** and **9.2**. This will be achieved through group work for both activities. Ensure that both groups are well constituted. During discussions, make sure **cooperation** is achieved as all learners are expected to work together.

You can propose a table showing characteristics of urban centres in Rwanda against those across Africa. Arrange a class presentation where learners will compare their findings. Correct them where necessary. Reinforce correct answers with additional explanation. Ensure that every point required to be explained is well elaborated. Involve the class in discussions ensuring that all members participate. Encourage the slow learners to participate in the discussion.

Synthesis

This lesson will be better learnt if approached from the known to unknown point of view. Learners already have knowledge on characteristics of urban centres. Build on this to include other urban areas across Africa. Remember to prepare notes and questions to use during the lesson. Ensure that you have specific examples of local towns such as Kigali that you will use so as to guide the learning from known to unknown. Learners are able to grasp concepts better when they apply knowledge of what they know to the unknown.

Ensure urban centres of different sizes are included in your study, with as large centres as Lagos, Johannesburg and Cairo to as relatively small as Banjul of Gambia, Lome of Togo and Juba of South Sudan.

It's also important to establish a relationship between what is mentioned in the Learner's Book with what is the actual case. Cite examples where necessary, such as:

- i) Government offices in some of the urban areas

- ii) Education centres in the centres
- iii) Vibrant trade hubs in the centres
- iv) Telecommunication centres in each centre

Identify newspaper articles, maps and photographs of the towns. The photos should depict some of the characteristics to be discussed. If you have a town near the school, you could organise a visit for learners to learn through observation.

Assessment

In pairs, ask learners to prepare a chart showing common functions of urban centres across Africa.

Let them also prepare unique characteristics to each urban centre you will have identified, and clearly show the uniqueness.

Afterwards, allow a class presentation, while insisting on weaker learners to present. Those who are physically disabled can be helpful in explaining the concepts, as others they are paired with hold the charts or draw the comparison tables on the board.

Emphasise correct answers throughout the session to ensure that they learn what is expected.

PART II: FUNCTIONS OF URBAN CENTRES

Learning objective

By the end of this lesson, the learner should be able to analyse the functions of urban centres in Africa.

Introduction

Urban centres have certain functions that make them important to the country.

They benefit business people and companies engaged in businesses in that the population provides ready market for trade goods. A wide range of business and trading activities are carried out in urban centres.

Urban centres are ideal as focal points for administration of a region or a country. It is easier to organise administrative activities in a central place than implement the decisions to the rest of the region. Some of the urban centres in Africa are capital cities where the highest seat of the country's' administration is located.

Urban centres are important in that they serve as focal points for transport and communication systems. Many radio and telecommunication facilities are found in some

urban centres. Information is transmitted to the rest of the country easily from the town as the central point.

Due to the concentration of population the towns offer education to the people by establishing learning institutions including primary and secondary schools and higher learning institutions such as polytechnics and universities.

Urban centres are important in that they form ideal location for Processing and manufacturing industries because there is efficient transport and communication network as well as supply of labour, water and electricity.

The points explained above are just a few of the reasons urban centres are important to a region or a country. Without them much would not be achieved.

Teaching aids

- Learner's book
- Newspaper articles
- Photographs
- Local environment

To effectively use the teaching aids, apply the following teaching/learning methods?

- Discussion method
- Photograph article analysis
- Question and answer
- Viewing local environment

Learning activities

Most of the functions of urban centres must have been captured in the discussion that was elicited from the first lesson of this unit. With this in mind, let learners try To effectively use the teaching aids, apply the following teaching/learning methods to find out on their own some of the functions that may be carried out in various urban centres.

For slow learners, you can start the discussion by asking them to think out aloud about some of the services they think they can get in urban centres and not in rural areas.

To link the discussion to the lesson, allow learners to attempt **Activity 9.3** so that they may understand their home city first, before transferring this knowledge to other cities around Africa.

To guide the various discussions, identify newspaper articles, maps and photographs of the towns. The photos should depict some of the characteristics to be discussed. If you have a town near the school, you could organise a visit for learners to learn through observation.

Synthesis

To ensure uniform learning, identify some of the cities around Africa. Divide the class into groups, each of which you will assign to a group. The group will then research on the functions of their city, then compare with what other groups will have found.

Ask each learner to identify the unique functions of each town assigned to the various groups. This will help them recall what they learnt, in an interesting manner.

Assessment

Ask learners to choose a city of their preference. Ask them to imagine that they are residents of the chosen city. With the knowledge gained, let them write an essay specifying the advantages and disadvantages of the city they'll have chosen.

Go through their essays to find out the most interesting which should later be read in class.

LESSON 2: FACTORS RESPONSIBLE FOR RAPID URBAN GROWTH

Learning objective

By the end of this lesson, the learner should be able to explain the factors influencing the growth of urban centres in Africa.

Introduction

Different urban centres in Africa have grown due to different reasons. There are some common factors that apply to all urban centres but there some unique factors that apply to specific centres. Some urban centres began as trading centres, others as recreation centres, administrative centres among others. After a town has started, there are other factors that cause them to expand. Trading activities and influx of migrants to an area hence population growth. However different towns expand due to unique reasons.

As you teach this section, ensure at the end of it learners are able to explain the factors influencing the growth of urban centres in Africa. They should be able to discuss the various factors that lead to growth and expansion of urban settlements in Africa with specific examples.

Learning activities

Start the lesson with a question requiring learners to mention specific examples of towns that they think they understand the actual reason for their rapid growth.

Each learner should be given a chance to explain why they think the reason they have given is the main reason. As they mention, ask one of them to summarise the points on the board.

Using what they will have generated, guide them through **Activity 9.4** so as to lead them to the factors influencing the growth of urban centres in Africa. It is important that even before the lesson, you prepare information about one of the many towns in Africa, which you will use as a guide or a demonstration to the learners.

Identify suitable maps and photographs of the towns to be studied and that you are able to generalise the information you have collected to apply to other towns in Africa. Prepare answers to the activities in the section so that you will be able to guide discussions on them.

Teaching aids

- Learner's book
- Photographs
- Maps
- Local urban centre

To effectively use the teaching aids, apply the following teaching/learning methods:

- Discussion method
- Photograph analysis
- Question and answer
- Viewing local environment

Synthesis

This lesson can be approached from a simplistic point of view, for example, by asking learners to discuss what they think contributed to the growth of their local shopping centre or town. Relate this information to the fact that even larger towns must have had reasons and factors that propelled them to the growth they must be experiencing.

Proceed to ask them to link this information to some of the urban centres in Rwanda, before concluding with urban areas around Africa.

Assessment

In groups, let learners compile specific factors that led to the major cities in Africa. Give them a two column table in which one column will have the city of interest while the other the factor for its growth.

The groups can be divided as follows:

- Those compiling cities in the West African states
- Those compiling cities in the East African states

- Those compiling cities in the South African states
- Those compiling cities in the South African states

Further activities

Learners should be asked to research on specific urban centres and present their findings for class discussion. They should complete answers to the activities in the section.

LESSON 3: PROBLEMS AND SOLUTIONS OF URBAN CENTRES IN AFRICA

Learning objective

By the end of this section, the learner should be able to explain the problems of urbanisation in Africa and suggest how to control them.

Introduction

A discussion on the problems experienced in towns needs you to research on the details as applies to the various towns in Africa. You can as well assign some of the learners the task of researching on problems in specific towns. Afterwards, let them make class presentation on the same. In giving out this assignment, let the learners chosen be with varied capabilities to enable all of them to have a meaningful learning experience. However, it is your responsibility to avail reference materials to them to make their work bearable, especially those that may need to be supported in their research.

Learning activities

Form groups that will discuss **Activity 9.6** in the Learner's Book. You can give the learners the following background information to help them pick out some of the problems urban centres face. Present the information as a statement of the problem for further research:

“Although towns are an attraction to thousands of people, they have a myriad of problems that affect the town dwellers. For example, not all the people who migrate to towns to seek employment get employed. As a result, some turn to criminal activities, drug use and abuse, prostitution and all the other antisocial behaviour. Many unemployed cannot afford to live in decent houses and this leads to development of informal settlement. Other problems include traffic congestion, shortage of social amenities among others. The problem of slum development is common in many towns but the magnitude depends on the size of the town and availability of employment opportunities.”

You can choose to print the paragraph for each learner, or simply ask one of the learners to read it out loud in class, as others attentively pick out the various points for further discussion.

However, task the slow learners with identifying the problems stated in the paragraph as the fast learners pick each point for further discussion.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs and maps

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Synthesis

Ask learners to identify suitable photographs depicting some problems experienced in towns in Africa. Suggest to them the relevant reference materials to help them in their research. As the teacher, ensure you have comprehensive notes on each of the problems as applies to different towns. Prepare questions to use during the lesson. You also need to have proposed some of the answers to the activities in this section.

Assessment

The Learner's Book has a summary of some of the problems facing urban centres in Africa. Let the learners summarise this information in a similar table in their notebooks. However, they should introduce two more columns in which they will summarise the cause of each problem and the other those concerned in providing the solutions – Individuals, non-governmental institutions, the government or the society, for example those living in the sector.

Afterwards, ensure you get their responses to ensure only correct responses are highlighted.

LESSON 4: CASE STUDIES: NAIROBI, KAMPALA, CAIRO AND JOHANNESBURG

Learning objective

By the end of this lesson, the learner should be able to discuss the development, functions and related problem of the case study urban centre in Africa.

Introduction

As you guide learners to discuss the towns given, you will need to research on the details why the location was chosen, what their population size is, what the functions, problems experienced and how they are being addressed.

Identify maps of location of each city and photographs of unique landmarks in each city. Ensure that you research widely and have comprehensive notes on each of the city in the case studies. Prepare questions to use during the lesson. Plan to divide the class into groups and assign different groups a different city to research on. Identify information on each city and let the groups have access so they can carry out the research.

Teaching aids

- Recommended learner's book
- Photographs
- Maps
- Relevant reference materials

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Photograph analysis
- Question and answer
- Reviewing reference materials

Learning activities

This is the most interesting section of this unit. This is because learners will get an opportunity to find out what actually happens in real life situations. It is this section that will help them understand that what they have learnt is not theoretical.

Divide the class into two groups, one to summarise the information about Nairobi and the other about Cairo as given in the **Learner's Book**. Group work is important because it tends **cooperation** amongst the learners. Let each group present their findings in a table similar to the one shown below:

NAME OF CITY:

Characteristics	Functions	Factors for growth	Problems	Possible solutions to problems

Synthesis

Allow each group to present its findings. During presentation, allow for a question and answer session, where some learners may want to seek for clarification. This will enhance full participation in the learning process, and unclear points can be clarified as they learn. In addition, be keen on what they will be discussing in order to offer timely guidance on their findings.

During the presentation, it's your duty to ensure the **rules of grammar** are adhered to. Correct learners in **pronunciation, language used, tonal variation** and **general communication principles** are followed. Remember to allow other learners not in the presentation panel to contribute, as this will cultivate tolerance in their thinking.

Assessment

Shuffle the groups learners had belonged to in the initial activity for this section. In the new groups, assign the learners one of the following two cities: **Kampala** and **Johannesburg**. If the population in class is large enough, you can include two more cities, **Lagos** and **Libreville**.

To each group, let them carry out a research then copy and complete the table given above. Encourage learners to support their findings with cuttings from newspapers, journals, magazines, government publications or photos/illustrations obtained from the Internet.

On your part, you need to collect the required information before hand so that you may be able to correct the learners in their work as they present for marking.

You can as well arrange for remedial lesson where presentations will be made on each of the cities assigned.

END OF UNIT

Summary of the unit

Each of the towns to be studied in this section is unique in terms of its characteristics, initial reason for growth, its location and population. However, the towns may have some common functions such as trading activities but at different scale. Towns that start as trading centres are in most cases located at a point where major roads used by different communities met. Such communities may have been producing different commodities which they would exchange with one another. With time, trade thrives and the town grows and gradually expands. Other functions begin as need arises among the residents of the town. Those that grow as recreation centres are like tourist centres but other functions develop so as to cater for the growing population and for the tourists. Such towns may have many entertainment points. With time, the population of the towns increase due to rural-urban migration and natural increase.

Problems facing many urban centres in Africa are common, with few being specific to some towns. It is good practice to mention those that are common and allow learners to find out what is unique to each urban centre.

Additional information

Learners are well aware of some of the characteristics, functions, factors for growth and problems facing urban centres in Rwanda. Against this background, introduce this unit with what they already know, and proceed to relate it to other urban centres in Africa.

Learner involvement in the teaching and learning process is key. This is because the unit is punctuated with various activities that will help you get the learners active in this.

Activity 9.1 of the **Learner's Book** is a good introductory point, as it will help learners first of all to understand the location of various urban centres in Africa. In this activity, ensure you emphasise on the urban areas that you will want to expound on as you progress.

Activity 9.2 of the **Learner's Book** on the other hand is the focal point of this unit. It is from this information, which they are likely to be familiar with, that you will construct more knowledge on. You can ask learners to tabulate the information for ease of comparison with other urban centres across Africa. All the other lessons after this can be treated the same, that is, tabulating the information about functions, factors and problems of Kigali with an intention of comparing it with other urban centres across Africa.

The assessment learners will undertake at the end of the unit will summarise the information

taught all through the unit. This is because as they scavenge for information about the urban centres not taught in class, they will come to understand that the information acquired is global, but not confined to Rwanda only. However, it is your responsibility to reinforce positive steps learners can understand, the government is responsible for making all people around the continent to make our environment a better place to live. Emphasise on **environmental conservation** as this is the main undoing in many urban centres. **Comprehensive sexuality** is also important to keep mentioning, as this is one of the reasons why urban centres keep on increasing in numbers. Learners, who are part of the larger citizenry, are equally responsible for keeping the society a better place to live in.

End unit assessment

1. In groups, discuss the characteristics of urban centres in Africa.
2. Analyse the functions of urban centres in Africa.
3. In pairs, discuss the factors influencing the growth of urban centres in Africa.
4. In groups, explain the problems and solutions to the problems of urban centres in Africa.

Answers to End Unit Assessment

1. Characteristics of urban centres in Africa

- (i) They have large population size and high population density.
- (ii) Settlements range from very low cost (slums) to high cost housing units.
- (iii) They have a variety of built up areas with tall buildings and little open space.
- (iv) Mobility of the people is high.
- (v) They experience traffic congestion especially when people are going to work or home and during the rainy seasons.
- (vi) Secondary and tertiary activities are dominant.
- (vii) Residents have extreme variations in their levels of income.
- (viii) Some are situated in areas where a number of roads converge
- (ix) They perform many functions such as commercial, industrial and administrative.

2. Functions of urban centres in Africa

- a) *They are commercial centres* - A wide range of business and trading activities are carried out in urban centres.
- b) *They are administrative centres* - Most urban centres serve as centres of administration for the regions in which they are found. Some of them are capital centres.
- c) *They are transport and communication centres* - Urban centres serve as focal points for transport systems. Many radio, television stations and telecommunication facilities are found in some urban centres.
- d) *They are educational centres* - Some urban centres have several primary and

secondary schools while others have higher learning institutions such as polytechnics and universities.

- e) *They are residential centres* - Urban centres have housing units for people with different levels of income.
- f) *They are industrial centres* - Processing and manufacturing industries are located in the major urban centres
- g) *They are recreational centres* - Most urban centres have recreational facilities such as cinemas, casinos, sport centres, clubs and hotels.

3. Factors influencing the growth of urban centres in Africa

- (i) *Rural-urban migration* - People move from rural areas to urban areas to look for jobs. Some migrate because urban centres have better facilities than rural areas. Others migrate due to internal conflicts and insecurity. The population in the urban centres increases due to the migration. This in turn leads to the expansion of urban centres.
- (ii) *Natural increase in the population* - There has been a decrease in death rates. This decrease has occurred due to improved nutrition and better health facilities. As the population increases, urban centres expand and new ones come up.
- (iii) *Development of trade and commerce* - As demand for goods and services increase, trade increases. Urban centres expand to accommodate commercial activities.
- (iv) *Industrial development* - Establishment of industries in urban centres attract job seekers. As more and more people come to the urban centres, a variety of businesses are set up. There will also be construction of residential areas to accommodate the increasing population. All these lead to the expansion of urban centres.
- (v) *Administrative activities* - Establishment of administrative services in urban centres attract people who require the services. Some people will also be employed. This will eventually lead to the expansion of urban centres.
- (vi) *Availability of transport and communication facilities* - Areas with good transport and communication networks attract investors. Such areas expand and become large urban centres. Existence of road junctions attracts settlements. These settlements later become urban centres.
- (vii) *Presence of mineral deposits* - Areas rich in mineral deposits which are of economic importance attract people. People go there in search of employment. The large population that is attracted to such areas requires facilities such as housing, schools, electricity, hospitals, water supply and transport. As these facilities are provided and the mining activities expand, these areas develop into urban centres. Later on, they become large urban centres.
- (viii) *Availability of educational facilities* - Establishment of learning institutions such as colleges and universities has led to the growth of urban centres.

- (ix) *Agricultural activities* - Collection and distribution centres for agricultural produce may develop rapidly and become urban centres.

5. Problems and solutions to the problems of urban centres in Africa

Problem	Solution
Unemployment	Setting up industries in rural areas as well as equipping learners at school with skills necessary to help them get self-employed.
Inadequate social amenities	Improving social amenities in the rural areas to reduce the strain on social amenities in urban centres
Traffic congestion	Expanding existing roads and building newer ones to accommodate more vehicles
Environmental degradation	Recycling wastes, punishing those who litter and teaching people on benefits of a cleaner environment.
Inadequate housing facilities	Constructing more housing units and upgrading shanties to house more people.
High rate of crime	Creating job opportunities or an enabling environment for trade, as well as punishing offenders to tame crime.
Emergence of street families	Encouraging sustainable families, responsible parenting and rehabilitation centres for those already on the streets.
Poor planning	Enforcing laws which restrict unplanned developments as well as building skyscrapers to reduce the problem of space.

Remedial activity (for slow learners)

Complete the following table with common features about cities in Africa:

Characteristics of urban centres	Functions of urban centres	Factors influencing the growth of urban centres

Answers to remedial activities

Characteristics of urban centres	Functions of urban centres	Factors influencing the growth of urban centres
<p>They have large population</p> <p>They have low cost houses (slums) and high cost houses.</p> <p>They have a variety of built up areas.</p> <p>Mobility of the people is high.</p> <p>They sometimes experience traffic congestion</p> <p>Secondary and tertiary activities are dominant.</p> <p>Residents have extreme variations in their levels of income.</p> <p>Some are situated in areas where a number of roads converge.</p> <p>They functions such as commercial, industrial and administrative.</p>	<p>They are commercial centres</p> <p>They are administrative centres.</p> <p>They are transport and communication centres</p> <p>They are educational centres</p> <p>They are residential centres</p> <p>They are industrial centres</p> <p>They are recreational centres</p>	<p>Rural-urban migration</p> <p>Natural increase in the population</p> <p>Demand for goods and services</p> <p>Industrial development</p> <p>Administrative activities</p> <p>Availability of transport and communication facilities</p> <p>Presence of mineral deposits</p> <p>Availability of educational facilities</p> <p>Agricultural activities</p>

Extended activities (for gifted and talented learners)

Complete the following table with examples of the following functions of Nairobi.

Nairobi	
Function	Examples
<p>Administrative centre</p> <p>International centre</p> <p>Financial and trade centre</p> <p>Tourist centre</p> <p>Transport and communication centre</p> <p>Education centre</p> <p>Residential centre</p>	

Answers to extended activities (for gifted and talented learners)

Nairobi	
Function	Examples
Administrative centre	Parliament and the headquarters of all ministries are found in Nairobi. The President's office is also located here. The city is the headquarters of Nairobi County.
International centre	It is the residential base for all the foreign mission in Kenya. It hosts a number of organisations for example, United Nations Environment Programme (UNEP) and United Nations Habitat. It also hosts international conferences.
Financial and trade centre	Industrial centre: It is a leading industrial town in East Africa. Major industries are food and non-food processing industries, motor vehicle assembly, brewing and service industries. The Central Bank of Kenya and all commercial banks in Kenya have their headquarters in Nairobi. It also hosts the Nairobi Securities Exchange (NSE). This exchange is Africa's 4th largest in terms of trading volumes. Many other trading activities are also carried out here. Insurance businesses are also found in Nairobi.
Tourist centre	The city has a number of tourist attractions for example, the Nairobi National Park, Animal Orphanage and National Museum. The availability of many hotels of international standards has made it a leading tourist attraction.
Transport and communication centre	Nairobi has road, railway and air links to the interior of the country and other parts of the region. It is served by Jomo Kenyatta International Airport which is the largest airport in East and Central Africa. There is also Wilson Airport. This is a small and busy general aviation airport. There are many radio and television stations based in Nairobi.
Education centre	Nairobi has many educational institutions. These include universities, tertiary colleges, secondary and primary schools.
Residential centre	There are many residential estates where people live. They range from high class to middle and low class estates. Some residential areas are slums.

Unit 10

AGRICULTURAL SYSTEMS IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to analyse the impact of various agricultural activities on sustainable development in Africa.

Prerequisite of this unit

In Senior One, learners studied about *Economic activities* (Unit 13), with specific focus on the various economic activities. Agriculture is part of the primary activities.

In Senior Two, learners were introduced to a more specific study of Agriculture, by being taught the various *agricultural systems in Rwanda* (Unit 15). In this unit, they explored the meaning of agriculture, types of agricultural systems in Rwanda, major crops produced in Rwanda, livestock farming, problems and solutions of agriculture in Rwanda, agricultural modernisation, factors favouring implementation of agricultural systems, impact of agriculture on sustainable development of Rwanda and the advantages and disadvantages of plantation farming in Rwanda.

This unit aims to expand learners' understanding of various agricultural systems in Africa, with a focus on types of agricultural systems, subsistence farming, modern methods of farming, livestock farming, impact of various agricultural activities on Africa's development and case studies in selected countries.

Cross-cutting issues

In this unit, learners will also appreciate the importance of *environmental conservation* because for sustainable farming activities, there has to be proper land use to ensure land remains productive over the years. Even the traditional methods of farming have to some extent some form of conservation to sustain crop production.

This unit will also help learners relate agriculture to *financial education awareness* especially when considering the modern systems of farming which are a source of employment and financial income. Farming also involves use of financial resources to acquire farm inputs.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>Agriculture is the backbone of almost all economies in Africa. However, it faces many challenges that need to be addressed. There have been ways of addressed some of these challenges, but critical thinking and problem solving skills among learners should see them suggest modern, alternatives or a combination of these to help all who depend on agriculture to achieve the most out of it.</i>
Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>Allow learners an opportunity to discuss how they can benefit from learning modern skills in agriculture by applying them in their local environment.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it explain phenomena from gathered information. <i>This will include adaptive methods in unique areas such as those that are marginalised. It also includes finding out the best agricultural practice that are in use today in different African countries and how they are beneficial locally.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. <i>Learners will acquire this competence when preparing class presentation and reports.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned. This competence will be developed when learners will be working in groups or pairs to accomplish prescribe activities. <i>Encourage interdependence and team work, for example, when evaluating the importance of agricultural activities in African.</i>
Lifelong learning	The acquisition of such skills will help learners to update knowledge and skills with minimum external support. The learners will be able to cope with evolution of knowledge advances for personal fulfilment in areas that are relevant to their improvement and development. <i>This unit will equip them with basic information about agriculture, an activitiy that some may chose to engage in after studies as a way of generating income.</i>

Vocabulary/key words/concepts

Monoculture	The cultivation of a single crop in a given area.
Green revolution	A large increase in crop production in developing countries achieved by the use of fertilisers, pesticides, and high-yield crop varieties.

Shifting cultivation	A form of agriculture, used especially in tropical Africa, in which an area of ground is cleared of vegetation and cultivated for a few years and then abandoned for a new area until its fertility has been naturally restored
Bush fallowing	A system of farming whereby the farmer cultivates one piece of land for some years and later leave it for some years with the aim of restoring the fertility of the soil naturally. During this fallow period, the farmer cultivates another piece of land.
Pastoralism	The branch of agriculture concerned with the raising of livestock. It is animal husbandry: the care, tending and use of animals such as camels, goats, cattle, yaks, llamas, and sheep.
Ranching	This is the practice of keeping animals in an enclosed area of land, including various structures, with an intention of raising grazing livestock such as cattle or sheep for meat or wool.
Siltation	Siltation is a process by which water becomes dirty as a result of fine mineral particles in the water. When sediment, or silt, is suspended in water, this is an example of siltation.
Latex	Non-vulcanised rubber, usually colloidal dispersion of polymer particles in a liquid.
Saline	Soil salinity is the salt content in the soil; the process of increasing the salt content is known as salinisation. Salts occur naturally within soils and water. Salination can be caused by natural processes such as mineral weathering or by the gradual withdrawal of an ocean.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the types of agricultural systems in Africa? {Subsistence farming in Africa: Shifting cultivation, small holder farming, rotational bush fallowing (characteristics, problems and solutions)}
- (ii) What are the characteristics, advantages and disadvantages of modern agriculture, plantation agriculture, green revolution and irrigation farming?
- (iii) What are the characteristics of livestock farming in Africa: nomadic pastoralism, ranching and dairy farming?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Leaners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Types of agricultural systems in Africa - subsistence farming in Africa: shifting cultivation, small holder farming, rotational bush fallowing (characteristics, problems and solutions)
Lesson 2	Types of agricultural systems in Africa - subsistence farming in Africa: shifting cultivation, small holder farming, rotational bush fallowing (characteristics, problems and solutions)
Lesson 3	Modern methods of agriculture in Africa - plantation agriculture, green revolution, irrigation farming (characteristics, advantages and disadvantages)
Lesson 4	Livestock farming in Africa: nomadic pastoralism - characteristics, problems and solutions
Lesson 5	Livestock farming in Africa: ranching in Africa - characteristics, problems and solutions
Lesson 6	Livestock farming in Africa: dairy farming in Africa - characteristics, problems and solutions
Lesson 7	Impact of various agriculture activities on Africa's development
Lesson 8	Cotton growing in the lower Nile
Lesson 9	Cocoa growing in west Africa
Lesson 10	Rubber growing in west Africa
Lesson 11	Dairy farming in Kenya
Lesson 12	Ranching in Botswana

LESSON 1: TYPES OF AGRICULTURAL SYSTEMS IN AFRICA - SUBSISTENCE FARMING IN AFRICA: SHIFTING CULTIVATION, SMALL HOLDER FARMING, ROTATIONAL BUSH FALLOWING (CHARACTERISTICS, PROBLEMS AND SOLUTIONS)

Learning objective

By the end of this lesson, the learner should be able to analyse the different methods of subsistence farming in Africa

Introduction

There has been rapid development in agriculture in Africa in the recent years. However due to the high levels of poverty, many people still practice subsistence farming where they only produce food for the households. Sometimes such food is not enough to last until the next harvest. It is not unusual to find People who have to get subsidy from governments and well-wishers. Governments are making strides educating the small subsistent farmers to modernise their farming systems so as to get higher yields. However, farm inputs such as fertilisers and pesticides are too costly for many. As a result, traditional subsistence farming practices still remain in many areas.

As you teach this section, ensure that the learners are able to describe what they see in the local environment for comparison with other areas in Africa. This will enable them to appreciate the importance of agricultural modernisation

To successfully deliver this lesson, consider identifying a suitable map of Rwanda showing areas with different agricultural activities. Also identify a suitable map of Africa on agriculture. Also, identify photographs showing different forms of subsistence farming. You may choose to look at some specific countries for detailed study then you apply to other countries with similar environments.

Prepare notes and guiding questions to ensure the flow of ideas is logical and ensure learners' attention is focused. Acquaint yourself with the activities in the section so that you prepare points that you can use to guide the learners as they discuss their findings.

Note that if you take the class for outdoor learning, ensure you take precaution by avoiding such areas as steep slopes and other areas where learners may get injured. You must be more cautious with the safety of learners with special needs.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs and maps of various agricultural practices

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer

- Reviewing reference materials

Learning activities

Divide the learners into three groups and assign them the following tasks:

Group 1 - The nature and sizes of the farms in densely populated areas

Group 2 - Types of tools used to till the land

Group 3 - Types of crops grown as cash crop and subsistence crop

Visit each group to ensure that all learners, including slow learners, take part in the discussion.

Ask the group leader to read out their group findings and write them on the chalkboard.

From the discussion, ask the learner to state different types of farming that is practised in Rwanda.

Synthesis

Sum up the learners points on the chalkboard. Ask the learner to make notes.

Relate the learner's finding from their local environment to the rest of Africa.

Ask the learner's to write their observation from Kayitesi's story under the following headings:

- | | |
|----------------------------|--------------------------------|
| a) The size of the farm | b) Tools used to till the land |
| c) Nature of animals kept. | d) Types of crops grown |
| e) Land ownership | |

Assessment

Activity 10.2 of the Learner's Book. (Use Kaitesi's story of the Learner's Book to determine answers to this assessment).

LESSON 2: TYPES OF AGRICULTURAL SYSTEMS IN AFRICA - SUBSISTENCE FARMING IN AFRICA: METHODS OF SUBSISTENCE FARMING IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to identify the methods of subsistence farming in Africa.

Introduction

Relate the previous lesson to the present one. It is important to have an understanding that where people have small farms, they tend to use simple tools to till their land and most of the crops grown are used at home (subsistence).

Explain why subsistence farming is practiced in areas where population is sparse (or low).
Ask the learner's to state periods when they prepare the land, plant and harvest.

Discuss traditional methods of subsistence agriculture in Africa as follows.

- (a) Shifting cultivation
- (b) Rotational Bush fallowing
- (c) Small holder farming

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing subsistence farming

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

a) Shifting cultivation

This is where people grow crops in an area and when the land gets exhausted they move to another area.

Ask the learners to look at the photograph in **figure 10.1** and list down crops grown in the farm. Let them suggest other crops that may be grown in this method of agriculture.

Discuss the characteristics of shifting cultivation in Rwanda and relate to the rest of Africa.

With the help of **Activity 10.3** in the Learner's Book, let the learners name the countries where shifting cultivation is practiced in Africa. *Answers to this question are to be discussed with the help of the Learner's Book.*

b) Rotational bush fallowing

Bush fallowing is where exhausted land is left for some time to regain fertility before the farmer can go back for it.

Ask the learner to state the characteristics of crop rotation in their immediate locality.

Use **figure 10.3** in the Learner's Book to assist you explain the characteristics of rotation bush fallowing given on **the same page** of the Learner's Book.

Before people can move to a new area, they must settle for a period of time, usually between 3-5 years.

Discuss different methods farmers in Rwanda use to clear their new piece of land – use of fire, use of knives or slashers.

The most common method of clearing the bushes is **slash and burn**.

Ask the learner to discuss disadvantages of slash and burn method. Summarise this section

with **Activity 10.5** of the Learner's Book.

c) **Small holder farming**

This is where people own small plots of land. This is as a result of population increase, yet the size of land for agriculture remains constant.

Use the photograph in **figure 10.2** in the Learner's Book to name the types of crops grown and the sizes of plots.

Note that in small holding, people grow both food crops and cash crops on a small scale.

Discuss the problems associated with small holder farming in the Learner's Book. **Activity 10.3** in the Learner's Book will be a good engagement to all learners while drawing a summary of this section.

Synthesis

In pairs, ask the learner's to list similarities and differences between shifting cultivations and bush fallowing. (**Activity 10.4** in the Learner's Book).

Choose one of them to write their findings on the chalkboard so that the whole class can make notes.

Discuss areas in Rwanda where people used shifting cultivation and rotational bush fallowing. Brainstorm on areas today where small holder farming (also known as **small scale farming**) is carried out and relate it to the rest of Africa. It is important to discuss how climate and soil fertility influences different types subsistence farming in Africa.

Assessment

In groups comprising learners of different abilities, let them summarise the characteristics of:

- Shifting cultivation – With reference of the Learner's Book
- Bush fallowing – With reference of the Learner's Book
- Small holder farming – With reference of the Learner's Book

LESSON 3: MODERN METHODS OF AGRICULTURE IN AFRICA - PLANTATION AGRICULTURE, GREEN REVOLUTION, IRRIGATION FARMING (CHARACTERISTICS, ADVANTAGES AND DISADVANTAGES)

Learning objective

By the end of this lesson, the learner should be able to identify the modern methods of agriculture in Africa.

Introduction

Use the learner's experience from their different localities to state areas where cash crops are grown.

Explain to learner what modern methods of farming means by citing examples from Rwanda.

Ask the learner to name three types of food crops that are not native to Rwanda and three types of cash crops grown on large scale.

The following additional information will also be important on your preparation for this lesson:

Many countries in Africa have strived to modernise their agricultural activities by exposing the farmers through extension workers, seminars and demonstrations. This has enabled many farmers to realise substantial yields on their farms and to get surplus for sale. It is because of modernising agriculture that countries of Africa are able to export farm produce like fruits, grains and animal products.

As you teach this section, ensure that the learners are able to describe the modern systems of agriculture that they are familiar with and are able to apply the knowledge as they study other parts of Africa.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing modern methods of farming in Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Using **figures 10.4** and **10.5**, ask learner to name the crops in the photographs.

These crops are not mixed with other crops. Growing of tea, cocoa, sugarcane or coffee is known as **plantation agriculture**. This is growing of one crop on a large piece of land.

In pairs, assign **Activity 10.7** in the Learner's Book to them.

Proceed to guide the learners in listing down the major characteristics of plantations as given in the Learner's Book.

Ask the learner to use **Activity 10.8** in the Learner's Book to discuss conditions for the crops grown in the photograph and the advantages and disadvantages of plantation agriculture. This information is detailed in the Learner's Book.

Using probing question, introduce **Green revolution** as a method of farming as given in the Learner's Book. Let the learners come up with an explanation of Green Revolution as given in the Learner's Book. Let them give explain why this method of farming leads to an increase in crop production.

Divide the class into **two groups** in readiness for **Activity 10.11** in the Learner's Book. Group one to list down the characteristics of green revolution and the second group to list down the advantages and disadvantages of green revolution.

Irrigation refers to the process of supplying water to the plants.

Using the local environment, list different methods of irrigation used to grow crops. Let learners suggest the types of crops grown most suitable under each method of irrigation mentioned.

With the help of a map of Africa in **figure 10.7** in the Learner's Book, learners are expected to list all dams and irrigation project shown.

Use **Activity 10.13** in the Learner's Book to explain different methods of irrigation as shown in the photographs in the Learner's Book.

Divide your class into two groups A and B. Group A to list down advantages of irrigation farming and group B to list down disadvantages of irrigation farming.

Ask the group leaders to present their discussion in point form as one of them writes them on the chalkboard.

Ask the learner's to make their own summary notes, with help from the notes in the Learner's Book.

Synthesis

Sum up the types of crop grown under photographs given in the Learner's Book. Ensure you cite advantages and disadvantages of each method.

Have a summary of the learner's findings in their different group discussion - on green revolution and irrigation farming.

With the help of an Atlas, and the map of Africa in the Learner's Book, assist learners to locate all the major irrigation projects in Africa and the types of crops grown under each irrigation project.

Assessment

To gauge learners' understanding, assign them **Activity 10.10** in the Learner's Book. It is your responsibility to go through their work afterwards in order to correct them where they may have given wrong responses.

LESSON 4: LIVESTOCK FARMING IN AFRICA: NOMADIC PASTORALISM - CHARACTERISTICS, PROBLEMS AND SOLUTIONS

Learning objective

By the end of this lesson, the learner should be able to:

- (a) Identify characteristics of nomadic pastoralism.
- (b) Name problems facing nomadic pastoralism.

Introduction

There is livestock farming in most countries in Africa. Livestock farming is carried out in both small and large scale in Africa. We cannot study livestock farming in Africa and avoid talking of the traditional breeds of cattle that are kept in large herds by some communities like the Tswana, Fulani and the Maasai among others. Such are the nomadic communities that move from place to place in search for water and pastures especially during the dry seasons.

Modern livestock farming methods involve keeping of improved breeds of livestock. The animals are reared in ranches some of which are paddocked to ensure pasture is available all the time. Some ranches have beef cattle, others have dairy cattle while others have sheep. Setting up a ranch requires a large financial capital that is not affordable by many farmers in Africa. This explains why many African livestock farmers are small scale farmers.

Nomadic pastoralism has its unique characteristics, problems and possible ways of overcoming these problems. Nomadic pastoralists experience mainly environmental related problems such as drought, pests and disease. How do they cope?

As you teach this section, ensure that you have good knowledge of the different livestock kept, problem encountered and how farmers are able to overcome each problem. Use local examples as much as possible.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing various types of livestock in Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Find out from your class whether you have a student from the community that practice nomadic pastoralism.

Ask the learners to name different types of animals kept by the people of Rwanda.

Use **Activity 10.14** in the Learner's Book to guide the learners in naming different types of livestock kept in Rwanda.

Ask the learner's to list down different types of livestock kept in the school neighbourhood.

As they figure out the meaning of **nomadic pastoralism**, ensure that they keep in mind the following key points in their definition: This is the keeping of livestock on an extensive piece of land where natural pasture and water are available.

With the help of an Atlas ask the learners to:

- (a) List down all the countries where nomadic pastoralism is practiced

(b) Explain why nomadic pastoralism is not practiced in tsetse fly infested areas

Ask the learner's to name communities that practice nomadic pastoralism in Rwanda and the rest of Africa using the map in the Learner's Book.

Proceed to divide the class into two groups. One group to discuss the characteristics of nomadic pastoralism as outlined in the Learner's Book and the other group to discuss problems facing nomadic pastoralism in Africa.

Further activities

In pairs, learners to read from other reference materials on their own and ensure they complete question 1 of **Activity 10.16** in the Learner's Book.

Synthesis

In groups, ask learners to:

- a) Discuss the importance of the animals kept to the nomadic pastoralist.
- b) Discuss the major problems facing nomadic pastoralist in Rwanda and the rest of Africa and their possible solutions.

To ensure that their discussion is within the expected limits, ensure you give a summary on the discussion on the chalkboard. Ask the learner's to make their notes from different group discussions.

Assessment

Give learners **Activity 10.16**; question 2 in the Learner's Book.

Problem	How it affects nomadic pastoralism	Possible solution
1. Population increase	Reduces the size of the land for pasture	Pastoralist to keep small herds of cattle
2. Pest and diseases		
3. Hilly areas		
4. Drought		
5. Types of breed		
6. Marketing		
7. Pasture and water		

LESSON 5: LIVESTOCK FARMING IN AFRICA: RANCHING IN AFRICA - CHARACTERISTICS, PROBLEMS AND SOLUTIONS

Learning objective

By the end of this lesson, the learner should be able to:

- (a) Identify characteristics of ranching in Africa.
- (b) State problems facing ranching in Africa.
- (c) Identify solutions to the problems facing ranching in Africa.

Introduction

Start the lesson by giving the root of the term ranching. Explain that it emanates from the term ranch, which is an enclosed place where beef animals are kept mainly for beef.

Brainstorm with learners the meaning of the term Ranching with this background in mind. Ensure that they come up with an explanation not far off from the following:

Ranching is the rearing of livestock for commercial purposes.

As you progress with the lesson, ask the learner to list down some of the ranching schemes in Rwanda as required in **Activity 10.17** in the Learner's Book.

Using the local environment, have the learner's in small groups to discuss conditions that are conducive for commercial livestock farming.

Find out from the learner's the type of animals found mostly in the ranches.

Name different breeds of cattle found in the ranches.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing beef livestock in Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

In groups, ask learners to list down the major characteristics of cattle ranching in Africa. On this, they can refer to the Learner's Book.

Use the local environment, geography books, an atlas and pictures find out area that have:

- a) Cattle ranches in Africa
- b) Sheep ranches in Africa

- c) Horse ranches in Africa
- d) Camel ranches in Africa

Discuss the climate conditions necessary for the rearing of livestock in ranches.

Ask each learner to study the photograph given in **figure 10.10** in the Learner's Book then list the conditions that are necessary for establishment of a cattle ranching scheme. Ask the group leaders to present their findings. As presentations will be on going:

- Let a volunteer write the main points on the board.
- Each point confirmed as correct and written on the board should be used to make notes from the class discussion.

Note: During the presentation, observe the language used and grammar. It is important to guide the presentation, and more advisable to have other learners help the presenter to explain further some of the points mentioned. This way, they will learn to tolerate each other's views as well as understand that knowledge is better shared for clarity purposes.

Synthesis

Livestock ranching in Africa are meant to provide quality meat and other products.

Beef cattle require extensive grasslands so the as they can have plenty of natural grass.

As compared to other forms of livestock rearing, ranching is most likely to be the least witnessed by learners. It is therefore important that you collect adequate information on ranching in Rwanda, from which you will help them understand it on a continental basis.

Before the lesson, ask learners to carry out research in groups on common features between ranching and nomadic pastoralism. In the beginning of this lesson, analyse with the entire class what each group will have come up with, with the aim of identifying what the learners may not have discovered in their research.

Assessment

Summarise the lesson with **Activity 10.18** in the Learner's Book.

It is important that learners support their answers with examples from Rwanda. You then need to relate this information to what is happening elsewhere in Africa.

LESSON 6: LIVESTOCK FARMING IN AFRICA: DAIRY FARMING IN AFRICA - CHARACTERISTICS, PROBLEMS AND SOLUTIONS

Learning objective

By the end of this lesson, the learner should be able to:

- (a) Identify characteristics of dairy farming in Africa.
- (b) State problems facing dairy farming in Africa.
- (c) Identify solutions to the problems facing dairy farming in Africa.

Introduction

Dairy farming is keeping of dairy cattle for production of milk and milk products.

Unlike beef cattle, dairy cattle are reared to produce milk and milk products. Have different photographs of different dairy cattle breeds to assist you discuss different breeds of dairy cattle kept in Africa.

To help them understand this section better, ask some learners to come to class with a compilation of photographs showing some of the milk products they know, or those they regularly consume. They can as well come with packets of milk, empty sachets of yoghurt, plastic containers of cheese or ghee.

Most of the dairy cattle are exotic. They were introduced in Africa by colonialists. In reference to what they can find out from their local environment, allow the learners to name different types of breeds dairy cattle.

It is also necessary to prepare for a brainstorming session where learners will discuss amongst themselves the benefits they get from dairy farming. To make it an interesting session, you can as well arrange for a debate session where they will debate for and against the need for farmers to engage in dairy farming.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing dairy livestock in Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Ask the learner to list down areas where dairy farming is practiced in Rwanda as required in **Activity 10.19** in the Learner's Book.

Proceed to discuss the main characteristics of dairy cattle farming in Rwanda as given in the Learner's Book. This can be achieved by:

- (i) Dividing the class into groups of four learners.
- (ii) Asking them to list down major characteristics or conditions necessary for dairy farming.
- (iii) Allowing group leaders to give their report.
- (iv) Writing the learner's findings on the chalkboard so that they can make their own notes.

Responses to these activities should be written down on the board in point form so that learners can make notes.

In an open discussion with learners, find out from the learner's what milk is used for in their homes. Apart from milk, let the learners discuss other types of dairy products (ghee, cheese, butter and yoghurt).

With the help of **Activity 10.19** in the Learner's Book, state areas where dairy cattle are reared in Rwanda.

Synthesis

Dairy farming in Africa is the rearing of dairy cattle for the purpose of milk and milk products, for local consumption or sale.

Dairy cattle are kept in the highland areas that experience cool and wet conditions.

With the help of **Activity 10.19** in the Learner's Book, ask the learners to state areas where dairy cattle are reared in Rwanda. Instruct the learners to summarise their findings in point form. Allow for class presentations thereafter.

Assessment

Complete the table below with the possible solutions to the problem indicated as given in **Activity 10.20** in the Learner's Book.

Problem	Possible solution
Cattle disease	
Inadequate pasture	
Distribution of Tsetse fly	
Water	
Transportation of milk	
Transportation of beef	
Marketing	
Population increase	

LESSON 7: IMPACT OF VARIOUS AGRICULTURE ACTIVITIES ON AFRICA'S DEVELOPMENT

Learning objective

By the end of this lesson, the learner should be able to name the main benefits of agriculture in Africa.

Introduction

At random, select learners to give reasons why they think agriculture is important. List the reasons given on the chalkboard. Relate the importance of agriculture at home to that of the entire country (Rwanda). It is important that link agriculture to the development of Rwanda, because it's from this that learners will relate it to the development of Africa as well.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Newspaper articles and photograph
- Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Divide the class into two groups to discuss importance of agriculture in Rwanda and Africa in general.

One group to discuss importance of growing of crops and the other group to discuss importance of keeping livestock.

During the discussion, visit all groups to ascertain that all the learners are involved in the discussion.

Ask the group leader to state their points and write them on the chalkboard.

Use the information found in the Learner's Book to guide them.

Ask the learners to make their own notes from the discussion on the importance of agriculture.

Synthesis

Sum up the learner's group discussion on the chalkboard. List down the impact of agricultural activities in Africa on the board:

- Source of food for people and animals
- Source of income
- Promotes international trade
- Provides raw materials for industries
- It's a source of revenue to the government
- Many areas have been opened for agriculture
- It provides food security on the continent

Assessment

Using **Activity 10.21** in the Learner's Book let the learners explain how agriculture has contributed to the development of Africa in terms of:

- a) Road construction
- b) Setting up of manufacturing industries
- c) Earning Foreign exchange

This, they should present in a summarise report that you should check before the next lesson.

Where necessary, let them give examples in each case, while citing Rwanda as their case study.

CASE STUDIES

LESSON 8: COTTON GROWING IN THE LOWER NILE

Learning objective

By the end of this lesson, the learner should be able to describe cotton growing in the lower Nile valley.

Introduction

Using a map of Africa or an Atlas, find out the course of River Nile. This is key in tackling **Activity 10.22** in the Learner's Book, which will provide prerequisite information for this lesson.

Describe the pattern of the river flow from the source (Lake Victoria) to the mouth (Mediterranean Sea).

It is also necessary at this point to discuss the early civilisation in Egypt.

Lastly, ask the learners to name items made from cotton.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cotton growing in the lower Nile

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Have different items that are made of cotton, silk, fur and wool. Ask the learners to sort them out.

Using the pictures in **figure 10.11** in the Learner's Book, ask learners to describe how cotton looks like before harvesting.

In groups, supervise a discussion on features of cotton growing in the Nile valley, as outlined in the Learner's Book.

In a brainstorming session, let learners try to explain what they understand by "long staple cotton."

In groups, allow learners to discuss why it has been possible to grow cotton in this region. They should use the following lead points in their discussion:

- a) Source of water
- b) Labour
- c) Importance
- d) Soil

One of the learners should write the main points on the board.

Every learner should then discuss the uses and importance of cotton growing in Egypt and Sudan.

Synthesis

Divide the class into five groups, with each group tasked to tackle one of the following sections:

- Explain how cotton is grown as plantations in the lower part of the River Nile under irrigation.
- Use statistics to show that Egypt is the world's major producer of long staple cotton.
- Discuss other crops that are grown in the Nile valley such as food crops (maize, millet, sorghum and vegetables) and cash crops (rice, fruits, wheat and barley).
- Explain the importance of cotton growing in the lower Nile valley.
- Discuss how cotton is grown from land preparation, the harvest and sale.

After the discussions in their respective groups, learners are expected to summarise their findings to be presented in class during their remedial lessons.

Assessment

1. In pairs, ask learners to attempt **Activity 10.23** in the Learner's Book. Afterwards, they should complete the table for presentation in class in the next lesson.
2. All learners should draw a map of Africa and on it mark and label:
 - a. River Nile and its tributaries
 - b. Areas where cotton irrigation is practiced.

Notify them that they are allowed to make references from relevant books and the Internet, which they should disclose at the end of their presentation.

LESSON 9: COCOA GROWING IN WEST AFRICA

Learning Objective

By the end of this lesson, the learner should be able to explain cocoa growing in West Africa.

Introduction

Ivory Coast leads the world in production and export of the cocoa beans used in the manufacture of chocolate as of 2012, supplying 33% of cocoa produced in the world. West Africa collectively supplies two thirds of the world's cocoa crop, with Ivory Coast leading production at 1.65 million tones and nearby Ghana, Nigeria, Cameroon and Togo producing additional 1.55 million tones. Ivory Coast overtook Ghana as the world's leading producer of cocoa beans in 1978. The primary non-African competitor of Ivory Coast is Indonesia.

Using an Atlas and a map of Africa, locate cocoa producing countries in West Africa. Tell the learners that Cocoa is a native crop of Brazil. The tree is a choice crop for areas of West Africa with low to slight elevations, good soils and the constant humidity of the tropics.

It is also important that you discuss the uses of cocoa.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cocoa growing in West Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce this lesson with a brief history of how cocoa growing was introduced in Africa. It is at this point that learners should be helped to understand that such information is obtained from the subject of History, which confirms its interrelatedness with Geography.

For **Activity 10.24** in the Learner's Book, cluster learners into groups for purposes of discussions.

Using the photographs in the Learner's Book to explain how cocoa pods grow from the trunk and the main branches of the cocoa tree. With reasons, ask them to estimate the stage at which the cocoa pods shown by the photograph are.

Use the photographs in the Learner's Book to explain how cocoa beans are extracted to explain how cocoa bean are dried.

Have your class in two groups. One group to discuss how cocoa plants are grown, how cocoa beans are extracted and dried. Task the other group to list down the procedure used in cocoa processing before sale.

In groups discuss the problems facing cocoa growing in West African countries and possible solutions.

Synthesis

Sum up the lesson by starting areas where cocoa in mainly grown in West Africa.

Have a wall chat showing areas where cocoa is grown in West African countries. State the conditions necessary for growing cocoa.

With reference to responses to **Activity 10.25** in the Learner's Book:

- i) Supervise learners to summarise the uses of cocoa.
- ii) Explain the procedure of processing cocoa
- iii) Enumerate the importance of cocoa to the people of West Africa and their countries.

Assessment

Individual learners should answer this revision questions on their own, after which you should mark their work.

- a. Give the uses of cocoa.
- b. Summarise how processing of cocoa is done as given in the Learner's Book.
- c. Sketch a map of West Africa showing the countries that grow cocoa.
- d. Draw a table showing the problems facing cocoa growing in West African countries and their possible solutions.

LESSON 10: RUBBER GROWING IN WEST AFRICA

Learning Objective

By the end of this section, the learner should be able to explain rubber growing in West Africa.

Introduction

Rubber trees are grown in regions that are hot and moist. Africa provides approximately 250 000 tons of natural rubber. Rubber trees are grown mainly in the forest regions.

In Africa the chief producers of natural rubber are Liberia, Nigeria, Zaire, Ivory Coast, Cameroon, Central African Republic, Ghana, Mali and Congo. Using an Atlas and a map of Africa, locate these countries.

To grow **good rubber trees** and harvest **plenty of latex**, farmers are required to:

- Prepare the seedlings well
- Look after the plantation
- Make a good plantation
- Harvest the latex well

Discuss the uses of rubber.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing rubber growing in West Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with **Activity 10.26** in the Learner's Book. This is after one of the learners reading the brief introduction on rubber growing in West Africa in the Learner's Book. To make the activity more interesting, provide learners with reference materials, including links to the Internet such as www.fao.org/docrep/006/ad221e/AD221E02.htm as well as pictures that they will interpret. They should then summarise the information obtained from these sources then prepare a class presentation.

From their findings and with the help of the photograph in the Learner's Book, let them explain how rubber is tapped from tree trunks.

Wind up the lesson by forming two groups. One group to discuss how rubber is extracted as shown on page 160 of the Learners Book and the other group to summarise the procedure of rubber processing before sales are made as outlined in the Learner's Book. This is what is required in **Activity 10.28** in the Learner's Book.

Synthesis

It is important to wrap this lesson by identifying areas where rubber is mainly grown in West Africa. To achieve this, have a wall chat showing areas where rubber is grown in West African countries.

Also important to keep learners alert of are the conditions necessary for growing cocoa.

Finally, ensure that every learner is able to explain the procedure for processing rubber.

Assessment

In groups, give the importance of rubber to the people of West Africa and their countries.

Discuss the problems facing rubber growing in West African countries and their possible solutions.

LESSON 11: DAIRY FARMING IN KENYA

Learning Objective

By the end of this lesson, the learner should be able to:

- (a) List the areas where dairy farming is practiced in Kenya.
 - (b) Explain the importance of dairy farming in Kenya.
 - (c) Discuss the problems facing dairy farming in Kenya.
-

Introduction

Dairy farming in Kenya is vibrant and it's rated the best in Africa. Under proper management, high yielding breeds used for dairy farming in Kenya produces an average of 30 litres of milk per day. 60% of success of dairy farming in Kenya depends on feeding. In addition, successful dairy farmers in Kenya are those with the ability to select the correct breeds of dairy animals for their various agro-ecological zones, good feeding of the dairy animals and overall good management on various aspects.

The main breeds selected for dairy farming in Kenya include Friesian, Ayrshire, Guernsey, Jersey and their crossbreeds. Friesian cows are preferred for dairy farming in Kenya highlands. However, they are heavy feeders, require plenty of clean water and are susceptible to diseases, milk fever and high temperatures. Guernsey breed is yellow to reddish-brown with white patches, adaptable to all climates and management systems with equally high milk yielding potential per day.

Dairy farming in Kenya is practiced both in the highlands and lowlands areas. Small scale farmers are major stakeholders, accounting for 80% production. Large scale farmers accounts for 20% of production.

Dairy farms, milk processing plants and dairy related industries like animal feeds, agrovets and dairy equipment stores offers employment opportunities to many Kenyans.

Dairy products are rich in nutrients especially protein, calcium, phosphorus, fats and vitamins which contribute greatly to food and nutrition security and achievement of Sustainable Development Goals.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing dairy farming

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

For the success of this lesson, relate the rearing of dairy farming in Africa to Kenya. It is necessary to trace the history of dairy farming in Kenya to the British. Also important to keep in mind is that dairy cattle are kept for milk and milk products.

You can ask **slow learners** to remind the class the main **difference between ranching and dairy farming**.

With the help of the map of Kenya given on **page 185** of the Learner's Book and an Atlas, let the learners locate and name areas where dairy cattle are practiced.

Let learners use the photographs given on **page 186** of the Learner's Book to identify some of the types of dairy cattle reared in Kenya. They should then look for more photographs showing other breeds of dairy cattle reared in Kenya.

Activity 10.29 on **page 186** of the Learner's Book should be the basis of group discussion during the lesson. As they present their findings after the discussion, a representative from each group should be tasked to write a summary of their findings on the board.

Synthesis

Most of the dairy cattle in Kenya and Africa as whole are exotic. They are mainly found in the highlands that are cool and wet most times of the year. Animals are fed on the fodder and natural grasses. Problems facing dairy cattle are diseases, delay in payment, drought, transportation of milk to the factory and tsetse flies that cause nagana in cattle.

In pairs, ask the learner to list down possible solutions these problems and more given on **page 186** of the Learner's Book. Have their findings on a flip chart for class discussion.

Assessment

Learners are expected to correctly respond to the following questions after this lesson:

- Explain four different types of dairy cattle in Kenya.
- Describe conditions necessary for dairy cattle rearing.
- With examples, identify areas where dairy farming is practiced in Kenya. Use an Atlas and the map of Kenya in **figure 10.17 and 10.18** in the Learner's Book.
- List the importance of dairy farming in Kenya.

LESSON 12: RANCHING IN BOTSWANA

Learning Objective

By the end of this lesson, the learner should be able to:

- a) List areas where livestock is practiced in Botswana.
- b) Explain the importance of livestock ranching in Botswana.
- c) State the problems facing livestock ranching in Botswana
- d) Suggest possible solutions to the problems facing livestock ranching in Botswana.

Introduction

Botswana is a cattle country and most Botswana people are farmers who have always owned cattle as security and a sign for wealth.

Cattle have been the mainstay for Botswana's economy as they represent the country's third largest income earner after diamonds and tourism.

Botswana Meat Commission BMC guarantees the production of quality beef for local consumption and export.

Note that Botswana is landlocked country just like Rwanda.

Most of the land is either arid or semi-arid where by most of the vegetation is natural grass.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Present to the learners the map of Africa that they will use to name the neighbouring countries of Botswana. They should then describe the location of Botswana and compare its location with that of Rwanda. Ensure that the idea of land lockedness comes out clearly.

In groups, ask the learners to identify different types of livestock reared in most homes and school neighbourhood in Rwanda. The next assignment will be to look at **the photographs** in the Learner's Book then list down areas where livestock is practiced in Botswana. They can source for additional information from the Internet or other reference materials so as to come up with correct responses.

Lastly, divide the class into two groups. **Group 1** to discuss problems facing livestock ranching in Botswana, with a comparison to cattle rearing in Rwanda.

Group 2 to discuss possible solutions to the problems identified by members of group 1.

Have the group leader present their findings and write them on chalkboard in point form as below:

Problem	Solution
Shortage of water	Digging more bore holes
Traditional herding	Introduction of friable ranches or cattle posts

Large herds of cattle	People to be encouraged to sell their animals regularly
Pest and diseases	Use of veterinary services and cattle dips
Inadequate knowledge on ranching	Government has set up demonstration ranches where pastoralist learns modern methods of keeping livestock.

Individual work should focus on **Activity 10.30** in the learner's book. Learners are expected to explain the importance of livestock to a pastoralist.

Expected explanations should revolve around provision of food, milk, and dowry and for conducting various ceremonies.

Synthesis

Most people in Botswana depend on livestock (cattle, goats, sheep and camels). This is the reason as to why the government has set up demonstration ranches where modern methods of keeping livestock are taught to the people. However, both the farmers and the government have their own ranching schemes.

Ranches are important because they have improved the quality of the animals in Botswana.

To support ranching further, there is cross breeding of local cattle with the exotic ones from Europe, Asia and other Africa countries.

Assessment

From the previous lesson on livestock rearing in Africa and with the help of **the photographs** in the Learner's Book, learners are to list down the conditions necessary for establishing a ranch in Botswana. This should be supported by references from the Internet and other relevant books. They should also carry out a research to find out the types of beef cattle reared in Botswana .

As a way of helping the learners read further, ask them to explain why demonstration ranches in Botswana are important.

END UNIT SUMMARY

Agriculture refers to growing of both subsistence and cash crops as well as keeping of livestock.

Traditional methods of subsistence farming include shifting cultivation, bush fallowing and small holder farming (small scale farming).

Modern methods of agriculture include plantation agriculture, irrigation farming and green revolution.

Livestock farming refers to domestic animals such as cattle, goats, sheep, pigs, camels and poultry kept for domestic use or for sale. Livestock farming may be practiced by pastoralists or by sedentary farmers. The animals especially the beef cattle are kept in ranches where they have veterinary services and water.

Dairy farming is practiced mostly in the highlands where cool and wet conditions are experienced. They are reared purposely for milk and milk products.

Agriculture has had great impact on the development of Africa such as food security, trade, provision of raw materials, source of employment, national revenue and improvement of transport in rural areas.

Case studies

Cotton growing in the lower Nile valley is under irrigation. Egypt is the world major producer of long staple cotton. West Africa produces a lot of cocoa in Africa. Much of cocoa is grown by small scale farmers.

Rubber is grown in plantation farms. Liberia is the main producer of rubber in Africa. Other countries include Côte d'Ivoire, Nigeria, Cameroon and DRC.

Dairy farming in Kenya is practiced in the Kenya highlands, Lake Victoria and at the coast. Exotic cattle such as Friesian, Jersey and Guernsey are kept.

Livestock ranching in Botswana is practiced by the locals and the government. They face the problem of drought quite often.

Additional information

It is important to have wall charts, enough atlases, videos and photographs showing different systems of farming for comparisons.

Where possible, have a local trip where the learner can interact with the reality. Such visits may be to a plantation or to a small scale farmer. You can as well bring the real objects/crops to class to help you in explaining some of the basics.

END UNIT ASSESSMENT

1. Compare and contrast characteristics of small holder farming and those of rotational bush fallowing.
2. Explain the characteristics of green revolution in Africa.
3. Discuss the impact of various agriculture activities on Africa's development.
4. Analyse the advantages of irrigation farming.
5. Describe the characteristics of nomadic pastoralism.
6. Discuss the features of cotton growing in the Nile valley region.
7. Summarise the steps in processing cocoa.
8. Briefly explain the problems of dairy farming in Kenya.

Answers to end unit assessment.

1. Refer to Learner's Book
2. Refer to Learner's Book
3. Refer to Learner's Book
4. Refer to Learner's Book
5. Refer to Learner's Book
6. Refer to Learner's Book
7. Refer to Learner's Book
8. Refer to Learner's Book

Remedial activities (slow learners)

- (a) Name three traditional methods of agriculture.
(b) Discuss the main characteristics of plantation agriculture.
- Discuss four characteristics of nomadic pastoralism.
- (a) List four countries that grow cocoa in West Africa.
(b) Explain how cocoa is processed from where they turn brown to export or sale.
- Draw a map of Botswana and on it mark and label cattle ranching areas.

Answers

- (a) Refer to Learner's Book
(b) Refer to Learner's Book
- Refer to Learner's Book
- (a) Refer to Learner's Book
(b) Refer to Learner's Book
- Refer to Learner's Book

Extended activities (for gifted and talented learners)

- Give four challenges facing nomadic pastoralism.*

Answers

- Shortage of water and pasture.
- Outbreak of animal diseases/foot and mouth/tripanosomiasis.
- Inadequate veterinary services.
- Cattle rustling, raids and attack by wild animals.
- Decrease in grazing land and competition from other land use.

- Name three exotic types of dairy cattle reared in Kenya.*

Answers: Friesian, Jersey, Ayrshire, Guernsey, Alderney, Sahiwal, Brown Swiss (Swiss brown).

- Explain three human factors that favour dairy farming in Kenya Highlands.*

Answers

- High population in the area offers **ready market** and other dairy products as well as labour.
- There are **milk processing factories** that help in milk processing and storage.
- Many areas in the highlands are well serviced road network, which support transport of milk to processing plants.
- **Cooperative societies** have been set up **to market** the dairy products.
- Provision of **extension officers to educate** the farmers on dairy cattle rearing.

Unit 11

FORESTRY IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to analyse the impact of forestry and forest exploitation in Africa.

Prerequisite of this unit

This unit, *Forestry in Africa*, was discussed in Unit 13 of Senior One as one of the economic activities people engage in. Learners must have categorised it as one of the many primary economic activities.

In Senior Two, under *Unit 16*, knowledge was narrowed down to be the study of *Forestry in Rwanda*. After defining terms related to forestry, learners discussed types of forests and major forest areas in Rwanda, importance of forests in Rwanda, the concept of deforestation, areas under the risk of deforestation in Rwanda and impact of forestry on sustainable development of Rwanda.

This unit presents forestry on a wider scale, with Africa being its areas of focus. Learners are expected to describe the major types of forests in Africa and their characteristics, factors favouring forest growth in Africa, forest exploitation in Africa, desertification in Africa and impact of forestry on sustainable development in Africa.

Cross-cutting issues

Forestry is an economic activity that involves exploiting a natural resource that is a crucial component of the environment. Studying forestry enables a learner to acquire knowledge on how to care for forests as part of the environment. Through this study one understands and appreciates the fact that conservation of forests is *conservation of the environment*. Study of forestry is directly linked to learning about the causes and measures against occurrence of *climate change* also known as *global warming*.

In addition, the study of forestry touches on income generation for individuals and for a country. This study will help the learners to acquire some knowledge on *financial education* as they study about industrial activities, transport and trade in relation to forestry.

We must make an effort to conserve forests so as to avoid hurting our economies and our environment directly and indirectly.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>They will cultivate this competence especially when examining the solutions to problems affecting forest exploitation in Africa.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it explain phenomena from gathered information. <i>Research skills will be required when learners search for information on solutions to problems affecting forest exploitation in Africa.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>This competence will be developed when leaders prepare class presentations and write down their findings for further referring.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>These skills will be developed when learners work in pairs or groups to apply knowledge of forest management to suggest measures to prevent desertification. They will also acquire the skill when they partner to perform tasks such as analysing characteristics of major forests in Africa.</i>
Lifelong learning	The acquisition of such skills will help learners to update knowledge and skills with minimum external support. <i>This skill is vital because it will help learners acquire skills of utilising forest resources for survival without necessarily destroying the ecosystem. This can be through lumbering medical research or even wildlife conservation.</i>

Vocabulary/key words/concepts

Sahel region	Transition zone between the savannah grasslands and the Sahara desert
Aspect	The direction of a slope in relation to rain bearing winds and sunlight.
Desertification	Process in which fertile land becomes a desert
FAO	UN body. Food and Agricultural Organisation
Sustainable development	Economic development that takes place without depleting the natural resources.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the major types of forests in Africa and their characteristics? (Forest areas: Gabon, DRC, Congo, Cameroon, Nigeria and Ivory Coast)
- (ii) What factors favour forest growth in Africa? (physical and socioeconomic factors)
- (iii) What are the methods, factors favouring, problems and solutions of forest exploitation in Africa?
- (iv) Which areas are affected by desertification in Africa? What are the causes, effects and control measures of desertification?
- (v) What is the impact of forestry and forests on sustainable development in Africa.

Attention to Special Education Needs

It is important to give special attention to the learners with special needs so that they are not disadvantaged. Ensure you have the appropriate learning materials such as braille and large print for those with **visual impairment**. For learners with **low vision**, you should ensure that they sit near the chalk board so that they are able to read when information is written on the board. Those who have **hearing impairment** should be provided with sign language interpreter and books written in sign language.

If you have to organise for outdoor learning, you must ensure that learners with **physical disabilities** are well taken care of especially those who have difficulties in movement.

List of lessons

Lesson 1	The major types of forests and their characteristics (Forest areas: Gabon, DRC, Congo, Cameroon, Nigeria and Ivory Coast) and factors favouring forest growth in Africa (physical and socio-economic factors).
Lesson 3	Forest exploitation in Africa (methods, factors favouring, problems and solutions).
Lesson 3	Desertification in Africa (areas affected, causes, effects and control measures).
Lesson 4	Impact of forestry and forests on sustainable development in Africa.

LESSON 1: MAJOR TYPES OF FORESTS AND THEIR CHARACTERISTICS AND FACTORS FAVOURING FOREST GROWTH IN AFRICA

PART I: MAJOR TYPES OF FORESTS AND THEIR CHARACTERISTICS

Learning objective

By the end of this lesson, the learner should be able to name the major forest types and forest areas in Africa

Introduction

The forests found in the listed countries are mainly tropical rain forests which develop naturally in areas that experience equatorial climate. The areas in question are hot and wet throughout the year leading to continuous growth of vegetation throughout. Some of the trees in these forest are huge and have taken many years to reach their size. The forests as will be learnt have many different species of trees and other forms of vegetation. Some trees are highly valuable and widely sought for.

Introduce the unit to the learners by building on the knowledge on forestry they have acquired in studies in the lower classes. At this stage the learners know what forestry entails but have to study in details as they apply the concept to the African situation. Ensure that the learners develop positive attitude towards forests as to appreciate need to conserve what is around them. Rwanda has insignificant areas under forest in relation to the other countries and this fact should make the learners appreciate that there is need to make a deliberate effort to increase areas under forests.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing forested areas in Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Photograph analysis

Learning activities

Introduce the lesson by asking one of the learners to read out the introduction given in the Learner's Book. Remind them that this unit is a continuation of **Unit 16 of Senior 2**.

Proceed to divide them into groups for purposes of **Activity 11.1** in the Learner's Book. When forming the groups, **ensure learners of all abilities are taken care of with a mix of slow and fast learners in each group**. This way, they will help each other in the learning process. Each group needs to have a representative who will present their answers to the class after the discussion. Encourage them to write clear and self explanatory points for ease of presentation.

After presentations, lead them in a brainstorming session in which they will identify the four major types of forests in Africa.

Ask them to retreat into their respective groups once again in order to discuss each type of forest as briefly discussed in the Learner's Book. It is important that you provide them with reference materials to make learning more interesting.

Each group should be asked to discuss the given types of forests under the following subheadings:

- a) Areas in Africa where they are found (they should mention specific countries). It is

also important for them to draw sketch maps of Africa showing areas where these types of vegetation are found.

b) Characteristics of each type of forest

Each of the four groups should be given specific activities from the Learner's Book to research on and generate answers to be presented in class. For instance:

Group I: Activity 11.2 and Activity 11.3 in the Learner's Book respectively.

Group II: Activity 11.4 in the Learner's Book

Group III: Activity 11.5 in the Learner's Book

Group IV: Activity 11.6 and Activity 11.7 in the Learner's Book

Synthesis

Each learner should draw a map of Africa showing where each type of vegetation is found. Ensure you identify the correct map to be drawn on a large display paper for the class.

Assessment

To ensure that all learners benefit from the presentation from each group, ask them to complete the following table after the lesson. You should check their work afterwards to correct areas that seem not to be clear to them.

Type of forest	Areas/countries where found	Major characteristics
Tropical rainforests		
Savannah woodlands		
Mountain forests		
Mangrove forests		

PART II: FACTORS FAVOURING FOREST GROWTH IN AFRICA (PHYSICAL AND SOCIO-ECONOMIC FACTORS)

Learning objective

By the end of this lesson, the learner should be able to explain the factors favouring forest growth and exploitation in Africa.

Introduction

There are varieties of factors favouring forest growth in Africa. Though many of the factors are natural, human influence cannot be ignored since human activities have increased drastically over the years. The factors that must be discussed are: climate, noting that the areas that receive high rainfall have thick forests while those areas with low rainfall may only have few trees. Altitude, as altitude increases on mountain areas, tree species become fewer, shorter and less dense. Aspect, this is the effect that the direction a slope faces in relation to rain bearing winds has on the nature of vegetation. The windward slopes of high mountains are forested, while the leeward slopes have scanty vegetation. Soils are either deep fertile soil, which support tree growth characterised by dense forests while shallow soils are unable to support tree growth.

Review briefly what the class learnt in the last section and let the learners give some the key points they learnt. The learners should be engaged in suggesting the factors that influence forest growth.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Engage learners in a question and answer session on factors favouring forest growth in Africa. The factors to be discussed should include those outlined in the Learner's Book.

After this discussion, group for **Activity 11.6** in the Learner's Book. As they discuss, ask them to write comprehensive notes on each factor, while citing examples from in Rwanda and Africa in general.

It is important that you ask them to obtain photographs of each type of vegetation that they can use in their explanation.

Other factors that learners will identify as they discuss should be added to the ones outlined in the Learner's Book, with your input on a detailed explanation of these additional points.

Synthesis

With knowledge gained from this lesson, ask learners to use their local environment as their case study to point out factors that have influenced the growth of vegetation. A detailed report of their findings should be presented in the next class.

Assessment

It will be interesting to find out how learners will try to relate the type of vegetation in different parts of Africa with the factors influencing their growth and development. Ensure that this task is done in groups composed of learners with different abilities.

LESSON 2: FOREST EXPLOITATION IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to analyse the forest exploitation processes in Africa.

Introduction

Note that in this section you have to discuss the methods used in forest exploitation, the factors that favour exploitation, problems encountered or hindering exploitation and how they are solved. Some of the factors that you have to bear in mind are luxuriant growth of trees due to heavy rainfall and constantly high temperatures in the equatorial regions, availability of water transport for the logs by rivers, trees that have straight smooth trunks ideal for saw milling, and high demand for timber among other factors. The numerous problems encountered such as lack of proper access into the forests, heavy rains, and scattered valuable trees.

Review briefly what the class learnt during the last section and let the learners give some of the key points they learnt. The learners should be engaged in suggesting the factors that influence exploitation of forests in Africa. They should study the photographs given in the learner's book to identify some of the factors which are related to the characteristics of forests. They are also able to give the problems and how those involved in the exploitation are able to overcome them.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing forest exploitation

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Ask one of the learners to explain the meaning of **forest exploitation**. Build on this to lead a brainstorming session on methods of forest exploitation in Africa.

As they discuss each point in the Learner's Book on methods of forest exploitation in Africa, be keen to guide them with appropriate examples, most of which should come from them.

As they discuss, be keen to identify difficult areas where you will help them to understand better using examples from the local environment.

The next discussion point will be on **factors favouring forest exploitation in Africa**, as outlined in the Learner's Book.

It is also important that you help them form groups to discuss **Activity 11.8** in the Learner's Book. After this discussion, they should prepare a class presentation.

During various discussions, it is important that you pay attention to rules of **grammar, pronunciation, report writing** and **public speaking**. This is because it is your responsibility to mould learners not only in your subject but also in all others that Geography is linked to.

As an assignment, let them prepare brief notes on **problems that may occur due to forest exploitation in Africa** and **solutions to the problems of forest exploitation in Africa**.

Synthesis

To gauge their understanding, let learners carry out a research to find out some of the methods of forest exploitation in Africa and factors favouring forest exploitation in Rwanda. Allow them to use Senior 2 Learner's Book as their main reference material as well as the Internet and any other reference material on this topic that may be available.

Assessment

Task learners to explain the following terms as used in forestry:

- i) Reafforestation ii) Afforestation iii) Agroforestry

They should then draw a table showing problems affecting forest exploitation in Africa and possible solution to each problem.

LESSON 3: DESERTIFICATION IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to identify the causes and effects of desertification in Africa.

Introduction

Desertification is a process in which an area that is semi-arid continues to become more arid. Formerly fertile land gradually changes to become a desert. This is mainly due to climatic variations and human activities. Prolonged drought is a major natural cause but the process is worsened if land is not carefully utilized.

The countries of Africa that border the Sahara Desert have been experiencing this phenomenon gradually changing the areas on the margins of the desert into true deserts. Countries such as Sudan, Ethiopia, Northern parts of Kenya and Northern Nigeria have had some their lands change from semi –arid to almost pure desert. Other than prolonged drought, desertification is accelerated by activities such as overgrazing deforestation and careless cultivation that leads to soil erosion.

Effect of desertification is formation of barren or waste land without water or vegetation. Such conditions can be reversed but it takes much longer than it takes to cause a desert to form. Control measures include planting of trees, keeping controlled number of livestock to avoid overgrazing and avoiding overuse of forests.

As you teach this section remember to use local examples that learners are familiar with as examples.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing forest exploitation

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

In Senior 2, learners mentioned areas under the risk of deforestation in Rwanda. In reference to this, ask them to list down the reasons that may account for this.

It is at this point that you should introduce areas affected by desertification in Africa, with a view to comparing causes of deforestation in these two cases (that is, Rwanda and Africa as a whole).

Place them into groups to discuss **Activity 11.11** in the Learner's Book.

Before the discussion, one of the learners should read out a loud the excerpt from the Ghanaian Times newspaper in the Learner's Book. After this, learners should retreat to their respective groups to analyse the information contained in this excerpt using the questions outlined in the Learner's Book.

Afterwards, each group should be given chance to present their findings in response to the questions given, which are:

- a) Causes of deforestation in Africa
- b) Effects of deforestation (More information to be sourced, and **Activity 11.13** in the Learner's Book).
- c) Measures put in place to protect forested areas (and **Activity 11.14** in the Learner's Book).

Note: The excerpt is only but a reference point. Allow learners to source for additional information from local dailies as well as the Internet and from other Geographical sources.

Identify a suitable map of Africa showing the countries that have experiencing desertification. Identify suitable photographs of such areas and photographs showing activities carried out to reverse the situation.

Synthesis

Use relevant photographs to explain the effects of desertification in Rwanda. They should accompany the photos with brief explanation on each effect discussed. They should then present their findings in the remedial lessons.

Assessment

Learners to carry out a case on a specific area experiencing desertification in Uganda, with the following topics for discussion:

- i) Reasons promoting desertification
- ii) Measures put in place by the government to control desertification in this area

Afterwards, they should then prepare a class presentation.

LESSON 4: IMPACT OF FORESTRY AND FORESTS ON SUSTAINABLE DEVELOPMENT IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to describe the effects of forestry on sustainable development in Africa.

Introduction

Sustainable development is achievable in different ways. One of them is to avoid degrading the environment so that the natural resources available such as forests are not depleted. Proper management of forests will give people services that they cannot do without. If forests disappear then any prospect of sustainable development is not attainable. As the population growth rate increases, countries have to utilise their available resources in a controlled way so that future generations will have resources to rely on. Thus, there is need to control deforestation and land degradation in order to achieve sustainable development. As you teach this section you should use local examples whenever applicable.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing areas in Africa where reafforestation has been done

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

In this lesson, ask learners to read ahead. You can suggest to them reference materials in advance or provide to them what will be available.

Organise a class debate under the following topic:

People will live a more miserable life without forest resources than with them.

You can invite a teacher for English to help you organise the debate. He or she can set out the rules of debating. This way, learners will learn the important aspect of interdependence and learn that we all need each other.

As the debate will be going on, ask a representative from those supporting the topic as well as those opposed to it to make brief notes that will be shared with the class after the debate.

Synthesis

This being the last lesson under this unit, it is important that you ask learners to summarise what they have learnt in a table similar to the one provided on the following page:

Forest resource	How it impacts on development	Dangers facing the resource	Possible solutions to the dangers
Timber			
Poles			
Roofing materials			
Herbal medicine			
Research centre			
Source of wood fuel			
Source of food			

Assessment

Each learner to attempt **Activity 11.15** in the Learner's Book then prepare a presentation during remedial learning.

END OF UNIT

Summary of the unit

In this unit learners are expected to explore the major types of forests and their characteristics. The areas that have equatorial forests in Africa including Gabon, DRC, Congo, Cameroon, Nigeria and Ivory Coast have been given in the syllabus as the case studies. Learners are therefore expected to learn about the extent of the forests in each of the countries given.

Secondly, the unit has the factors favouring forest growth in Africa. It is expected that learners study the physical and socioeconomic factors that favour forest growth examples of the factors are climate, altitude, soils and aspect. Socioeconomic factors are those related to human activities such as availability of forest exploitation controls and agro-forestry initiatives.

The third part of the unit is on forest exploitation in Africa. Specifically learners have to study the methods used in exploitation, factors favouring exploitation of forests in Africa and the problems associated with forest exploitation with possible solutions. This part of the unit would be easy for learners to grasp by applying the knowledge they have of Rwanda from what they have learnt before and their experiences.

The next part is on desertification in Africa. The learners should explore the areas affected by desertification, causes of desertification, and effects of desertification and control measures that are being employed to reduce the pace at which the process is occurring. While some causes of desertification are natural such as climate change, the others are related to human activities. These include deforestation and employing poor methods of farming such as overgrazing.

The last part of the unit looks at the impact of forestry and forests on sustainable development in Africa. This is best studied with the Rwandan case as the local example. Effects of over exploitation of forests such as soil erosion are explicit in Rwanda. Others are effects resulting from proper forest management which where sustainable development results from.

Additional information

Forestry plays a major role in supporting livelihoods in many African countries. Forest resources provide the energy needed in many homes. At the same time, forests provide direct monetary income to individuals and to governments.

Africa has experienced extensive deforestation due to the high demand for forest products. There is widespread illegal felling of trees as people have to get timber for building and for sale to raise money and also they need wood fuel. Forests have also been affected by fires that are not easy to put off especially during the dry seasons. Farming activities have encroached into the forest areas reducing what was a forest into farm lands. The worst is when the farming methods used lead to soil erosion thus causing what was once a forest area turn into a desert.

Thus there is a remarkable decrease in forest areas in the continent and this is a cause of concern in the affected countries. As a result, in an effort to reverse the situation, most countries have afforestation programmes where citizens engage in tree planting to establish new forest plantations and agro forestry where farmers are encouraged to plant trees in their farms for supply of wood fuel and timber.

End unit assessment

1. Analyse the major types of forests in Africa
2. Summarise the characteristics of the major forests in Africa
3. Discuss three factors favouring growth of forests in Africa
4. Identify the effects of forest exploitation in Africa
5. Explain the causes and effects of desertification in Africa
6. Explain the impact of forestry and forests on sustainable development in Africa

Answers to end unit assessment

1. Major types of forests in Africa

Tropical rain forests	These are known as equatorial forests. They are mainly found in areas which experience equatorial climate. The major areas in Africa where they are found are Gabon, Democratic Republic of Congo (DRC), Congo, Cameroon, Nigeria and Cote d'Ivoire (formerly Ivory Coast).
Savannah woodlands	Savannah woodlands are mainly found in north and south of Congo basin and in West Africa between the Sahel and tropical rain forest areas. They are also found in the plateau of East Africa. Miombo woodlands in Tanzania are a good example of savannah woodlands.
Mountain forests	Mountain forests are found on slopes of mountains and highlands. Such areas include Drakensberg Mountains in South Africa, Ruwenzori Mountains in Uganda, Mount Kilimanjaro, Mount Kenya, Adamawa highlands in Cameroon and the Ethiopian highlands.
Mangrove forests	These are found in the low lying muddy coasts along the East coast of Africa from Kismayu in Somalia to Mozambique. They are also found on the North West coast of Madagascar, along the Coast of the Gulf of Guinea in West Africa especially in the Niger delta and along the Coast of Gambia up to Sierra Leone.

2. Characteristics of the major forests in Africa

- Trees are closely set with three distinct layers or canopies.
- Some of the trees are tall. They may rise up to a height of 40 metres.
- Most of the trees are hardwoods such as mahogany, teak, ebony and camphor.
- The trees are straight and have smooth trunks.
- The trees are evergreen and have broad leaves
- The forests support the growth of many species of plants.
- There are creepers that wind around big trees to get to where there is sunlight.
- There is little vegetation under the trees.

3. Factors favouring growth of forests in Africa

The following are some of the factors learners are expected to discuss in detail:

- Climate:** Areas that receive high rainfall have thick forests. Areas with low rainfall may only have few trees. Cold mountain tops have bare rock.
- Attitude:** As altitude increases tree species become fewer, shorter and less dense.
- Aspect:** This refers to the direction a slope faces in relation to rain bearing winds. The windward slopes of high mountains are forested, while the leeward slopes have scrub and grassland vegetation.
- Soils:** Deep fertile soils support tree growth characterised by dense forests.
- Human activities**
- Wild animals**

4. Effects of forest exploitation in Africa

- Soil erosion:** Removal of trees exposes soil to agents of erosion such as wind and running water. On steep slopes gullies may develop. Landslides may occur on the sloppy areas. In areas where almost all the vegetation is removed strong winds may blow away top soil.
- Climate change:** Forest exploitation may lead to increase in temperature. With high temperatures there would be more evaporation. This may lead to drying up of rivers and lakes which are sources of water. There will be slow process of tree regeneration hence reduction in forest areas. There will also be a decrease in rainfall, which eventually may lead to desertification.
- Flooding:** When trees have been cut, there is likely to be fast movement of rain water. The water may collect in gullies, ditches, streams and rivers. The rivers may get too much water which may make them burst their banks. The water floods the nearby areas. Sometimes soils carried by rain water silt up river beds causing flooding.
- Decrease in crop production:** Due to soil erosion, the soil fertility will be reduced. This in turn will lead to poor yields.

5. Causes and effects of desertification in Africa

- Causes
 - Climatic variations
 - Soil erosion
 - Deforestation

- Overgrazing especially in arid and semi-arid lands
- Exploitation of marginal dry lands for farming
- Improper farming methods such as cultivating on steep slopes

b) **Effects of desertification**

Destruction of water catchment areas. This reduces the amount of water in rivers.

Increase in the incidences of drought which may lead to loss of animals and human life.

Rural to urban migration occurs as rural lands become strained to support the same number of people who previously lived there. The migrants increase population in the urban areas.

Decrease in food production due to land degradation.

Loss of livestock leads to the need for food aid.

Poverty as many people in the affected areas are unable to carry out their daily activities.

6. Impact of forestry and forests on sustainable development in Africa:

If we manage forests well, they will provide us with things cannot do without. If forests disappear, we lose any prospect of sustainable development. The aim of any country in Africa is to reduce poverty. Poverty reduction means improving welfare and quality of life. This involves increase in consumption of especially food, shelter, energy and water. All these are extracted from the environment. With continued depletion and degradation of natural resources, the fight against poverty is undermined. As the population growth rate increase, the fight against poverty becomes worse. There is need to control deforestation and land degradation in order to achieve sustainable development.

Remedial activities (for slow learners)

1. Identify three countries in Africa where there are areas under equatorial types of forests
2. Outline four characteristics of equatorial forests
3. Briefly explain some of the efforts towards ensuring sustainable exploitation of forests in Rwanda.

Answers to the remedial questions

1. The Atlantic Equatorial coastal forests are a tropical moist broadleaf forest of central Africa, covering hills, plains, and mountains of the Atlantic coast of Cameroon, Equatorial Guinea, Gabon, Republic of the Congo, **Angola**, and Democratic Republic of the Congo.
2. Tropical rainforests have a type of tropical climate in which there is no dry season – all months have an average rainfall value of at least 60 mm. Tropical rainforests have no summer or winter; it is typically hot and wet throughout the year and rainfall is both heavy and frequent. One day in an equatorial climate can be very similar to the next, while the change in temperature between day and night may be larger than the average change in temperature along the year.
3. **Some of the efforts towards ensuring sustainable exploitation of forests in Rwanda**
Planting trees in areas where forests have been destroyed. That is reforestation. The species should be fast growing and high yielding.

Planting trees in areas where there were no trees. That is afforestation.
Regulating forest exploitation by enacting laws to effectively manage forests.
Creating forest reserves in order to protect some tree species.
Encouraging farmers to practice agro-forestry.
Encouraging use of alternative sources of energy such as biomass to minimise use of wood fuel.
Using fuel efficient cooking stoves to reduce amount of wood fuel being used.
Encouraging use of efficient tree harvesting methods.

Extended activities for gifted and talented learners

1. Explain four causes of desertification in Africa
2. Discuss the effects of desertification on human activities
3. Suggest the measures that should be taken to control desertification.

Answers to the extended activities

1. Causes of desertification in Africa
 - Climatic variations
 - Soil erosion
 - Deforestation
 - Overgrazing especially in arid and semi-arid lands
 - Exploitation of marginal dry lands for farming
 - Improper farming methods such as cultivating on steep slopes
2. Effects of desertification
 - Destruction of water catchment areas. This reduces the amount of water in rivers.
 - Increase in the incidences of drought which may lead to loss of animals and human life.
 - Rural to urban migration occurs as rural lands become strained to support the same number of people who previously lived there. The migrants increase population in the urban areas.
 - Decrease in food production due to land degradation.
 - Loss of livestock leads to the need for food aid.
 - Poverty as many people in the affected areas are unable to carry out their daily activities.
3. Control measures for desertification
 - Afforestation and reforestation.
 - Reducing livestock numbers to avoid overgrazing.
 - Improving farming methods for example encouraging crop rotation.
 - Introducing alternative sources of energy to reduce the use of wood fuel.
 - Educating the public on the need to conserve the environment.
 - Reducing soil erosion through soil conservation measures.

Unit 12

FISHING IN AFRICA

Key Unit Competence

By to be able to explain the impact of fishing on the sustainable development of Africa.

Prerequisite of this unit

Unit 13 of **Senior One** introduced the study of **Economic Activities** to the learners. They started by defining the meaning of an economic activity, and must have understood that fishing is part of the many primary activities.

Unit 17 of Senior Two provided a specific study on the study on **Fishing and Fish Farming in Rwanda**. Using their familiar environments and Rwanda in general, they learnt about the various fishing and fish farming areas in Rwanda, factors influencing fish farming in Rwanda, methods of fishing used in Rwanda, problems faced by fish farming in Rwanda and their possible solutions and fish preservation and conservation in Rwanda.

In this unit, learners will study **Fishing in Africa**. Specific areas of study will be on the major fishing grounds and types of fish in Africa, major fishing methods in Africa, factors favouring the development of fishing in Africa, importance of fishing in Africa and problems with fishing in Africa and possible solutions.

Cross-cutting issues

In this unit we may consider the *standardisation of culture* as being promoted through fishing as an economic activity. The people who live near lakes and rivers may have a culture that is oriented towards fishing. With encouragement of fish farming more people in Rwanda will develop the culture of fishing and eating fish. When a society embraces one cultural activity, it becomes a unifying factor for the people. The unit has a lot to do with *financial education* since most of the large scale fishing is commercial in nature. We cannot ignore *environment conservation* as an issue because fishing for sustainable development involves conservation of fisheries.

Generic competences

Generic competence	Explanation
Cooperation, interpersonal management	This will help the learners to cooperate as they work on groups and teams on different tasks and assignments. It will enable them learn to relate with one another as members of the group which will eventually translate into cooperation in the communities where they come from and to create national unity and integration. <i>They will acquire this competence when working in groups to discuss tasks such as analysing factors responsible for the growth and development of the fishing industry in Kenya.</i>

Creativity and innovation	Acquisition of this competence will help the learner to become imaginative far beyond the knowledge acquired during classroom learning and that obtained from resource materials and internet. <i>Learners are expected to think creatively and innovatively in coming up with local ways of fishing responsibly. They can make fishing traps from locally available materials. They can also suggest storage ways by citing localised methods that are cheap and easy to adapt for those who do not have a lot of money to spend on modern technology.</i>
Research skills	Learners are able to take initiative, and become resourceful in finding out answers to new concepts and phenomena they come across in life. It enables one to make sound judgement and making viable solutions. <i>This skill will help learners to cope with new knowledge and information acquired in life under new situations and environments. They are expected to carry out a research in order to correctly examine the problems affecting fishing in Africa and suggest possible solutions.</i>

Vocabulary/key words/concepts

Fishing ground	An area where fishing is carried out, for instance a lake the sea or a river
Marine	To do with the oceans
Traditional fishing method	Non-scientific methods of fishing that have been used in for thousands of years and are still used nowadays
Trawling	To catch fish with a large net called a trawl
Seining	To catch fish using a drag net that hangs vertically with the bottom edge held by weights and the top edge buoyed by floats.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the major fishing grounds in Africa? (Morocco, South Africa, Angola, Nigeria)
- (ii) What types of fish and major fishing methods (traditional and modern methods) are used in Africa?
- (iii) What factors favour the development of fishing in Africa?
- (iv) What is the importance of fishing in Africa?
- (v) Problems of fishing in Africa and possible solutions

Attention to Special Education needs

A child who has difficulties that make learning harder than for other children of the same age requires special attention to avoid such a child having disadvantages. During a timed tests for instance, they may require additional time since their speed is impaired due to the disability.

Visually impaired learners require brailled materials while those with low vision have to be provided with materials with large prints. In class, low vision learners need to sit close to the chalk board to follow whatever is written on the board. Such learners may not be able to draw maps and diagrams.

Learners with hearing impairment should be provided with materials written in signs language and also must have interpreters to be able to follow when a teacher is teaching.

Learners with physical impairment have to be given special attention but the attention depends on the degree of impairment and the affected part of the body. Some may require assistance when moving during outdoor learning sessions while others may require assistance when writing.

Slow learners also have special learning needs because their pace of comprehending information is slow. They require more time and teacher's patience.

List of lessons

Lesson 1	The major fishing grounds in Africa (Morocco, South Africa, Angola, Nigeria) and types of fish and major fishing methods (traditional and modern methods) in Africa..
Lesson 2	Factors favouring development of fishing in Africa.
Lesson 3	Importance of fishing in Africa.
Lesson 4	Problems of fishing in Africa and possible solutions.

LESSON 1: THE MAJOR FISHING GROUNDS IN AFRICA, TYPES OF FISH AND MAJOR FISHING METHODS IN AFRICA

PART I: THE MAJOR FISHING GROUNDS IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to draw a map of Africa to show fishing grounds.

Introduction

The major fishing grounds of Africa are diverse in that some are in the ocean others in lakes while others are in rivers and fish farms.

Inland fishing grounds are mainly from freshwater lakes, rivers and dams. The most important inland fishing grounds are lakes such as Victoria, Malawi, Tanganyika, Albert, Kyoga, Mweru and Chad. Fishing is also carried out in the man-made lakes such as Volta, Kainji, Nasser, Kariba and Orange. The main fish caught in the lakes are Tilapia, Dagaa, Nile perch, Herring, Cat fish and Shell fish.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- The Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

With reference to **Unit 17** of **senior 2** Geography, ask learners to find out a comprehensive definition of fishing.

Using **Activity 12.1** in the Learner's Book group learners with regard to their abilities to draw the map of Rwanda showing the major fishing areas. This will remind them of what they learned in Senior 2. Build on this activity to introduce major fishing areas in Africa.

It is important to mention at this stage that the water bodies in Rwanda are part of **Inland Fishing Grounds**. It is important to add that rivers and lakes in other parts of Africa form part of inland fishing grounds. At this point, let them attempt **Activity 12.2** then prepare a class presentation.

Ask learners to differentiate this with **Marine Fishing Grounds**. At this point, let learners identify marine fishing grounds and features favouring fishing within these fishing grounds.

Fish is part of learners' food. Ensure that you mention the benefits of fish in our diets. In a brainstorming session, ask learners to mention the common products they consume that result from fishing.

To differentiate products of inland fishing grounds from marine fishing grounds, task learners to use the photos given in the Learner's Book.

Synthesis

Apart from fish, there are other products obtained from fishing that are beneficial to people. Ask learners to make a summary of some of these products and their uses. Let them include products processed from fish or other fishing products.

Assessment

Activity 12.3 of the Learner's Book will form the basis of assessment after studying this lesson. Let them use relevant maps to justify their answers.

PART II: MAJOR FISHING METHODS IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to classify fish species caught in Africa and describe the fishing methods.

Introduction

Africa's fisheries have a wide variety of fish species. The species that are caught from the ocean are different from those caught from fresh water fisheries. The methods of fishing are equally varied depending on the economic abilities of the communities the type of fish and the type of fishery.

Traditional fishing methods are very common in Africa includes spearing method, hook and line method, basket method, use of herbs, lamp attraction method among others. Modern methods are mainly used in deep waters. They include drifting method, trawling method, seining method and lining method

As you discuss these methods keep in mind that the learners are familiar with some of the method and can be actively involved in describing them. Ensure they give specific examples.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing some of the types of fish caught in Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Some of the learners may have been involved in fishing activities at one point of their lives. Identify those who have, then ask them to share with the class how they used to catch the fish.

As they share, be keen to identify the likely method of fishing they may have used.

For those who have watched documentaries on how fishing is done on a large scale, ask them to describe what they observed.

It is important to allow learners to attempt **Activity 12.4** in the Learner's Book, answers to which will be obtained from the narration learners will already have given.

On one side of the board, ask one learner to list the traditional fishing methods as the other lists the modern methods on the other side.

Synthesis

It will be better for learners discuss each of the traditional and modern methods of fishing in detail in groups, then prepare brief notes on each. In selected cases, ask them to provide illustrations or photographs cut out from magazines and newspapers to support their thinking.

Assessment

To ensure that the intended objective of the lesson is achieved, task learners to draw the map of Africa then on it indicate both inland and marine fishing grounds.

LESSON 2: FACTORS FAVOURING DEVELOPMENT OF FISHING IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to explain factors favouring growth and development of fishing in Africa.

Introduction

A variety of factors favour fishing activities in different fisheries. Presence of many inland fishing grounds such as lakes, rivers and ponds is a favourable factor for inland fisheries. Indented coastline and shallow continental shelves which allow sunlight to penetrate through the water encouraging growth of sea plants used as food by fish are factors for marine and large lake fisheries. Presence of the cold ocean currents like Benguela and Canary create cool conditions that encourage thriving a wide variety of fish species. The learners' book outlines all the important factors that you must go over with the learners to ensure they are able to comprehend each of them.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Maps showing some of the coastlines where fishing is done

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method

- Question and answer
- Reviewing reference materials

Learning activities

Africa is endowed with massive fish resources, which is continuously being exploited because of their benefits. However, the development of the fishing industry has been pegged on several factors, which learners are expected to explain in detail.

To achieve this, let them form groups to discuss **Activity 12.8** in the Learner's Book. Their findings should be presented in class in a discussion.

During discussions, allow for a question and answer session so that what is unclear is explained further.

Group work enhances **team spirit** as well as **sharing** and **cooperation**. Shared knowledge is also remembered for long.

During discussions, guide learners with appropriate questions that will help them remain within the confines of the knowledge intended.

Summarise the lesson with a note taking session, where learners will add to the points generated from their discussions with what has been summarised in the Learner's Book.

Synthesis

Learners should discuss separately factors favouring inland fishing and those favouring marine fishing.

After discussions, let them present their findings in a two-column table with one column having factors favouring inland fishing in Africa and the other those factors favouring marine fishing.

Assessment

Ask learners to explain factors favouring fish farming in Rwanda. Let them use the Senior 2 Learner's book in these discussions.

LESSON 3: IMPORTANCE OF FISHING IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to identify the importance of fishing in Africa.

Introduction

Presence of fisheries in Africa play an important role in the economy of each of the countries. It is a major economic activity for some of the communities especially those who live along the coasts where land is unsuitable for agriculture. It also contributes significantly to the national income in some countries where it is carried out on large scale. In some areas it has led to development of transport and communications as well as trade.

You should engage the learners in discussing the situation in Rwanda to enable them appreciate these types of developments and relationships as they compare with other countries in Africa. Use local examples as much as possible to enable learners make comparisons.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- The internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Form groups in which learners will discuss the importance of fishing. The first task will be to discuss **Activity 12.9** in the Learner's Book.

Each group should then suggest one of them who will present their findings in class. As presentations will be underway, ask other learners to be making brief notes.

Using the points in the Learner's Book, ask learners to give examples of how people and governments in general have benefitted from the fishing industry.

The importance of fishing can as well be summarised using photographs. To promote **creativity** amongst the learners, ask them to provide different photographs to explain each point on the importance of fishing. They can obtain them from various sources including the Internet, newspaper cuttings and relevant geographical resources.

Synthesis

In pairs, let learners identify a fishing ground in Rwanda or an industry processing fish products in Rwanda then discuss how it has been beneficial to the people and the government.

Assessment

Ask learners to write an imaginary story on 'How life could have been without fish.'

LESSON 4: PROBLEMS OF FISHING IN AFRICA AND POSSIBLE SOLUTIONS

Learning objective

By the end of this lesson, the learner should be able to examine the problems affecting fishing in Africa and suggest solutions.

Introduction

Fishing industry in Africa has numerous challenges in which in some cases vary from place to place. However there are some common problems such as lack of proper preservation facilities, use of traditional methods whose yields are very low, distance to the market and poor transport network. Majority of the small scale fishermen are affected by some of the problems but that does not exempt the large scale players from being faced some of by there challenges.

You should engage the learners in discussing the challenges in Rwanda to enable them appreciate the similarities with other countries in Africa. Use local examples as much as possible to enable learners make comparisons.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with a brainstorming session where learners will be expected to recall some of the problems affecting fishing in Rwanda.

In groups, let them use the Senior 2 Learner's Book to discuss the problems affecting fishing in Rwanda. This will be in line with **Activity 12.10** in the Learner's Book. For each problem mentioned, let them explain how it may occur in other inland fishing grounds of Africa.

In pairs, let them hold a discussion on the problems affecting fishing in marine grounds of Africa. The points given in the Learner's Book should form a basis of their discussion.

Learners should proceed to suggest some of the solutions to the problems. This will be in line with **Activity 12.11** in the Learner's Book, after which they should prepare for class presentations.

Remember, group discussions and pair work promotes **cooperation** and **teamwork**.

It also makes each learner feel valued and that his or her opinion also matters. This enhances **tolerance** amongst learners as well as they will understand that input from each learner is important in the learning process.

Synthesis

In a tabular presentation, let each group present problems facing fishing in Africa and possible solutions to each.

Assessment

Each learner should imagine being the Minister for Fisheries in Rwanda. As the Minister, let them outline the benefits of the fishing, problems facing the industry and possible solutions to these problems.

The narration should be written as a report to be read out aloud in class. The best narration should be read to the entire class, then printed and pinned on the board in the Learning Corner of the class.

END OF UNIT

Summary of the unit

The unit begins by looking at the major fishing grounds in Africa. The countries with the largest fishing industry in Africa have been specified for learners to zero into each of them to identify the location of the fishing grounds in each country. The countries are Morocco, South Africa, Angola and Nigeria. These countries' fishing industry is based mainly on marine fisheries. The countries have advantages of having cold ocean currents off their coasts. Cold ocean currents cause upwelling of water which causes planktons to move from the sea bed to shallow depths of the ocean.) To float from the seabed attracting large shoals of fish. Planktons are organisms that live in the sea and are food for fish.

The second section of the unit explores the types of fish and the major fishing methods in Africa. Learners are supposed to learn about both traditional and modern methods of fishing. In Africa the traditional methods such as use of hook and line, basket and fish traps are widely used by small-scale fishermen who catch fish in shallow waters. Modern methods such as trawling are common in the deep sea fisheries and are applied by individuals and companies that are able to raise the large capital that is required.

The unit then looks at the factors favouring development of fishing in Africa. In this section it will be noted that the factors are not unique to Africa as they are applicable in any parts of the world. What is unique for Africa is the degree to which each factor influences the fishing industry. For instance, there is underdeveloped fishing industry among the poor who are only able to use traditional methods of fishing due to lack sufficient capital.

The fourth section of the unit is on the importance of fishing in Africa. This section looks at the contribution of fishing industry to the economy of African nations. Compared to the countries with highly developed fishing industry such as Canada, Africa's fishing industry has negligible contribution to the economy.

Finally the unit's last section is on the problems of fishing in Africa and possible solutions. Problems such as unavailability of capital, overfishing and poor methods of storage of fish among others are to be discussed. These problems are a hindrance to development of the fishing industry. The section then proposes possible solutions to the problems as means by which the fishing industry can be improved so that its contribution to the economy can become significant.

Additional information

Fishing like farming is among the oldest economic activity practised over generations by communities that live near water bodies that have fish. For instance, communities that live near fresh water lakes and rivers have always had fish as part of their diet. In modern times, fishing methods have improved increasing the volume of the catch and turning what was a subsistence activity into a commercial undertaking. For some communities, it their main source of income while for some groups of people especially the rich, it is a sporting activity.

Fish is a main source of protein which helps to build body tissues. It also provides the body with energy. Some fish produce highly valuable fish oil that is processed and used to as food supplements. Examples are cod liver oil and salmon oil which are highly nutritious. The fish species that are processed to produce fish oil are more common in the temperate regions such as the Scandinavian countries, Canada and USA than in Africa.

Fish is also an important ingredient in the manufacture of animal feeds. It is a source of protein added to the feeds to provide healthy food for animals. Fish bones and some species of fish such as sardines and dagaa are dried and ground into flour and mixed with other ingredients to make animal and chicken feeds.

It is important to protect and conserve fisheries so that effects of pollution and overfishing are countered. This way, fisheries can yield more fish and better returns for governments and for those whose income depends on fishing.

End unit assessment

1. Mention four major fishing grounds in Africa.
2. Identify the major fish species caught in inland fishing grounds in Africa.
3. Mention two traditional and two modern fishing methods.
4. Explain four factors favouring the development of fishing in Africa.
5. Explain the importance of fishing in Africa.
6. Describe the problems affecting fishing in Africa.
7. Explain possible solutions to the problems affecting fishing in Africa.

Answers to the end of unit assessment

1. a) **Inland fishing grounds** – These are mainly the freshwater lakes, rivers and dams. The most important inland fishing grounds are lakes such as Victoria,

Malawi, Tanganyika, Albert, Kyoga, Mweru and Chad. Fishing is also carried out in the man-made lakes such as Volta, Kainji, Nasser, Kariba and Orange.

b) Marine fishing grounds - Marine fishing grounds in Africa are found in the seas and oceans along the coasts. The main areas are in the Indian and Atlantic oceans. Other marine fishing areas are in the Mediterranean Sea and the Red Sea. The richest marine fishing grounds are located along the coast of Namibia, Morocco, South Africa, Angola and Nigeria.

2. **Major fish species caught in inland fishing grounds** in Africa include Tilapia, Dagaa, Nile perch, Herring, Catfish and Shellfish.

3. a) Traditional fishing methods
- Spearing method
 - Use of herbs
 - Hook and line method
 - Trapping method
 - Basket method
 - Lamp attraction method
 - Gill-net method

b) **Modern fishing methods**

- Drifting method
- Seining method
- Trawling method
- Lining method

4. **Factors favouring the development of fishing in Africa**

- Presence of many inland fishing grounds such as lakes, rivers and ponds.
- Indented coastline in some areas which provides ideal fish breeding sites.
- Some areas have shallow continental shelves which allow sunlight to penetrate through the water encouraging growth of sea plants used as food by fish.
- The cold ocean currents like Benguela and Canary create cool conditions which encourage thriving a wide variety of fish species.
- The mixing of warm Guinea current and cold Benguela current modifies the temperature of the ocean water making the areas nearby ideal for fishing throughout the year.
- The mixing of warm Guinea current and cold Benguela currents result in rising of ocean water which brings minerals for growth of food for fish (planktons) to the surface attracting a large number of fish to the area.
- The coastal areas of Morocco, Namibia, Angola and South Africa have cool waters due to the cold currents. These cool waters have a lot of supply of planktons which is the main food for fish.

- The dry climatic conditions in some areas limit agricultural activities so people turn to fishing as an alternative economic activity.
- Availability of labour for the fishing industry.

5. **Importance of fishing in Africa**

- It creates jobs for a number of people therefore improving their standards of living.
- Fish is a source of protein which improves the health of people.
- Fishing has led to the development of related industries. For example boat making and repair and manufacture of nets.
- Fish and fish products when exported earn countries foreign exchange.
- The fish wastes are made into fish-meals, glues and fertilisers.
- Fish oil is used in the manufacture of medicines.
- Fishing activities lead to the development and improvement of transport and communication facilities.
- Sport fishing attracts tourists and so make the countries with fishing activities earn foreign exchange.

6. **Problems affecting fishing in Africa**

- Some countries in Africa have straight coast lines which make it hard to set up fishing ports.
- Many people in Africa use poor fishing methods that sometimes lead to catching of immature fish.
- Poor storage and preservation methods leading to a lot of waste since fish get spoilt very fast. Sometimes high temperatures make rot faster.
- Sometimes there is water pollution due to industrial wastes. Polluted water often kills fish.
- Many people in Africa are poor. This makes the market for fish within the continent small. The export market is also small due to competition from other countries.
- The spread of water hyacinth weed over many lakes in Africa has made it difficult to catch many fish. The weed sometimes suffocates fish and they die.
- Dangerous water animals in some lake make boats capsize.
- Some rivers have rapids and waterfalls that make it difficult to do fishing in such rivers.
- Most fishermen do not have enough money to buy modern fishing equipment. Due to this they use poor fishing methods which prevent them from catching large quantities of fish.
- In some areas there is overfishing due to limited control measures on fishing.
- Some fishing areas do not have good transport facilities. This makes fish go bad before reaching the market.
- There is loss of fish from the Atlantic and Indian Oceans due to fishing done

by non-African countries. These countries undertake fishing in sections that belong to the African continent.

7. **Possible solutions to the problems affecting fishing in Africa**

- Fishing in the inland fishing grounds should be restricted to specific seasons to allow for breeding and to avoid overfishing.
- Encouraging fishermen to form cooperative societies in order to get financial assistance for buying modern equipment.
- Introducing cold storage facilities near the fishing grounds in order to reduce spoilage of fish.
- Improving transport facilities to ensure that fish reach the markets before getting spoilt.
- Enacting laws against water pollution and ensuring laws are enforced. This would help reduce water pollution.
- Encouraging fish farming to ensure that there is sufficient supply of fish.
- Restocking the overfished inland fishing grounds.
- Issuing licenses to prospective fishermen to control their number and to ensure that there is no overfishing.
- Using effective navy patrol in order to control the territorial waters. This would ensure that no illegal fishing is done by fishermen from other continents.
- Clearing water hyacinth weeds to enable fishing activities in the water bodies.
- Educating the local people on the value of eating fish to promote local market.

Remedial activities (for slow learners)

1. Identify the major marine fishing grounds in Africa
2. Describe two fishing methods used to catch fish in the deep sea fisheries
3. Explain the factors that favour fishing in Morocco
4. Explain how water pollution affects fishing.

Answers to remedial activities

1. - Drifting method - Seining method
 - Trawling method - Lining method

Drifting method	Trawling method	Purse seining
<p>A drift net is hanged vertically in the sea like a tennis net.</p> <p>The net is held vertically in the water by floats at the top and weights at the bottom end of the net.</p> <p>The net is attached to a boat called a drifter.</p> <p>The net is usually placed just a few metres below the water surface.</p> <p>The boats drags the net across the water.</p> <p>The fish swim into the net.</p> <p>Some of the fish are caught by their gills and are unable to free themselves.</p> <p>The fish are removed from the net and put into the boat.</p>	<p>A bag shaped net also called trawl net is used.</p> <p>A net is attached to a ship or trawler.</p> <p>The mouth of the net is kept open by either boards or head beams.</p> <p>The upper part of the net is kept afloat by corks or floats.</p> <p>Weights are used to keep the lower part of the net at the sea bed.</p> <p>The trawler or ship drags the net along.</p> <p>After sufficient fish is caught, the net is lifted up and put into the trawler or ship.</p>	<p>This involves the use of two boats and a large net.</p> <p>One boat is large while the other one is small.</p> <p>Once an area with a large amount of fish is identified, the net is released into the water.</p> <p>The small boat goes around the fish and encloses them in the net.</p> <p>There is a string at the bottom of the net.</p> <p>The string is pulled to close the bottom end of the net. This is to make sure the fish do not escape.</p> <p>The net is then dragged to the large boat.</p> <p>The net is put into the large boat.</p>

3. Factors that favour fishing in Morocco

- Indented coastline which provides ideal fish breeding sites
- shallow continental shelves which allow sunlight to penetrate through the water encouraging growth of sea plants used as food by fish.
- The Canary cold current creates cool conditions which encourage thriving a wide variety of fish species.
- Guinea current and cold canary current modifies the temperature of the ocean water making the areas nearby ideal for fishing throughout the year.
- The coastal areas of Morocco have cool waters due to the cold currents. These cool waters have a lot of supply of planktons which is the main food for fish.
- The dry climatic conditions in some areas limit agricultural activities so people turn to fishing as an alternative economic activity.
- Availability of labour for the fishing industry.

4. How water pollution affects fishing

- Sometimes there is water pollution due to industrial wastes. Polluted water often kills fish.
- Pollution has created unnecessary nutrients that have led to the growth and spread of water hyacinth weed over many lakes in Africa. This has made it difficult to catch many fish. The weed sometimes suffocates fish.

- **Oil** destroys the insulating ability of fur-bearing mammals, such as **sea** otters, and the water repellency of a bird's feathers, thus exposing these creatures to the harsh elements. Without the ability to repel water and insulate from the cold water, birds and mammals will die from hypothermia.

Extended activities for gifted and talented learners

Explain some of the problems hindering the development of fishing in Rwanda and suggest their possible solutions.

Answers to extended activities

1. Over-exploitation of fish in the major fishing areas
 - Restocking of the fisheries that have been depleted to increase the species and quantity of fish
 - Encouraging people to engage in other income generating activities
2. Use of unregulated fishing nets that catch all sizes of fish including those that are not ready for harvesting
 - Punishing fishermen found using the small meshed nets
 - Banning the use of nets with small meshes
3. Use traditional methods of catching fish like use of traps, spears and poisoning
 - Introducing better methods of fishing to increase the output
4. Pollution in the lakes, swamps and rivers due to discharge of domestic waste into the water and use of poison to kill fish
 - Enacting laws against water pollution
 - Ensuring that the laws are enforced in order to reduce pollution
5. Inadequate internal market for fish
 - Educating and sensitising the local people on the value of eating fish to promote the local market
 - Rearing and exporting of fingerlings of valuable fish which are on high demand in some countries
6. Use of traditional methods of conserving fish because the modern methods are expensive
 - Improving preservation methods by improvising for remote areas
 - Expanding supply of electricity for cooling systems to be installed
7. Some fisheries have water weeds that hinder movement of boats and limit the catch
 - Clearing water weeds to enable fishing activities in the water bodies
8. The country has few commercially profitable species of fish which limits the earnings from the industry
 - Carrying out research on the suitability of fisheries for breeding of more

Unit 13

MINING IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to explain the impact of mining on sustainable development in Africa.

Prerequisite of this unit

Mining is one of the economic activities studied in Senior One in Unit 13 under the category of primary or extractive activities.

In Senior Two, *Mining and Quarrying in Rwanda* provided an in depth understanding of mining, with examples being cited from Rwanda and learners' local environment. The various topics of study were:

- Minerals and mining areas in Rwanda
- Methods of mining in Rwanda
- Factors influencing mineral exploitation in Rwanda
- Importance of mining and quarrying in Rwanda
- Problems hindering mining and quarrying in Rwanda
- Examples of areas affected by over-exploitation of mineral resources
- Effects of mining on the natural environment in Rwanda
- Future prospects of mining and prospects of mining and their solutions

At this level, learners are expected to build on the knowledge as they study more about mining and related activities in Rwanda.

They are therefore expected to explore the following study areas:

- Various types of minerals in Africa
- Major mining areas in Africa
- Methods of mining in Africa
- Factors favouring the exploitation of minerals in Africa
- Problems affecting mining and ways to enhance sustainable mining in Africa
- Impact of mining on sustainable development of Africa.

Cross cutting issues to be addressed

Mining begins by clearing the vegetation to give room for the activity to begin. This is followed by digging or drilling through the rocks thus interfering with the natural environment. This unit will help learners appreciate the need for *environmental* conservation and rehabilitation. The unit will also educate the learners on *financial education* because mining is undertaken for commercial reasons.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>This may arise from the various challenges posed by diminishing returns from mineral resources. It may also arise from extracting minerals whose value is low. How learners respond to this challenges will be as a result of their ability to critically think about solutions to these obstacles.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it explain phenomena from gathered information. <i>Learners are expected to develop this competence when they will be seeking to find out more about solutions to problems affecting mining in Africa.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>Learners will develop this skill through various learning activities that will require them to compile class reports for presentation. This may apply in areas such as when analysing factors responsible for the growth and development of the fishing industry in Africa.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>This may include taking care of the environment after mining or engaging in mining processes that do not degrade the environment. Working in pairs or groups to develop these concepts will also enhance the acquisition of this competence.</i>
Lifelong learning	The acquisition of such skills will help learners to update knowledge and skills with minimum external support. The learners will be able to cope with evolution of knowledge advances for personal fulfilment in areas that are relevant to their improvement and development. <i>This is applicable in this unit as learners may end up engaging in different economic activities in future, not necessarily limited to mining. It is therefore important that they acquire relevant skills they can get at this level to enable them survive in future.</i>

Vocabulary/key words/concepts

Ore	This is a type of rock that contains sufficient minerals with important elements including metals that can be economically extracted from the rock
Oil derrick	This is a complex set of machines that is used on some offshore oil and gas rigs
Adit	It is a horizontal passage leading into a mine for the purposes of access or drainage
Panning	It is a form of placer mining and traditional mining that extracts gold from a placer deposit using a pan
Ferrous	It is an adjective used to indicate the presence of iron

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the various types of minerals in Africa? (copper, gold, coal, diamond, petroleum).
- (ii) What are the major mining areas in Africa? (South Africa, Copper belt in DRC and Zambia, Nigeria, Angola, Libya...)
- (iii) Which methods of mining are used in Africa?
- (iv) Which factors favour the exploitation of minerals in Africa?
- (v) What are the problems affecting mining and ways to enhance sustainable mining in Africa?
- (vi) What is the impact of mining on sustainable development of Africa?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- **Learners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Various types of minerals in Africa (copper, gold, coal, diamond, petroleum); major mining areas in Africa (South Africa, Copper belt in DRC and Zambia, Nigeria, Angola, Libya...) and methods of mining in Africa
Lesson 2	Factors favouring the exploitation of minerals in Africa.

Lesson 3	Problems affecting mining and ways to enhance sustainable mining in Africa
Lesson 4	Impact of mining on sustainable development of Africa

LESSON DEVELOPMENT

LESSON 1: VARIOUS TYPES OF MINERALS IN AFRICA (COPPER, GOLD, COAL, DIAMOND, PETROLEUM); MAJOR MINING AREAS IN AFRICA (SOUTH AFRICA, COPPER BELT IN DRC AND ZAMBIA, NIGERIA, ANGOLA, LIBYA...)

PART I: VARIOUS TYPES OF MINERALS IN AFRICA (COPPER, GOLD, COAL, DIAMOND, PETROLEUM)

Learning objective

By the end of this lesson, the learner should be able to name the various types of minerals in Africa.

Introduction

Africa is endowed with a variety of minerals most of which have not yet been exploited. Many countries lack funds to spend on exploration and exploitation and have to allow foreign governments and companies to undertake the activities. As a result the benefits from the minerals are not as high as would have been if they were to do it themselves. Besides, some of the minerals occur in very remote areas where accessibility is very difficult. This has made the minerals remain unexploited.

Africa has a wide variety of minerals which contribute to the development of economies of the different countries. This section will help the learners to appreciate the distribution of different types of minerals in the continent.

Some of the minerals found in Africa are copper, gold, coal, diamond and petroleum. While petroleum is widely found in the regions north of the equator such as Libya, Nigeria, Tunisia and Sudan, the other examples are found mainly in the countries to the south of the Equator such as South Africa, Botswana, Zimbabwe and Zambia.

It is important to ensure learners work on the answers to the activities in the section as this will enable them gather more information of the section expectations. Ensure as many of them as possible have given their presentations and all class members have participated in the discussions on each presentation.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The

following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

In your daily life, you have seen different objects or items made of different types of minerals. In a household, there are metallic cups, spoons, forks, knives and electric cables. The learners have also come in contact with different types of vehicles such as buses, cars and tractors. They also know bicycles and wheelbarrows.

In pairs, let learners list minerals that are used to make vehicles, wedding rings and other ornaments.

Have the learners in groups of between three and five and provide them with different items made of different minerals [metals]. Ask them to identify or group the item according to the type of mineral used to make them. Finally, group the items made from metallic minerals such as ferrous and non-ferrous. Note that the minerals classified as ferrous for example, haemodite and limonite, have more iron in them than non-ferrous minerals such as copper, coal, tin, zinc and lead.

With the help of photographs of minerals or the actual ore, guide the learners how to identify them. You need to have metallic ore or their photography so as the learners can tell their differences.

Explain what energy metallic mineral are. Ask the learner to name the ones they know or have seen near the school or at home. The learner might have used petrol and gas.

Explain how uranium is different from the other energy metallic minerals such as petroleum, natural gas and coal.

Ask learners to read widely on the different minerals found in Africa including why some areas have more minerals than others. They also need to have comprehensive notes and questions to use as they discuss in their various groups. It is important that they identify photographs showing the appearance of different types of minerals.

You could divide the class into groups and assign each group a mineral to research on.

Acquaint yourself with the activities within this section in the Learner's Book so that you plan on how much time the learners will take to answer the questions and discuss them in class.

Synthesis

After group discussions, ask each group leader to present their finding in point form.

Have the group information on the chalkboard for all to see and compare with what they have.

As they observe different types of items made of different metals, ensure that the **slow learners** can also identify them.

Sum up the learners findings on the chalkboard using question and answer method.

Have the **learners make notes** of their class finding from the chalkboard.

Assessment

Provide the learners with different items made up of different minerals for them to sort out, for example a knife, pencil, salt, buildings, electric cables, rings, bits, coal and parts of bicycles. They can also suggest reasons why each item they have is made of that specific mineral.

PART II: MAJOR MINING AREAS IN AFRICA (SOUTH AFRICA, COPPER BELT IN DRC AND ZAMBIA, NIGERIA, ANGOLA, LIBYA...) AND METHODS OF MINING IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to locate the major minerals and mining areas of Africa

Introduction

In Senior 2, you learnt how to locate places on maps. Use the map of Africa on **page 225** of the Learner's Book and an Atlas to assist your learners to locate the countries where major mining areas are found in Africa.

Ask the learners to locate the following countries in the map of Africa:

- South Africa
- Democratic Republic of Congo
- Zambia
- Nigeria
- Angola and Libya

Ask the learners to name the neighbouring countries of each of the above named countries. This section requires you to have knowledge of the major mining areas of Africa.

While the countries to the north are better endowed with petroleum, to the south we find copper, gold, diamond coal and iron ore among other metallic minerals. The main reason for the difference is that the northern regions of Africa have predominantly sedimentary rocks in which petroleum occurs. To the south the rocks have been subjected to metamorphism leading to formation of the hard substances such as diamond and gold.

As you teach this section it is advisable to compare with the situation in Rwanda to give the learners a picture of the similarities in the types of minerals found compared with the other countries in Africa.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson by asking the learners to name the countries that border Rwanda. What minerals are mined in Rwanda?

Prepare questions that will assist learners to move from what they know to what they do not know. Use in the Learner's Books to help them locate other countries in Africa and their neighbours.

Using the skill of map reading and interpretation, ask the learner to name different minerals in South Africa and where they are mined in the Learner's Book. This should be done by learners in pairs.

Discuss the following minerals in South Africa: Gold, Uranium, Coal and Diamond. The answer to this question is found in the Learner's Book between.

Use the map of Zambia in the Atlas and the one in the Learner's Book to locate the copper belt in Zambia. Ask the learner to name the major towns located in the copper belt.

From the **graph on copper production in Zambia** between 1930-2010 given in the Learner's Book, ask the learners to name the period when Zambia produced a lot of copper.

Make sure both the fast and slow learners have read the graph correctly.

With the help of an Atlas, ask the learners to locate Nigeria in Africa. On the map of Nigeria, locate and name Port Harcourt and Bedel. These are the major oil mining areas in Nigeria.

Using the map of Nigeria in the Learner's Book, list down all gas field and oil fields shown on the map.

With the help of the diagram in the Learner's Book, explain how oil occurs in the earth crust and how it gets to the surface.

Discuss the similarities of oil mining, transportation and export in Nigeria, Angola and Libya. This is part of the tasks in the Learner's Book.

Ask the learner in groups to discuss the importance of oil in the producing countries of Africa. Have the learner report their findings.

Synthesis

Identify a suitable map of the Africa showing the location of the major minerals. Identify samples of photographs of some of the minerals. You need also to make a table with major mining towns and the country where it is located. Apart from the major minerals, you need to research to find out which other minerals are found in Africa since there are many more

other than the ones listed in the section. This will help widen learners' knowledge.

Your notes should be comprehensive and you need questions to guide the flow of the lesson. Also, ensure you work out answers to the activities in the section.

Assessment

In group discussions, make sure all the learners are actively involved in naming and locating of the minerals on the map of Africa in the Learner's Book.

Keep on changing group leaders that all learners can take part in the discussion.

The following activities would enhance learning to the individual learner:

- Drawing the map of Africa and on it:
 - i) Naming all the major minerals found in Africa
 - ii) With the help of a key, shading areas where mineral are found in their respective country.
- Drawing a map of Rwanda and on it indicating areas where different minerals are found.

After every group discussion, ask the learners to make their own notes.

Ask the learners to work on the **Activity 13.4** in the Learner's Book.

PART III: METHODS OF MINING IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to describe different methods of mining in Africa.

Introduction

Minerals are found either on the earth's surface, just below the earth's surface or deep into the earth's crust.

Different methods are used to mine minerals depending on the location of the mineral in the crust.

Minerals found on the earth's surface and those near the earth's surface require simple machines or tools to extract them. Deep shaft mining is used when the mineral ore is found deep below the surface. Alluvial mining is employed when minerals occur as deposits together with silt in a river valley or shallow seashore. Drilling is for petroleum and natural gas as they occur in fluid form. Other methods include adit mining where horizontal tunnels are made through the rocks when the mineral is found in horizontal beds within the rocks

Did you know that the stones used for building houses or other constructions are also minerals? Now you know.

In this section you and the learners will be required to visit a nearby quarry to really actualize how mining especially surface mining is done.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Identify suitable diagrams or photographs showing how minerals on the earth's surface and those deep in the ground are mined.

Using the photograph in Fig. 13.19 in the Learner's Book, ask learner the following questions:

What type of machines and equipment is used in this mining process?

Guide learners on how machines extract minerals that are near the earth's surface. Where possible, visit a place where there is a quarry so that the learners can observe the process of extracting minerals from the ground. Make sure that the learners are safe.

Do the same for the photograph in Fig. 13.21 in the Learner's Book.

Inform the learner that minerals found deep in the crust are mined using underground methods.

With the help of diagrams in the Learner's Book, explain examples of minerals that can be extracted by the methods illustrated.

Describe how underground mining takes place in the following types of mining:

- Adit or drift mining
- Slope mining – Study the diagram in Fig. 13.23 in the Learner's Book.
- Shaft mining – Study the diagram in Fig. 13.24 in the Learner's Book.
- Solution mining
- Drilling mining

Guide the learners to identify why different methods are used in some areas and not the others.

Ask the learners to compare and contrast underground mining and surface mining in form of machinery and quantity of production used.

Synthesis

To help make the lesson real, visit a nearby quarry. Alternatively, you can as well organise

for a video showing how minerals are extracted from the ground. If visiting the field, make sure that the learners are safe, especially learners with special needs.

Use question and answers method while in the field. Make sure learners are actively involved either by answering questions, taking notes and observing the activities within the quarry.

The learners can also draw some field sketches.

After the field study, organise the class into small groups to write down different activities that were taking place in the quarry. Relate this to what happens in the mining of minerals in Rwanda and the rest of Africa.

Identify suitable diagrams and photographs showing the various methods of mining. For each method, ensure that you have the example of the mineral mined that way and a country that has the type of minerals. You could also make a table with the name of the mineral, method of mining and country where it is found.

Learners should also make comprehensive notes during the lesson. Also, ensure you work out answers to the activities in the section.

Assessment

Ask the learner to describe how the shaft method is used in the extraction of minerals, with the help of figure 13.24.

For the slow learners, ask them to describe how the panning method is used in the extraction of minerals. Be guided by **Figure 13.22** in the Learner's Book.

LESSON 2: FACTORS FAVOURING THE EXPLOITATION OF MINERALS IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to analyse the factors favouring the exploitation of minerals in Africa.

Introduction

In the previous lesson, learners learnt about the types of minerals found in Africa as well as how they are mined or exploited. During the visit to a nearby quarry, the learner must have noticed why it was easy to get stones in a particular area as compared to another. The owner of the quarry must have done some research to identify areas that have plenty of the stones that are of good quality.

The learner may have noticed some problem during extraction of building materials [rocks] at the quarry. Some of the problems may include:

- The size of the rocks
- The quality of the rocks
- Transportation

There are many general factors that influence exploitation of minerals in Africa. Among them is the value or the grade of the mineral. There is more exploitation of minerals like petroleum, gold and diamond because of their high value compared to exploitation of mineral such as coal. The cost of mining is a major factor. Poor countries may have minerals

but be unable to exploit them due to lack of capital. Related to costs is the location of a mineral (whether in a remote area or close to a developed area). Other factors include availability of skilled labour, transport cost and level of mechanisation of a country. It is important to read widely so that you guide the learners to acquire the correct information about each of the factors and the interrelationship between the factors.

Preparation for teaching

Read widely on the factors influencing mining activities ensuring that you identify the factors that may be unique in different countries. Make comprehensive notes and guiding questions to help the flow of the lesson. You could also divide the class into groups and assign each group factors to research on. As you consider the groups, have in mind learners of different abilities in each group.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Prepare guiding notes and questions on what the learners know about the quarry to lead them to identify the new information on a large scale, as to how minerals are exploited and the challenges they face.

Arrange learners in groups for them to attempt **Activity 13.7** in the Learner's Book. Help the learner understand factors favouring the exploitation of the minerals.

After discussions in groups, explain each of the factors that favour the exploitation of minerals in any part of the world.

Similarly, when discussing problems affecting mining in Africa, learners should be paired in order to discuss **Activity 13.8** in the Learner's Book.

After discussion, ask the learners to state problems affecting mining in Africa.

Use question and answer method to establish whether the learners have understood how different factors such as quality of the ore, the size of the exploits or market affects exploitation of the mineral.

Encourage the learners to make notes during the discussion.

After tackling **Activity 13.9** in the Learner's Book, let learners explain the sustainability and impact of mining in Africa.

It is important for you to introduce the group discussion using simple and clear questions to ensure all the learners are alert and actively involved.

Synthesis

Divide the learners into three groups. The first group Q to discuss factors favouring exploitation of minerals in Africa, second group R to discuss problems affecting mining in Africa and third group S sustainability of mining in Africa.

Each group to appoint one person to report in point form to the whole class.

As the group leader reads out their finding, write the main points on the chalkboard.

Assessment

Use the discussion in the three groups (for example Q, R and S) to find out from the learners how they have understood factors favouring exploitation of the mined, problems affecting mining and the sustainability of mining in Africa.

Ask the learners to prepare notes on factors that influence mining activities in Africa. You can also ask them to complete their group work for class presentation and discussion.

LESSON 3: PROBLEMS AFFECTING MINING AND WAYS TO ENHANCE SUSTAINABLE MINING IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to explain the problems affecting mining in Africa and possible solutions.

Introduction

There are different types of problems that African countries face in their effort to develop the mining sector. Some problems are common to all the countries but some countries sometimes experience unique problems.

Some of the common problems affecting mining in Africa include inadequate capital to invest in mining, shortage of skilled labour, limited local market for some of the minerals and competition for market in the world market. Poor transport infrastructure and power supply are also hindrances to development of mining. Large scale mining requires high operation costs which the poor countries strain to raise. Insecurity and political instability are problems in some countries at different times.

As you teach this section, ensure that the learners are able to make comparisons between countries and note the similarities and differences in the problems experienced. There is need to have discussions on how certain problems have been solved or can be solved.

Teaching aids

- Recommended learner's book
- Relevant reference materials

- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Put learners in pairs to discuss **Activity 13.8** in the Learner's Book on the various problems affecting mining in Rwanda. Let learners understand that just like Rwanda, other countries also experience a number of problems in the exploitation of their mineral resources. After discussion, they should present their findings in class for further discussion.

To make their discussions more meaningful, provide them with appropriate photographs such as the one showing some mining operations in order to identify possible problems. For instance, people mining manually using simple tools such as pans is a sign of capital inadequacy.

Ask learners to research widely on the problems in different countries in Africa. They can achieve this with the guide from the notes provided in the Learner's Book. They should then make comprehensive notes during the lesson. Plan to divide the class into groups and allocate each group a country to work on the problems for comparison as they present and discuss.

Synthesis

Any country engaged in mining faces some common problems, ranging from exhaustion of mineral ores, limited capital to finance expensive methods of extraction, environmental degradation and fluctuation of international prices for the minerals. With reference to **Activity 13.8** in the Learner's Book, ask learners to prepare a presentation after carrying out a research on the problems affecting mining in Rwanda.

Explain clearly to them that Rwanda, just like any other country, faces problems in its mining sector. Some of these problems are common to all mining countries while others are unique to particular countries.

With reasons, ask them to identify common problems across all mining countries and those unique to Rwanda. As a case study, identify a country in the sub-region such as Zambia where they will identify common problems as well as those unique to it. This will help them understand and master the concept under study for ease of application in related cases.

Assessment

Ask the learners to prepare notes on problems affecting mining in specific African countries. Ensure they complete their group work and the activities in the section for class presentation and discussion.

SECTION 6: IMPACT OF MINING ON SUSTAINABLE DEVELOPMENT OF AFRICA

Learning objective

By the end of this lesson, the learner should be able to evaluate the impacts of mining on sustainable development of Africa.

Introduction

Mining and the processing of minerals inevitably have great impact on the economic development of a country. The effect of gold mining in South Africa among other minerals can be seen today. We find that South Africa is the most developed in Africa in terms of industrialisation, transport, infrastructure, availability of well-developed social amenities and many other economic sectors.

Discovery of minerals such as oil has made Africa to become a focus by foreign investors in the recent past. This trend is very promising as the developed nations provide the required capital and skills needed in the exploration and mining development. Development of transport and power supply has been on the increase in some countries with the provision of funding by foreign development partners. Provision of training programmes in managerial, technical and entrepreneurial skills and hiring of skilled workers in the mining sector from other countries creates a promising future. These are all trends that are indicators that the continent is moving towards the right direction. Income obtained from mining should be invested well so that even if the mineral get exhausted, the country can sustain its economy depending on where the investments were made.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

For **Activity 13.9** in the Learner's Book, divide the class into two groups, 1 and 2 for a brainstorming session:

- i) Group 1 will handle the effects of mining.
- ii) Group 2 will handle the impacts of mining on sustainable development to a country.

Ensure that the groups are well put together; **with slow and fast learners carefully**

integrated into each group to enable all learners participate meaningfully.

Group one should still have sub-groups A and B. Sub-group A should handle negative effects while B should explore the positive effects of mining on the environment.

Group 2, just like group 1, should still have sub-groups C and D. Sub-group C should handle negative impacts while B should explore the positive impacts of mining to a country.

Ask each group to prepare a short presentation of their findings. As they present, correct wrong responses as you reinforce correct ones. Where points are insufficient, add more to help learners have a wider scope as much as possible.

Correct their speech during the presentation and summarise the lesson with a mention of what they need to remember.

Synthesis

Organise for a session where learners will pretend to be newscasters, reporting on the sustainability of mining in Rwanda. For this to be as realistic as possible, let them assume a visit to an imaginary mine, to assess the impact of mining on sustainable development of the country. This is a very difficult assignment and should be approached carefully, with enough background information provided to the learners to enable them make meaningful conclusions.

Assessment

Ask the learners to suggest possible solutions to the challenges affecting mining in Africa, and how each challenge can be addressed for the mining sector to help various countries realise sustainable economic development. Afterwards, they should compile a comprehensive class report for presentation.

END OF THE UNIT

Summary of the Unit

Mining refers to exploitation of valuable minerals that can either be sold to earn foreign exchange or used in the country for economic development such as infrastructure and agriculture.

Africa has many different types of minerals, some that appear in large quantities and others that are not economically viable for exploitation. Some of these minerals include copper, gold. Coal, diamond, crude oil and iron.

Different methods are used to mine metals are used and those deep into the ground, underground mining methods are used.

Sustainability of mining in Africa, all countries must pull their resources together and form a body that deals with exploitation [research] of minerals other than relying on foreign firms or countries.

Addition information

There is great need to use photographs, maps, video, local environment, samples of different ore or rocks from the field, other textbooks, wall charts etc. stored at one corner of a classroom or a room in the school.

It is important to link this topic with other subjects such as chemistry, mathematics and physics.

End unit assessment

1. Explain the process involved in surface mining.
2. In your opinion, give a brief explanation why petroleum is more important in Africa as compared to gold.
3. Discuss problems that affect mining in Africa.
4. Briefly explain the characteristics of energy producing minerals in Africa.

Answers to end unit assessment

1. The process involved in surface mining
This method is an appropriate for mining minerals that are found at the earth's surface or very close to the earth's surface. The main methods used to mine minerals found near or on the earth's surface are **open-cast** or **stripping** methods.
This involves the removal of the topsoil or layers that cover the required minerals by either digging out the top layer or blasting the rocks in the area. Bulldozers or tractors are used to excavate the minerals.
2. Why petroleum is more important in Africa as compared to other minerals
 - Oil occurs in large quantities which guarantees long term return than other minerals whose deposits are usually smaller as compared to those of oil
 - The method of mining oil is cheaper since after reaching crude oil, the same derrick can be used over a long period before the mineral is exhausted. For other minerals, newer sites need to be constructed as miners 'follow' the mineral to where it is.
 - The method of transporting crude oil is through a pipeline, which is much cheaper than other minerals that must be transported by road or railway.
 - The technology involved in refining oil is less complicated and not costly as compared to those of processing minerals such as gold and copper.
 - The demand for the mineral in internal market is almost constant as opposed to other minerals that fluctuates from time to time.
 - International prices for oil is more stable than for other minerals.
3. Problems that affect mining in Africa
 - a) **Quality of the mineral:** Some minerals are of low quality and therefore uneconomical to mine. For example, iron is found nearly everywhere but it is low quality. The concentration of iron in the iron ore is less than 10%.
 - b) **Value of the mineral:** Some minerals that are valuable are mined at a very high cost

that most African countries cannot afford. Some of these minerals include gold, diamond and copper.

- c) **Methods of extraction:** Most minerals found in Africa are found deep into the crust. The method of extraction to be used are relatively very expensive that they cannot make good returns. Africa lacks technology to exploit them economically.
 - d) **Market:** A mineral in Africa may remain unmined because of low demand.
 - e) **Capital:** Most African countries are poor. They do not have enough capital and technology in mineral exploitation.
 - f) **Labour:** Mining of minerals requires both skilled and non-skilled labour. Africa has plenty of non-skilled labour and little of skilled labour.
 - g) **Transport: Some of the** roads are not passable throughout the year in remote areas where minerals are found. Most of the minerals mined are heavy and bulky and need good means of transport.
 - h) **Political differences:** Where minerals occur at the border of two countries, political influence may not favour exploitation of the mineral. An example is copper mining in DRC and Zambia, power for processing of mineral for Zambia and Zimbabwe. Sometimes even within the same country, political or tribal difference affect the exploitation of the mineral leading to civil wars and animosity.
4. Impact of mining on sustainable development in Africa
- When countries export their minerals they earn foreign exchange. The money earned is used to develop other sectors including the agriculture.
 - It leads to infrastructural development in terms of roads, railways, waterways and airways that will remain to be used even after the minerals have been exhausted.
 - People get employed in the mines, factories and offices that have had their living standard improve.
 - People who work in the mines are trained on how to operate machines, do research, learn administration and business skills that they can use in their country or any other part of the world.
 - Mining creates settlement in areas that were once hostile to human settlement such as marshy lands of Nigeria and parts of the Kalahari and Sahara deserts.
 - Money from the minerals exported is used to develop agriculture processing and manufacturing industries in the country which will be operational for a long period.
 - Some of the minerals mined in Africa are exported to other parts of the world or within Africa. This brings about local and international trade.

Remedial activities [slow learners]

1. Study the map of South Africa on **page 226** of the Learner's Book and name the minerals that appear in large quantities.
Answer: Coal
2. Describe the process of purifying copper.
Answers:
 - a. Grind the copper ore into powder.
 - b. Mix the powdered copper with water to produce slime

- c. Add sodium salt into the slime to precipitate it into copper sulphide ore
 - d. The precipitate is removed, dried and smelted to pure copper
3. List four factors that determine the exploitation of minerals.

Extended activities [for gifted and talented learners]

Explain how the following factors influence the exploitation of minerals.

- a. Mode of occurrence of the mineral
- b. Transport
- c. Level of technology

Answers

a. Mode of occurrence

- Mineral that occur in small quantities are not exploited if they are of low commercial value or valuable. Large deposit ore exploited since they make profit
- Minerals near the surface are cheaper to exploit, deep seated minerals are expensive to exploit.
- The value of the mineral such as gold is exploited regardless of its location in the crust.

b. Transport

- Efficient transport links allow minerals products to be moved from the mining site to port, market, and factory without delay.
- Bulky minerals require cheap transport such railway that reduce cost of production.
- Mineral deposit found in remote areas or poorly developed transport system is less easily to be exploited.

c. Level of technology

- Advanced technology has improved mining operations thus leading to high quality/ large quality mineral product.
- High level of technology allows for effective exploitation of minerals leading to accurate location of the minerals.
- Advance technology boosts effectiveness in production hence reducing wastage.
- High level of technology in mining operations reduces the destruction of the environment, health and safety of workers.
- Low level of technology limits exploitation leading to low quality.

Unit 14

POWER AND ENERGY IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to analyse the impact of power and energy production on sustainable development in Africa.

Prerequisite of this unit

Power and Energy in Africa is a continuation of the Unit 19 of Senior Two's Power and Energy in Rwanda, with the difference being the scope or area of study. The knowledge learners have about power and energy in relation to renewable and non-renewable resources, importance of power and energy resources, problems, possible solutions and prospects of energy and efficient utilisation of energy resources forms the basis for discussion, with a wider understanding by using examples across Africa.

Learners are therefore expected to apply the knowledge they have about Rwanda in explaining the various aspects of power and energy resources in other African countries.

The case studies provided on the hydro-electric power stations/projects in Africa should be the basis of guidance on how to discuss other forms of energy across Africa, This should include solar energy, wind energy and geothermal energy in Rwanda with a comparison to other African countries.

Allow learners chance to cite specific examples as they discuss the specific types of energy across Africa.

Cross-cutting issues

There are various sources of energy in Africa. Examples of these include wood energy, biogas, solar energy, petroleum and coal. As much as these sources of energy are useful to us, some are not completely safe to our health, and worse still, to the environment at large. The study of these types of energy in this unit is meant to equip learners with the prerequisite knowledge on the usefulness of each, while at the same time exploring the safest amongst them. It is such knowledge that will help learners appreciate the need for and measures taken to ensure *conservation of the environment* in order to avoid poisoning themselves, depleting of the energy resources and contaminating the environment. This is the reason why the study power and energy is strongly linked the causes and measures against environmental pollution and *climate change* or *global warming*.

Implications of using any of the many sources of energy also have a financial aspect. This is because of the cost involved in the acquisition of such sources of energy. Many require financial analysis on the part of the user, to avoid a scenario where expensive sources are used when cheaper ones could have been used instead. For example, in using kerosene at home for cooking, one will realise in the long run that it is far more expensive than investing in a gas cooker. This brings in the aspect of *financial education*, which will task learners to consider weighing the available options before settling on one that is pocket friendly. In the same vein, if possible, it will be advisable to use a solar water heater than rely on an electric one as this will increase the cost of heating water for home use.

From the investment perspective, the study of power and energy is also about generating income by putting the energy into economic use for development. This study will therefore help the learners to acquire knowledge on how to generate incomes by harnessing or vending the various sources of energy. This will be important for them, as it will enrich their *financial education* in their study of energy production and use.

Generic competences

<p>Creativity and innovation</p>	<p>The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>There have been various innovative ways people have come up with to give alternatives to power needs. These include energy saving stores and fuel efficient charcoal burners. In a brainstorming session, let learners suggest how they would conserve power and energy.</i></p>
<p>Research skills</p>	<p>This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>Research skills will be cultivated in the learners especially when using various sources of information to find out more about certain areas of discussion. This can include sources of power and energy in Rwanda, factors favouring power and energy production in Africa and importance of power and energy in Africa.</i></p>
<p>Communication in official languages</p>	<p>Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>This competence will be developed in the learners when compiling notes, essays and findings for class presentation.</i></p>
<p>Cooperation, Inter-personal management and life skills</p>	<p>This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>It is important that you encourage learners to work in pairs or groups where necessary in order to generate content. In doing so, they will learn the value of co-operation and interdependence.</i></p>

Vocabulary/key words/concepts

Renewable energy	This is energy that is collected from resources which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat.
Non-renewable energy	These are energy sources that come from resources that will run out or will not be replenished. Most non-renewable energy sources are fossil fuels: coal, petroleum, and natural gas. Carbon is the main element in fossil fuels
Biomass	This is organic matter used as a fuel, especially in a power station for the generation of electricity
Geothermal energy	This is the heat from the Earth. It's clean and sustainable. Resources of geothermal energy range from the shallow ground to hot water and hot rock found a few miles beneath the Earth's surface, and down even deeper to the extremely high temperatures of molten rock called magma
Draught animals	Also called draft animals or beasts of burden, these are working animals, either as service animals or draft animals. They may also be used for milking or herding, jobs that require human training to encourage the animal to cooperate.
Siltation	Siltation is a process by which water becomes dirty as a result of fine mineral particles in the water. When sediment, or silt, is suspended in water, this is an example of siltation.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the types and sources of power and energy in Africa?
- (ii) What factors favour power and energy production in Africa?
- (iii) What is the importance of power and energy in Africa?
- (iv) What are problems and solutions of power and energy production in Africa?
- (v) **Case studies:** Hydro–electric power stations/projects in Africa:
 - Aswan (Nile) in Egypt
 - Akosombo (Volta) in Ghana

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lessons commences. For instance:

- a) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily

read and see what is being written on board or activities being carried out in front of the class.

- b) **Leaners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- c) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Types and sources of power and energy in Africa and factors favouring power and energy production in Africa
Lesson 2	Importance of power and energy in Africa
Lesson 3	Problems and solutions of power and energy production in Africa
Lesson 4	Case studies: Hydro-electric power stations/projects in Africa - Aswan (Nile) in Egypt and Akosombo (Volta) in Ghana

LESSONS DEVELOPMENT

LESSON 1: TYPES AND SOURCES OF POWER AND ENERGY IN AFRICA AND FACTORS FAVOURING POWER AND ENERGY PRODUCTION IN AFRICA

PART I: TYPES AND SOURCES OF POWER AND ENERGY IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to differentiate among types and sources of power and energy in Africa.

Introduction

This lesson requires you to have knowledge of the sources of power and energy that are available in Africa with specific examples. You also need knowledge on whatever resources that are not yet exploited so that as you discuss the future prospects then you have the basis to say there is a bright future. Where local examples exist is an opportunity for learners to learn from known to unknown.

At this stage the learners have knowledge about energy resources in your country, knowledge they are able to apply this knowledge to the African situation.

A map of Africa showing the locations where the resources are found must be provided as an essential learning resource for this section. It is important to ensure learners work on the answers to the activities in the section as this will enable them gather more information of the section expectations. Ensure as many of them as possible have given their presentations and all class members have participated in the discussions on each presentation.

Teaching aids

- Recommended Learner's Books
- Atlases, wall maps and sketch map of Africa showing location of sources of energy
- Photographs

The teaching aids will be found relevant if used alongside the following teaching and learning methods:

- Observation
- Group discussion method
- Photograph and map analysis
- Question and answer

Learning activities

Pick one learner to read the general introduction in the **Learner's Book**. Link this unit to what learners gained from the study of Power and Energy in Unit 19 of Senior 2. For example, you can start by asking them to the various sources of energy in Rwanda, and areas where these sources are harnessed.

Proceed to a brainstorming session where they will try to define renewable and non-renewable sources of energy. This is part of the things to be done under **Activity 14.1** in the Learner's Book. Ensure learners of different capabilities in class are meaningfully involved in the discussion. For example, slow learners can be involved in the drawing of the table and filling it in with information got from fast learners. Moderate learners can be involved in class presentation.

Ask learners to work in groups of between 3 and 5 to discuss Activities 14.2, 14.3, 14.4 and 14.5 in the Learner's Book. Oversee formation of these groups to ensure that all learners are fairly represented.

After this discussions, allow for class presentations on findings from each group. Be careful during the presentation so as to correct what may be wrong while emphasising what is right.

Synthesis

Ask learners to identify suitable maps of both Rwanda and Africa as whole showing major sources of power and energy. This will help them in understanding the lesson to be learnt under **Activities 14.2** and **14.3**.

On your part, prepare comprehensive guiding notes and questions to use as you guide

learners through the lesson. You can as well prepare a sketch map of Africa showing power dams and areas where mining of minerals like oil and coal are found. Ensure it is simple enough for learners to draw. Identify appropriate photographs to support your explanations. Acquaint yourself with the activities within this section in the learners' book so that you plan on how much time the learners will take to answer the questions and discuss them in class. Ensure you have possible answers to the activities.

Assessment

Ask learners to prepare a table showing the various sources of energy in Africa and examples of places or areas where these sources are harnessed. An example of such a table is presented below.

Solar energy stations	Petroleum sources	Hydroelectric power stations

PART II: FACTORS FAVOURING POWER AND ENERGY PRODUCTION IN AFRICA

Learning outcome

By the end of this lesson, the learner should be able to analyse the factors favouring power and energy production in Africa.

Introduction

The factors that favour power and energy production in Africa are varied. They include availability of the natural resources such as fossil oil and coal and permanent rivers that have sites for development of HEP stations. The increasing demand for power as the population increases and manufacturing industries also increase is also a major factor. Availability of renewable energy resources in most parts of the continent including geothermal resources in Red Sea Valley and Rift Valley as well as wind and solar power is also a factor. As you discuss these factors, learners should be able to give local examples and make comparisons with the other parts of Africa.

Identify a suitable map of Africa showing major sources of power and energy and then for each source, prepare short notes on the favouring factors. You also need to prepare questions to use as you introduce the topic to the class.

Ensure you have possible answers to the activities within this section in the learners' book so that you plan how to guide the learners through the activities.

Teaching aids

- Learner's Book
- Wall maps

- Sketch map of Africa showing location of sources of energy
- Photographs and Atlases

The teaching aids will be found relevant if used alongside the following teaching and learning methods:

- Discussion method
- Photograph and map analysis
- Question and answer

Learning activities

Prepare a plenary discussion where learners will discuss some of the considerations the government and various investment companies are likely to look at before setting up a power harnessing plant. After this discussion, let selected learners present their findings. Be keen to pick out the correct pointers towards factors favouring power and energy production in Africa.

Reconcile this information with what is presented in the **Learner's Book**, on **page 250**.

To make the discussions credible, ask learners to research on some of the countries where each of these factors has been key in developing the energy sources. This can be achieved by redrawing the table given in the Learner's Book to include the third column where specific countries will be included in the new table.

Synthesis

Activity 14.4 in the **Learner's Book** is a good learner centred way of ensuring that what is taught is understood by all learners in class. This activity requires learners to further the learning process by following what has already been discussed. In presentation, learners are required to make a report, which should conform to the **rules of report writing** as taught in English Classes.

Since this will be done in groups, ensure **cooperation** is achieved by forming cohesive groups where interdependence among the learners will be a key element in achieving what needs to be discussed.

It is necessary that learners give **references** of the materials they will use to source for the information they will be looking for. This way, you will avoid a scenario where they will simply imagine wrong information for the sake of completing the assignment.

Assessment

Learners already are aware of different energy sources in Rwanda. Ask them to make a research from the website of the Ministry of Infrastructure (MININFRA) on some of the factors they usually consider before venturing into energy exploration in Rwanda.

Let learners present their findings in class for further discussion. Where possible, ask them to examples of actual places in the environment.

LESSON 2: IMPORTANCE OF POWER AND ENERGY IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to evaluate the importance of power and energy in Africa.

Introduction

Power and energy production in Africa has significant contribution to the economic development of the African nations. Without power, it would not be possible to run industries, light homes and provide heating in industries and homes among other uses. The transport sector has been steadily developing and expanding because of availability of petroleum products on which vehicles rely. Some of the multi-purpose river projects are tourist attractions. For example, Kariba Dam is a major tourist attraction in the region. Some of the countries that produce large amounts of power use it as an export commodity to the neighbouring countries. For example, the power generated in Mozambique is exported to South Africa. This generates foreign exchange for countries that have such projects. Power plays a major role in the modernisation of agriculture and agro based industries. Lighting in urban centres and homes all require power.

Teaching aids

- Learner's book
- Internet
- Other relevant reference materials energy
- Photographs and atlases

The teaching aids will be found relevant if used alongside the following teaching and learning methods:

- Discussion method
- Question and answer
- Photograph and map analysis

Learning activities

Ask learners to imagine life before electricity and industries.

Allow for a five minute session of writing imaginative pieces by individual learners who will read it out to the entire class. As they present to the class, ask learners to identify what could be the case in the past and what is being differently. This will mark the starting point of this lesson.

Activity 14.5 should be done on an individual basis, with reference made from Senior 2 Learner's Book. Ensure you go through Learner's Work to guide them in case their response is not correct. Apart from the Senior 2 Learner's Book, allow them to use the Internet and any other relevant reference sources to tackle the activity. This will promote their **research skills**, promoting **problem-solving skills** in the long run.

Synthesis

You need to prepare questions to use as you introduce the topic to the class and ensure you have local examples.

Ensure you have comprehensive notes and possible answers to the activity within this section in the **Learner's Book**, so that you plan how to guide the learners accordingly.

Remember, each reason given in the Learner's Book can have a local example. For instance, learners can mention some of the energy generating companies that have offered people with employment opportunities, some of the urban centres that have grown because of energy resources being readily available as well as some of the transport facilities that have grown because of the influence of the energy sector in Rwanda.

Further activities

Ask learners, in pairs, to discuss the benefits of energy resources at school and at home. Let them clearly list these benefits then present to the rest of the class for comparison purposes.

LESSON 3: PROBLEMS AND SOLUTIONS OF POWER AND ENERGY PRODUCTION IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to analyse the problems hindering effective production of power and energy in Africa and possible solutions.

Introduction

Power and energy production in Africa is affected by a number of challenges that the countries face. Some countries, however, have been able to develop their power resources to some extent despite the challenges. Some of the challenges include:

Weather changes which affects production of hydro-electric power when the river volumes go down. This is solved by building dams to regulate the flow of the river and hold excess water which is released when the rivers have low volume.

Inadequate capital that limits development of power resources has been addressed in some cases by borrowing loans and grants from developed countries and financial institutions.

Poverty in most countries means that there is limited local market as the demand is very low. Such countries have limited industrial activities and other demands for power are limited.

There are many other challenges that are relevant in this section. As you discuss these challenges and the solutions you should use local examples that learners are familiar with.

Preparation

Research widely and ensure you have comprehensive notes on the problems and the solutions where applicable. Prepare possible answers to the activities within this section in the learners' book so that you plan how to guide the learners through the activities. You

also need to prepare questions to use as you introduce the topic to the class as you go over the section.

Teaching aids

- (i) Learner's book
- (ii) Internet
- (iii) Other relevant reference materials on energy
- (iv) Photographs and atlases

The teaching aids will be found relevant if used alongside the following teaching and learning methods:

- Discussion method
- Question and answer
- Taking notes
- Class presentations

Learning activities

It is your role as the teacher to guide learners through this lesson, by overseeing their discussion of problems facing power and energy in Africa. This will best be captured by **Activity 14.7** in the **Learner's Book**. Remember, this activity should be done in groups, with an intention of building a learning team. Group work not only enhances **sharing, cooperation** and **team spirit**, but also promotes **tolerance** of learners' views by those they are working with.

After discussions, allow team leaders from each group to present their findings. This will then be followed by two learners that you will choose from the class depending on their special abilities to read out a loud what has been given in the **Learner's Book**. From this two sessions, encourage learners to reconcile what the correct information is against what they had come up with.

Assessment

Before this session, learners should be tasked to give examples of countries that may be experiencing the problems mentioned in the Learner's Book.

The next step in your assessment will be based on how well learners will have understood what was taught – problems affecting power and energy in Africa. Learners are expected to demonstrate their grasp of the concepts earlier taught by their ability to propose solutions to each of the problems highlighted.

In groups, learners should be able to propose solutions to each of the problems earlier mentioned. This should then be followed by a session where they will present their findings.

LESSON 4: CASE STUDIES: HYDRO-ELECTRIC POWER STATIONS AND PROJECTS IN AFRICA - ASWAN (NILE) IN EGYPT AND AKOSOMBO (VOLTA) IN GHANA

Learning objectives

By the end of this lesson, the learner should be able to discuss the importance of power projects in Africa.

Introduction

Africa has some very large rivers that have ideal conditions for development of hydro-electric power projects. Some are yet to be developed but there those that have been developed. Aswan High Dam and Akosombo Dam are some of the largest river projects in Africa. Their development was necessitated by demand for power within the host country and in the neighbouring countries. However, because of the financial constraints, it was necessary to ensure that the projects were multi-purpose to generate income to pay for the loans used and eventually benefit the countries.

Each of the case studies in this section has benefited the respective country in different ways. The projects are multi-purpose. The dams are tourist attractions. The reservoirs behind the dams are used for fishing and as water transport routes. They also supply large amounts of water for irrigation boosting agriculture. For example, Egypt is mostly a desert country but the area near Aswan High Dam is one of the most productive regions in agriculture in Africa. The projects support industrial development making the countries self-sufficient in some industrial products.

The projects not only have benefits but also some problems arising from their construction. For example large areas were submerged as the rivers were dammed causing loss of land that was initially used for settlement and agriculture. In the case of Egypt, the fertile silt that used to be deposited at the delta of River Nile reduced as it is deposited in Lake Aswan.

As you teach about each of the case studies, ensure you research on:

1. The reasons for construction of the dam
2. Generation of electricity
3. Other benefits
4. Problems resulting from the construction.

Learning activities

Some of the activities in this lesson will require you to provide a map of Africa showing the location of the projects to be studied. You can ask learners in advance to look for diagrams and photographs of the dams as well.

Divide the class into groups so that some groups research on one dam and others on the other. Let each group prepare possible answers to **Activities 14.8, 14.9 and 14.10** in the Learner's Book. This will help you plan how to guide the learners through the activities. You also need to prepare questions to use as you introduce the topic to the class as you go over the section.

To each group, ask them prepare a comprehensive class presentation with the following

sub-topics:

- (i) Brief history of each of the dams
- (ii) Reasons for its establishment
- (iii) Importance of the dam
- (iv) Some of the problems experienced in the production of power on each of these dams
- (v) Possible solutions to the problems identified

Teaching aids

- a) Learner's Book
- b) The Internet
- c) Other relevant reference materials on energy
- d) Photographs and atlases

Synthesis

Ensure that the intended objective of the lesson is achieved. Guide the learners in the discussion and question and answer sessions ensuring that learners of all abilities are involved. It is important to make comparisons between the different projects so that learners may note the differences and similarities.

Assessment

To gauge the understanding of learners, ask learners to carry out individual research on Kariba Dam. They should use the same sub-headings as given above.

This should be an individual's research project, which should be scored as part of Continuous Assessment.

However, you need to be acquainted with prerequisite information that will help you mark learner's work.

Encourage learners to include illustrations, diagrams and photographs where necessary, which will add marks to their work if relevance of each is considered.

END OF UNIT

Summary of the unit

Power and energy in Africa is a broad topic that can best be discussed along the following forms of energy: Solar energy, biomass, hydro-electric power, geothermal power, drought animals and petroleum. **(Refer to Learner's Book).**

The most developed forms of energy in Africa that have industrial benefits are solar energy, hydro-electric power, geothermal and petroleum.

Factors favouring power and energy production in Africa include demand, improved infrastructure, presence of renewable energy resources and fossil energy resources and a large population. **(Refer to Learner's Book).**

Importance of power and energy in Africa have been summarised in the **Learner's Book.**

Some of the problems of power and energy production in Africa have been given in the **Learner's Book**.

For some of the solutions to the identified problems to power and energy, refer to **Learner's Book**.

End unit assessment

1. Briefly explain three examples of non-renewable energy sources.
2. Analyse factors favouring power and energy production in Africa.
3. Explain the importance of power and energy in Africa.
4. Discuss the problems hindering effective production of power and energy in Africa.
5. Suggest possible solutions to problems of power and energy production in Africa.

Answers to End unit assessment

1. Examples of non-renewable energy sources
 - Sun
 - Biomass
 - Geothermal steam
 - Wind
 - Water
 - Wood
2. Some of the factors discussed in the **Learner's Book** are:
 - a) Demand
 - b) Improved infrastructure
 - c) Presence of renewable energy resources
 - d) Presence of fossil energy resources
 - e) A large population
3. Importance of power and energy in Africa (**Refer to Learner's Book**) can be summarised as follows:
 - (i) It leads to increased employment opportunities
 - (ii) It spurs the development of industries.
 - (iii) It contributes to the growth of urban centres
 - (iv) It leads to an improvement in agricultural production
 - (v) It provides energy for domestic use.
 - (vi) It a factor in the expansion of the transport sector
 - (vii) It is a source of revenue for governments
 - (viii) It also promotes generation of foreign exchange
4. Some of the problems of power and energy production in Africa (**Refer to Learner's Book**) include:
 - a) Inadequate capital
 - b) Shortage of skilled manpower
 - c) Political instability
 - d) High cost of power

- e) Fluctuation of volume of water in rivers
- f) Low level industrialisation

5. Solutions to some of the problems (**Refer to Learner's Book**) mentioned above include:

- Intensifying regional and interregional cooperation on renewable energy production and transmission.
- Improving efficiency in the production, distribution and use of energy.
- Ensuring there is peaceful political situation in order to attract investors in the energy sector.
- Encouraging development of small power projects especially in the rural areas
- Lowering the pricing of power to make it affordable to the low income people
- Strengthening regional cooperation on research and training of skilled personnel required in the energy sector.
- Fully utilising geothermal, wind and solar resources for renewable energy production.

Remedial activities (for slow learners)

1. With examples, identify the various sources of energy in Rwanda.
2. Suggest some of the ways that can be used to ensure effective utilisation of energy.

Answers to remedial activities

1. With examples, identify the various sources of energy in Rwanda.
 - **HEP** – Ntaruka, Mukungwa, Gihira, Gisenyi, Rukarara and Nyabarongo.
 - **Gas** – On Lake Kivu
 - **Biomass** and **biogas** – Mostly done by farmers who can access biodegradable agricultural wastes
 - **Peat based energy** – Reserves in Gishoma, Akanyaru, with some others near Kigali.
 - **Geothermal power** – Karisimbi fields, Rubavu, Kinigi and Bugarama fields.
 - Other sources of energy freely found in Rwanda are **solar energy** and **wood fuel**
2. Suggest some of the ways that can be used to ensure effective utilisation of energy. These include:
 - a) Introduction of motivations such cash power.
 - b) Development of alternative energy sources such as solar, geothermal, wind, methane gas, biomass to supplement the available non-renewable power sources.
 - c) Use of efficient energy saving stoves or cookers to limit the use of fuel wood for industrial and domestic purposes. Appropriate technology is applied in the construction of the cookers so that they are non-polluting cheap and simple to use.
 - d) Promotion of effective energy programmes such as low power consumption

- bulbs.
- e) Switching off lights when not in use.
- f) Encouraging the use of well-maintained vehicles with low fuel consumption.
- g) Educating people on energy making, conservation and management.

Extended activities (for gifted and talented learners)

The following is a list of other HEP stations across Africa:

- Gaborone Dam in Botswana
- Inga Dam in DR Congo
- Katse Dam in Lesotho
- Bin el Ouidane Dam in Morocco
- Gariep Dam in South Africa
- Kihansi Dam in Tanzania

They are required to pick one of the mentioned dams then research on the following:

- The river on which the project is found
- Factors favouring the production of energy on this project
- The importance of the power project
- Problems hindering effective production of power on this project
- Possible solutions to problems of power generation on this project.

Unit 15

INDUSTRIAL DEVELOPMENT IN AFRICA

Key Unit Competence

To be able to analyse the impact of industrialisation on sustainable development in Africa

Prerequisite of this unit

Industrialisation is a broad area of study, with learners having a passive understanding of what it really means. Building on their knowledge of *Industry in Rwanda* as learnt in *Unit 20* of Senior Two, learners are encouraged to relate the information to what happens in other countries across Africa.

This unit handles the following sections on a broader perspective (continental level), which can be directly be related to the Rwandan context as shown:

- Classification of industries (Senior Two), a foundation to types of industries in Africa.
- Factors for location, growth and development of industries in Rwanda (Senior Two), a link to factors favouring industrialisation in Africa.
- Importance of industries in Rwanda (Senior Two), with a wider view to include importance of industrialisation to the economies of Africa
- Problems and effects of industrial development in Rwanda (Senior Two) and problems affecting industries in Africa and prospects for the sustainable development of industries in Africa.

Cross-cutting issues

Although industrialisation is a crucial form of development in a country, it has a negative effect on the environment, as it is a major cause environmental pollution. Through the study of this unit, learners will understand and appreciate the measures that are taken to ensure *conservation of the environment* is undertaken to avoid contaminating the environment. Study of industry and industrialisation is directly linked to learning about the causes and measures against air, water and land pollution and ultimately occurrence of *climate change* or *global warming*.

Generic competences

Generic competence	Explanation
Cooperation, interpersonal management	This will help the learners to cooperate as they work on groups and teams on different tasks and assignments. It will enable them learn to relate with one another as members of the group which will eventually translate into cooperation in the communities where they come from and to create national unity and integration. <i>Class activities which will promote co-operation among learners include working in groups to classify major types of industries in Africa and analysing factors influencing industrialisation in Africa.</i>
Research skills	Learners are able to take initiative, and become resourceful in finding out answers to new concepts and phenomena they come across in life. it enables one to make sound judgement and making viable solutions. <i>From time to time, task learners to carry out a research for example on the problems and prospects for industrial development in Africa.</i>
Critical thinking	This is the ability of the learner to think critically and to evaluate situations to be able to make logical conclusions. <i>This skill will be important when learners are expected to analyse the effects of industrialisation on the economies of Africa. Let them apply knowledge from their immediate environment to suggest some of the effects.</i>

Vocabulary/key words/concepts

Extractive industries	These are economic activities also referred to as primary industries. They involve exploitation of natural resources. For instance, exploitation of minerals.
Secondary industries	These are also known as manufacturing industries. These are industries that use raw materials obtained from primary industries and convert them into products of a higher value.
Tertiary industries	These are also referred to as service industries. These are the services that make it easy for the primary and secondary industries to function. They include transport and communication, banking and insurance services among others.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement::

- (i) What are the types of industries in Africa?
- (ii) What are the major industrial areas of Africa? (South Africa, Nile valley...)
- (iii) What factors favour industrialisation in Africa?

- (iv) What is the importance of industrialisation to the economies of Africa?
- (v) Which problems affect industries in Africa?
- (vi) What are the prospects for sustainable development of industries in Africa?

Attention to Special Education Needs

It is important that you prepare learning materials for learners with special needs to ensure they are not disadvantaged. If you have hearing impaired learners in your class, you must ensure their reading materials are in sign language. You also need to organise for an interpreter who would assist during lesson delivery sessions.

For low vision learners the writing materials should be in large print. Such learners should be allocated sitting positions near the chalk board. For learners who are blind there should be braille taped materials.

Learners who have physical impairment are attended to as need arises as these are varied disabilities. For instance those using wheel chairs or clutches may need assistance during outdoor learning sessions.

List of lessons

Lesson 1	Types of industries in Africa, the major industrial areas of Africa (South Africa, Nile valley...) and factors favouring industrialisation in Africa
Lesson 2	Importance of industrialisation to the economies of Africa
Lesson 3	Problems affecting industries in Africa.
Lesson 4	Prospects for sustainable development of industries in Africa

LESSON DEVELOPMENT

LESSON 1: TYPES OF INDUSTRIES IN AFRICA, THE MAJOR INDUSTRIAL AREAS OF AFRICA (SOUTH AFRICA, NILE VALLEY...) AND FACTORS FAVOURING INDUSTRIALISATION IN AFRICA

PART I: TYPES OF INDUSTRIES IN AFRICA

Learning objective

By the end of this section, the learner should be able to classify the major types of industries in Africa.

Introduction

This section requires you to have knowledge of the three types of industries primary, secondary and tertiary, with specific examples. Use of local examples will enable the learners to grasp concepts faster.

Introduce the section to the learners by building on the knowledge on study of industries that they have acquired in the lower classes. At this stage the learners have knowledge about what industries entails. They are then expected to apply this knowledge to the African situation.

Reference to the map of Africa will enable the learners identify the main towns where the main manufacturing industries are located. They will need your guidance to name the industries in different locations.

It is important to ensure learners work on the answers to the activities in the section as this will enable them gather more information of the section expectations. Ensure as many of them as possible have given their presentations and all class members have participated in the discussions on each presentation.

Teaching aids

The teaching/ learning resources listed below will be appropriate for the lesson. However Ant other materials that may facilitate learning can be used.

- Learner's book
- Wall maps
- Sketch map of Africa showing location of different industries
- Photographs of different types of industries
- Atlases

Alongside these materials, the following teaching methods are recommended.

- Expository approach
- Group discussion method
- Photograph and map analysis
- Question and answer

Learning activities

It is important for you as the facilitator of learning process to be well prepared for the lesson beforehand.

Identify a suitable map of Africa showing major towns and the dominant industries located in each. You also need to have comprehensive notes and questions to use as you introduce the topic to the class. Prepare a sketch map of Africa showing the towns and industries. Ensure it is simple enough for learners to draw. Identify suitable photographs of different industries.

Acquaint yourself with the activities within this section in the learners' book so that you plan on how much time the learners will take to answer the questions and discuss them in class.

Using the atlas locate industrial sites studying photographs, asking/answering questions, and class presentations, discussions and taking notes.

Involve the learners in the following activities

- Analysing photographs of different types of industries
- Discussions
- Asking/answering questions
- Taking notes

Synthesis

To ensure that the learners are able to synthesise the information in the section, you have to involve the class in discussions ensuring that all members participate. Guide the learners in the discussion ensuring that learners of all abilities are involved. For **Activity 15.1 in the Learner's Book**, it is recommended that learners are in pairs and engaged in discussions during which learners jot down points for class presentation and discussion. This helps the learners to internalise the information learned more effectively.

Assessment

For effective continuous assessment, ensure you use diagnostic questions all along the lesson. Guide the learners as they discuss the various types of industries and ensure they come up with specific examples from Rwanda. In addition, involve the class in discussions ensuring that all members participate.

Learners should be asked to read through the sections and make a summary of the types of industries for discussion. Assess their participation as they discuss.

PART II: THE MAJOR INDUSTRIAL AREAS OF AFRICA (SOUTH AFRICA, NILE VALLEY...)

Learning objective

By the end of this lesson, the learner should be able to locate the major industrial areas of Africa.

Introduction

This section requires you to have knowledge of the major industrial areas of Africa.

Africa has a wide variety of industries ranging from heavy iron and steel, car manufacture, chemical industries, engineering works and manufacture of machinery located in South Africa to light industries found in different countries in urban and rural settings. There are also numerous light industries such as food processing and repair works among others. Most of the capital cities double as the main industrial areas of each country. This is because each new industry is attracted to the towns since they are already well served with the necessary infrastructure and have ready market due to the high population concentration.

When you consider the requirements of a population, then it means the demand for industrial products is very high.

As you teach this section it is advisable to compare with the situation in Rwanda to give the learners a picture of the similarities and differences with the other countries in Africa.

Teaching aids

The teaching/learning resources listed below are recommended.

- Recommended text books
- Map of the Africa showing location of industrial regions
- Photographs of different industries

The following teaching methods will enable effective use of the teaching aids.

- Expository approach
- Photograph and map analysis
- Question and answer
- Discussion

Learning activities

Identify a suitable map of the Africa showing the location of the major industries. Identify samples of photographs of some of the industries. You need also to make a table with major towns and the dominant industry in each for learners to copy. Apart from the major industries you need to research to find out which other industries are found in the Africa other than those in towns and where they are located. Your notes should be comprehensive and you need questions to guide the flow of the lesson. Involve the learners in activities such as:

- Photograph interpretation
- Drawing of tables,
- Note-taking
- Asking and answering questions,
- Map reading, and

Ensure that you involve learners of all abilities in asking and answering questions and in discussions. Ensure the slow learners are actively involved.

Synthesis

The main aim is to ensure that the learners are able to synthesise the information in the section, you have to involve the class in discussions ensuring that all members participate. Guide the learners in the discussion ensuring that learners of all abilities are involved. Ensure that learners participate in working out answers to the activities as this helps them to internalise the information learned more effectively.

Assessment

For effective continuous assessment, ensure you use diagnostic questions all along the lesson. Guide the learners as they analyse the map that shows the major industrial regions of Africa and are able to identify the different types of industries located in these regions. Also, ensure you involve the class in discussions ensuring that all members participate so that you can gauge their level of understanding. Ask the learners to make a list of the towns and the major industries in each. Also, ensure they complete the answers to all the activities in the section for discussion.

PART III: FACTORS FAVOURING INDUSTRIALISATION IN AFRICA

Learning objective

By the end of this section, the learner should be able to analyse the factors influencing industrialisation in Africa.

Introduction

There are many general factors that influence industrial development. Most factors are common to many areas but each country in Africa may have some unique factors that apply only to it and not to others. For instance the effect that apartheid had on industrial development is quite unique to South Africa. All the general factors such as availability of raw materials, market, capital, transport, water and power supply are common to most industries. It is important to read widely so that you guide the learners to acquire the correct information about each industry and its uniqueness in its reason for development.

Teaching aids

- Recommended text books
- Internet
- Other relevant reference books
- Map of the Africa showing location of industries
- Photographs

These can go along with the following teaching/learning methods

- Expository approach
- Photograph and map analysis
- Class discussions
- Question and answer
- Group

Learning activities

As you prepare for the lesson you will determine the activities that learners will be involved in. Read widely on the factors influencing industrial development ensuring that you identify the factors that may be unique in different countries. Make comprehensive notes and guiding questions to help the flow of the lesson. You should divide the class into groups to work on **activity 15.3** in the Learner's Book. Assign each group factors to research on. As you consider the groups, have in mind learners of different abilities in each group. Ensure the learners are engaged in the following activities:

- Asking and answering questions
- Researching on the factors
- Discussing
- Taking notes

Synthesis

For you to achieve the intended objective of the lesson, ensure the learners read through the text and work on the activities provided in the section. With proper guidance and ideal learning environment, they will be able to synthesise the information for proper understanding of the concept. As the work on **Activity 15.4** in the learner's book they should be able to discover many more factors than those outlined in the text book. It is also important that they understand the role of each factor and not just memorize them. Ensure that you constitute groups with learners of different abilities. Also when asking questions and in discussions ensure all learners participate.

Assessment

Guide the learners in the discussion and question and answer sessions ensuring that learners of all abilities are involved.

Learners should be asked to research on the factors that favour growth of certain industries as they read through the sections and also complete any questions not yet done. All the work that the learners do on their own should be marked to ensure the achievement of each learner is determined. It is from there that those who require remedial work will be discovered.

Ask the learners to prepare notes on factors that influence growth of industries in Africa. Also, ensure they complete their group work for class presentation and discussion.

LESSON 2: IMPORTANCE OF INDUSTRIALISATION TO THE ECONOMIES OF AFRICA

Learning objective

By the end of this lesson, the learner should be able to analyse the effects of industrialisation on the economy of Africa.

Introduction

Presence of manufacturing industries in a country play an important role in the economy of that country. Apart from contributing to the national income, industries are a source of employment and a source of products needed by the people. As industries grow in a place, other developments grow concurrently. For instance, growth of industries sparks off growth of agriculture, transport and communications as well as trade. You should engage the learners in discussing the situation in Rwanda to enable them appreciate these types of developments and relationships as they compare with other African countries which may be far more advanced economically such as South Africa.

As you teach this section, ensure you have specific examples of different countries because the level of industrial development is different in each country. It is important that you carry out research to gather more information on specific countries with different economic development levels.

Teaching aids

- Recommended text books
- Other relevant reference books
- Internet
- Photographs

Learning activities

Identify appropriate photographs that show features of development such as roads that are built as a result of high income generated by industries.

Research widely on the importance of industries in different countries in Africa. Make comprehensive notes and guiding questions to make the lesson have logical flow. Plan to divide the class into groups and allocate each group a country to work on and later present for discussion. Involve the learners in the activities below and any other that may add value to the learning process by:

- Asking and answering questions
- Researching on importance of industries
- Discussing
- Taking notes

Synthesis

To achieve the intended objective, and retain what is taught, learners have to synthesize the information learnt. It is for this reason that learners have to participate fully in the learning process. They should discover the answers to tasks by themselves in order to retain what is learnt for a longer time. **Activity 15.8** in the Learner's Book takes them back to what they had studied in the previous class so that they can relate and apply knowledge on the importance of industries.

Assessment

Use diagnostic questions throughout the lesson to make the learners remain focused and to assess their understanding of the concept step by step. Learners should be asked to research more on the topic in the section as they read through the sections and also complete any questions in the activities.

Ask the learners to prepare notes on importance of industries in specific African countries. Ensure they complete their group work and the activities in the section for class presentation and assessment.

LESSON 3: PROBLEMS AFFECTING INDUSTRIES IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to explain the problems affecting industrial growth in Africa.

Introduction

There are different types of problems that African countries face in their industrial sector. Some problems are common to all the countries but some countries sometimes experience unique problems.

Some of the common problems affecting industrial growth in Africa include inadequate capital to invest in industries, shortage of skilled labour limited local market and competition for market among countries and with the more industrialised nations. Poor transport infrastructure and power supply are a major hindrance to industrial development. Heavy industries require high operation costs which the poor countries strain to raise. In addition, many industries in Africa are agricultural based and sometimes there is short supply especially when droughts strike and crops fail. Insecurity and political instability are problems in some countries at different times.

As you teach this section, ensure the learners are able to make comparisons of their country with those highly industrialised and note the similarities and differences in the problems experienced.

Teaching aids

- Recommended text books
- Internet
- Other relevant reference books
- Photographs

You could use the teaching methods below for effective utilisation of the teaching aids.

- Expository approach
- Question and answer
- Photograph analysis
- Group and class discussions

Learning activities

Identify appropriate photographs such as one showing an industry that has closed down.

Research widely on the problems in different countries in Africa. Make comprehensive notes and guiding questions to make the lesson have logical flow. Plan to divide the class into groups and allocate each group a country to work on the problems for comparison as they present and discuss. Involve the learners in activities such as:

- Asking and answering questions
- Researching on the problems affecting industries
- Discussing
- Note-taking

When asking questions and in discussions ensure all learners participate.

Synthesis

Learners should be assisted to put the learned facts about problems and their possible solutions together to understand the reasons some countries have poorly developed industries and how they can overcome the challenges they face. Comparison between developed and developing countries will enable them synthesise the facts more easily.

Assessment

Use diagnostic questions and group discussion methods and any other appropriate method to be able to assess the level of understanding of each learner.

Ensure that the learners have worked on the activities in the section so that they are all fully involved in class discussion and answering questions.

Ask the learners to prepare notes on problems affecting industries in specific African countries. Ensure they complete their group work and the activities in the section for class presentation and assessment.

LESSON 4: PROSPECTS FOR SUSTAINABLE DEVELOPMENT OF INDUSTRIES IN AFRICA

Learning objective

By the end of this section, the learner should be able to discuss the future prospects for industrial development in Africa.

Introduction

Africa has in the recent past been a focus by foreign investors. Countries such as China have been aggressive setting up development projects in Africa. This trend is very promising as the developed nations provide the required capital and skills needed in the industrial development. Development of transport and power supply has been on the increase in some countries with the provision of funding by foreign development partners. Other times money has to be borrowed from local banks or foreign financial institutions like the World Bank and IMF.

The rapid developing information and communication technologies experienced in Africa in the recent past is an indicator of further development in future. Countries of Africa have formed trading blocs further widening the market base for industrial goods. Provision of training programmes in managerial, technical and entrepreneurial skills and hiring of skilled workers from other countries creates a promising future. These are all trends that are indicators that the continent is on the move and if sustained then there is possible sustainability of industrial growth.

Teaching aids

- Recommended text books
- Other relevant reference books

- Internet
- Government development plan documents.

You may employ the following teaching/learning methods for effective use of the teaching aids:

- Expository approach
- Answer
- Question
- Class discussions

Learning activities

Research widely on what is happening in different countries especially their development plans. Make comprehensive notes and guiding questions to make the lesson have logical flow. Prepare possible answers to the activities in the section. Involve the learners in the following activities:

- Asking and answering questions
- Researching
- Discussing
- Note-taking

Synthesis

It is important to ensure that the intended learning objective is achieved and learners have acquired competencies such as ability to carry out research. The aim is to ensure they are able to retain the acquired knowledge for a long time and are able to appreciate the importance of the development of industries for sustainable development.

Assessment

Use diagnostic questions during the learning process to draw the attention of learners to key concepts and to assess their understanding. Ensure that you involve the class in discussions ensuring that all members participate. You could appoint one student to lead the discussion for each activity ensuring that slow learners and those with other challenges are also appointed to lead once in a while.

Learners should be asked to read through the sections of the topic so far covered and if possible to read ahead in preparation for the next section. Ensure that the learners work on activities in the section and ask them to prepare to make class presentations to enable you assess whether they have grasped the intended knowledge.

END OF UNIT

Summary of the unit

The unit begins by exploring the types of industries found in Africa. The industries have been classified from extractive or primary industries to the service industries. Within each category, there are numerous examples that the teacher should use to enable the learners to

be able to classify the industries that they are familiar with. **Activity 15.1 in the Learner's Book** provides examples of the three types of industries.

Part two of the unit deals with the major industrial areas in Africa. Specifically the syllabus allows the study of South Africa and the Nile valley as the most highly industrialised regions in the continent. The wide range of industries in these two regions are given in the section

Part three of the unit is on the factors that favour industrialisation in Africa. A wide range of factors are explored among them being the availability of raw materials, power, labour and capital among others. It will be noted that many countries in Africa have poorly developed industrial sector because they are not well endowed in as far as most of the favouring factors are concerned.

Importance of industrialisation to the economies of Africa is the next section of the unit. It will be noted that industrial development is one of the key drivers of economic development in any country. It plays major roles such as creating employment and earning foreign exchange that countries require to be able to import what is not produced locally. The other contributions include generating revenue for individuals and for the government and diversifying the economy as we know that African countries rely mostly on primary products whose value is low compared to manufactured goods.

The next part of the unit is on the problems affecting industries in Africa. As noted earlier, majority of the African countries are poorly developed in the area of industrialisation. This is directly linked to the economic challenges that they face that hinder their efforts to develop industries. These challenges can also be viewed as the unfavourable conditions which is the flipside of the factors that promote growth of industries.

Prospects for sustainable development of industries in Africa is the last part of the unit. This part is an analysis of what can be done for the countries to achieve sustainable development of industries. For instance, investing in training of skilled labour, sustainable power supplies, ensuring sustainable sources of raw materials so that industries are up and running and widening the market base so that the industrial products have commensurate market as they are produced. **Activity 15.10** encourages the learners to look at the Rwandan context to relate and apply the situation in Rwanda to many other countries in the continent.

Additional information

This unit is linked to Unit 20 in Senior 2 on Industry in Rwanda. It is important to remind the learners on the basic information learnt in Senior 2 which form the foundation on which they build the knowledge on industrial growth in Africa. It is important to facilitate discussions as learners work in groups on **activities such as 15.3 and 15.5. Activity 15.4** is a case study and in the absence of an industry near your school, you should organise a field study for the class to an appropriate industry.

Industrialisation is the process of establishment of new industries and expansion of existing ones. Due to different reasons, different countries develop at different pace in all their sectors of the economy. Thus African countries are at different levels of industrialisation. The level of industrialisation is the basis against which countries are classified as highly or less industrialised or developed. African countries are among the less industrialised in the world.

It is important to discuss the effect of the development of modern technology to industrial development. Modern technology has brought about a shift from traditional industrial processes as the use of computers and Internet has changed the way industries operate. For instance, some machines are computerised, making production faster and increasing the output. Information technology has improved communication between the players in the industrial sector and this has facilitated development in the sector.

There are direct benefits accrued from industrialisation. Jobs are created and income levels raised. Transport and communication and other forms of infrastructure are developed not only to facilitate industrial growth but also as a result of availability of capital obtained from the sale of industrial goods. More foreign exchange is earned by exporting manufactured goods than exporting raw materials. This explains why industrialised countries are also richer than those that are less industrialised.

Apart from South Africa and Egypt, other countries in Africa that have made strides in industrial development include Ghana, Kenya and Nigeria. Rwanda is moving fairly fast but being landlocked among other factors is a hindrance faster industrial growth.

End unit assessment

1. Briefly explain the three types of industries
2. In groups explain five factors favouring industrialisation in Africa
3. Prepare a summary on the importance of industrialisation to the economies of Africa
4. Describe the problems affecting industrial growth in Africa
5. Explain the prospects for industrial development in Africa

Answers to end unit assessment

1. a) **Primary or extractive industries**

These are involved in the exploitation of natural resources.

They provide raw materials for the secondary industries.

Primary industries include mining, farming, fishing and forestry.

- b) **Secondary or manufacturing industries**

These industries use the raw materials from the primary industries.

In order to add value to the raw materials, they are processed in a factory.

The finished products are suitable for consumption.

For example, coffee berries are raw materials.

These berries are processed to make coffee which is ready for use.

The processed coffee has higher value than the berries.

c) Tertiary or service industries

These are activities that make it easy for the primary and secondary activities to be carried out. Tertiary services include transport and communication, trade, banking, insurance, printing and publishing services.

2. Industrialisation in Africa has been favoured by the following factors:

- (i) **Availability of raw materials:** Industries in Africa have developed because of availability of raw materials. Raw materials such as minerals led to industrial development in South Africa. Availability of agricultural raw materials such as sugarcane, tea, coffee, maize and cocoa has made it possible to set up industries in many African countries.
- (ii) **Availability of capital:** Capital is the money required to establish a business or an industry. Some African countries such as South Africa, Morocco and Egypt have capital to set up industries. In some African countries, money for establishment of industries is borrowed from international donors and financial institutions such as World Bank. In some African countries, rich individuals are able to establish industries. There are also foreign investors.
- (iii) **Availability of market:** The large urban centres with increasing population numbers provide market for industrial products. Some African countries have formed trading blocs that have enlarged the market for member states. There is also a large market outside the continent.
- (iv) **Availability of power:** Many countries in Africa have hydroelectric power (HEP) projects. For example, Akosombo in Ghana, Aswan High Dam in Egypt, Kainji in Nigeria, Kariba in Zambia, Ntaruka, Rusizi and Mukungwa HEP stations in Rwanda and Nalubaale HEP in Uganda. All these provide power to industries. Some countries use other sources of power. For example, coal is used in South Africa.
- (v) **Availability of transport and communication systems:** There are some major trans-continental highways like Great North Road, Trans Sahara Highway and Trans Africa Highway. These highways help in the transportation of raw materials and manufactured goods to different countries. There are also railway connections that help in the transportation of finished products. Water transport is also used.

There is also a well developed communication system. This keeps the market and industrial sector connected all the time.

3. The following are some of the benefits of industrialisation to the economies of Africa:

a) *Creation of employment opportunities*

Industries create employment opportunities to many people. This enables them

to earn salaries, which raises their living standards. This helps many African countries to reduce the problem of unemployment.

b) *Earning foreign exchange*

When manufactured goods are exported, the countries earn foreign exchange. The money earned can be used in the development of other sectors of the economy.

c) *Generating revenue for governments*

The industrial sectors pay taxes that are levied by the governments of different African countries. The money earned from taxes is used to provide social services to the people. The money is also used in developing other sectors of the economy.

d) *Improved infrastructure*

When an industry is established in an area, transport and communication networks are improved. Power and water are also supplied. Other social amenities such as schools and health centres are also established. All these facilities stimulate development.

e) *Self-sufficiency*

By developing industries, countries can provide consumer goods and other essential goods instead of relying on imports. This would reduce the amount of money that would have been used to import the goods.

f) *Diversification*

Development of industries leads to diversification of the economies of Africa. Countries end up reducing reliance on one or two primary products, for example reliance on agricultural products like coffee, cocoa, tea and sugarcane.

g) *Improvement in international relations*

Production of industrial products enables countries to engage in international trade. This enables people from different countries to interact.

4. **Some of the problems affecting industrial growth in Africa include the following:**

- (i) *Shortage of capital:* Many African countries have inadequate capital for development of the industrial sector. These countries therefore depend on foreign investors. Sometimes, money has to be borrowed from local banks or foreign financial institutions like the World Bank at a higher cost. This reduces the overall profitability of such industries to their citizens.
- (ii) *Shortage of skilled labour:* Most countries in Africa have a shortage of skilled labour especially those with managerial skills. This has led to the hiring of skilled workers from other countries. This increases the cost of running such industries as such people are highly paid.
- (iii) *Limited market:* In most African countries, the local market is limited. Although African countries have large populations, their levels of income are low. They do not provide sufficient market for the locally manufactured goods. Such a low

demand may not sustain large scale manufacturing.

- (iv) *Poor infrastructure:* Many African countries have few roads, railways and port facilities for handling goods on large scale. This may hinder the development of industries because it becomes expensive for raw materials to be transported to the industries. At the same time, finished products may not be easily distributed, because of the expenses involved.
- (v) *Competition:* In some countries, there is stiff competition between imported and locally manufactured goods. This is because of the low quality of some manufactured locally. This makes people prefer imported goods. Such goods are like textiles, electronics, shoes and cooking oil. Although some countries have restricted importation of some goods, they still find their way into the countries. Competition has therefore made industrial growth in Africa to be slow.
- (vi) *High operational costs:* The cost of acquiring industrial equipment may be very high. Worse still, when such equipment breaks down, it is expensive to repair them. The end result is a delay to the production process, sometimes leading to closure of the industry involved. In some instances, there is high cost of energy especially when it has to be imported, for example, petroleum.
- (vii) *Shortage of raw materials:* Fluctuation of agricultural output affects agricultural industries as they may not get a constant supply of raw materials. Industries that depend on imported raw materials may experience shortages when strict foreign exchange controls are used.

5. The following are some ways of improving and expanding the industrial sector in Africa:

- (i) Provision of adequate and efficient power supplies by investing in new power plants.
- (ii) Improving the quality of infrastructure in order to promote industrial development.
- (iii) Developing information and communication technologies in order to reduce transaction costs in the industrial sector.
- (iv) Widening the market base by expanding regional markets and international markets.
- (v) Adding value to the quality of products manufactured to make them marketable and competitive.
- (vi) Provision of training programmes in managerial, technical and entrepreneurial skills.
- (vii) Promoting a conducive business environment.
- (viii) Developing modern transport network to ease transportation of goods and services.
- (ix) Encouraging industries that are more efficient in the use of resources such as those that use resources that generate less pollution and waste.

Remedial activities for slow learners

1. With specific examples from Rwanda describe the meaning of a primary industry.
2. Briefly explain how availability of raw materials encourages growth of industries in South Africa.
3. Describe three problems that affect industrial development in most African countries.

Answers to remedial activities

1. Primary industry involves extraction of minerals such as tin and excavating of gravel, sand and building stones in different parts of Rwanda.
2. South Africa's industries are mainly found in Witwatersrand, a region that is rich in minerals and agricultural products. These products provide raw materials for a wide range of industries.
3. See answers in the Learner's Book.

Extended activities for gifted and talented

1. Distinguish between primary and tertiary types of industries.
2. Compare Industrial development in South Africa and Rwanda under the following sub-headings
 - (a) Availability of raw materials
 - (b) Availability of local market
3. Discuss the prospects of industrial development in Africa

Answers to extended activities

1. Primary industries deal with extraction of natural resources such as mineral and agricultural raw materials while tertiary industries provide services such as transportation to facilitate industrial activities.
2.
 - (a) South Africa has a wide variety of raw materials such as minerals like gold, coal and agricultural products while these exist in Rwanda in small quantities in comparison.
 - (b) Rwanda's population is about 12 million and most of them have relatively lower income thus limiting the local market for manufactured goods compared to South Africa whose population is about 53 million with a large number of high income people who are able to buy the manufactured goods produced in the country.
3. The economies of many African countries are changing. There are development in the transport sector, modern technology and business environment. This will promote the manufacturing sector to expand in future.

Unit 16

TRANSPORT, COMMUNICATION AND TRADE IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to analyse the impact of transport, communication and trade on sustainable development in Africa.

Prerequisite of this unit

Transport, communication and trade are commonly called aids to trade. These are services that support other sectors of the economy. As much as they are independent of each other, when looked at closely, they are interdependent.

Learners already have knowledge on each of these services, and are able to give examples from their local environment as well as from the entire country. This is because in Senior Two, they studied about transport, communication and trade in Rwanda. In a detailed way, they acquired knowledge on the types of transport and communication in Rwanda, advantages and disadvantages of transport and communication systems in Rwanda and problems and solutions of transport and communication in Rwanda. About trade, they got to understand about the types of trade in Rwanda, importance of trade in Rwanda, problems affecting trade and possible solutions in Rwanda and regional and international trade partners with Rwanda.

In this unit, you are expected to guide them to understand the transport, communication and trade in Africa. The broad sections of discussion will be major means of transport in Africa, communication in Africa and trade.

Cross cutting issues

This unit heavily leans towards financial matters, both on an individual basis and on the country at large. While teaching this unit, it is therefore important to incorporate *financial education* into the various aspects of discussions. To an individual, it is important to mention that in choosing a means of transport, one needs to consider efficiency, urgency, *cost* and flexibility. To arrive at this, you need to guide the learner to understand:

- Developments in the transport and communication sector
- Advantages of each means of transport/communication
- Disadvantages of each means of transport/communication
- Future prospects of each means of transport and communication

In carrying out various business transactions, learners need to be patient because in some cases, they will be required to do price comparisons. This is to settle on a quality service but of a lesser cost, so as to save money. However, insist that cost should not be a compromise on the standard of the service. It is at this point that *standardisation culture* will feature.

To a country, developing the three sectors requires financial planning and involves large sums of money. In trade, goods and services are exchanged mainly for money. This is the

reason why financial planning will not only be important to individuals, but government agencies and investors alike.

Through the study of this unit, learners will also get to learn about *environmental conservation*. They will understand and appreciate the measures that are being taken to protect the environment against contamination by use of inefficient vehicles that produce excessive exhaust fumes. In addition, the word environment is endangered by careless disposal of **e-waste**. For instance, old computers and other related materials. Disposal of such waste materials is causing concern worldwide.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>This competence will be acquired in instances such as when analysing problems of transport and communication in Africa. Since these problems are common in many countries of Africa, it is important that learners are expected to think critically in order to come up with localised solutions the problems in their immediate environment.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>Learners are expected to engage in research from time to time to find out information such such as importance of various types of transport, problems of transport in Africa and how various countries have overcome.</i>
Communication in official languages	Teachers are expected to use the proper language of instruction by applying it appropriately and using relevant vocabulary. <i>In the learners, This competence will be developed when they prepare notes and presentations in class on topics such as factors influencing development of transport systems in Africa.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. <i>This is a competence that learners will develop when working together in pairs or groups on activities outlined in the Learner's Book.</i>
Lifelong learning	The acquisition of such skills will help learners to update knowledge and skills with minimum external support. <i>Technology has led to innovation and efficient channels of transport, communication and trade. This include the coming of taxi motors that were not there in the past. Apart for aiding in communication, moblie phones can now offer money transfer solutions. These are some of the changes in these sectors that learners can venture into as ways of generating income in future.</i>

Vocabulary/key words/concepts

Transport	This refers to the movement of goods, services and people from one place to another
Communication	These refers to ways of passing information from a sender to a receiver

Trade	This is the selling and buying of goods and services
Porterage	This is the carrying of goods by people on their heads, back or by hand
Barter trade	This is the exchange of goods for goods, goods for services or services for services

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

Transport

- (i) What are the major means of transport in Africa?
- (ii) Which factors influence development of transport in Africa?
- (iii) Evaluate the importance of various types of transport in Africa.
- (iv) What are the problems of transport in Africa and their possible solutions?

Communication

- (i) What are the major means of communication in Africa?
- (ii) Which factors influence the development of communication in Africa?
- (iii) What is the importance of communication in Africa.
- (iv) Which problems affect communication in Africa and possible solutions?

Trade in Africa

- (i) What are the types of Trade in Africa?
- (ii) What is the importance of trade in Africa?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lessons commences. For instance:

- **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- **Leaners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.

- **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Transport in Africa
Lesson 2	Communication in Africa
Lesson 3	Problems of transport and communication in Africa
Lesson 4	Trade in Africa

LESSONS DEVELOPMENT

LESSON 1: MAJOR MEANS OF TRANSPORT IN AFRICA

Learning Objectives

By the end of this lesson, the learner should be able to identify:

- Types of transport in Africa
- Factors influencing development of transport
- Importance of various types of transport

Introduction

Major modes of transport in Africa are land transport, air transport and water transport. Land transport is the oldest and most commonly used.

Before the invention of the wheel, people used to transport their goods either on their heads, shoulders, hands or back. This is called human portorage. People also used animals such as donkeys or camels to carry their luggage. These modes are still used today especially in areas that do not have a more developed road transport system.

Road transport is the most common form of land transport. They are widespread in Africa where they connect countries as well as different parts of individual countries. They include all weather roads, dry weather roads and footpaths. Three major roads in Africa are the Great North Road that runs from Cape Town in South Africa to Cairo in Egypt, Trans-Saharan Road which runs from Algiers in Algeria to Lagos in Nigeria and the Trans-African Highway which runs from Mombasa in Kenya to Lagos in Nigeria.

Rail transport is another common form of land transport in Africa. The first railway was constructed in Africa in the 19th century. However, there are very few railway connections between African countries. South Africa has the largest railway network in Africa while most of the other countries have rail lines running from the interior to the coast.

Water transport is used on rivers, lakes and oceans. River transport in Africa is limited because of various hindrances such as rivers being seasonal while others have waterfalls which hinder movement along the river.

Air transport is very expensive and not accessible to many people in Africa.

Introduce the unit to the learners by building on the knowledge on study of transport and communication that they have studied in the lower classes. At this stage the learners have knowledge about what transport entails but have to study in details as they apply the concept to the Rwandan situation.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs of some of the means of transport used in Africa

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with pair work, where learners will work on **Activity 16.2** of the Learner's Book. As they compile their findings, ask them to identify different ways people use to travel to different parts of Rwanda. They should also list down different means of transport they use. You will realise that most of them commonly use land transport. Apart from this, introduce air transport by mentioning the use of aeroplanes and helicopter. Ensure you mention other forms of transport such as water where people use boats or ships on lakes, seas or rivers.

Ask the learners to discuss the advantages of human and animal transport and the challenges they face as shown in photographs A and B in the Learner's Book under **Activity 16.3**.

Have your class divided into three groups: **Group A** to discuss land transport, **Group B** water transport and **Group C** air transport.

Each group should then be given the following specific tasks:

Group A

Using an Atlas and the map of Africa, given in **figure 16.1** in the Learner's Book, they should discuss:

- a) Road transport network in Africa and name the major Trans African Highways.
- b) The advantage and disadvantages of road transport as outlined in the Learner's Book.

- c) Railway transport network in Africa and name countries that have developed railway network.
- d) The advantages and disadvantages of railway transport as outlined in the Learner's Book.
- e) Pipeline transport in Africa and state areas that have more of pipeline transport in Africa.
- f) The advantages and disadvantages of pipeline transport as given in the Learner's Book.

Group B

Using the map of Africa in **figure 16.4** in the Learner's Book and an Atlas, let this group identify the main rivers, lakes and seas that are navigable. Ask the learners to identify the main river ports, lake ports and sea ports on the map of Africa and the world in the Learner's Book. Ask the group leader to present their findings. The group should also choose one of them to write points discussed on the chalkboard.

Assist the learners to state the advantages and disadvantages of sea ways as outlined of the Learner's Book.

Group C

With reference to **Activity 16.17** in the Learner's Book, ask learners, with the help of an Atlas, to draw a map of Africa showing pipeline transport across Africa, from the Sahara Desert to the Coastal region.

Using the local environment, ask the learner to list the advantages and disadvantages of using pipelines in Rwanda. Remind the learners that pipelines are used to transport fluids/liquids such as water, milk, oil and gas.

Each group should prepare a class presentation from their findings.

Proceed to **Activity 16.17** in the Learner's Book. Guide the learners in identifying factors that influence development of transport systems in Rwanda and how they are related to development of roads in Africa. Supporting points are found in the Learner's Book.

While referring to the Learner's Book, ask learners to use the local environment in listing down the importance of various types of transport in Rwanda. Assist the learners to relate the importance of transport in Rwanda to the rest of Africa.

Synthesis

Encourage the learners to make their own notes during group discussion. Visit each group at a time to make sure that all the learners are taking part in the discussion.

Sum up transport systems in Africa from each group in order to have unified information. A visit to an urban area, a lake or a big river would enhance learning especially to the slow learners.

Assessment

Ask the learners to compile photos showing the different forms of transport in Africa. Under each photo, let them write a brief on the benefits and challenges of using that form of transport.

LESSON 2: COMMUNICATION IN AFRICA

Learning Objectives

By the end of this lesson, the learner should be able to identify types of communications in Africa.

Introduction

Communications refers to methods used to pass messages from one person to another.

Every learner communicates with other people on daily basis.

There are different types of communication. Apart from verbal communication and the traditional forms of communication such as use of smoke, horns and drums, the other forms of communication can be divided into two broad classifications. These are print media and electronic media.

In this section, you are expected to help learners develop positive attitudes such as appreciating the relationship between the development of communication and other economic activities. Learners also need to appreciate the importance of communication in the development of the country.

Introduce the unit to the learners by building on the knowledge on study of communication that they have studied in the lower classes. At this stage, the learners have knowledge about communication but have to study in details as they apply the concept to the African situation.

Teaching aids

- Recommended learner's book
- Realia, including newspapers, mobile phones and portable transistor radios
- Photographs showing some of the gadgets used in communication

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Ask the learners to name different types of communication that are common within the locality. Let them refer to the Learners Book between. This is what is required in **Activity 16.23** in the Learner's Book.

Use **Activity 16.22** whereby the teacher will list all types of communication.

Provide the learner with different means of communication such as letters, computers, laptops, satellite, newspapers, radio, TV, billboards, telephones and people and ask them to group them into the following categories:

- (i) Written communication
- (ii) Electronic source
- (iii) Audio communication
- (iv) Audio-visual communication

Use **Activity 16.24** to help you discuss factors influencing development of communication in Africa.

In groups of **four**, ask the learners to list down the importance of communication in Rwanda and Africa as a whole. Use the **Activity 16.25** in the Learner's Book.

Synthesis

During various group activities, make sure that all the learners are actively involved in naming different types of communications.

Discuss how different factors listed in **Activity 16.24** have influenced development of communication in Rwanda.

Let each group leader present their findings to the class. Encourage learners to make their own notes as group leaders present their points.

Assessment

Ask the learner to work on questions 1 and 2 of **Activity 16.23** in the Learner's Book.

LESSON 3: PROBLEMS OF TRANSPORT AND COMMUNICATION IN AFRICA

Learning Objectives

By the end of this lesson, the learner should be able to state problems of transport and communications and their possible solutions in Africa.

Introduction

A large proportion of people in Africa cannot afford to buy items such as televisions and computers due to low income levels. This explains why only a small proportion of the population has access to modern communication equipment. However, some of the gadgets such as mobile phones are currently affordable and are now widespread on the continent. Communication is affected by problems such as lack of capital and illiteracy among a large number of African people. Most of the items used for communication use electricity, yet many parts of the African countries are not served with it. This hinders effective and fast communication in many areas in the continent.

African governments should provide solar panels to tap solar power, as the sun is always available in all African countries. This can supply little electricity that can be used by simple communicating devices such as mobile phone.

Some form of communication such as newspaper must be transported to the consumers. Bad roads cause delay in the delivery of the newspapers, letters and other parcels.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Use the local environment and learners' experiences on the problems of road transport in Rwanda. Ask the learner to suggest what the government can do to solve problems to road transport in Rwanda. Similarly, use question and answer method to find out from the learner problem associated with communication in Rwanda and their possible solutions.

Let learners understand that the information obtained in reference to Rwanda can also apply in other African countries.

You will then be required to divide your class into two major groups, that is, A and B.

Group A will discuss problems of transport in Africa and their possible solutions.

Group B will discuss problem of communication in Africa and their possible solutions.

Group B can use the **Activity 16.27** in the Learner's Book as a guide while **Group A** can use **Activity 16.19** in the Learner's Book and **Activity 16.26** in the Learner's Book.

Group A should have a table showing the problems and possible solutions, as suggested below:

Problems affecting transportation in Africa

Mode of Transport	Problems and possible solutions
Roads	1. Impassable road during heavy rains – Construct all weather roads.
	2.
Railways	1. Use of different railways gauge - Have a unified railway gauge
	2.

Pipeline	1.
	2.
Harnessing and animals	1.
	2.
Water	1.
	2.
Air	1.
	2.

Synthesis

Relate the problems of transportation and communications in Rwanda to the rest of Africa and the world.

You can organise for a debate to discuss possible solutions to the problems of transportation in Rwanda. An example of a topic to be debated is *'Road transport is better than railway transport.'*

Sum up the outcome of the debate as advantages and disadvantages of road over railway transport.

Discuss the possible solutions stated by **Group A** by the whole class.

Ask the learners to make their own notes after the discussion.

Assessment

Provide the learner with a map of Africa and ask them to show land, air and water transport.

How is e-learning effective in Rwanda? Ask them to refer to the Learner's Book on **page 310**.

LESSON 4: TRADE IN AFRICA

Lesson Objectives

By the end of this lesson, the learner should be able to:

- Identify types of trade in Africa
- State importance of trade in Africa
- List problems hindering trade in Africa
- Explain internal and international trade

Introduction

Trade is an essential part of every country's economy. It contributes towards development and increase in national wealth. There is no country that can survive without trade because none is self-sufficient. One characteristic of trade in Africa is that most African countries export mainly raw materials and imports mainly manufactured goods. The other characteristic is that there is limited trade between African countries as mostly the countries trade with countries in other continents.

Introduce the unit to the learners by building on the knowledge on study of transport and communication because these are the vehicles that facilitate trade.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing cattle ranches in Botswana

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Use the learners experience on local trade in the local market to define what trade is. The main reference point will be the introduction found in the Learners Book.

Ask the learners to list down items traded in the local market such as grains, bananas, sugar, tea and clothes. Let them then attempt **Activity 16.28** in the Learner's Book.

In groups, ask the learners to state items that are imported and sold to people of Rwanda.

Help them to understand that goods bought from outside the country are referred to as **imports** while those from the country to other countries are known as **exports**.

When you buy goods produced within the country, this is referred to as **domestic trade** and from outside the country is referred to **external trade**.

With reference to the local environment or local market, state the types of trade practiced. You will notice there are people who sell small quantities [retail trade] of good and other sell goods in bulk [wholesale trade].

While discussing **Activity 16.29** in the Learner's Book, help the learners to find out types of trade practiced in different regions in Africa.

In **groups of five**, let them discuss the importance of trade in Africa with the help of **Activity 16.30** in the Learner's Book.

Ask the learners to name towns in Rwanda that have developed as a result of trade.

Use the **Activity 16.31** in the Learner's Book to explain how each problem has affected trade in Rwanda and Africa in general. Check on the notes the learners make to ascertain

they are correct.

In **pairs**, ask the learners to use the Internet to find out the difference between **internal trade** and **international trade**. Provide the learner with a map of Africa showing all the countries and ask them to shade and name members of EAC, ECOWAS, COMESA and CEEC. The knowledge gained should be used to complete **Activity 16.32** in the Learner's Book.

Synthesis

Divide the class into small groups of **three** or **four** learners to study the table of export and import of Rwanda in **Activity 16.32** in the Learner's Book. Using this information, ask them to draw bar graphs of import and export from January to July 2016.

It is also important for the learners to explain what causes **trade imbalance**. Part of the information to help them carry out further research is found in the Learner's Book.

Each learner should then list down the items bought and sold within Rwanda [internal trade].

Assessment

1. Using the figures given in the table in **Activity 16.32** in the Learner's Book, learners should calculate the:
 - a. Total the value of import
 - b. Total the value of export
 - c. Total value of difference

In addition to this, learners should also attempt Question 2 of the **Activity 16.32**.

2. In groups, learners should carry out a research from various sources of geographical information and the Internet to find correct responses to **Activity 16.33** on **page 321** of the Learner's Book. Afterwards, let them prepare class presentations from their findings.

END OF THE UNIT

SUMMARY OF THE UNIT

Transport refers to the movement of goods, people and service from one place to another or from one country to another. **Communication** refers to way of passing message from one person to the other [sender to the receiver.] **Trade** is the selling and buying of goods and services.

Transportation refers to the movement of goods, services and people from one place to another using different means of transport. There are traditional or rural means of transportation as well as developed regions of Africa such as urban and sub-urban areas.

Communication refers to means or ways of passing information from a sender to a receiver. Communication in Africa is improving day by day. It is now possible to reach all parts of the continent with a touch of a button.

Trade is the selling and buying of goods and services. There is local trade, national trade, international trade and world trade. Both traditional and modern trade are practiced in Africa. The origin of trade is believed to have started when people started living in communities. Different communities exchanged goods for goods depending on what they had and what they wanted from the other community. This method of trading is known as **barter trade**. Goods refers to tangible items such as tea, cattle, minerals etc. and services refers to intangible products such as education, insurance, banking, tourism, shipping and hotel services.

Additional information

Some countries of Africa such as Rwanda, Burundi, Uganda, Niger, Mali, South Africa and Botswana have unique problems of transportation. These countries are landlocked. They rely on the goodwill of their neighbours.

Political differences among the African countries also hinder transportation and trade.

Most rivers of Africa are only navigable for short distance. They are characterised by being seasonal having rapids and water falls. They only use boats.

Except South Africa which has well developed mode of transportation, other countries have one or two modes of transportation fairly developed.

End unit assessment

1. List down four forms of land transport.
2. Name all the Trans African Highway
3. List **three** advantages and **three** disadvantages of railway mode of transport
4. Name the countries that use Lake Malawi to transport their goods, people and services. (Malawi, Tanzania and Mozambique)

Answers to end unit assessment

1. Forms of land transport
 - Human portorage and animal transport in Africa
 - Road transport in Africa
 - Pipeline transport in Africa
 - Railway transport in Africa
2.
 - i) **The Great North Road:** This road runs from Cape Town in South Africa to Cairo in Egypt. It passes through the following countries: South Africa, Zimbabwe, Zambia, Tanzania, Kenya, Uganda, Southern Sudan, Sudan and Egypt.
 - ii) **Trans-Saharan Road:** This road runs from Algiers in Algeria to Lagos in Nigeria. It passes through Algeria, Niger and Nigeria.
 - iii) **Trans-African Highway:** It runs from Mombasa in Kenya to Lagos in Nigeria. Trans-African Highway passes through the following countries, Kenya, Uganda, Democratic Republic of Congo (DRC), Republic of Central Africa, Cameroon and Nigeria.
3. Advantages of railway mode of transport

- a) Trains on rail carry both bulky and heavy goods cheaply.
- b) Trains are time bound, making them reliable and efficient especially to passengers and goods for trade.
- c) There is no congestion on railways because they leave at specific times. They use a timetable.
- d) Trains are less prone to accidents compared to motor vehicles.
- e) Once railways are constructed, they are very cheap to maintain.

Disadvantages of railway mode of transport

- a) Most of trains in Africa are relatively slow but, new and fast trains are being constructed. These rails are referred to as Standard Gauge Rails.
 - b) Railway transport cannot serve door to door. They are not flexible.
 - c) It is very expensive to construct a single railway line.
 - d) Different countries have different gauges. This makes it difficult to transport goods by railway from one country to another. There is always trans-shipment that leads to breakage and theft of goods.
 - e) Rails cannot be used during the time of construction like the way they do when constructing roads.
 - f) Railway lines can only be constructed on relatively flat areas since trains cannot climb hilly areas. Tunnels, railway cutting and winding slopes must be constructed that makes railway construction very expensive.
4. Malawi, Tanzania and Mozambique

Remedial activities [Slow learners]

1. Use the map of the world in **figure 16.18** in the Learner's Book and state the shortest route from Malaysia to Great Britain.

Answer

Malaysia – Sri Lanka- Red Sea - Suez Canal - Mediterranean Sea - North Atlantic Ocean - Great Britain

2. What do you understand by written communication?

Answer

Passing information-through writing whereby the writer and the reader must be able to write and read. This includes letters, newspaper, telegram, fax and billboards. Refer to Learner's Book.

3. List down the member countries of COMESA and its head quarter.

Answer

Head quarter of COMESA – Lusaka Zambia

Member Countries

Rwanda	Seychelles
Angola	Burundi

Sudan	Comoros
Swaziland	D.R.C
Uganda	Djibouti
Zambia	Eritrea
Namibia	Ethiopia
Mauritius	Egypt
Malawi	Kenya
Madagascar	Zimbabwe

Extended activities [for gifted and talented learners]

1. State four factors that influence external trade in Rwanda

Answers

- Availability of transport and communication network
 - Political stability of trading partners
 - Varying exchange rate
 - International trade
 - Demand for goods and services
 - Similarities or differences in goods produced
 - The purchasing power of the people
2. Briefly explain three problems facing railway and pipeline transport in Africa.

Answer

Problems facing railway transport in Africa

- a) **Different railway gauge:** Most countries have different railway gauges depending on the colonisers. This therefore means the trains cannot transport goods and services from one country to another. This leads to transshipment that is very expensive, goods disappear, delay and breakage of goods or destruction of goods.
- b) **Capital:** Construction of railway line is very expensive. The only country that had managed to develop a railway system in Africa is South Africa. This is because it is rich in minerals. Other countries have not developed even an inch of the railway line other than what was constructed by their colonisers.
- c) **People's preference:** Except in South Africa, trains that are used to transport cargo are slow and not accessible. People prefer to transport their goods by lorries and trucks that are faster and flexible though expensive.

Problems of pipeline transport in Africa

- Construction and maintenance of pipeline is high.
- Pipes can only be used to transport one commodity – fluids. This means they can only be constructed in areas that have oil and gas that can meet the cost of the construction.
- The other problem is that pipes are easily damaged by the thieves to steal the products being transported.

Unit 17

TOURISM IN AFRICA

Key Unit Competence

By the end of this unit, the learner should be able to analyse the impact of tourism on sustainable development in Africa.

Prerequisite of this unit

In Senior One, learners acquired information on various economic activities people engage in. Tourism is part of the tertiary activities that generate income not only for the country in form of foreign exchange, but also to individuals who are employed in the sector.

Senior Two work on this topic was a specific study of tourism in Rwanda. Apart from learning the definition of tourism, learners got an opportunity to learn about:

- Tourism sites in Rwanda (both historic and natural sites)
- Factors for tourism development in Rwanda
- Importance of tourism industry to the economy of Rwanda
- Problems affecting tourism and possible solutions in Rwanda
- Relationships between tourism in Rwanda and regional countries.

At this level, learners are required to study more about tourism by studying tourism in Africa, by specifically looking at:

- The major tourist areas in Africa
- Factors favouring the development of tourism in Africa
- Contribution of tourism to the development of Africa
- Problems affecting tourism in Africa and future prospects for sustainable development.

Important to note is that the study of various aspects of tourism from Senior One to this level is based on continuous expansion of knowledge, from the local environment, to a national level and in Africa.

As you teach this unit, ensure that you help learners acquire more information by promoting personal and group work approaches. Encourage them to carry out further studies in an effort to apply the information learnt not only about Rwanda, but Africa and the entire world.

Cross-cutting issues to be addressed

An attractive environment is all that tourists would want to come and see. To have such environments, it requires deliberate efforts towards *conservation*. A beautiful environment is therefore not only good for tourism but also good for health reasons. We therefore have to keep our environment clean to earn these double benefits of staying healthy and attracting tourists.

On the flip side, some activities that result from tourism have negative effects on the

environment. This includes the interference with the wildlife and sometimes pollution. Through the study of this unit, learners will understand and appreciate the measures that should be taken to ensure *conservation of the environment*.

Tourists also buy various items in places they visit (called souvenirs) which earns local craftsmen income. This therefore implies that a careful use of our talents in crafts making may lead to enable us earn a living. It is therefore important that we understand how to use our income wisely because it requires effort to earn. This is a factor of *financial awareness* that learners need to be helped to develop.

Some tourists visit other countries with selfish interest including engaging in irresponsible sexual behaviour, while taking advantage of vulnerable low-income earners that serve them or stay nearby. It is therefore good to advise learners against irresponsible sexual behaviour that may lead to diseases such as HIV and AIDs. Unplanned pregnancies and early families may also result from such actions.

Also important to mention to the learners is the fact that tourism takes place in a *peaceful environment* where tourists feel safe. In addition, let them understand that many other economic activities depend on peace for them to thrive. With such knowledge, ask them to always observe peaceful co-existence because it is one of the many reasons why people earn a living.

While teaching this lesson, ensure that you explore the aforementioned cross-cutting issues, in addition to many others that may be relevant depending on the direction the discussion takes.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>There are many vices that have been brought about by tourists. In their own thinking, ask them to think critically about these problems and suggest possible solutions. This is because tourism remains one of the highest foreign income earners for many African countries.</i>
Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in the classroom to generate new ideas and construct new concepts. <i>To provoke critical thinking in the learners, ask them to mention some of the things they think they can make which they can sell to tourists. Let them also suggest some of the activities they can engage in, which can attract tourists. This may include forming music or cultural bands to perform in tourist hotels or preparing traditional literature to recite to tourists with interpreters..</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>Encourage learners to carry out research on how various countries are benefiting from tourism. Let them suggest ways in which they can help in dealing with vices brought about by tourism. They can carry out a research from the internet to know how other countries have dealt with such issues.</i>

Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>Learners are expected to develop this competence when preparing class presentations. Help them to come up with correct information that they will share in form of essays and class presentation.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>This competence will be developed when to learners work in groups or pairs to accomplish.</i>

Vocabulary/key words/concepts

Ecotourism	Tourism directed toward exotic, often threatened, natural environments, especially to support conservation efforts and observe wildlife.
Wildlife	Wild animals collectively; the native animals (and sometimes plant vegetation) of a region
Terrorism	The unlawful use of violence and intimidation, especially against civilians, in the pursuit of political aims
Habitat	The natural home or environment of an animal or plant
Scenery	The natural features of a landscape considered in terms of their appearance

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the major tourist areas in Africa? (natural environment, national parks, historical sites, socio-cultural activities ...).
- (ii) Which factors favour the development of tourism in Africa?
- (iii) What is the contribution of tourism to the development of Africa?
- (iv) Which problems affect tourism in Africa and future prospects for sustainable development?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for

before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Learners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	The major tourist areas in Africa (natural environment, national parks, historical sites, socio-cultural activities ...)
Lesson 2	Factors favouring the development of tourism in Africa
Lesson 3	Contribution of tourism to the development of Africa
Lesson 4	Problems affecting tourism in Africa and future prospects for sustainable development

LESSONS DEVELOPMENT

LESSON 1: THE MAJOR TOURIST AREAS IN AFRICA (NATURAL ENVIRONMENT, NATIONAL PARKS, HISTORICAL SITES, SOCIO-CULTURAL ACTIVITIES ...)

Learning objective

By the end of this lesson, the learner should be able to locate different tourist attraction areas in Africa.

Introduction

This section requires you to have knowledge of the major tourist areas which include the natural environment, wildlife, historical sites and the cultural activities among other attractions. Use of local examples will enable the learners to grasp concepts faster.

Reference to the map of Africa will enable the learners identify the main tourist areas while

identifying the respective countries. They will need your guidance to identify the countries matching them with the respective tourist attractions.

It is important to ensure learners work on the answers to the activities in the section as this will enable them gather more information of the section expectations. Ensure that as many of them as possible have given their presentations and all class members have participated in the discussions on each presentation.

Identify a suitable map of Africa showing the countries that are leading in tourism and where possible the tourist sites. You also need to use questions to introduce the topic to the class. Prepare a sketch map of Africa showing some of the major tourist regions. You could divide the class into groups and assign each group a tourist region to research on. Identify suitable photographs of different tourist attractions which you are likely to use through the unit.

Acquaint yourself with the activities within this section in the learners' book so that you plan on how much time the learners will take to answer the questions and discuss them in class.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs and the map of Africa showing the major tourist areas

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Ask a volunteer from among the learners to read the introduction in the Learner's Book. Using Activity 17.1 and Activity 17.2 in the Learner's Book, ensure learners revise what they had learned in Senior 2.

Proceed to guide them through the lesson by asking them to study the map of Africa showing tourist attractions in Africa from their Atlases. Let each learner attempt to identify the countries in each tourist regions.

In groups, let them read through the text provided in the Learner's Book then list the main tourist attractions within each of the tourist region. Ask them to draw a map showing these areas.

Throughout the lesson, involve the class in discussions ensuring that all members participate. Ensure you constitute groups made up of learners of different abilities. Ensure that **slow learners** and those with other challenges participate in the discussions and in answering questions. Remember, **cooperation** and **sharing** are values learners will acquire by working in groups.

Synthesis

Using **Activity 17.3** in the Learner's Book, ask learners to carry out a research from different learning materials and the Internet then prepare a slideshow to be presented in class. This activity is important because it will teach learners how to ICT can be useful in studying and understanding our environment.

Assessment

Learners to summarise the information learnt in this lesson by completing the following table:

Major tourist attractions in North Africa	Major tourist attractions in West Africa	Major tourist attractions in Central Africa	Major tourist attractions in Eastern Africa	Major tourist attractions in Southern Africa

You should check learners' work to ensure that they have given correct answers.

LESSON 2: FACTORS FAVOURING THE DEVELOPMENT OF TOURISM IN AFRICA

Learning objective

By the end of this lesson, the learner should be able to explain the factors favouring tourism in Africa.

Introduction

This section requires you to have read widely on factors that influence tourism in most countries in Africa. The factors can be classified into groups including the physical factors such as climate, scenery and wildlife. Human factors refer to what has been done by the stakeholders to promote tourism. For instance, government policy on conservation of wildlife and historical sites, part played by tour operators, local communities and the part played by any other person or groups of people towards tourism. It is important to note that some human factors work against the progress. For instance, insecurity is a negative human factor.

You also need knowledge of the major tourist areas and the major attractions in each area in order to apply the appropriate factors in each region.

It is important to ensure learners work on the answers to the activities in the section as this will enable them gather more information of the section expectations. Ensure as many of them as possible are able to give their presentations and all class members have participated in the discussions on each presentation.

Identify a suitable map of Africa showing the countries that are leading in tourism and where possible the tourist sites. For each region, ensure you analyse the factors that influence tourism. You will note that most of the factors are common to most regions but you must emphasise the unique factors that apply to specific region or country.

Encourage learners to keep making comprehensive notes during discussions in class. Prepare a sketch map of Africa showing some of the major tourist regions while applying the factors for each region. Ensure you work on the answers to the activities within this section in the Learner's Book.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Newspaper articles and cuttings

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning Activities

Introduce the lesson by asking learners to name things, events and places in Rwanda that they think attracts tourist in Rwanda. Let each of them list these factors in their notebooks.

In groups, they should attempt **Activity 17.4** in the Learner's Book. Each group should have a group leader. The leader will be responsible in guiding others on items for discussion. He or she should also ensure that the group has a presenter who will discuss their findings in class afterwards.

The discussion should be guided by the notes given in the Learner's Book between.

In conclusion, each group needs to complete the following table that they will use during their presentation.

Explanation of physical factors influencing tourism	Explanation of human factors influencing tourism
a) Climate	a) Culture
b) Scenery	b) Historical sites
c) Wildlife	c) Political stability
d) Wildebeest migration	d) Hospitality

Synthesis

Activity 17.5 in the Learner's Book should form the basis of individual work that should be presented in summary form.

Assessment

Learners should look for photographs showing the things, places and events in Rwanda and other countries of Africa that are tourist attractions.

LESSON 3: CONTRIBUTION OF TOURISM TO THE DEVELOPMENT OF AFRICA

Learning objective

By the end of this lesson, the learner should be able to evaluate the importance of tourism in Africa.

Introduction

Before this lesson, ask learners to read widely on the significance of tourism in Africa. There are many benefits derived from tourism in different countries. Most of the benefits are uniform in all the countries with only few unique ones in a limited number of countries.

The most reward for tourism is the foreign exchange earnings. The revenue generated through tourism is used to pay for the imports that their respective countries require. The other importance is creation of employment, development of infrastructure, promotion of international relations and cultural exchange. Tourism and its value is one of the many reasons that we conserve wildlife.

It is important to ensure learners work on the answers to the activities in the section as this will enable them gather more information of the section expectations. Ensure as many of them as possible are able to give their presentations and all class members have participated in the discussions on each presentation.

Identify statistical data that will enable the learners to see the significance of tourism. For instance the revenue earned or number of people employed in the sector. Make comprehensive notes and questions to use as you introduce the topic to the class. Prepare to divide the class into groups and assign each group a task to research on. Ensure you work on the answers to the activities within this section in the learners' book.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- The Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning Activities

Start the lesson with **Activity 17.6** in the Learner's Book. This should be done in pairs, which you should participate in their formation.

Allow learners to use the points given in the Learner's Book as a guide in their discussion.

Afterwards, each pair should prepare brief notes which they will share with their colleagues

in class.

The best pair is that of learners who will:

- a) Give examples for each point discussed
- b) Use photographs, newspaper cuttings and other support illustrations to explain their points

Synthesis

Let learners debate the usefulness of tourism to:

- i) An individual
- ii) Tour companies
- iii) Hoteliers
- iv) The Government
- v) The local community

Assessment

Ask learners to study the photographs in the Learner's Book in this unit. From what they can see, let them write an essay of what they think would have happened without tourism.

LESSON 4: PROBLEMS AFFECTING TOURISM IN AFRICA AND FUTURE PROSPECTS FOR SUSTAINABLE DEVELOPMENT

Learning objective

By the end of this lesson, the learner should be able to analyse the problems affecting tourism in Africa and prospects.

Introduction

This section requires you to have read widely on the problems affecting tourism in Africa. One of the major problems affecting tourism is poaching which has caused a reduction in the number of specific types of animals. The other problem is underdeveloped infrastructure needed to enable tourists to access tourist sites. Insecurity is another major problem. Civil strife and terrorism has caused a reduction in the number of foreign tourists in some countries.

It is important to ensure learners work on the answers to the activities in the section as this will enable them gather more information of the section expectations. Ensure as many of them as possible are able to give their presentations and all class members have participated in the discussions on each presentation.

Throughout the lesson, ensure that learners make comprehensive notes as you guide them. Prepare to divide the class into groups and assign each group a country or region to research on.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Newspaper cuttings

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning Activities

Through a question and answer session, let learners discuss the various problems mentioned in the Learner's Book.

Afterwards, ask them to work on question 1 of **Activity 17.7** in the Learner's Book in small groups. Let each group summarise its findings for a short class presentation session.

To help them differentiate between problems facing tourism in Africa and problems associated with tourism, take them through the points mentioned in the Learner's Book as they make notes.

Conclude the lesson with prospects for sustainable development in Africa, by giving them a task to research on how Africa can exploit her tourism potential to the fullest. Let them use the information detailed in the Learner's Book.

Once they are done with this task, they should prepare brief notes to be discussed further during remedial learning.

Synthesis

Working in groups, learners should be tasked to attempt question 2 of **Activity 17.7** in the Learner's Book. Each group should then prepare a class presentation.

In their presentation, ensure that they clearly differentiate between problems affecting tourism and problems associated with tourism.

Assessment

Ecotourism is a recent phenomenon in tourism aimed at conserving the environment in the midst of tourist activities. Ask learners to carry out a research from various geographical sources to find out how the Rwandan government has embraced this phenomenon, and the benefits it has gotten from it.

Allow them to use different forms of explanation, including drawing of illustration, use of photographs, maps and brief explanations. Where newspaper cuttings, excerpts from geographical sources and other sources can be used, be ready to guide them on this appropriately. Important to note is that they can refer to additional notes in the Learner's Book.

END OF UNIT

Summary of the Unit

Tourism is the activity involving a person travelling from home to other places for leisure, education, social activities or business. Most of us engage in tourism without being conscious of it. A person who leaves home and travels to other places for the mentioned purposes is called a tourist. When residents leave their homes and travel to other parts of their own country of residence for similar purposes, they are called **domestic tourists** and the practice is referred to as **domestic tourism**. When people travel from their country of residence to another country, this practice is called **international tourism** and the people are referred to as international tourists. Another concept that has emerged in recent years is **ecotourism**. It is the practice of combining tourism and conservation. Its aim is to care for and preserve nature. It involves using some of the earnings from tourism to conserve the same environment that tourists visit.

Additional information

Africa can be divided into five tourist regions. These are:

- i) Northern Africa
- ii) West Africa
- iii) Central or Middle Africa
- iv) Eastern Africa.
- v) Southern Africa.

Eastern and Southern Africa are world renowned for their abundant wild game. Countries such as Kenya, Tanzania, Uganda, Botswana and South Africa have national parks and game reserves as well as sanctuaries for conservation of wildlife. Kenya boasts of no less than 25 national parks including the marine ones, 19 game reserves and at least 5 game sanctuaries.

There are two broad categories of factors that affect tourism. These can be divided into physical and human factors.

The tourism industry contributes immensely to the economy of each country where it is conducted. Even so, the tourism industry still faces a number of problems on the continent. This notwithstanding, Africa is loved as a tourist destination. For that reason, there is need for governments to plan to develop and expand the industry. For the industry to grow and be sustainable, some measures need to be taken to curb the challenges that drag it behind.

End Unit Assessment

1. (a) Distinguish between domestic and international tourism.
(b) Explain the concept of ecotourism.
2. Explain physical factors and human factors favouring tourism in Africa.
3. Discuss ways in which tourism contributes to the economy of African countries.
4. Explain problems affecting tourism in Africa.
5. Summarise the prospects for sustainable development of tourism in Africa.

Answers to End Unit Assessment

1. (a) Domestic and international tourism
Domestic tourism occurs when residents leave their homes and travel to other parts of their own country of residence for leisure, education, social activities or business. When people travel from their country of residence to another country, this practice is called **international tourism**.
- (b) Concept of ecotourism
Ecotourism is the practice of combining tourism and conservation. Its aim is to care for and preserve nature. It involves using some of the earnings from tourism to conserve the same environment that tourists visit.
2. Ways in which tourism contributes to the economy of African countries
 - (a) **Earns a country foreign exchange:** Tourists pay for most of the services offered in foreign currency. The foreign currency is used to pay for imports and services offered abroad. That is why tourism is referred to as an *invisible export*.
 - (b) **Employment.** The tourism industry provides employment to a large number of people in the various sectors associated with tourism. This would be in sectors such as drivers, tourist guides, tour operators, game rangers, park attendants and hotel workers. Some are self-employed for example those who make handicrafts.
 - (c) **Improvement of infrastructure:** Many roads leading to tourist sites are built or improved on. Airports are expanded while airstrips are established within the neighbourhood of tourist destination.
 - (d) **Conservation of wildlife:** In the process of promoting tourism, a country's wildlife, which is also a natural heritage is conserved for posterity as well as it being part of the environment and our natural heritage.
 - (e) **Preservation of artefacts:** Important artefacts as well as ancient artworks and architecture are preserved in museums across the countries. Historical sites are also preserved and protected for the tourists to visit. These are learning for the current and future generations as well as for researchers.
 - (f) **Source of local revenue:** Internally, a country collects revenue through taxation of various items that tourists buy and services offered them. Visitors are charged entry fees to various tourist sites.
 - (g) **Promotion of agriculture:** Food, vegetables and fruits are on high demand in tourist hotels, lodges and resorts. These establishments rely on farmers for the supply of these commodities. This promotes agriculture.
 - (h) **Growth of training institutions:** The tourism industry constantly needs skilled manpower in the various sectors of the industry. This has led to many countries setting up or expanding colleges specialising in these services. Even universities have introduced degree courses in hospitality and wildlife and range management.
 - (i) **Promotion of international relations:** When tourists visit a country, they indirectly establish friendly relations between their countries and those they visit. This leads to interaction in activities such as sports, trade and cultural exchanges.

3. *Problems affecting tourism in Africa*

- (a) **Shortage of capital:** Some countries experience a shortage of capital to invest in improvement and expansion of the infrastructure in tourist areas.
- (b) **Poaching of wild game:** Animals such as the elephant, rhino and leopard are in danger of extinction because of poachers.
- (c) **Political conflicts and civil wars:** Many African countries have experienced political instability meaning that they lack peace. This discourages tourism.
- (d) **Terrorism:** Many African countries lack capacity to counter terrorism. African countries are more vulnerable also because of complacency among the citizenry as well as government departments.
- (e) **Environment destruction:** Human activities are causing conflict between the people and wildlife. Agricultural activities, mining and road construction all lead to destruction of the habitat for animals as well as corridors for animal migration. Indiscriminate felling of trees destroys some rare indigenous plants.

4. Prospects for sustainable development of tourism in Africa

- (a) Governments need to budget for and allocate funds for the purpose of growing and expanding the tourist sites.
- (b) Foreign companies need to be encouraged to invest in the countries by building hotels and other tourist resorts.
- (c) Security has to be given priority through co-operation with neighbouring countries to combat terrorism. Locally governments will need to train personnel on ways of detecting and countering terrorism.
- (d) Training and equipping game rangers with modern equipment including weaponry would be a measure to curb poaching.
- (e) Efforts have to be made and funds allocated for improvement and establishment infrastructure in areas that have tourism potential.
- (f) Land that is reserved for wildlife has to be protected against encroachment and the offenders need to be prosecuted.
- (g) Establishment of environmental bodies that would be in charge of supervising the state of the environment and advise on measures of controlling pollution would be vital in maintaining a healthy environment.

Remedial activities for slow learners

Learners to summarise the major tourist attractions in Africa by filling in the table as follows:

Region	Countries	Major tourist attractions
<i>Northern Africa</i>	Libya, Tunisia, Algeria, Morocco, Sudan Egypt and Western Sahara	Egypt is famous for its pyramids and the Sphinx. Libya, Tunisia and Algeria have historical sites while Morocco has ancient sites as well as famous waterfalls. Marrakech, Morocco's second largest city has a rich history and ranks in position six.

<i>West Africa</i>	Mali, Mauritania, Ivory Coast, Guinea, Nigeria, Burkina Faso, Senegal, Sierra Leone, Liberia	The Grande Mosque is made of mud that is now painted in Djenne, Mali. The city of Timbuktu, famous for its ancient African architecture
<i>Central or Middle Africa</i>	DRC, Chad, Gabon, Congo, Central African Republic	This region is famous for its historical sites, landforms, forests, Rivers and associated features. The Virunga mountains in DRC are famous for tracking the mountain gorillas.
<i>Eastern Africa</i>	Rwanda, Burundi, Uganda, Ethiopia, Kenya, Tanzania, Mozambique, Zambia	Mt Karisimbi in Rwanda, Mount Kilimanjaro in Tanzania, The Maasai Mara National Reserve in Kenya, Zanzibar has fascinating history, Omo River region
<i>Southern Africa</i>	Namibia, Botswana, Swaziland, Lesotho and South Africa	South Africa, Namibia and Botswana have national parks with a wide variety of wildlife. Cape town is a tourist destination because of the scenic beauty, beaches and sea creatures such as dolphins and seals.

Extended activities for gifted and talented learners

Discuss in detail how physical factors and human factors favour tourism in Africa.

Answers to Extended activities

How physical factors and human factors favouring tourism in Africa:

a) Physical factors

- i) *Climate*: Most of Africa is within the tropics and the rest within the warm temperate zone. Africa is therefore endowed with warm to hot as well as sunny climate throughout the year. This is an attraction especially during winter for people living in Europe and North America.
- ii) *Scenery*: These include snow-covered mountains such as Mt. Kenya that is located along the equator, and Kilimanjaro and Ruwenzori in the neighbourhood. Other sceneries include the Rift Valley, waterfalls, lakes, volcanoes and associated volcanic features, the beautiful sandy beaches and warm ocean.
- iii) *Wildlife*: Africa is endowed with a large variety of wildlife because of the tropical climate. Animals such the elephant, buffalo, giraffes, leopards, lions, rhinos, hippos, gorillas, impala, gazelles and crocodiles among others are a beauty to marvel. There is also a large variety of plant species and marine life especially along the East African coast that tourists view.
- iv) *Gorilla naming and wildebeest migration*: The annual gorilla naming ceremony in Rwanda and the wildebeest migration from Masaai Mara in Kenya to Serengeti in Tanzania are major events that attract tourists.

b) Human factors

- i) *Traditional culture*: Africa has thousands of ethnic groups each with its unique culture and traditions. Tourists are keen on seeing the people in their traditional lifestyles such as dances, games, cultural festivals and dressing styles.
- ii) *Hospitality*: Many indigenous people in Africa are very friendly and welcoming to visitors. This encourages tourist to come and sample this hospitality and feel

the friendliness of the people. This is one of the reasons that attract foreigners to come back to those countries and even try to permanently settle there.

- iii) *Preserved attractions:* There are many monuments and historical sites in almost every country in Africa which visitors wish to see. The pyramids and sphinx of Egypt, the architectural structures and the city of Timbuktu in Mali, the numerous forts such as Fort Jesus and the Gedi ruins along the coast of Kenya as well as the numerous museums in many countries are attract tourists.
- iv) *Political stability:* The peace and political stability prevailing in many countries have created a conducive atmosphere to promote tourism. Tourists prefer visiting countries where they feel secure and many governments in Africa recognise that and strive to work towards that goal.
- v) *Infrastructure:* In developing infrastructure of a country, many governments have tourism in mind as an industry that contributes immensely towards national development. Many roads to tourist sites are improved on continuously to make the sites accessible. Some areas are reachable by air or water. Wireless communication such as the Internet is available in many areas as well.
- vi) *Accommodation:* High-class international hotels are to be found in many countries that promote tourism. In addition, lodges, cottages are constructed in major towns that tourists visit as well as in national parks and game reserves. Tented camps are also available for enjoyment by the visitors.

Unit 18

DEVELOPMENT CASE STUDIES

18.1. AGRICULTURE

18.1.1. AGRICULTURE ON POLDER-LANDS IN NETHERLANDS

Key Unit Competence

By the end of this unit, the learner should be able to compare the agricultural development levels on Polder-Lands in Netherlands in relation to Rwanda.

Prerequisite of this unit

Agriculture on the polder lands in the Netherlands is a case study meant to help learners appreciate the various agricultural practices across the world. In comparison to Rwanda, learners are expected to understand the best farming methods and new developments in the various methods of farming employed in developed countries.

Despite their massive development and giant economies, agriculturally stable countries like the Netherlands also experience problems in farming. Just like there are problems experienced in farming in Rwanda, the Netherlands also has its unique problems that have to be dealt with from time to time to ensure sustainability in agricultural productivity.

Cross-cutting issues

This unit will help learners relate agriculture *financial education* especially looking at the value of the sector to the economy of USA and also for Rwanda.

Learners will also appreciate the importance of *environmental conservation* because for sustainable farming activities, there has to be proper land use to ensure land remains productive over the years.

The unit also touches on *inclusive education* as both men and women can engage in agriculture.

Generic competences

Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>They are therefore expected to carry out a research on issues such as factors favouring farming on the polder lands and the general importance of agriculture in the Netherlands.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. <i>Help learners to master the language by guiding them on how to write or compile their findings and how to present them in their groups or to the class.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>It is expected that learners will develop this competence while working in groups to accomplish given tasks or activities.</i>
Lifelong learning	The acquisition of such skills will help learners to update knowledge and skills with minimum external support. <i>This unit aims at exposing learners in modern and advanced family methods which they can adopt in future for sustainable farming.</i>

Vocabulary/key words/concepts

Polder lands	This is a low-lying tract of land enclosed by dykes that forms an artificial hydrological entity, meaning it has no connection with outside water other than through manually operated devices.
Dykes	These are artificial barriers that provide defence against storm surges from the sea in The Netherlands, as about two thirds of its area is vulnerable to flooding.
Greenhouse	This is a structure with walls and roof made chiefly of transparent material, such as glass, in which plants requiring regulated climatic conditions are grown.
Land reclamation	Land reclamation, or simply reclamation, is the process of creating new land from ocean, riverbeds, swamps or lakebeds. The land reclaimed is known as reclamation ground or landfill.
Horticulture	It is the branch of agriculture that deals with the art, science, technology and business of growing plants. It includes the cultivation of medicinal plants, fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

Netherlands

Agriculture on polder lands

- (i) Describe the location, size and population of Netherlands.
- (ii) Agriculture on the Polder Lands in Holland: (Dairy farming and Horticulture in Netherlands).
- (iii) What are the factors influencing agriculture on the polders in Holland?
- (iv) What is the importance of agriculture in Holland?
- (v) Which unique problems hinder agricultural expansion on the Polders and their possible solutions?
- (vi) Describe livestock farming in Netherland.

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Learners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Introduction to Netherlands; Agriculture on the Polder Lands in Holland (Dairy farming and Horticulture in Netherlands) and factors influencing agriculture on the polders in Holland
Lesson 2	Importance of agriculture in Holland and unique problems hindering agricultural expansion on the Polders and possible solutions
Lesson 3	Livestock farming in Netherland

LESSON DEVELOPMENT

LESSON 1: INTRODUCTION TO NETHERLANDS, AGRICULTURE ON THE POLDER LANDS IN HOLLAND (DAIRY FARMING AND HORTICULTURE IN NETHERLANDS) AND FACTORS INFLUENCING AGRICULTURE ON THE POLDERS IN THE NETHERLANDS

PART I: INTRODUCTION TO NETHERLANDS

Learning objective

By the end of this lesson, the learner should be able to describe the location, size and population of Netherlands.

Introduction

Netherlands is one of the Western European countries. It borders Germany to the east and north, Belgium to the west and the North Sea along its western coast. The country is located at the crossroads of three of Europe's major rivers, the Rhine, the Meuse and the Schelde. The country has a total area of 41,526 square kilometres. Out of the total areas, dry land constitutes 33,889 km² while about 7,643 km² is water bodies. The country borders the North Sea with a coastline that is 451 kilometres long. It has a long border with Germany amounting to roughly 577 kilometres.

The Netherlands is the 64th most populated country in the world. The country had a population estimated at 17 million in 2016. As you go over this section, ensure you make comparisons with Rwanda in terms of area and population.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the location of Netherlands

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

With the help of a suitable map of Western Europe, ask learners to describe the position of Netherlands. This can be supported by the map presented in **Activity 18.1.1** on **page 338** of the Learner's Book.

One of the learners should then take the class through the **introduction section** in the Learner's Book in the Learner's Book.

In this introduction, ensure that learners correctly define the terms **dykes, polders** and **land reclamation**.

Using the Information on introduction to the Netherlands in the Learner's Book, ask learners to identify the major rivers in the Netherlands.

Other important statistics to mention about Netherlands will be its area, estimated population and major forms of agriculture carried out in the country.

At this point, group learners for them to work on **Activity 18.1.1** in the Learner's Book.

After the discussions, every group should present its findings to the class for further discussion.

Synthesis

Let learners compare the Netherlands to Rwanda as follows:

- | | |
|-----------------------------|------------------------------------|
| a) Population size | b) Size of the country |
| c) Main economic activities | d) Location in relation to the sea |

They should then present their findings in class.

Assessment

Carry out a research to find out the areas that were reclaimed. Explain how the reclamation was achieved, with a special mention to **dykes/polders**. Prepare brief notes to be shared during class discussions.

PART II: AGRICULTURE ON THE POLDER LANDS IN HOLLAND (DAIRY FARMING AND HORTICULTURE IN NETHERLANDS)

Learning objective

By the end of this lesson, the learner should be able to describe agricultural practices on the Polder Lands in Netherlands.

Introduction

Since the 1940s, Dutch agriculture has become highly technologically sophisticated and mechanised. Farmers use the latest farming technologies which enable them to maximise

crop yields. Most farms are managed and worked on intensively with machines. There are many cooperatives which have added to the efficiency of production and distribution of farm produce.

Farmers apply techniques such as analysing soils scientifically, increased use of fertilisers and use of green houses. More than 27% of the total land area of the Netherlands is under combined seasonal and permanent crop production while grasslands account for about 54% of all agricultural lands.

Other than horticultural crops, the principal crops include sugar beets, potatoes, wheat, barley and rye. The best farming land is found in reclaimed polders where scientific methods of farming is widely applied. The government encourages scientific research, consolidation of small landholdings into larger, more efficient units and specific education related to agriculture. These are some of the factors contributing to high productivity.

Like in the previous section, whatever you teach in this section you should draw comparisons with Rwanda for the learners to compare the agricultural development levels on Polder-Lands in Netherlands with that of their own country.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- the Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

While working in groups and provided with the maps of Rwanda showing agricultural activities, ask learners to work on **Activity 18.1.2** in the Learner's Book.

After group work, ask the learners to explain why land reclamation is an important phenomenon worldwide.

Divide the class into two groups, A and B. **Group A** should discuss **Dairy Farming** while Group B should discuss **Horticulture Farming in the Netherlands**.

Group A should be guided by **Activity 18.1.3** while Group B should use **Activity 18.1.4** in the Learner's Book.

Each group should prepare comprehensive notes to be presented in class.

Synthesis

Ask learners to discuss reasons why farming on the polder lands has been beneficial to the people of the Netherlands.

Assessment

In pairs, let learners summarise the conditions that favour dairy farming and horticultural farming in the Netherlands.

PART III: FACTORS INFLUENCING AGRICULTURE ON THE POLDERS IN THE NETHERLANDS

Learning objectives

By the end of this lesson, the learner should be able to discuss the factors favouring development of agriculture on polder lands.

Introduction

Netherlands has many favourable factors that influence agriculture. Among them is the *mild climate* due to the influence of the sea. Winters are mild while summers are sunny allowing ripening of crops and blossoming of flowers. The country has *ready market* as most of the people in the region have a high purchasing power. At the same time, there are large cities that create *high demand for farm products*. The scientific way of doing things, including analysing soils scientifically, ensures efficiency in the agricultural sectors as it promotes the growing of specific crops. The government encourages scientific research, consolidation of small landholdings into larger, more efficient units and also encourages specific education related to agriculture. In addition, farmers are highly innovative and are members of cooperatives that enables them to prosper in farming. Other factors are availability of skilled labour, efficient transport and availability of capital to invest.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs of dykes, greenhouses and horticultural crops grown in Netherlands

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with a discussion on the factors influencing agriculture in Rwanda. Learners should classify these factors as either physical factors or human factors. After discussions, they should present their findings in class.

In pairs, allow learners some time to work on **Activity 18.1.5** in the Learner's Book. Each of the factors listed in the activity should be explained in detail, for example, using photographs obtained from various sources of information. For rainfall distribution, they should draw graphs showing its distribution while for financial ability of the farmers, they should explain the role of cooperatives in supporting the farming process.

One of the learners should be tasked to read aloud the text in the Learner's Book as others take notes.

Synthesis

In groups, ask learners to attempt **Activity 18.1.6** on additional factors influencing agriculture in the Netherlands. They should then present their findings in class for further discussion.

Assessment

With reasons, learners should compare the factors affecting agriculture in Netherlands to those affecting agriculture in Rwanda. They should then write comprehensive notes from their findings for sharing with their classmates.

LESSON 2: IMPORTANCE OF AGRICULTURE IN THE NETHERLANDS AND UNIQUE PROBLEMS HINDERING AGRICULTURAL EXPANSION ON THE POLDERS AND POSSIBLE SOLUTIONS

PART I: IMPORTANCE OF AGRICULTURE IN THE NETHERLANDS

Learning objective

By the end of this lesson, the learner should be able to analyse the importance of agriculture in the Netherlands.

Introduction

Agriculture in the Netherlands is a major source of employment both directly and indirectly. The country is a major exporter of a wide variety of farm produce. It is the leading exporter of fresh vegetables, thus generating foreign exchange for the country. Farms supply all the food requirements within and outside the country. Products such as dairy products, potatoes, wheat and oats are largely grown.

Agriculture is very significant because it leads to development of agribusiness related industries that is the leading form of industry in the country. Just like in the last sections, you must compare the significance of agriculture in the Netherlands with that of Rwanda to enable learners appreciate the value of the sector in their own country.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Relevant articles and supporting information obtained from the Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

On their own, learners should give points in their notebooks outlining the importance of agriculture to the following:

- a) The government b) Farmers c) Citizens of a country

At random, chose some of them to read out aloud their points, as others compare theirs with what is being read.

In groups, ask earners to relate the points generated to those explaining the importance of agriculture in the Netherlands. Some of these points have been outlined of the Learner's Book.

Conclude the lesson with **Activity 18.1.7** of the Learner's Book. Working in four groups, learners should share the questions outlined in this activity, then hold a joint session under your supervision to summarise their findings.

Synthesis

Organise for an interview session to be carried out among the learners. Let them divide themselves into various smaller groups, each group to pretend to represent a section of the population. One group can be traders, another to be transporters, others to be professionals such as teachers, doctors and engineers while others can be school children.

Let some of the learners interview all these groups on how agriculture has impacted on their lives. Other learners can be taking notes from the interviews being conducted. Before this session, prepare some of the questions that learners will use to each group.

Assessment

With reasons, learners to propose some of the lessons Rwanda can learn from various forms of agriculture in the Netherlands.

PART II: UNIQUE PROBLEMS HINDERING AGRICULTURAL EXPANSION ON THE POLDERS AND POSSIBLE SOLUTIONS

Learning objective

By the end of this lesson, the learner should be able to assess the problems or challenges faced by the agricultural practices on the polder lands and suggest possible solutions.

Introduction

Agriculture in Netherlands is not without concerns that have to be addressed to avoid negative effects on agriculture.

High levels of farm inputs such as mineral based fertilisers, pesticides and manures have negative environmental effects that has brought about restrictions aimed at promoting environmental friendly agricultural production. For instance, excess use of pigs and poultry manures causes high levels of ammonia, nitrogen and phosphorous in the soil which threatens the quality of soil and water.

Shortage of locally available labour especially during harvesting seasons has been a concern but migrants from the new EU member states have bridged the gap.

Agriculture consumes about 80% of the total energy consumption in Netherlands.

The country experiences increase seepage of salty seawater into the soil raising soil salinity and lowering land productivity. Some areas experience excessive water logging which is a hindrance to agricultural expansion. During the dry periods, there is scarcity of fresh water in the Polders that affects productivity. Netherlands spends large amounts of money to continue controlling the sea from flooding the land.

There are other challenges that farmers in Netherlands have to cope with to sustain production. As you teach this section, you will need to compare with the problems that are experienced in Rwanda.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Supporting information obtained from the Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

In a brainstorming session, learners should briefly explain some of the problems they think Rwanda experiences in her various agricultural undertakings. Use this opportunity to compare these problems to those experienced in the Netherlands.

With the help of **Activity 18.1.8** in the Learner's Book, guide learners in their discussion of the unique problems that hinder agricultural expansion on the Polder Lands.

For each of the problem mentioned, learners should carry out a research to find out their possible solutions. They should then complete the table given in this activity then present their findings in class for further discussion.

Synthesis

This section is meant to help learners to understand that there is no country around the world that doesn't experience problems in their various economic activities. With such knowledge, they should always strive to seek for solutions that looking for simpler ways out, because some of these problems are common all world round.

Assessment

Learners already mentioned some of the problems affecting agriculture in Rwanda. In pairs, let them compare them to those affecting agriculture in the Netherlands. Out of the points raised, they should identify, with reasons, those that are unique to the Netherlands.

LESSON 3: LIVESTOCK FARMING IN NETHERLANDS

Learning objective

By the end of this lesson, the learner should be able to describe livestock farming in the Netherlands.

Introduction

Dutch agriculture is divided into three categories, namely crop production, dairy and livestock production and horticulture. Livestock production is dominated by dairy farming. The dominant dairy cattle breeds of cattle reared include Guernsey, Jersey, Friesian and Ayrshire.

Netherlands is one of the leading producers and exporter of dairy products. The soils in the eastern and southeaster parts of the country are poor and can only support grass. These areas have highly developed dairy farming.

Livestock farming provide both exports and products which contribute a great deal to the country's domestic food-processing industries. Despite the small size of the country, the Netherlands is the world's third-largest exporter of dairy products.

Some farmers keep pigs, others beef cattle while Poultry farming is widespread in the polders.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs types of livestock reared in the Netherlands

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with a discussion on the various types of agriculture carried out in the Netherlands.

For each of the types, designate a group of learners to carry out a research on it, while giving reasons why that type of agriculture thrives in the Netherlands.

In a common discussion session, let learners focus on Livestock Farming. Through a research, they should find out specific conditions that favour this type of farming.

Summarise the lesson with question 5 of the End Unit Assessment Exercise in the Learner's Book, which should be done in pairs, with responses to be shared amongst them. It is however important that you moderate the discussion to ensure that they only make notes using correct points.

Synthesis

Ask learners to describe some of the livestock kept in the Netherlands on commercial basis.

Assessment

For each of the type of livestock kept, learners should find out the benefits farmers get from it.

END OF UNIT

Summary of the Unit

Netherlands literally means *lower countries*, influenced by its low land and flat geography, with only about 50% of its land exceeding one metre above sea level. Most of the areas below sea level are artificial. Since the late 16th century, large areas (polders) have been reclaimed from the sea and lakes, amounting to nearly 17% of the country's current land mass. With a population density of between 412 and 507 people per km² (January 2017) if water is excluded – the Netherlands is classified as a very densely populated country.

The Dutch agricultural sector produces mostly cereals (wheat in particular), feed crops (such as fodder maize) and potatoes. The horticultural sector focuses on vegetables and flower bulbs. Dutch greenhouses produce mostly vegetables and flowers like sweet peppers and roses.

After the United States, the Netherlands is the biggest exporter of agricultural produce in the world. Accounting for 10% of the Dutch economy and employment, the agricultural and horticultural sectors play a crucial role.

The government works with entrepreneurs towards a more sustainable agriculture and horticulture. Government subsidies and knowledge help to stimulate *multifunctional agriculture*, a term used for farms that combine agriculture with providing care (so-called care farms) or nature management (by leaving fields to lie fallow for meadow birds to breed, for instance).

Organic farms in agriculture and horticulture care for the environment. They do not use chemical pesticides for instance. To make organic farms more competitive with regular agriculture, the government signed covenants with supermarkets, the Dutch Confederation of Agriculture and Horticulture and other parties for the joint promotion of organic products and a wider selection in the shops. These efforts should lead to a 10% increase in the sale of organic products.

The government stimulates the development of new, sustainable technology through *the greenhouse as a source of energy* programme. The programme is collaboration between the government and the Horticulture Product Board and the Dutch Confederation of Agriculture and Horticulture.

Farmers and growers use plant protection products, or pesticides, to protect their crops against weeds, diseases and pests. Their use can be harmful, if, for instance, they leak into food or ground water. The government supports safe and sustainable crop protection.

Before farmers or growers use crop protection products, they must try alternative measures such as growing particular types of crop, or non-chemical crop protection. Plant protection agents must be used only if these fail. Their use requires proof of competence.

End Unit Assessment

1. Explain why the polders are ideal for agriculture in the Netherlands.
2. Explain the mechanism of protecting polders from flooding by sea water.
3. Explain why farmers in the Netherlands prefer keeping the Friesian breed of dairy cattle.
4. Describe the advantages of growing horticultural crops in green houses.

Answers to End Unit Assessment

1. Why farming is done on polders in the Netherlands

Over the years, the engineers in the Netherlands have developed techniques to drain wetlands and make them usable for agriculture and other development. This is illustrated by the English saying: “God created the world but the Dutch created Holland”. The Dutch have a long history of reclamation of marshes and fenland, resulting in some 3,000 *polders* nationwide.

The need to use polders was necessitated by an increasing population within a limited area. Food security and need for employment has always been a driving force to maintain this type of maintaining farmlands.

Another reason was flooding disasters, especially in areas near the sea. Barriers, also called dykes, are used to maintain the integrity of the water defences around polders, maintain the waterways inside a polder, and control the various water levels inside and outside the polder.

The level of technology in the Netherlands is another enabling factor for polder farming. This, when combined with availability of capital for investment, makes farming on such areas possible.

2. Mechanism of protecting polders from flooding by sea water

A **polder** is a low-lying tract of land enclosed by dykes that forms an artificial water system entity, meaning it has no connection with outside water other than through manually operated devices. There are three types of polder:

- Land reclaimed from body of water, such as a lake or the sea bed
- Flood plains, separated from the sea or river by a dyke
- Marshes separated from the surrounding water by a dike and subsequently drained.

The ground level in drained marshes subsides over time. All polders will eventually be below the surrounding water level some or all of the time. Water enters the low-lying polder through infiltration and water pressure of ground water, or rainfall, or transport of water by rivers and canals. This usually means that the polder has an excess of water, which is pumped out or drained by opening sluices at low tide. Care must be taken not to set the internal water level too low. Polder land made up of peat (former marshland) will sink in relation to its previous level, because of peat decomposing when exposed to oxygen from the air.

3. Why farmers in the Netherlands prefer keeping the Friesian breed of dairy cattle

As the Friesian is mainly a dairy breed, surplus male animals are highly regarded, as they are producers of high quality lean meat, whether crossed with a beef breed or not. Beef cross heifers are also the most sought. Other advantages are:

- The Friesian is a breed with outstanding examples of the breed with an average of 12 to 15 lactations.
- They calve more frequently and often in their lifetime
- They need less replacements
- They provide valuable male calves
- They have lower cell counts
- They have higher fat and protein per cent
- They are also known for their versatility, quality milk, high lifetime yields and high quality lean meat

4. Advantages of growing horticultural crops in green houses

- *Security*

For individuals who enjoy home grown fruits and vegetables, a greenhouse provides an efficient way to grow crops in relative safety from the outside world.

- *Controlled elements for optimum production*

Greenhouses are typically equipped with glass or clear plastic walls, which allow them to conserve heat while still allowing light to filter through. This creates an ideal environment for growing numerous varieties of plants.

- *Longer Growing Season*

Plants grown within a greenhouse aren't subject to the same degree of temperature

variation as plants grown in an outdoor garden. The new microclimate the greenhouse creates allows gardeners to extend the growing season of plants that would not thrive in the colder or warmer climate outside of the greenhouse.

- *Plant Isolation*

Many varieties of plants are prone to damage from insects. A greenhouse keeps plants in isolation, locked safely away from the outside world where insects, rodents and other animals could damage crops. A greenhouse in complete isolation that is tightly sealed with properly controlled air flow can provide protection not only from insects and rodents but from diseases as well.

- *Protection From the Elements*

Plants grown in a greenhouse, however, are protected from unfavourable weather conditions such as storms and high winds. In addition, greenhouse plants aren't at the mercy of soil erosion due to torrential rain or flash floods. This gives gardeners the comfort of knowing that they don't have to race home from work to cover their gardens or simply hope that their plants survive during periods of inclement weather.

- *Control overproduction*

Those without the benefit of a garden must purchase their produce at the grocery store or a local farmer's market. Commercial farms often use pesticides and other toxic chemicals to improve the growing conditions of their crops and increase production. Individuals who opt to use a greenhouse to grow their own produce have complete control over the growing environment, and, therefore, they can grow fresh, delicious produce without worrying about pesticide residue that could potentially harm them or their families.

- *Season extension*

This is just one of the advantages gained from greenhouse growing. Protected crops are less apt to be damaged by wind, rain and hail so the percentage of marketable products is higher. Yield is often higher as well, if you can provide optimum growing conditions for each crop. Greenhouses protect crops from many diseases, particularly those that are soil borne and splash onto plants in the rain. Greenhouse crops may be protected from common field pests.

Remedial activities for slow learners

Learners to summarise the factors influencing agriculture on the Polder lands in the Netherlands by filling in the table as follows:

Factor	How it influences agriculture in the Polder Lands
Climate	Netherlands experiences temperate climate with mild winters, cool summers, and well distributed rainfall. This has made it possible for different agricultural activities to be carried out.
Efficient transport system	The highly developed transport system enables farm produce to reach the market while still fresh.

Government policy	The government facilitates development of agriculture by encouraging farmers to form cooperatives which assists them especially in marketing their produce.
Advanced technology	Farmers in the Netherlands apply highly advanced technology in agriculture. For instance they use computerised controls in green houses where they control the moisture and temperature to what is ideal for the crops. Thus the crops are not affected by variation in climate whether winter or summer.
Market	The Large population within Netherlands and in the rest of Western Europe provide ready market for farm produce.

Extended activities for gifted and talented learners

Ask learners to explain the main challenges facing the agricultural sector in the Netherlands.

a) Animal welfare

Animal welfare, especially in the intensive livestock production sector, where animals often have restricted space only to live-in and roam around. Also, many live-animals (pigs, piglets, calves) are being transported over long distances within Europe.

b) Animal diseases

Given the intensifying international contacts and high animal densities, the Netherlands' livestock sector is under increasing risk of outbreaks of contagious diseases including Foot and Mouth Disease, Swine Fever and Avian Influenza. Such outbreaks have enormous consequences for individual farmers and their animals, as well as for the sector as a whole, including cross-border impacts.

c) Food safety

Netherlands' authorities are well-aware of the health risks of specific ingredients, dioxins or antibiotics for instance, in food for humans. Such risks are large, and difficult to manage, in particular given the complexity of the current food production-chains as they encompass a continuum from farm inputs, farm production, (value-adding) processing, trade and transport and retail trade through to consumption.

d) Landscape and biodiversity

The numerical and acreage growth of intensive agricultural production systems affects the quality of landscapes in the Netherlands which become less varied- as well as the diversity of floral and faunal habitats in rural areas. Also, there is growing public demand for recreational space.

e) Labour

The Netherlands' agricultural sector horticulture in particular- is facing difficulties with respect to availability of labour, especially during harvesting periods. Labour shortages draw

many workers -mainly from new EU member states like Poland to the Netherlands. The conditions of their work and accommodation are subject of discussion.

f) Energy

Greenhouse cultivation in the Netherlands -in total some 5,000 holdings of about 2 hectares each- accounts for more than 80 % of the total energy consumption by the agricultural sector. Based on new physiological insights in conjunction with state-of-the art technology, transitions are now being made from energy-consuming to energy-producing systems.

g) Organic farming

Consumers in the Netherlands as elsewhere- increasingly demand food products from organic origin, both for reasons of health as for reasons of environmental concern and animal welfare. Rather than supporting the sector by subsidies, the Netherlands' government policy on organic agriculture focuses on market development, knowledge generation and multiple-stakeholder approaches.

Other challenges are:

1. Super specialisation and productivity focus
2. Decreasing soil fertility
3. Dependence on inputs (fertiliser, carbon energy) and subsidies
4. Environmental problems
5. Regulation requires administrative burden and major investments
6. Need to reduce antibiotic use

The above challenges result in:

1. Low income due to very low profit rate per kilo of milk produced
2. Future income prospects are difficult due to abolishing milkquotum system in 2015
3. Social problems – farmers going out of business (85% has stopped between 1960-2007)
4. Young people moving out of farming, lack of 'replacement'
5. Criticism of general public, especially on animal wellbeing and climate change

18.1. AGRICULTURE

18.1.2. PLANTATION AGRICULTURE IN BRAZIL

Key Unit Competence

By the end of this unit, the learner should be able to be able to analyse the plantation agriculture development in Brazil.

Prerequisite of this unit

The location of Brazil and its landscape presents it with unique characteristics, most of which promote farming in plantations.

In comparison to Rwanda, Brazil is expansive, with a low population density and relatively flat land that supports mechanisation.

Despite these advantages, just like Rwanda, it experiences some problems that limit its optimum productivity. It is against this background that learners are expected to understand that even in the midst of advantages that other factors can provide, there will always be challenges to overcome. However, it is important to learn the best farming practices this case study will provide, and it is expected that they will capitalise on the knowledge to better productivity in their homeland – directly or indirectly.

Cross-cutting issues

This unit will help learners relate agriculture financial education especially looking at the value of the sector to the economy of USA and also for Rwanda.

Learners will also appreciate the importance of environmental conservation because for sustainable farming activities, there has to be proper land use to ensure land remains productive over the years.

The unit also touches on Inclusive education as both man and women can engage in agriculture.

Generic competences

Critical and problem solving skills

The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. They will also be able to cope with the evolution of knowledge and technology advances for personal fulfilment. *Considering the size of Rwanda and Brazil, learners should be helped discover that these two countries vary greatly in size. However, there are crops grown in Brazil and Rwanda which learners should compare with a view of coming up with ways of maximising returns from cultivating them. As much as the size of Rwanda is not a problem, it will be interesting to find out how learners come up with ways of benefiting maximally from the same crop grown in much larger plantations in Brazil.*

Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>To be able to compare agricultural practices in Brazil and Rwanda, they need to engage in research activities, for example, to find out how common the problems facing agriculture in Brazil compare with those experienced in Rwanda. They should also seek to find out how each problem has been dealt with.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>This will be achieved when learners are guided on how to come up with presentation groups for class presentation.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. <i>This competence will be developed when learners work in pairs or groups to accomplish different tasks assigned to them.</i>

Vocabulary/key words/concepts

Fazenda	This is a plantation found throughout Brazil . During the colonial period (16 th – 18 th centuries) they were concentrated primarily in the north eastern region, where sugar was produced, expanding during the 19 th century in the south eastern region to coffee production.
Plantation	A <i>plantation</i> is a large-scale farm that specialises in cash crops. The crops grown include cotton, coffee, tea, cocoa, sugar cane, sisal, oil seeds, oil palms, rubber trees, and fruits.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

Plantation

Agriculture in Brazil

- (i) Describe the location, size and population of Brazil.
- (ii) What are the characteristics of plantation agriculture zones in Brazil and types of crops grown? (coffee, tea, sugar cane,...)
- (iii) Which factors favour plantation agriculture in Brazil?
- (iv) What is the importance of plantation agriculture in Brazil?
- (v) What are the problems and solutions associated with plantation agriculture?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lessons commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Learners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Plantation agriculture zones in Brazil: characteristics and types of crops grown (coffee, tea, sugarcane...)
Lesson 2	Factors favouring plantation agriculture in Brazil
Lesson 3	Importance of plantation agriculture in Brazil.
Lesson 4	Problems and solutions associated with plantation Agriculture

LESSON DEVELOPMENT

LESSON 1: INTRODUCTION TO BRAZIL, PLANTATION AGRICULTURE ZONES IN BRAZIL, CHARACTERISTICS AND TYPES OF CROPS GROWN

Learning objective

By the end of this lesson, the learner should be able to:

- a) Describe the location, size and population of Brazil.
- b) Describe the agricultural plantation zones in Brazil and major crops grown.

Introduction

Brazil is officially known as Federative Republic of Brazil. Apart from Chile and Ecuador, it borders all other South American countries (French Guiana, Suriname, Guyana, Colombia, Venezuela, Peru, Bolivia, Paraguay, Argentina and Uruguay) on mainland. It also extends to the Atlantic Ocean to the east. Most of the country is drained by the Amazon River and its tributaries.

Brazil is the largest country in South America. It covers an area of 8,349,320 km² and has a population estimated at 209,398,410 by 2016. It has about 2.8% of the world's population.

Most parts of the country have fertile soils that are favourable for different types of crops. There is extensive use of mechanisation and other forms of modern technology in farming. Farming areas are well served with adequate infrastructure such as transport means and supply of power. Farming methods have continued to be modernised and many farmers are highly experienced.

Brazil has large plantations where principle grain crops are corn and soy. Other crops are sugarcane, coffee, tea, tobacco fruits, cocoa rubber, and irrigation of rice in Rio Grande valley. In teaching this section you must draw parallels with Rwanda for learners to make comparisons.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the location of Brazil

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Before the lesson commences, ask learners to identify a suitable map of South America that has comprehensive information on position and size of Brazil. Using the Internet and other sources, let them find out more about the population of the country. You should specifically check the population distribution so that you will be able to relate to establishments of plantations.

The next type of map learners should consider will be a regional map of the world to use as you compare the size of Brazil to other countries of the world.

At this point, make a reference to the map in the Learner's Book, showing the location of Brazil on the continent of South America.

Ask learners to draw a sketch of Brazil in their notebooks. Prepare questions to guide class discussion and ensure you have notes on the section.

At this point, group learners for them to work on **Activity 18.2.1** in the Learner's Book. Afterwards, let them make brief notes to be presented in class.

The second engagement for the learners will be to discuss the characteristics of plantation agriculture and types of crops grown in Brazil.

Synthesis

Working in groups, let learners attempt **Activity 18.2.2** in the Learner's Book. After research and discussions, let them prepare comprehensive notes that will be discussed in class.

Assessment

Assign learners in groups to work on the **Activity 18.2.3** in the Learner's Book. For the last question of this activity, learners should make Rwanda their reference point, which they should compare with Brazil. They should then prepare summary notes to be discussed further during remedial learning.

LESSON 2: FACTORS FAVOURING PLANTATION AGRICULTURE IN BRAZIL

Learning objective

By the end of this lesson, the learner should be able to explain the factors favouring plantation agriculture in Brazil.

Introduction

Brazil has different factors that favour establishment of plantations. Most parts of the Brazil have fertile soils that are favourable for different types of crops. There is extensive mechanisation and other forms of modern technology in farming. Farming areas are well served with adequate infrastructure such as transport means and supply of power. Farming methods have continued to be modernised and many farmers are highly experienced.

Brazil has large plantations where principle grain crops are corn and soya. Other crops are sugarcane, coffee, tea, tobacco fruits, cocoa rubber and irrigation of rice in Rio Grande valley.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing some of the crops grown in Brazil in plantations

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Each learner is expected to carry out a research on the different factors that favour growing of different crops in plantations in Brazil. They should use a map to identify and locate areas that have different plantation crops.

Before the lesson starts, ensure you divide the class into groups and assign each group a crop to research on the favouring factors.

As they discuss, let them prepare comprehensive notes on the factors relating to each crop. A summary of these factors has been outlined in the Learner's Book.

Within the same groups, conclude the lesson by asking them to work on **Activity 18.2.4** in the Learner's Book.

As they discuss, ensure that they prepare comprehensive notes for reference during their remedial lessons.

Synthesis

Ask learners to compare factors favouring plantations in Rwanda and Brazil. Prepare questions to guide class discussion. They should then present their findings in a table that you should check afterwards to confirm that they have given correct responses.

Assessment

Guide learners in discussing factors unique to Brazil that favour plantation farming. Afterwards, they should prepare a report for presentation in class.

LESSON 3: IMPORTANCE OF PLANTATION AGRICULTURE IN BRAZIL

Learning objective

By the end of this lesson, the learner should be able to evaluate the importance of plantation agriculture in Brazil.

Introduction

Like any other economic activity, plantation farming in Brazil has contributed a great deal to the economy of the country especially in providing export commodities such as sugar, coffee, rice and fruits among other crops. It is therefore a major source of foreign exchange for the country. Other contributions include creation of employment opportunities for a large proportion of the population. Establishment of plantations attracts development of infrastructure including transport facilities, water and electricity supply and development of social amenities to cater for those who work in the plantations.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Relevant information from the Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

As you guide learners through this lesson, you may use the examples of plantations in Rwanda and how they benefit the local people and the country at large.

At random, select one learner to read through the points outlined in the Learner's Book. For each of the points mentioned, learners should discuss how it is important to Brazil.

Using **Activity 18.2.5** in the Learner's Book, learners should compare plantation agriculture in Brazil and Rwanda.

As they discuss, encourage them to make brief notes, citing examples from their local environment and Rwanda in general.

It is also important to identify suitable relevant photographs that can help demonstrate the importance of the plantation farms. For instance a processing factory for a given farm product. Prepare questions to guide class discussion.

Synthesis

Organise learners into groups to discuss the importance of agriculture to:

- i) Farmers
- ii) Business people
- iii) The society
- iv) The government
- v) Other countries

Assessment

You could ask the learners to draw a table comparing contribution of plantation farming to the economy of Brazil and that of Rwanda.

LESSON 4: PROBLEMS AND SOLUTIONS ASSOCIATED WITH PLANTATION AGRICULTURE

Learning objective

By the end of this lesson, the learner should be able to explain the problems faced by the agricultural sector of Brazil and possible solutions.

Introduction

Plantation farming in Brazil is not without challenges that farmers have to cope with. The main problems experienced in plantation farming in Brazil include insufficient financial support mainly when farmers have to rely on government subsidies. Accidental fire outbreaks are experienced in sugarcane farms especially when the crop is maturing. There is in some plantations a shortage of labour occasioned by a migration of labour to urban centres where wages are better than in plantations. There is stiff competition in the world market for commodities such as sugar and coffee, which are widely produced elsewhere. This affects the income for the farmers.

Price fluctuations, climate change, pests and diseases and soil exhaustion are other problems that need to be discussed in this section.

As you teach this section you may use the examples of problems experienced in plantations farming in Rwanda and how the farmers solve them.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs shown in the Learner's Book and others collected by learners

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Guide learners in researching on the problems that are outlined in the Learner's Book.

Ask learners to obtain photographs showing different problems affecting plantation farming in Brazil. An example has been given in **figure 18.1.2. 5**.

For each of the problem, learners should find out how Brazil farmers overcome them. Let them prepare notes on the problems and solutions and ensure that they draw comparisons with Rwanda.

At this point, it is important to consider the solutions listed in the Learner's Book.

Learners should read through these points, discussing each in detail. Important points generated during the discussion should be written down by the learners.

Remember, it is your responsibility to prepare questions to guide class discussion. You should also ensure that groups formed for discussions are composed of learners of all abilities, so that all of them can benefit from the learning process.

Synthesis

Make a table showing problems affecting agriculture in Brazil and Rwanda. For the common problems, suggest possible solutions for each of these countries. Where you can gather evidence, explain how the problem has been tackled.

For unique problems to Brazil, carry out a research to find out how farmers and the government have dealt with to ensure continued productivity.

Assessment

Compare the problems affecting plantation farming in Rwanda and those in Brazil. Explain how each country has addressed the common problems. How has these problems been dealt with differently between these two countries despite the fact that they are the same in nature?

End unit assessment

1. Explain five factors that favour plantation farming in Brazil.
2. Outline four characteristics of plantations in Brazil.
3. Explain four problems experienced in plantation farming in Brazil and for each, suggest possible solutions.

Answers to End unit assessment

1. **Factors favouring plantation farming in Brazil**

- Availability of vast land
- Farms are managed by people who have been trained
- Availability of capital as owners of large farms are able to get finances to run the farms
- Availability of water for irrigation in areas which lack sufficient rainfall
- Flat land that is ideal for mechanization.
- Well-developed transport facilities for transporting farm inputs and the produce.
- Good transport system
- Availability of market
- Government policy
- Availability of capital
- Availability of labour
- Role of the Brazilian Agricultural Research Corporation

2. **Characteristics of plantations in Brazil**

- a) Most of the plantations are owned by foreigners
- b) Plantations also known as 'Fazendas' are used mainly for the production of cash crops.
- c) The farms are highly mechanised
- d) Owners use paid or hired labour
- e) Plantations in Brazil are extensive
- f) They grow cash crops for export purposes

3. **a) Problems experienced in plantation farming in Brazil**

- (i) Prolonged drought especially in northeast region and Amazon basin. In these areas, rainfall is not well distributed.
- (ii) Some areas have infertile soils that hinder the desired output in harvesting. This is common in Brazilian grassland
- (iii) Inadequate infrastructure such as roads and railways
- (iv) Inadequate capital among some farmers
- (v) Use of hired labour which is fairly expensive
- (vi) Migration of rural population to urban areas causing labour shortage
- (vii) Frequent fire outbreaks for instance in sugarcane farms.
- (viii) Price fluctuation of produce in the international market

b) Possible solutions to the problems experienced in plantation farming in Brazil

- There was the construction of the Cadro Dam in 1903 that sorted out the problem of prolonged drought by providing water for irrigation.
- Financial institutions give out loans to farmers on minimum interest rate and this solved the problem of inadequate capital.
- Infertile areas have been utilised for animal grazing other than living it idle.
- Semi-temperate climate have been used to grow grains. This rendered such areas economically viable.
- In order to keep up with increasing production, crops are immediately trucked to market. This also solved inadequate storage facilities.
- The government reduced tax burden and controlled exchange rate, which allowed price stability.
- Transport has been solved by the use of trucks that carry goods to the market
- Fire extinguishers and other measures have been availed on plantation farms in Brazil to counter attack fire out breaks.

Remedial activities for slow learners

Let learners give reasons why plantation agriculture in Brazil is important.

Answers to remedial activities for slow learners

Plantation farming is a major activity contributing a great deal to the economic development in Brazil. The following are some of the reasons why it is important:

1. Creation of employment opportunities
2. Provision of revenue for the government.
3. Earning of foreign exchange for the country from exports
4. Provision of market to the small scale farmers.
5. Skill development for those involved in different farm activities.

Extended activities for gifted and talented learners

Explain some of the conditions that have favoured plantation farming in Brazil.

Answers to extended activities for gifted and talented learners

Brazil has advantages that make it possible to establish large plantation farms. The density of population is estimated at 25 people per km², which means there is plenty of land to set up large plantations. For instance, there were 260 million acres of undeveloped land by 2009.

The country has varied types of climatic conditions ranging from tropical type in the north, equatorial in the Amazon basin to temperate zones in the south. This creates favourable weather for a variety of crops from those suited to equatorial and tropical climate to those that grow in temperate areas.

Most of the country experiences high rainfall except for north eastern region that sometimes experiences drought.

Most parts of the country have fertile soils that are favourable for different types of crops. There is extensive mechanisation and other forms of modern technology in farming. Farming areas are well served with adequate infrastructure such as transport means and supply of power. Farming methods have continued to be modernised and many farmers are highly experienced.

Brazil has large plantations where principle grain crops are corn and soya. Other crops are sugarcane, coffee, tobacco, cocoa, rubber and rice.

The main problems experienced in farming include insufficient financial support, fire outbreaks, migration of labour to urban centres and competition in the world market.

18.1. AGRICULTURE

18.1.3. AGRICULTURE IN U.S.A

Key Unit Competence

By the end of this unit, the learner should be able to analyse the levels of agricultural development in U.S.A

Prerequisite of this unit

America is among the agriculturally developed countries in the world. Learning about *Agricultural systems in Rwanda* (in *Senior Two, Unit 15*) and *Agricultural systems in Africa* (*Unit 10*) provided learners with insights into the various methods of farming practised in Rwanda and across Africa.

It is important therefore that the knowledge gained is expanded by comparing how agricultural practices in Africa are carried out and how they differ with those in giant economies such as that of USA.

Just like in Units 18.1.1 and 18.1.2, learners have to be helped to understand that there are challenges that face agricultural activities in all countries across the world. Some of the challenges are similar from one country to another, but ways of handling these challenges is what differs. Against such an understanding, learners are expected to embrace the best solutions from various countries across world.

Cross-cutting issues

This unit will help learners relate agriculture *financial education* especially looking at the value of the sector to the economy of USA and also for Rwanda.

Learners will also appreciate the importance of *environmental conservation* because for sustainable farming activities, there has to be proper land use to ensure land remains productive over the years.

The unit also touches on *Inclusive education* as both man and women can engage in agriculture.

Generic competences

Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>Agricultural practices in America may be more modernised than in Rwanda. It is expected that each learner will think imaginatively and creatively on how they can borrow from these practices to apply in their local environment. This may include regionalisation of agriculture as well as agri - business that they can introduce in their local environment.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>This skill will be developed when learners engage in information gathering exercises, including examining agricultural practices in USA, analysing the importance of agriculture in USA and assessing the problems and challenges of agriculture in USA. Further research will be on how each of this problem has been addressed.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>Learners will perfect this competence through presentation of their findings as well as compiling their class work.</i>
Cooperation, inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. <i>While working in pairs and groups, they will develop this skills..</i>

Vocabulary/key words/concepts

Agribusiness	This is a business operation that may include farming that is done as a business and any other businesses that are directly or indirectly dependent on agriculture
Archipelago	Sometimes called an island group or island chain, is a chain, cluster or collection of islands.
Non-contiguous	These are two things (in this case, countries) that are not connected.
Ranch	An area of land, including various structures, given primarily to the practice of <i>ranching</i> , the practice of raising grazing livestock such as cattle or sheep for meat or wool.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) Explain the location, size and population of USA.
- (ii) Describe regionalisation of agriculture in U.S.A.
- (iii) What are the agricultural systems in U.S.A?
- (iv) What factors favour agricultural development in U.S.A?
- (v) What are the various agribusinesses in U.S.A? (agrichemicals, farm machinery, crop production, processing, seed supply)
- (vi) Which unique problems hinder agricultural expansion and their possible solutions in U.S.A?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Leaners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Introduction to USA and Regionalisation of agriculture in U.S.A
Lesson 2	Agricultural systems in U.S.A and factors favouring Agricultural development in U.S.A.
Lesson 3	Agribusiness in U.S.A: (agrichemicals, farm machinery, crop production, processing, seed supply)
Lesson 4	Unique problems hindering agricultural expansion and possible solutions in U.S.A.

LESSON DEVELOPMENT

LESSON 1: INTRODUCTION TO USA AND REGIONALISATION OF AGRICULTURE IN U.S.A

Learning objectives

By the end of this lesson, the learner should be able to:

- a) To explain the location, size and population of USA
 - b) Explain the regionalisation of agriculture in U.S.A
-

Introduction

United States of America is located between Mexico to the south and Canada to the north. To the west is the Pacific Ocean while to the east is the Atlantic Ocean. The country has an approximate area of 9,826,630 km². It is the 3rd largest country in the world after Russia and Canada.

The country's 2016 census indicate that the total population was about 323,730,000. This population is ethnically very diverse. It consists of White Americans who constitute the majority. African Americans form the second largest group. The others are Asian Americans and the Latino Americans.

USA is a very large country with diverse landscapes and varied climatic regions. As a result, the types of agricultural activities vary from one area to another. Regionalisation of agriculture therefore is the zoning of agricultural types and systems according to climate and nature of landscape in different parts of the country.

Some regions of USA are extensive plains, which enable establishment of large farms that are easy to mechanise. Other areas are mountainous and farming activities are confined to the gentle slopes and valleys. The country has varied climate ranging from hot deserts to very cold areas. This also influences agriculture. As a result USA has zones of agricultural regions.

As you teach this section, you must ensure the learners have access to a map that is large enough to show the details of the country including the states and population distribution. You should also ensure that the learners have access to a map showing the zones of different agricultural activities. Each region must be studied thoroughly for learners to be able to compare the different regions by identifying the differences and similarities. You also have to make comparisons with Rwanda.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the location of USA

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Using maps in their atlases, ask learners to identify suitable maps of USA that have comprehensive information on position, size and population. Ask them to compare the size of USA to other countries of the world.

Ask them to draw a sketch map of USA similar to the one provided in the Learner's Book.

In groups, learners should research on USA's statistics, in the following areas:

- Size
- Number of states its made up of
- Population
- Population density

Activity 18.1.3.1 in the Learner's Book should form part of learners' group work. After accomplishing this activity, they will be able to describe the position of USA in relation to her neighbours.

Learners should be able to explain the meaning of regionalisation of agriculture in the USA, using the explanation given in the Learner's Book.

In the same groups that carried out the first activity, let them discuss **Activity 18.1.3.2** in the Learner's Book.

The findings from the two activities should then form the basis of further class discussions.

Guide them during these discussions by highlighting the main points that they should summarise in their notebooks.

Synthesis

In their remedial discussions, let them identify states that are found within different resource regions in the USA. Allow them to use the map of USA in **Activity 18.1.3.2** in the Learner's Book.

Afterwards, they should explain why each region is utilised as shown on the map.

Assessment

Every learner should carry out research in order to find answers to **Activity 18.1.3.3** in the Learner's Book. This should then be followed by sharing their findings in pairs in the next lesson.

LESSON 2: AGRICULTURAL SYSTEMS IN U.S.A AND FACTORS FAVOURING AGRICULTURAL DEVELOPMENT IN U.S.A

Learning objective

By the end of this lesson, the learner should be able to:

- a) Explain the agricultural systems in U.S.A.
 - b) Evaluate the factors favouring agricultural systems in U.S.A.
-

Introduction

As learnt earlier, USA is so large that by studying its characteristics from east to west and north to south, one will notice diverse changes in agricultural systems. These systems of agriculture vary from one place to another depending on the climatic conditions, population density and nature of the landscape. For instance, in the plains of the states such as north and south Dakota where land is fairly flat and population density very low, agriculture is mainly large scale wheat farming and sheep and cattle ranching. In the hot areas such as south California where farming depends on irrigation, farmers specialise in fruit and vegetable farming. The areas that are densely populated in the eastern parts of the country, farming is mainly intensive since the farms are small but production is maximised.

In any part of the world, agricultural systems depend on the local environmental conditions combined with application of modern technology in farming. The varied agricultural systems in USA are as a result of the human and physical factors that vary from place to place.

It is also important to bear in mind that USA is one the most advanced countries in application of modern technology in agriculture. Regardless of the physical factors, technology is used to ensure whatever the farmers grow there is efficiency that leads to high productivity. For instance, even in areas that have extreme climates such as the deserts of southern California, agricultural productivity is high because of use of modern farming methods. This includes well controlled water supply, use of machines and proper control of any possible pests and diseases that could affect the crops and animals. Mechanisation of agriculture is widespread both in small and large farms. There is little use of human labour in most of the farming activities.

As you teach this section, it is advisable that you help the learners to make comparisons with the mode of production in Rwanda. For instance, they should compare how farmers in the two countries adapt to the physical environment and also the human factors that influence farming systems.

As you guide learners through this section, remember to compare the agricultural systems to those of Rwanda. It is advisable to be well knowledgeable of the different systems that must be taught in reference to the states in which different systems are practised.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing various agricultural systems in USA

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson by asking learners to discuss the systems of agriculture in the USA. This can effectively be done by placing learners into five groups for them to discuss **Activity 18.1.3.4** in the Learner's Book.

Additional information on types of agricultural systems in the USA is provided in the Learner's Book.

Each group should carry out research to find out more information on each type of agriculture, including details on:

- i) Meaning of the type of agriculture
- ii) Characteristics of this type of agriculture
- iii) Varieties of animals or crops reared or cultivated respectively

Conclude the lesson by guiding learners in discussing factors favouring agricultural development in USA. This can be achieved by creating two large groups, one to discuss physical factors and the other to discuss human factors.

Synthesis

From the information obtained during class discussions, individual learners should research on the task given in **Activity 18.1.3.5** in the Learner's Book.

They should then compile their findings for discussion in their respective study groups.

Assessment

In their study groups formed to discuss activities in the learner's book during the lesson, let them find out the factors that affect the various types of agricultural systems in Rwanda then compare them with those in the USA, in line with **Activity 18.1.3.6** in the Learner's Book. Afterwards, they should prepare comprehensive points for further discussion in your presence during their remedial learning.

LESSON 3: AGRIBUSINESS IN U.S.A: (AGRICHEMICALS, FARM MACHINERY, CROP PRODUCTION, PROCESSING, SEED SUPPLY)

Learning objective

By the end of this lesson, the learner should be able to analyse the importance of agribusiness in U.S.A.

Introduction

Agriculture is basically a primary activity. However, as a primary activity develops, it gives rise to other related economic activities. For instance, agriculture provides a basis directly and indirectly for related businesses to develop. Agribusiness therefore is a combination of businesses that benefit directly or indirectly from agricultural activities. Agriculture in USA has given rise to a wide variety of business enterprises that depend both directly and indirectly to agriculture. The type of businesses vary from small to enterprises operated by individuals to large company owned undertakings. For instance, an individual may open a small business making and selling fresh fruit juices. On the other hand we may find a large company running a fruit canning industry. Such are businesses that are directly related to agriculture because they obtain raw material directly from farming activities. An individual or a large organisation may operate a fleet of trucks be engaged in transportation of farm products or finished goods whose raw materials are farm products. Such business is indirectly related to agriculture.

In USA, there are numerous agribusinesses throughout the country. These include agricultural processing factories, manufacturing of farm machinery, chemicals and fertilisers, transport businesses among others. Their growth and development being influenced by demand.

Introduce this section by giving local examples of local agribusiness that learners are familiar with. Then ensure you make comparisons between the agribusinesses that are found in Rwanda with those in USA.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing different agribusinesses carried out in USA

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Choose one of the learners to read out aloud notes on agribusiness given in the Learner's Book.

In groups, learners should then attempt **Activity 18.1.3.8** in the Learner's Book. They should complete the table given in their notebooks then share their findings.

Agribusiness in the USA is on a much wider scale than in Rwanda. Some of the areas it covers have been listed in the Learner's Book. As they read through this section, ask them to discuss the importance of each of these activities to the overall development of agriculture in the USA.

For them to find out are the specific examples of agribusinesses and the names of large enterprises and where they are located in Rwanda. Prepare guiding questions to use so as to ensure learners are attentive during the lesson.

Synthesis

By discussing the section on importance of agribusiness in the Learner's Book, learners should be able to work out answers for **Activity 18.1.3.8** in the Learner's Book. They should then share their findings with the rest of the class.

Assessment

In pairs, ask learners to carry out a research to find out the benefits of agribusiness to Rwanda. They should then prepare comprehensive notes to be discussed further during remedial learning. It is important to point out to them that their reference will be in the Learner's Book.

LESSON 4: UNIQUE PROBLEMS HINDERING AGRICULTURAL EXPANSION AND POSSIBLE SOLUTIONS IN U.S.A

Learning objective

By the end of this lesson, the learner should be able to assess the problems or challenges faced by agriculture in U.S.A and discuss possible solutions.

Introduction

Despite the level of economic development in USA, agriculture faces some unique problems that limit its expansion. We can consider these problems as unique because they are not common in many parts of the world. It is important to note that in parts of USA and North America in general, large scale agricultural activities have been carried out for over almost a

century. The main types of crops grown have been wheat, corn and soya among other crop. It is not a surprise that there is overuse of topsoil due to over tillage. This calls for careful land management.

Extensive industrialisation of agriculture has to a large extent contributed to overuse of fossil fuels, which are slowly diminishing from the ground. This calls for proper planning for future expansion of agriculture.

Government policy on reduction of migrant workers has been hurting agriculture causing heavy losses in vines when they lack the usual manual labour provided by migrants.

Land for agricultural expansion is slowly diminishing as urban growth swallows the nearby agricultural lands. In addition, the ground water resources are slowly diminishing due to overuse in irrigation in the drier areas. This paints a negative picture for agriculture in affected areas in future. There is also the problem of pollution of water bodies with chemical run off which makes the water unfit for crop production. Also notable is the depletion of nitrogen from the top soil due to continuous production of the same crop in one area over the years. Some farmers have had to rotate the usual crop with legumes for fixing the nitrogen.

In preparation for this section, you must read widely on the challenges facing agriculture in USA and ensure you are able to identify which problems are unique in the country and that may hinder future expansion of the sector. As you prepare, remember to make a comparison of the problems with those experienced in Rwanda. Prepare questions to guide the flow of the lesson and prepare answers to the activities in the section so that you will be able to guide the learners on the same. You will also require a map showing different agricultural regions and the crops or animals in each.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- The Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with information about Rwanda, by leading a discussion in class of the problems hindering agricultural expansion in Rwanda.

With contributions from learners, compare the problems identified to those experienced in the neighbouring countries and Africa at large.

In groups, ask learners to read through the section on the unique problems hindering agricultural expansion in the USA in the Learner's Book, in **Activity 18.1.3.9**. Let them list in their notebooks the problems given in this section.

With the guidance from their group leader, let them copy the table given in this activity then conduct a research from various sources of information for them to complete the table appropriately.

Synthesis

Through a research from the Internet and from other sources of information, learners should find out how each problem affects farmers, the societies in these regions and the government at large. They should then compile their findings for class presentations.

Assessment

Task learners to discuss how the government of Rwanda has dealt with unique problems affecting agriculture in Rwanda. They should cite sources of information. Encourage them to support their explanations with evidence.

END OF UNIT

Summary of the Unit

United States of America is made up of 50 states, 48 of which form the mainland while Alaska is to the north west of Canada and Hawaii is made up of several islands in the Pacific Ocean. In terms of area, Alaska is the largest state followed by Texas. The smallest state is Rhode Island that is one of the states that form the region called New England.

Unlike in African countries such as Rwanda where most farms are small scale and farm work is done manually, in U.S.A, farming is mainly large scale and highly mechanised.

In any part of the world, agricultural systems depend on the local environmental conditions combined with application of modern technology in farming. The varied agricultural systems in USA are as a result of the human and physical factors that vary from place to place.

It is also important to bear in mind that USA is one the most advanced countries in application of modern technology in agriculture. Regardless of the physical factors, technology is used to ensure whatever the farmers grow there is efficiency that leads to high productivity.

Agriculture in USA has given rise to a wide variety of business enterprises that depend both directly and indirectly to agriculture. The types of businesses vary from small to enterprises operated by individuals to large company owned undertakings. For instance, an individual may open a small business making and selling fresh fruit juices. On the other hand we may find a large company running a fruit canning industry. Such are businesses that are directly related to agriculture because they obtain raw material directly from farming activities. An individual or a large organization may operate a fleet of trucks be engaged in transportation

of farm products or finished goods whose raw materials are farm products. Such business is indirectly related to agriculture.

In USA there are numerous agribusinesses throughout the country.

Despite the level of economic development in USA, agriculture faces some unique problems that limit its expansion. We can consider these problems as unique because they are not common in many parts of the world.

End Unit Assessment

1. Describe the location of USA in the North American Continent.
2. Explain why agricultural activities vary so widely in USA
3. Explain the physical factors that favour agriculture in USA
4. Discuss three unique problems that affect agricultural expansion in USA

Answers to End Unit Assessment

1. Description of the location of USA in the North American Continent.

United States of America is located between Mexico to the south and Canada to the north. To the west is the Pacific Ocean while to the east is the Atlantic Ocean USA is a Federal Republic divided into fifty states including Alaska a non-contiguous state and Hawaii an archipelago state.

2. Reasons for a wide variation in agricultural activities in USA

USA is so large that by studying its characteristics from east to west and north to south, one will notice diverse changes in agricultural systems. These systems of agriculture vary from one place to another depending on the climatic conditions, population density and nature of the landscape.

Each region produces for domestic and export market. The major crops grown in the northern plains where the population is fairly low include wheat, oats, barley and corn. Here the farms are very large and highly mechanized.

3. Physical factors that favour agriculture in USA

- **Climate:** USA has varied climate which favours a wide range of agricultural systems. In some places, agricultural activities are determined by the climatic prevailing condition. For instance in areas that have ranches and the areas with large scale arable farms, farmers depend on natural rainfall for growth of pastures or crops.
- **Soils:** Originally most of USA agricultural areas depended on natural soil fertility. However, with continued use of the land, soil fertility is maintained by adding chemical fertilisers so that high yields can be sustained.
- **Topography:** The topography of USA is ideal for agriculture because land is gently sloping or generally flat. Apart from the Rocky and Appalachian mountain ranges, the rest of the country has favourable landscapes.

4. Some of the solutions to the unique problems that affect agricultural expansion in USA
- Applying artificial fertilisers has solved problems resulting from monoculture. This has also been dealt with by growing in growing rotating crops especially for cereals.
 - Paddocking has been improvised to curb down overgrazing. Animals in a paddock leave it after say a week and the carpet of cow dung left behind enriches the soil before cows are returned to that paddock.
 - Intensive farming has been adopted in order to solve the problem of industrialisation and urbanisation. The small land available is used to the maximum.
 - The production of high quality goods has been used as a solution to outcompete other countries on global market.
 - Climatic problem of unevenly distributed rainfall has been solved by irrigation. For example in California, Imperial Valley is the largest irrigated area in the whole of North America

Remedial activities for slow learners

Assign learners a task of summarising the varied agricultural systems in USA.

Answers to remedial activities for slow learners

The following are the varied agricultural systems in USA

- a) ***Mixed farming:*** This is the type of farming that involves growing of crops and rearing of animals in the same farm. Usually the manure from animals is used to enrich the soils and some crops may be grown for feeding the animals. The little that may be surplus can be sold. In this system of agriculture, less advanced technology is used, no reliance on machinery and chemicals. The farmer majorly relies on natural factors like rainfall, temperature and soil fertility.
- b) ***Ranching:*** Ranching is rearing of livestock in large numbers on a rangeland. Ranching in USA is mainly practiced in the open grasslands in states such as Montana and North Dakota among many others. Some ranches extend hundreds of kilometres where cowboys riding on horses look after the animals. Some farmers keep cattle while others keep sheep in ranches.
- c) ***Irrigation farming:*** This is a type of farming is common in the USA in the areas where rainfall is low. Some of the states are so dry that agriculture depends entirely on irrigation.
- d) ***Intensive farming:*** This farming aims at maximising the yields through means such as application of manures and fertilisers. The farming is capital intensive with high inputs per unit area. The land is always under cultivation and is characterised by high yields. Some farms have both livestock and crop production.

- e) **Large scale arable farming:** This a system of farming characterised by very large farms that are highly mechanised. Each farm produces a single crop largely for export. Single farmers could have hundreds of acres of land under one crop. This is common in areas where the land is generally flat or gently sloping to allow use of machines in activities such land preparation, planting, application of pesticides and harvesting.

Extended activities for gifted and talented learners

Discuss how various agribusinesses are related in the USA.

Answers to Extended activities for gifted and talented learners

How various agribusinesses are related in the USA

- a) **Making of agrichemicals:** The demand for agrichemicals is very high leading to the presence of different types of factories where such products are made.
- b) **Manufacturing of farm machinery:** There are numerous industries engaged in the manufacture of farm machinery such as tractors, combine harvesters, milking machines, feed mixers and other agri-related related equipment. Such machine make farm activities efficient.
- c) **Commercial crop production:** Most farmers in USA carry out farming as an income generating activity. For instance the large wheat and corn farms produce for local and international market. Thus the farmers are like business people.
- d) **Food processing:** This is a widespread industry that provides the local demand for processed foods. Examples include fruit, vegetable and meat canning, flour milling, milk processing and baking. Processed foods last longer before getting spoilt than fresh produce.
- e) **Production of animal feeds:** The small scale livestock farmers require feeds for their livestock since the animals do not go always go out to graze especially during the cold seasons.

18.2. INDUSTRIALISATION

18.2.1. INDUSTRIAL DEVELOPMENT IN GERMANY

Key Unit Competence

By the end of this unit, the learner should be able to compare the levels of industrial development in Germany in relation to Rwanda.

Prerequisite of this unit

In senior Two, learners were introduced to the concept of industrialisation in *Unit 20*. The scope of study was industrialisation in Rwanda, with wide areas of study, including classification of industries, factors for location, importance and problems affecting industrialisation.

In Unit 15, learners gained knowledge on industrial developments in Africa. In a general view, learners were exposed to the various types of industries in Africa, factors favouring industrialisation in Africa, major industrial areas of Africa, importance and problems affecting industries in Africa and prospects of sustainable development of industries in Africa.

In this unit, learners are expected to acquire knowledge on industrial development in Germany. Just like in the previous studies on industrialisation in Rwanda and Africa at large, Germany also has an industrial region, with major industries, which thrive as a result of some factors that favour their establishment. This has proven the fact that industries are equally important in the economy of a country, Germany being one of them.

Despite these favourable factors and the importance of industries in Germany, there are a number of problems that affect this sector of the economy. This makes it necessary for learners to evaluate some of these problems and how they have been handled. It is important to note that some of these problems are almost identical to those in African countries and Rwanda, but how they are handled is the focus that learners will want to understand more.

Cross-cutting issues

Countries are classified as developed when their level of industrialisation is very advanced. Industrial developed however can easily cause negative effects on the environment in that it could lead to water, air and land pollution. In this unit therefore learners will explore the negative effects of industrialisation in Germany and learn the measures put in place to ensure *conservation of the environment* is undertaken.

Industrial development is also linked to occurrence of *global warming/climate change*. Gases emitted to the atmosphere from factories interfere with the natural balance of atmospheric gasses and moisture leading to climate change.

Study of industrial development will enable the learners to gain knowledge on *financial education*. To set up and develop an industry requires capital undertaking and the end product is financial income.

Generic competences

Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>This unit requires learners to demonstrate practical ways of developing industrialisation in Rwanda based on the acquired knowledge of industries in USA. This requirement will promote learners' creativity and innovation as they apply the knowledge learned in their local environment.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>By looking for information from various geographical documents, the internet and other reference books, they will appreciate the added value research offers to them. Areas of research may include on factors favouring industrial development in USA and reasons why industrialisation is important to the economy of USA.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>This skill will be acquired when learners engage in discussions, prepare class reports and present information gathered in class.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>This competence will be achieved when learners work in pairs or groups to accomplish tasks and activities specified in Learner's Book.</i>

Vocabulary/key words/concepts

Ruhr region	The most industrialised region in Germany
Unification	The process of being united

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

Industrial Development in Germany

- (i) Describe the location, size and population of Germany.
- (ii) What are the major industries in the Ruhr region?
- (iii) What are the factors for Ruhr Industrial development?
- (iv) What is the importance and problems of industrialisation in Germany?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Leaners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Introduction to Germany
Lesson 2	The Ruhr industrial complex in Germany and factors for Ruhr Industrial development
Lesson 3	Importance and problems of Industrialisation in Germany

LESSON DEVELOPMENT

LESSON 1: INTRODUCTION TO GERMANY

Learning objective

By the end of this lesson, the learner should be able to describe the location, size and population of Germany.

Introduction

To the south, Germany shares the Alps Mountains with Switzerland and Austria. To the north, it borders the North Sea. The neighbours to the east are Netherlands, Belgium and France while to the west are Czech Republic and Poland.

The country has an area of about 357,050 Km², making it the seventh largest country in Europe, the largest being Russia. In terms of population, Germany has approximately 80,682,357.

The major characteristic of the population in Germany is that it consists of mainly elderly people because the country experiences low birth rate. As a result, the country has been allowing immigrants to provide semi-skilled labour in the industries. The population has high life expectancy and the majority of the people live in urban areas. It is therefore important to note that Germany's characteristics of the population are the opposite of that

Teaching aids

- Recommended learner's books
- Relevant reference materials
- Map showing location of Germany

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with a brainstorming session by asking learners to read through the introduction of the unit given in the Learner's Book. As they read through, let them identify and find out the meaning of difficult words, such as unification and industrialisation.

With the help of maps from their atlases and the one given in the Learner's Book, learners should try to describe the position of Germany in relation to her neighbours. This should be followed with describing its position in Europe. These research points are captured by **Activity 18.2.1.1** in the Learner's Book. Remember, this activity will be best **done in groups. Group work is important because it promotes cooperation and interdependence among learners.**

As a class assignment, let learners draw a sketch map of Germany, showing all her neighbours. The map should contain all the qualities of a good map, with the compass, key and title. Let each learner frame it for it to look neat.

Synthesis

Below the sketches each learner drew, task them to show the following details about Germany:

- a) Its approximate size in km²
- b) Its approximate population
- c) Areas with iron and coal deposits
- d) Examples of industries found in Germany

Assessment

Ask learners to read through the introduction of this unit again, in the Learner's Book again. As they read, they should summarise some of the reasons that have contributed to industrial development of Germany.

Expected responses include:

- i) Unification
- ii) Good education policy
- iii) Good governance
- iv) Availability of labour
- v) Presence of natural resources/minerals such as coal and iron deposits
- vi) Presence of Rhine River

LESSON 2: THE RUHR INDUSTRIAL COMPLEX IN GERMANY AND FACTORS FOR THE RUHR INDUSTRIAL DEVELOPMENT

PART I: THE RUHR INDUSTRIAL COMPLEX IN GERMANY

Learning objective

By the end of this lesson, the learner should be able to name and locate the major industries found in Ruhr industrial region.

Introduction

The Ruhr region has a wide variety of industries ranging from heavy iron and steel, car manufacture chemical industries, engineering works and manufacture of machinery among others. There are also numerous light industries such as food processing, textile and footwear industries, wineries, confectioneries among others. It is important to note that

the Ruhr region is one of the most densely populated parts of Germany. When you consider the requirements of a population, then it means the demand for industrial products is very high. As you teach this section it is advisable to compare with the situation in Rwanda to give the learners a picture of the other extreme in development.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map of the Ruhr Industrial Complex in Germany

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

With the help of the map of Germany showing the Ruhr Region provided in the Learner's Book, learners should describe its position within Germany.

In the Learner's Book specify the major industries in the Ruhr region. Before exploring these industries, have learners work in groups to attempt **Activity 18.2.1.2** in the Learner's Book.

After this activity, give learners a chance to present their findings in class.

In comparison to Rwanda, ask learners to complete the following table in reference to industries in Rwanda:

Type of industry	Area/town where found	Main raw material	Its major products

Synthesis

Ask learners to carry out a research on the other industries not discussed in the Learner's Book. A mention of these industries has been done in the Learners book. Afterwards, they should draw a table similar to the one given above.

Assessment

Ask the learners to work on **Activity 18.2.1.3**. Ensure that they are paired well, balancing slow and fast learners. Each pair should compile their findings for sharing in class during remedial learning.

PART II: FACTORS FOR THE RUHR INDUSTRIAL DEVELOPMENT

Learning objective

By the end of this lesson, the learner should be able to analyse factors that favour Industrial development in Germany.

Introduction

There are many general factors that influence industrial development. Most factors are common to many areas but each region may have some unique factors that apply only to that area. In the Ruhr region, all the general factors such as market, capital, transport and availability of water apply. However, the region is unique especially in the factors that influenced the growth of the industries historically. These factors such as availability of coal and iron ore locally no longer apply. It is important to read widely so that you guide the learners to acquire the correct information.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing parts of the Ruhr industrial complex in Germany

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Learners identified some of the factors that greatly contributed to industrialisation in the Ruhr Region in Lesson 1. Have a brainstorming session to revisit these factors..

It is also important for learners to mention what they think are indicators of industrialisation in a country. They can give some of these indicators in Rwanda. Ask them to use the internet and other sources of information to mention those for Germany.

Encourage learners to obtain photographs of some of the industrialised regions. Some of these have evidence of the factors. Refer them as well to the photographs shown in the **Learner's Book**. In groups, allow them to identify some of the factors discussed in the **Learner's Book**.

Summarise learning in this section by grouping learners appropriately for **Activity 18.2.1.4** in the Learner's Book. Afterwards, ask them to prepare brief notes to be presented in class.

As a class assignment, let learners draw a sketch map of Germany, showing the Ruhr Industrial Region. The map should contain all the qualities of a good map, with the compass, key and title. Let each learner frame it for it to look neat.

Synthesis

In pairs, learners should compare the factors that have favoured industrialisation in Germany and those for Rwanda. In a report, let them show the common factors and how each country has capitalised on them to achieve industrialisation.

Assessment

Ask the learners to prepare notes on unique factors that have influence growth of industries in the Ruhr comparing in Germany. They should then explain how Germany has achieved industrialisation because of these factors. Let them justify hoe these unique factors have provided a boost in the industrialisation process in Germany in comparison to other European countries.

LESSON 3: IMPORTANCE AND PROBLEMS OF INDUSTRIALISATION IN GERMANY

Learning outcome

By the end of this lesson, the learner should be able to:

- a) Analyse the importance of industrialisation in Germany.
- b) Explain some of the problems of industrialisation in Germany.

Introduction

Presence of manufacturing industries in a country plays an important role in the economy of that country. Apart from contributing to the national income, industries are a source of employment and a source of products needed by the people. As industries grow, other developments grow concurrently. For instance, growth of industries sparks off growth of agriculture, transport and communications as well as trade. You should engage the learners in discussing the situation in Rwanda to enable them appreciate these types of developments and relationships as they compare with the Ruhr region, which is far more advanced. Some examples of the problems associated with industrialisation in the Ruhr include pollution of air and water, urban sprawl leading to reduced areas for agriculture, and depletion of minerals such as coal and iron ore. It is important that you carry out research to gather more information on the sub unit.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- The Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with **Activity 18.2.1.5** in the Learner's Book.

The findings from this activity will help learners appreciate the importance of industrialisation in Rwanda and Germany.

From this activity, learners will also understand that Rwanda is similar to other countries through the various industrial activities it carries out.

Ensure that learners clearly draw similarities in industrialisation between Rwanda and Germany.

One of the learners can take others through the information given in the Learner's Book, as others generate brief notes from the ensuing discussions.

Conclude the lesson with **Activity 18.2.1.6** in the Learner's Book. Learners are expected to study the photograph provided, with others that you should avail to them, in order to discuss some of the problems affecting industrialisation. Ensure that they write comprehensive notes on each point mentioned for further discussion.

Synthesis

As a continuation to a discussion on **the importance of industries to Germany** and Rwanda, learners should discuss **Activity 18.2.1.6** in the Learner's Book. Each should then prepare notes for class presentation.

Assessment

For each of the problem affecting industrialisation in Germany and Rwanda, let learners carry out a research to find out how each country has dealt with it.

For fast learners, ask them to compare the approaches taken by Germany and those taken by Rwanda especially for similar problems.

Ensure that you go through their findings to correct them where they may have gone wrong.

END OF UNIT

Summary of the Unit

Germany is one of the most industrialised countries in Europe and the world. Industrial development in Germany began much later after other countries in Europe such as Britain, France and Belgium were already industrialized. The history of industrial development in Germany dates back to the 1870s when the modern Germany nation came to existence.

The Ruhr industrial region is one of the largest in the world. Growth of heavy industries in the Ruhr region was initially influence by factors such as availability of coal and iron ore. Ruhr was a leading producer of coal for many years but currently most coal mines are exhausted. The region had large deposits of iron ore which led to growth of iron and steel industries. Like coal, iron ore deposits in the region are exhausted and currently the industries depend on imported iron ore. The region had an advantage of having cheap water transport by rivers such as the Rhine which is one of the busiest inland waterways in the world.

The Ruhr region has a wide variety of industries ranging from heavy iron and steel, car manufacture chemical industries, engineering works and manufacture of machinery among others.

Presence of manufacturing industries in a country plays an important role in the economy of that country. Apart from contributing to the national income, industries are a source of employment and a source of products needed by the people. As industries grow, other developments grow concurrently.

However, the growth of industries comes with associated problems such as pollution of air and water, urban sprawl leading to reduced areas for agriculture, and depletion of mineral. It is important that you as industrialisation takes place, so do the pace of dealing with associated problems in order to gain optimally from this process.

End Unit Assessment

1. Draw a map of Germany showing the location of the Ruhr industrial region
2. Explain the factors that led to the development of industries in the Ruhr region.
3. Explain four ways in which industries are important in Germany
4. Explain three problems associated with industrialization in Germany
5. Give possible solutions to the problems identified in question 4 above.

Answers to End Unit Assessment

1. **Map of Germany showing the location of the Ruhr industrial region**
Refer to map of germany showing the location of the Ruhr industrial region

2. Factors that led to the development of industries in the Ruhr region

- ***The presence of cheap coal deposits:*** The Ruhr was well endowed with quantities and high quality coal deposits lying exposed on the earth's surface while some of it was close to the surface. This was useful in iron and steel industries since it could generate heat of up to 5000°C needed to melt iron.
- ***Availability of water transport:*** The region had cheap water transport as raw materials and finished products would be transported along Rivers Ruhr, Lippe, Essen and the Rhine.
- ***Availability of iron ore:*** Germany had large deposits of iron ore along the valley of river Wupper. This was a major raw material in the production of steel.
- ***Presence of ready market:*** The large population of Germany and the other countries in Europe provided ready market for industrial products from the Ruhr region.
- ***Availability of capital:*** The government and private firms provided the required capital for establishment of the industries in the Ruhr region.
- ***Availability of skilled labour:*** The German people had skills of craftsmen dating as far back as 1800. When modern technology was mixed in this skill, industries emerged very quickly and steadily.
- ***Government policy:*** The government policy was also favourable. After Second World War, German government was determined to boost her industrial sector. It poured in large amounts of capital and put policies that favoured industrial growth.

3. Importance of industries in Germany

- a) Industries provide employment opportunities to a very large population. Over 70% of the German's total population works in industries.
- b) The government earns large amounts of revenue from industries. This is through taxes that manufacturers are expected to pay.
- c) Exporting the manufactured goods earns the country large amounts of foreign exchange.
- d) Industries have facilitated the development of infrastructure in Germany. These include roads, railways, pipelines and water ways.
- e) Many employees in the industries are able to acquire specialized skills which they could use even after leaving that employment.
- f) Some of the largest urban centres in Germany have developed as a result of industrial development. Examples of such towns include Mainz, Duisburg, Hamburg and Bremen.
- g) Industries provide consumer goods that the citizens require.

4. **Problems associated with industrialisation in Germany**

- i) High level of mechanization and automation in industries leads to loss of jobs.
- ii) There has been a decline and closure of some industries due to lack of raw materials such as iron and coal. This contributes to loss of jobs and regional imbalance in development levels.
- iii) There is congestion in urban centres due to high population which is attracted by industries.
- iv) There is a problem of environmental pollution due to toxic waste materials that pollute land and water. In addition, gases from thermal power plants and petrochemical industries have greatly affected European atmosphere.
- v) Land degradation has resulted from mining. This is common in areas with coal deposits existing in deeper layers and its extraction leaves land degraded.
- vi) There is a problem of stiff competition with countries producing similar products. They include USA and Japan. Because of a high technology in these countries, they use low costs of production and this poses a threat to industrial sector in Germany.

Remedial activities for slow learners

Carry out a research to find out the major industries in the Ruhr region then present your findings in class for further discussion.

Answers to Remedial activities for slow learners

Learners to summarise the major industries in the Ruhr region by filling in the table as follows:

Type of industry	Area/town where found	Main raw material	Its major products
Iron and steel	Duisburg, Essen, Bochum and Dortmund	Coal and Sweden	Iron and steel products
Engineering	Essen, Dusseldorf, Dortmund, Duisburg and Solingen	Iron and steel	Agricultural implements and machinery such as tractors and combine harvesters used in large scale farming, ship building, heavy vehicle manufacturing and armament.
Chemical	Cologne, Dusseldorf, Essen, Stuttgart, Marl and Leverkusen.	Solid, liquid and gaseous minerals imported from many countries around the world	Agrichemicals

Textile	Krefeld, Dusseldorf, Wuppertal and Gladbeck	It requires silk, cotton and other raw materials for textiles	The main production centre for women clothing. It produces silk, cotton textiles, rayon products and carpets.
----------------	--	---	--

Extended activities for gifted and talented learners

Ask learners to suggest some of the solutions to industrialisation in Germany.

Answers to Extended activities for gifted and talented learners

- i) High level of mechanisation and automation in industries leads to loss of jobs.
- ii) There has been a decline and closure of some industries due to lack of raw materials such as iron and coal. This contributes to loss of jobs and regional imbalance in development levels.
- iii) There is congestion in urban centres due to high population that is attracted by industries.
- iv) There is a problem of environmental pollution due to toxic waste materials that pollute land and water. In addition, gases from thermal power plants and petro-chemical industries have greatly affected European atmosphere.

- v) Land degradation has resulted from mining. This is common in areas with coal deposits existing in deeper layers and its extraction leaves land degraded.
- vi) There is a problem of stiff competition with countries producing similar products. They include USA and Japan. Because of a high technology in these countries, they use low costs of production and this poses a threat to industrial sector in Germany.

18.2. INDUSTRIALISATION

18.2.2. INDUSTRIAL DEVELOPMENT IN JAPAN

Key Unit Competence

By the end of this unit, the learner should be able to compare levels of Industrial Development in Japan in relation to Rwanda.

Prerequisite of this unit

Industrial development studies in the previous unit provided important background information for this unit. Learners will however be required to understand the unique characteristics of Japan and how this has provided a good environment for industrial growth.

While drawing lesson from the Study of Industry in Rwanda (Unit 20 of Senior Two), help learners in discussing the various classifications of industries in Japan, factors for location, growth and development of industries of industries in Japan, importance of industries in Japan and problems and possible solutions to industrialisation in Japan.

This unit will consolidate learners understanding of industrial development in Japan through learning the following:

- Introduction to Japan
- Industrial areas in Japan
- The major industries in Japan
- Factors for industrial development in Japan and importance and problems of industrialisation in Japan.

Cross-cutting issues

Countries are classified as developed when their level of industrialisation is very advanced. Industrial developed however can easily cause negative effects on the environment in that it could lead to water, air and land pollution. In this unit therefore learners will explore the

negative effects of industrialisation in Germany and learn the measures put in place to ensure *conservation of the environment* is undertaken.

Industrial development is also linked to occurrence of *global warming/climate change*. Gases emitted to the atmosphere from factories interfere with the natural balance of atmospheric gasses and moisture leading to climate change.

Study of industrial development will enable the learners to gain knowledge on *financial education*. To set up and develop an industry requires capital undertaking and the end product is financial income.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>Learners are expected to come up with suggestions to identified problems facing tourism in Rwanda. Allow them time to research and read broadly on this topic then brainstorm on possible solutions to each problem identified.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>They will learn this skill when required to justify tourist attractions of Switzerland.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>Learners are also expected to perfect this competence through participation in writing reports of their findings and compiling class presentations. Guide them in writing and presenting their findings to ensure they acquire and perfect this skill.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. It is a general competence learners are expected to acquire especially after interacting in pair and group work.

Vocabulary/key words/concepts

Aerospace	The branch of technology and industry concerned with both aviation and space flight
Petrochemicals	A chemical obtained from petroleum and natural gas

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

Industrial Development in Japan:

- (i) Describe the location, size and population of Japan.
- (ii) What are the major industries in Japan?
- (iii) Which factors favour industrial development in Japan?
- (iv) What is the importance and problems of industrialisation in Japan?
- (v) Which are the industrial areas in Japan?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Learners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Introduction to Japan the major industries of Japan
Lesson 2	Major industries of Japan and factors for industrial development in Japan
Lesson 3	Importance and problems of Industrialisation in Japan

LESSON DEVELOPMENT

LESSON 1: INTRODUCTION TO JAPAN AND THE MAJOR INDUSTRIES OF JAPAN

Learning objectives

By the end of this lesson, the learner should be able to:

- i) Describe the location, size and population of Japan.
 - ii) Identify the industrial areas of Japan.
 - iii) Locate the major industries found in Japan.
-

Introduction

Japan lies between latitudes 24°N and 46°N. It is an island nation comprising of 6,852 islands. Out of these, only 430 have settlements. The largest islands are four, namely Kyushu to the extreme south, Shikoku, Honshu and Hokkaido to the north. Japan is separated from the Asian continent mainland by the Sea of Japan that is to the west of the four islands. To the east is the Pacific Ocean. Japan's closest neighbours are North and South Korea and Russia that lie east of the Sea of Japan. To the south are the islands that constitute the Philippines.

The total land area of Japan is 364,486Km². The country is the 10th most densely populated country of the world with an estimated total population of 127,110,000 and an average population density of 336 persons per Km².

Japan is a leading industrial nation in the world. It has industries spread out in various parts of the four main islands. However, there are regions where there are major concentrations, which form the nerve centre in the country. They happen to be the centres where the initial development of industries started before spreading out elsewhere.

Among the major areas are the region around Tokyo (the capital city), regions around Osaka, Nagoya and south western part of the island of Honshu and southern Shikoku. There are many other industrial zones spread out in the four main islands.

Japan has a wide variety of industries ranging from heavy iron and steel, car manufacture chemical industries, engineering works and manufacture of machinery among others. There are also numerous light industries such as food processing, textile and footwear industries, and confectioneries among others. It is important to note that the Japan is one of the most industrialised nations in the world. With a population estimated at over 127 million people and out of the 364,486 km² area of Japan, only 11% is arable land. This tells us that most people rely on industrial activities for income and livelihood. When you consider the requirements of a population, then it means the demand for industrial products is very high.

When teaching this section, it will be necessary to draw the learners' attention to the statistics of Rwanda so that they can make comparisons. Rwanda's figures are, an area of

26,338 km², an estimated total population of 11,272,000 and an average density of 477 persons per km². Compare with the situation in Rwanda to give the learners a picture of the other extreme in industrial development.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the location of Japan

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with a reading session where one of the learners will read to the whole class the **introduction** given in the Learner's Book.

Avail a map showing the location of Japan that learners will compare with the one given in the Learner's Book.

Divide the class into five groups; each assigned one of the questions given in **Activity 18.2.2.1**. Each group will be expected to draw a sketch map of Japan then show the features required. Ask group leaders of each group to draw a combined map showing all the features discussed in their respective groups. This is the map they will hang in the Learning Corner of the class for reference in the next lesson.

In conclusion, learners should attempt **Activity 18.2.2.3** in the Learner's Book, then summarise their points in their notebooks. After the lesson, let the class leader collect their notebooks for you to check and verify that they have done it correctly. Guide those who will not have grasped the concept accordingly.

Synthesis

Ask learners to work in pairs for **Activity 18.2.2.2** in the Learner's Book.

Assessment

Give learners a task to research on the industrial regions of Japan they discussed in **Activity 18.2.2.3** in the Learner's Book. These regions are:

- a) The Keihin Region
- b) The Hanshin Region
- c) The Isle Bay Region
- d) The Kitakyushu region

On each of these regions, they should prepare brief notes on their location in Japan, the main industries and the products made in each region. This information can be presented in a tabular form for ease of compilation.

LESSON 2: MAJOR INDUSTRIES OF JAPAN AND FACTORS FOR INDUSTRIAL DEVELOPMENT IN JAPAN

Learning objectives

By the end of this lesson, the learner should be able to:

- i) Locate the major industries found in Japan.
- ii) Outline the factors favouring development of industries in Japan

Introduction

For this lesson, it is important that you identify a suitable map of the Japan showing the location of the major industries. Identify samples of photographs of some of the industries. You could make a table with major towns and the dominant industry in each. Apart from the major industries, you need to research to find out which other industries are found in the region. In each discussion, ensure that learners make notes that are comprehensive. Have questions to guide the flow of the lesson.

There are many general factors that influence industrial development. Most factors apply to many industrial nations but a country may have some unique factors that apply only to it. In Japan, all general factors such as skilled labour, market, capital, transport and availability of water do apply. However, Japan is unique in that it lacks most of the necessary raw material and thus relies on importation. Coal and iron ore occur in very small quantities locally yet Japan is among the leading nations in development of heavy metallurgical industries.

It is important to read widely so that you guide the learners to acquire the correct information about industrialization in Japan. As you teach the section keep in mind the comparisons that you need to make with Rwanda so that learners are able to appreciate the level of industrial development in Japan and desire to improve the industries in Rwanda.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing some of the industrialised areas of Japan

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Start of the lesson with a brief history of how Japan became industrialised. It is important that you ask learners to read ahead of you so that as you lead them in this discussion, they will be able to understand more and even add points to what you will have presented to them.

To make the explanation more realistic, learners should discuss **Activity 18.2.2.4** in the Learner's Book, with particular reference to questions 2 and 3.

In a brainstorming session, learners should be led to discuss the major industries in Japan. Information required for this session is given in the Learner's Book.

The photographs provided on these pages can be used to support your explanation. Using the Internet, let learners source for additional photos to support the industries on these pages.

Synthesis

In groups, let learners discuss the first question of **Activity 18.2.2.4** in the Learner's Book. They should then compile their findings for class presentation.

Assessment

Divide the class into two groups, one to discuss **Activity 18.2.2.5** and the other **Activity 18.2.2.6** of the Learner's Book.

In a joint session, group leaders of each group should then present their findings, with additional information given by members from their respective groups.

LESSON 3: IMPORTANCE AND PROBLEMS OF INDUSTRIALISATION IN JAPAN

Learning objective

By the end of this lesson, the learner should be able to analyse the importance and problems of various industrialisation in Japan

Introduction

The presence of manufacturing industries in Japan has played an important role in the economy of that country. It is the leading economic activity earning the country about 24% of the gross domestic product. Apart from contributing to the national income, industries are a source of employment and a source of products needed by the people. As industries grow in a place, other developments grow concurrently. For instance, growth of industries sparks off growth of agriculture, transport and communications as well as

trade. You should engage the learners in discussing the situation in Rwanda to enable them appreciate these types of developments and relationships as they compare with Japan which far more industrialised. Some examples of the problems associated with industrialisation in the Japan include pollution of air and water, urban sprawl. It is important that you carry out research to gather more information on the sub unit.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- The Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Ask learners to research widely on the importance of industries in Rwanda and the problems associated with the industrialisation in the country. While working on **Activity 18.2.2.10** in the Learner's Book, ensure that learners full explore reasons that make industries important in Rwanda. As they discuss, let them be making brief notes in their notebooks.

On a rejoinder, remind them that despite the fact that industries have such immense benefits, they face a number of problems. On a fresh page in their notebooks, learners should explain some of the problems that industries in Rwanda face.

Relate the points generated in these two discussions to Japan. In panels, learners should read and discuss the points listed in the Learner's Book.

Synthesis

In groups, let learners work on **Activity 18.2.2.11** in the Learner's Book. They should then compile a class report for presentation during remedial learning.

Assessment

Working in groups, learners should respond to the questions in **Activity 18.2.2.12** in the Learner's Book. One of the group members should then compile their findings to be shared with other groups.

END OF UNIT

Summary of the Unit

Japan lies between latitudes 24°N and 46°N. It is an island nation comprising of 6,852 islands. Out of these, only 430 have settlements. The largest islands are four, namely Kyushu to the extreme south, Shikoku, Honshu and Hokkaido to the north.

Japan has a wide variety of industries ranging from heavy iron and steel, car manufacture chemical industries, engineering works and manufacture of machinery among others. There are also numerous light industries such as food processing, textile and footwear industries, and confectioneries among others. It is important to note that the Japan is one of the most industrialised nations in the world.

There are many general factors that influence industrial development. Most factors apply to many industrial nations but a country may have some unique factors that apply only to it. In Japan, all general factors such as skilled labour, market, capital, transport and availability of water do apply. However, Japan is unique in that it lacks most of the necessary raw material and thus relies on importation. Coal and iron ore occur in very small quantities locally yet Japan is among the leading nations in development of heavy metallurgical industries.

End Unit Assessment

1. Briefly discuss the major industries in Japan.
2. Summarise the factors that favour industrial development in Japan.
3. Describe the importance of industrialisation to the economy of Japan.
4. Compare the similarities between the problems of industrialisation in Rwanda and Japan.

Answers to End Unit Assessment3

1. **The major industries in Japan**
 - a) **Iron and steel industry:** In the whole world, Japan ranks number two in the production of iron and steel after China. This industry is majorly found in Yawata, Kamaishi in Honshu and Muroran in Hokkaido. Over half of the Japan's steel capacity is concentrated near the major port cities of Himeji, Kobe-Osaka and Tokyo-Yokohama areas of South Central Honshu. Most of Japan's steel plants are situated either on the Bay-Coast or on some canal or river. This is because of the fact that they depend upon outside raw materials and also need ready market for finished steel.
 - b) **Ship building:** Although Japan faces stiff competition from South Korea and China, it has a successful and advanced shipbuilding manufacturing industry. Many ships have been built in Japan with high technology.
 - c) **Petrochemicals:** The petrochemical industry in Japan is well-developed it picks a lot of market in developing countries of Asia. These industries are common in areas such as Kashima, Kawasaki, Oita, Shunan, Iwakuni, Mizushima, Osaka and Yokkaichi. Products from this industry include: Ethylene, Benzene, Toluene, Xylene, Polyethylene, Polyvinyl Chloride and many others.

- d) **Motor vehicles and machinery industry:** The motor vehicle industry is one of the most successful industries in Japan, products here include, tyres and engines, cars, construction vehicles, motorcycles, Japan's automobiles are generally known for their quality, durability, fuel efficiency and more features for a relatively lower price than their competitors. Global Japanese motor vehicle companies include: Toyota, Honda, Nissan, Infiniti, Suzuki, Mitsubishi, Subaru, Isuzu among others. These companies are mainly based in areas like Tokyo, Aichi, Kawasaki, Hokkaido and Kyoto.
- e) **Aerospace:** In 1969, Japan established the National Space Development Agency and this was tasked with the development of satellites and launch vehicles. This boosted industry so much. In this industry, products such as Commercial aircraft and aircraft engines, Helicopters Aircraft parts and supplies and Avionics
- f) **Electronics:** Because many of the world's major electronics companies are based in Japan, such as Canon, Casio, Citizen, Fujitsu, Hitachi, Nikon, Panasonic, Sharp, Sony among others, Japan has developed far in as electronics are concerned. The electronic products from Japan are known for their quality, durability, and technological sophistication. Products include, computers, cameras, radios, televisions, projectors, telephones, robots and washing machines.
- g) **Food:** Food industries in Japan ranks number three after electric and transport machinery. In this industry, a variety of products, ranging from traditional Japanese items, such as soybean paste (miso) and soy sauce, to beer and meat are all produced.
- h) **Fish industry:** Fishing industry in Japan is one of the largest in the world. They use both large vessels and medium sized boats to catch large quantities of fish. Some of the species caught include bonito, crab, sardines, salmon, shrimp, Pollock, mackerel clams, tuna and yellowtail. Fishing is done from Hokkaido to Kyushu and also in the Korean and Chinese waters as well. From this industry, products such as cosmetics, medicines and lubricants are obtained.

2. Factors that favour industrial development in Japan

- **Post war financial help:** after World War II, Japan got a lot of financial support from USA which enabled her to rebuild the ruined industries.
- **Government policy:** The government of Japan encourages industrialisation so much. It ensures that people are well educated to possess the required skills and also taxes are not a hindrance to industrialisation.
- **Market:** Japan is located in strategic place that is near Asia's main land. This enables her industrial goods to have ready market immediately after production.
- **Energy:** Japan has sufficiently developed Hydro-electric power which has compensated her lack of coal. This has prevented her from importing petroleum from other countries.
- **Indented coastline:** Japan has favourable coastline that enables large sea ports and even loading and off-loading ships is easy. This makes the importation of raw materials and exporting hers manufactured goods a walk-over.
- **Technology:** The technology in Japan is high, it is because of this they their products outcompete those of other countries. For efficiency, they even use automated robots.

- **Trade:** Japan embraced global trade, this enabled her to widen on her market and through this and in addition to their high quality, her industrial goods became popular throughout the world.

3. **Importance of industrialisation to the economy of Japan**

- **Government revenue:** the government levies taxes on industries and earns revenue. This revenue is used to develop other infrastructure such as roads, schools and hospitals.
- **Market:** The development of industries in Japan created high demand for agricultural products hence providing market.
- **Tourism:** Many people have been attracted by Japanese industries who go to tour industrial manufacturing sites which in long run adds to government revenue.
- **Foreign exchange:** Industrialisation has enabled Japan to earn a lot of foreign exchange. Japan ranks number four in exports to other countries after USA, Germany and China.
- **International relations:** Industrialisation has ensured good relations with other countries where goods are sold or where raw materials are bought from.
- **Urbanisation:** Industrialisation enhanced the development of towns and ports in areas where industries are located.

4. **A comparison of the similarities between the problems of industrialisation in Rwanda and Japan**

Problems of industrialisation in Japan

1. Industries in Japan have resulted into **deforestation** because more land for industries is required.
2. It has greatly led to high **population growth** in Japan which strains natural resources.
3. It has led to **global warming** resulting in the destruction of ozone layer and its eventual effect on water cycle.
4. It has resulted into heavy **pollution** of the environment from the waste materials disposed off from industries such as gases.
5. There has been **competition** from other countries such as China, USA and Germany. This forces Japan to make a lot of research to keep its products needed.

Problems of industrialisation in Rwanda

1. **Pollution:** Industries can lead to both air and water pollution. Some industries produce chemical substances which if discharged into water bodies are harmful to the living things in the water. Therefore, waste substances from chemical industries must be treated and discharged with care to avoid pollution.
2. **Rural-urban migration:** As more industries are set up in towns, more people move from rural areas hoping to get employment in these industries. This causes overcrowding in towns creating pressure and congestion on social amenities like health facilities.

3. **Over-exploitation of natural resources:** Resources such as forests are overexploited as the demand for raw materials increase. Forests like Nyungwe are endangered as people exploit timber to supply building and furniture industries.
4. **Displacement of people:** Development of industries creates demand for space. As a result, people are made to relocate to allow for building of a factory. This is worse in rural areas where farmers are made to give up their farms. It is also expensive for the government to compensate those whose land has been used.

Remedial activities for slow learners

Let learners summarise the importance of industrialisation to Japan.

Answers to Remedial activities for slow learners

A summary of the importance of industrialisation to Japan

- i) It generates revenue for the government through the taxes it levies on electronics exports. This revenue is used to develop infrastructure such as roads, schools and hospitals.
- ii) Tourism has developed as a result of many people being attracted to the various industrial manufacturing sites.
- iii) Industrialisation has ensured good relations with other countries where goods are sold or where raw materials are obtained.
- iv) It provides jobs to many people. Jobs include those of managers, engineers, accountants, and technicians among others.
- v) It promotes local and international trade.
- vi) Industrialisation has enhanced the development of cities and ports in areas where industries are located. Some of these cities are Sapporo, Yokohama, Kyoto and Hiroshima.

Extended activities for gifted and talented learners

Ask learners to explain the main challenges facing industrialisation in Japan.

Answers to Extended activities for gifted and talented learners

Ask learners to explain the main challenges facing industrialisation in Japan.

- (a) **Deforestation:** Industries in Japan have resulted into deforestation because more land for industries is required. This has been compounded by Japan's high population, which requires settlement on the limited land available.
- (b) **Global warming:** It has resulted into high levels of pollution of the environment from the waste materials such as gases emitted from industries. This has contributed to global warming.
- (c) **Competition:** There has been competition from other countries such as China, USA and Germany. This forces Japan to invest in research to keep its products needed.

18.2. INDUSTRIALISATION

18.2.3. INDUSTRIAL DEVELOPMENT IN U.S.A.

Key Unit Competence

By the end of this unit, the learner should be able to analyse the levels of Industrial development in U.S.A

Prerequisite of this unit

The curtains come closing on the study of industrialisation by studying industrial development in the USA.

It will important for learners to exploit the knowledge they have gained from previous units, including Unit 20 of Senior Two (Industry in Rwanda), Unit 18.2.1 (Industrial development in Germany) and Unit 18.2.2 (Industrial Development in Japan).

In this unit, learners are expected to study the industrial regions in USA, factors influencing industrial development in USA and importance and problems associated with industrialisation in USA and their possible solutions.

To help learners gain even more and remember previous information, let them learn through comparing industrialisation in Rwanda, Germany, Japan and USA.

Choose the following areas for comparison purposes:

- Factors favouring industrialisation in each of the selected countries
- Major industrial areas in each country
- The type and major industries in each country
- Importance of industries in each country
- Problems associated with industrialisation in each country
- Possible solutions to the problems facing industrialisation on each country

Cross-cutting issues

Countries are classified as developed when their level of industrialisation is very advanced. Industrial developed however can easily cause negative effects on the environment in that it could lead to water, air and land pollution. In this unit therefore learners will explore the negative effects of industrialisation in Germany and learn the measures put in place to ensure *conservation of the environment* is undertaken.

Industrial development is also linked to occurrence of *global warming/climate change*. Gases emitted to the atmosphere from factories interfere with the natural balance of atmospheric gasses and moisture leading to climate change.

Study of industrial development will enable the learners to gain knowledge on *financial education*. To set up and develop an industry requires capital undertaking and the end product is financial income.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. They will also be able to cope with the evolution of knowledge and technology advances for personal fulfilment. <i>This competence is to be acquired when learners demonstrate practical ways of developing industrialisation in Rwanda, based on the acquired knowledge of industries in USA.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>It is only through research that learners will correctly analyse the importance of industrialisation in USA.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>By compiling reports, findings and notes for discussion and class presentation, it is expected that learners will perfect this competence.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. <i>Learners will acquire this competence through working in groups on activities such as when describing factors that favour industrial development in USA..</i>

Vocabulary/key words/concepts

Megapolis	A megalopolis (sometimes called a megaregion or supercity) is a chain of roughly adjacent metropolitan areas.
Global warming	This refers to a gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide, chlorofluorocarbons, and other pollutants.
Skyscraper	A very tall building of many stories.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

Introduction

- (i) Locate the major industrial regions and major industries found in USA in the Great Lakes Region, Megalopolis, coastal areas around the Gulf of Mexico and the western coast of U.S.A.
- (ii) Which factors influence industrial development in U.S.A.?
- (iii) What is the importance, problems associated with industrialisation in U.S.A. and their possible solutions?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Learners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Industrial Regions in U.S.A
Lesson 2	Factors influencing industrial development in U.S.A.
Lesson 3	Importance of industrialisation in U.S.A, problems associated with industrialisation and their possible solutions

LESSON DEVELOPMENT

LESSON 1: INDUSTRIAL REGIONS IN U.S.A

Learning objective

By the end of this lesson, the learner should be able to locate the major industrial regions and major industries found in USA.

Introduction

USA has a wide variety of industries ranging from heavy iron and steel, car manufacture chemical industries, engineering works and manufacture of machinery among others. There are also numerous light industries such as food processing, textile and footwear industries and confectioneries among others. It is important to note that the USA is one of the most industrialised nations in the world. The importance of the industrial sector is seen in terms of the number of people who depend on jobs in the sector and the supply of manufactured goods to the citizens.

The country has six areas that can be classified as the industrial regions. These are the Atlantic industrial region, the Great lakes industrial region, Pacific coast region North Atlantic region, south central region and the Gulf coast region as shown in the map in the learners' book.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the industrial areas of USA

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Start the lesson by revising what learners already know, as they already have background information about USA.

In a brainstorming session, let them discuss the position, size and population of USA. Ask them to compare the size of USA to other countries of the world, including Rwanda. Link the information obtained from this session to the lesson by explaining that the size of the population of USA has given rise to numerous needs which can only be solved by Americans themselves first before sourcing for help elsewhere. This is where industrialisation elsewhere only serves to support what they can produce.

In groups, ask learners to use their Senior Two Learner's Book to respond to **Activity 18.2.3.1** of the Learner's Book. The activity is meant to help learners appreciate industrialisation in Rwanda and then relate it to the USA. While focusing on this activity, let them carry out a research on the industrial regions of USA. They should then write brief notes on each region, then share their findings.

Lead them to conclude the discussion by referring to the table showing some of the industries in major industrial region in USA in their learner's book.

Synthesis

Divide the class into groups and ask each group to research on a given region. They should also identify the major towns in these regions to enable them relate the regions with the industrial cities rather than the locations.

From their discussions, let them make comprehensive notes on each of the region regarding the major industries and the specific towns for each. Prepare questions to guide the flow of the discussion.

Assessment

Learners should draw a map of USA showing the location of industrial regions. Let them show the boundaries and names of the states in USA where the industrial regions are found.

LESSON 2: FACTORS INFLUENCING INDUSTRIAL DEVELOPMENT IN U.S.A

Learning objective

By the end of this lesson, the learner should be able to describe the factors that favour Industrial development in U.S.A.

Introduction

There are many general factors that influence industrial development. Most factors apply to many industrial nations but a country may have some unique factors that apply only to it. In the USA, all the general factors such as skilled labour, market, capital, transport and availability of water do apply. Coal and iron ore occurred in very large quantities in some of the localities leading to the nation's development of heavy metallurgical industries. It is important to read widely so that you guide the learners to acquire the correct information about industrialisation in USA at the specific regions. As you guide learners through this lesson, keep in mind the comparisons that you need to make with Rwanda so that learners are able to appreciate the level of industrial development in USA and desire to improve the industries in Rwanda.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing sections of the industrialised areas of USA

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Ask learners to carry out a research on the factors influencing industrial development in the USA. Ensure that that you have the historical factors and those that apply today to assist them in their discussion.

As they discuss, prevail on them to make comprehensive notes. Have guiding questions to help the flow of the lesson.

Divide the class into groups then ask them to read through the factors discussed on **page 390** of the Learner's Book. Have one of the learners list the various points identified on

the board. Afterwards, assign each group specific factors to research on. As you help them form groups, have in mind **learners of different abilities in each group**.

To help them contextualise the topic of discussion further and boost their understanding, let them compare these factors to those that are applicable to Rwanda.

With the help of the photographs in the Learner's Book between (found under factors influencing industrial development in the USA), let them explain how industrial development is supported by each of the resources shown.

Conclude the lesson by having learners you would have picked at random, to read aloud some of the factors for USA already discussed in class.

Synthesis

Activity 18.2.3.2 in the Learners' Book should form the basis of this important session of learning. Let them work in pairs to generate responses that they will summarise in their notebooks for presentation in class during remedial learning.

Assessment

On an individual basis, learners should find out the unique factors that have favoured industrial development in the USA. In a comprehensive way, they should then document it, better still, with supporting photos or excerpts from newspapers, magazines or downloads from the Internet.

Ask the learners to prepare notes on factors that influence growth of industries in the USA comparing with Rwanda.

LESSON 3: IMPORTANCE, AND PROBLEMS ASSOCIATED WITH INDUSTRIALISATION IN U.S.A. AND POSSIBLE SOLUTIONS

Learning objective

By the end of this lesson, the learner should be able to analyse the importance and the problems associated with Industrialisation in U.S.A.

Introduction

The presence of manufacturing industries in USA plays an important role in the economy of that country. It is the leading economic activity earning the country about 12.5 % of the gross domestic product. Apart from contributing to the national income, industries are a source of employment and a source of products needed by the people. As industries grow in a place, other developments grow concurrently. For instance, growth of industries sparks off growth of agriculture, transport and communications as well as trade. You should engage the learners in discussing the situation in Rwanda to enable them appreciate these types of

developments and relationships as they compare with USA that is far more industrialized. Some examples of the problems associated with industrialization in the USA include pollution of air and water, urban sprawl. It is important that you carry out research to gather more information on the sub unit area.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Newspaper articles, the internet and other sources of information.

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Encourage learners to carry out a research on the importance of industries in USA and the problems associated with the industrialisation in that country.

Divide the class into three groups. Each group should have a special assignment as suggested below:

Group 1: To discuss the importance of industrialisation in USA. They should do so as part of the response to specific questions in **Activity 18.2.3.3** in the Learner's Book.

Group 2: To find out the problems affecting industrialisation in USA. They should do so as part of the response to specific questions in **Activity 18.2.3.4** in the Learner's Book, **except for questions 2 and 4** which will be discussed later.

Group 3: To use the findings of Group 2 in finding out the solutions in place for the problems of industrialisation identified. They should do so as part of the response to specific questions in **Activity 18.2.3.5** in the Learner's Book.

NOTE: Ensure that each group is balanced with learners of all abilities in class. The physical disabled, visually impaired, slow learners and fast learners should all be catered for in this arrangement.

Members of the group should jointly present the findings of each group. After presentations, shuffle memberships of the groups then ensure new members of the group are helped to make comprehensive notes on the topic of discussion.

Synthesis

In pairs, learners should read the **newspaper article** on environment in the Learner's Book. With specific reference to the article, let them describe the activities that lead to pollution in USA.

Assessment

In reference to the newspaper article discussed earlier, let learners identify the measures the Government of USA has taken to manage pollution. They should then summarise their findings for presentation in class.

End Unit Assessment

1. Draw a map of USA showing the location of the main industrial regions. Observe the good qualities of a map, that is, it must have a title, compass, key and a frame.
2. Explore the factors that led to the development of industries in the regions identified in question 1 above.
3. Briefly explain four ways in which industries are important in USA
4. Explain three problems associated with industrialisation in USA
5. Suggest the possible solutions to the problems identified in question 4 above.

Answers to End Unit Assessment

1. Draw a map of USA showing the location of the main industrial regions. Observe the good qualities of a map, that is, it must have a title, compass, key and a frame.
Refer to Figure 18.2.3.1 of the Learner's Book.
2. **Factors that led to the development of industries in industrial regions of USA:**
 - Transport and communication system
 - Population increase which provide labour and market for industrial goods
 - Availability of varied sources of fuel for running the industries.
 - Effective Banking System that enabled people to save, access loans and and invest in industrial activities
 - Supportive Government Policy, such as a lenient tax system that encourages industrialisation.
 - Availability of raw materials
 - External and Internal Security both internally and externally
 - Increased Agricultural productivity due to mechanisation of farms
3. **Importance of industries in USA**
 - It provides jobs to many Americans. These include accountants, bankers, and lawyers that are associated with any industry, as well as a broad range of other jobs including basic research and technology.
 - It has improved people's standards of living because they get money from industries and even get better goods for consumption.
 - The government obtains a lot of revenue from industries
 - USA earns a lot of foreign exchange from exportation of industrial products.

- People obtain exceptional skills from industries. This is through regular workshops and training in addition to experience obtained.
- Industrialisation diversified USA's economy not to rely on one activity.

4. **Problems associated with industrialisation in USA**

- Declining mineral resources have led to closure of some industries leading to loss of jobs.
- Competition from imports that limits markets for manufactured goods. For instance, Japan exports automobiles to USA and this greatly threatens motor vehicle industry in USA.
- There is a problem of rising cost of production that leads to increased prices of industrial goods.
- Unfair taxation system imposed on USA industrial products in other countries has affected the demand for US products in the external markets. For example, Japan levies high taxes on cars from USA, which has seriously discouraged further manufacturing in USA.
- Industrial expansion leads to large areas that would be used for agriculture being used up by industries.
- Growth of industries led to growth of large urban centres that came along with urban problems such as limited office space, rise in crime rate and emergence of shanties due to housing problems.

5. **Possible solutions to the problems identified above**

- Pollution has been solved by government intervention where industrialists are urged to treat wastes before disposal
- There has been localisation of industries in regions where there is enough space and also setting them outside cities. This has left people with resident space.
- For high crime rate, the government has used its police to crack down law breakers
- The high cost of production has been checked by the use of automated robots.
- Skyscrapers have been established in order to solve the problem of shortage of space on land.
- Constructing underground tunnels and sub-ways has solved the problem of traffic jam.

Remedial activities for slow learners

There are four main industrial regions of USA. Carry out a research to find out the main industries in each region.

Answers to Remedial activities for slow learners

The table below shows some of the industries in major industrial regions in USA.

Region	Main industries
The western coast of the USA	Ship building, electrical equipment, textile machinery, clothing industry, transport equipment, pharmaceutical industries, food processing
Megalopolis region	Oil refining, mining equipment, steel milling, chemical industries, synthetic rubber, clothing industry, food industries
Coastal areas around the gulf of Mexico	Oil refining, chemical industries, textile industry, food processing, pharmaceuticals, fishing equipment
The Great lakes Region	Automotive, consumer products, medical, process industries, energy, heavy equipment, aerospace, transportation

Extended activities for gifted and talented learners

Assign learners a task of briefly explaining the factors that have encouraged industrialisation in USA.

Answers to Extended activities for gifted and talented learners

Factors that have encouraged industrialisation in USA:

- **Transport and Communication system**
USA had a well developed network of roads and communication. This made it easy for raw materials to be transported to factories and finished goods to be moved to market centres.
- **Population increase**
The increase in population also influenced industrial development in USA. There was enough labour needed for mining and agriculture. People also provided domestic market for the produced goods.
- **Good Supplies of Fuel**
USA developed industries because of the availability of varied sources of fuel. For example it had access to biomass, petroleum, coal, natural gas, wind power, solar energy and others. All these made the running of day-to-day industries.

- **Effective Banking System**

USA had a well developed banking system that was non-restrictive in managing people's finance. This enabled USA citizens to save and invest sufficiently and even to get loans that availed people with enough capital hence industrial development.

- **Supportive Government Policy**

USA government favoured industrialisation in a way that it never frustrated businessmen but instead regulated rules that shaped the economy in a positive way. This was through a better taxation system that did not hinder development.

- **Availability of raw materials**

This is also a common factor but the types of the dominant raw materials vary from region to another and this determines the main type of industry in each region.

- **External and Internal Security**

For a long period of time, USA enjoyed maximum security both internally and externally and this gave businessmen to invest in industries and they boomed because nothing threatened their development.

- **Increased Agricultural productivity**

USA developed agricultural sector first and this provided sufficient raw materials that industries required hence industrial development in regions such as:

- Great lakes region
- Megalopolis region
- Coastal areas around the gulf of Mexico
- The western coast of the USA

18.3. TOURISM IN SWITZERLAND

Key Unit Competence

By the end of this unit, the learner should be able to compare levels of tourism development in Switzerland in relation to Rwanda.

Prerequisite of this unit

The first time learners studied about Tourism was in Senior Two, under Unit 22 (Tourism in Rwanda). The information was built around their understanding of the definition of tourism, tourist sites in Rwanda, factors for tourism in Rwanda, importance of tourism in Rwanda, problems affecting tourism in Rwanda and the relationship between Rwanda and regional countries in tourism. This information was key as it helped them appreciate not only the benefits of tourism to the country and Rwandans in general, but also the various challenges that industry faces in earning the all important foreign exchange from this economic activity.

In Unit 17, they learnt about tourism, but on a larger scope, this time round studying tourism in Africa. Through studying a number of countries, they must have learnt that tourism is as important to other countries as it is to Rwanda. They also explored the major tourist areas in Africa, factors favouring the development of tourism in Africa, contribution of tourism to the development of Africa, problems and suggested solutions and future prospects of sustainable development in tourism in Africa.

The expanded view must have also helped them appreciate that beyond Rwanda, there are other interesting areas to visit. These are not superior to Rwanda, but compliment the choices they already have in their motherland.

This Unit is meant to help them understand tourism from a global point of view, by studying the one of the world's best tourist destination. There are various attractions in Switzerland, factors favouring tourism in Switzerland and the importance of the tourism industry to the economy of Switzerland.

It will be interesting to compare the tourist destinations across Africa and those in Switzerland. It will also be important to compare the factors favouring tourism in Switzerland as compared to those in African countries. Despite it being a leading tourist destination in the world, it also faces a number of challenges. It is important for learners to study in detail how Switzerland deals with such problems in comparison to Rwanda and various other African countries. This unit, if well handled, will be an interesting read as it will open up the thinking of the learners, giving them ability to compare and appreciate their locality, country and continent .

Cross-cutting issues

In this unit, learners will explore tourism in Rwanda and compare with Switzerland to find out similarities and differences. This will help them learn some of the measures that can be put in place to ensure *conservation of the environment* and to sustain tourist attractions.

The study of tourism will enable the learners to gain knowledge on *financial education*. A developed tourist industry promotes capital generation for the government while individuals are able to earn their living through tourist related activities.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>Due to the need to assess the problems facing the tourism industry, learners are expected to think critically and suggest possible solutions to each of the problem identified.</i>
Creativity and innovation	The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts. <i>This competence will be developed when learners explore oportunities in their local environment that are potential tourist attraction but have not been explored.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>Each learners will be expected to carry out research on information related to areas such as factors surrounding the development of the tourism industry. They also need to explain or justify the tourist attractions in Switzerland, information that they will obtain from extensive research.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>When compiling their findings or making class presentations, encourage correct use of language and emphasise communication skills.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. <i>While working in pairs and groups, learners will be expected to develop this competence as they will need to depend on one another to cook for information, compile class presentations and make corret conclusions.</i>

Vocabulary/key words/concepts

Scenery	The natural features of a landscape considered in terms of their appearance
Ski	A narrow strip of semi-rigid material worn underfoot to glide over snow (or for skiing)
Antiques	Antiques are usually objects that show some degree of craftsmanship—or a certain attention to design. It is collected or desirable because of its age, beauty, rarity, condition, utility, personal emotional connection, and/or other unique features. It is an object that represents a previous era or time period in human society. Tourists buy sometimes as souvenirs
Rapids	Fast-flowing and turbulent parts of the course of a river.
Rugged	Having a broken, rocky, and uneven surface.

Landlocked	Almost or entirely surrounded by land; having no coastline or seaport (of a lake) enclosed by land and having no navigable route to the sea.
-------------------	--

Guidance on the problem

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) Explain the location, size and population of Switzerland.
- (ii) What are the touristic attractions in Switzerland?
- (iii) Which are the factors for development of tourism industry in Switzerland in comparison to that of Rwanda?
- (iv) What is the importance and problems affecting tourism and possible solutions in Switzerland?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Learners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Introduction to Switzerland and tourist attractions in Switzerland
Lesson 2	Factors for the development of the tourism industry in Switzerland in comparison to that of Rwanda
Lesson 3	The importance of and problems affecting tourism and possible solutions in Switzerland

LESSON DEVELOPMENT

LESSON 1: INTRODUCTION TO SWITZERLAND AND TOURIST ATTRACTIONS IN SWITZERLAND

Learning objectives

By the end of this section the learners should be able to:

- a) Explain the location, size and population of Switzerland.
- b) Describe the tourist attractions of Switzerland.

Introduction

In this section, it is important to take a while to make comparisons between Rwanda and Switzerland since both are located in a central position of continents, are small in size and have a mountainous relief.

Switzerland is a landlocked country located in central Europe. To the south is Italy, to the west is France, to the north is Germany and to the East is Austria. The country is made up of three landforms: the Alps that occupy most of the country, the Swiss plateau and the Jura Mountains. The country is 41,285 km² in size. The population of Switzerland is about eight million, most people living on the Swiss plateau with the majority living in the large cities such as Geneva and Zurich.

Tourist attractions in Switzerland range from the physical environment, the hospitality of the Swiss people, the multiple languages spoken in the country and the sporting activities that take place in summer and in winters. The other attractions include the beautiful scenery with U-shaped valleys, snow-capped mountains and winter sports such as skiing. Other attractions are the warm summers, which encourage summer sports. The country has well-developed transport facilities such as cable cars which connect the large cities to all tourist sites. The country is very safe making visitors feel very secure in all the places they visit.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the position of Switzerland

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with **Activity 18.3.1** in the Learner's Book. This should be a brief session for individual work, allowing them to use Senior 2 Learner's Book as well as Unit 17 of this book as points of references.

In groups, learners should work on **Activity 18.3.2** in the Learner's Book. This is the first instance a comparison is being made between Rwanda and Switzerland. Analyse learner's responses to ensure that they understand this element of comparison.

Switzerland has a number of tourist attractions, which have been detailed between **pages 399 and 403** of the Learner's Book. As learners read through this section, supervise them to ensure that they understand each attraction (that is, by location, name where applicable, and reasons that make it preferred by tourists).

Divide the class into four groups, each to take on the following activities in the Learner's Book:

Group 1: **Activity 18.3.3** in the Learner's Book

Group 2: **Activity 18.3.4** in the Learner's Book

Group 3: **Activity 18.3.5** in the Learner's Book

Group 4: **Activity 18.3.6** in the Learner's Book

After discussions, each group should prepare a class presentation. In their presentation, encourage them to cite examples, use photographs and citations to support their explanation.

Synthesis

Learners to complete the following tables appropriately:

Human factors that attract tourists in Rwanda	Human factors that attract tourists in Switzerland	Natural tourist attractions in Rwanda	Natural tourist attractions in Switzerland

Tourist activities in Rwanda	Tourist activities in Switzerland

Assessment

Ask learners to carry out a research to explain the unique features of tourist attractions in Rwanda and Switzerland.

Further activities

1. Learners should draw a map of Switzerland showing the location of the country in relation to the surrounding. Ask them to ensure they complete the answers to all the activities in the section for discussion.
2. Learners should research and make notes on Switzerland's location in relation to other countries where most of the tourists originate from and the tourist features for class discussion.

LESSON 2: FACTORS FOR THE DEVELOPMENT OF THE TOURISM INDUSTRY IN SWITZERLAND IN COMPARISON TO THAT OF RWANDA

Learning objective

By the end of this lesson, the learner should be able to describe the factors that favour the development of the tourism industry in Switzerland in comparison to that of Rwanda.

Introduction

Switzerland is one of the countries that receive the highest number of tourists per year in the world. The number of tourists is sometimes close to ten million in a year. This is not only because the country has many different attractions but also the facilities to cater for tourists such as accommodation and transport are very highly developed. In addition, the country is located very close to other European nations where it is a common practice to find many people saving money specifically to go for vacations away from their own countries. Switzerland is also one of the safest countries to visit in the world where crime rate is extremely low.

Unlike Rwanda where tourists have to follow narrow paths to access mountain tourist attraction, in Switzerland mountain features are accessed using cable cars and funicular railways. It is worthwhile taking other aspects of tourism to compare the two countries.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Maps of Rwanda and Switzerland showing tourist attractions

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Photographs of various sceneries and tourist attractions in Switzerland have been provided in the Learner's Book. Learners should obtain additional photos to support the explanation that Switzerland has many attractive places for tourists to visit.

To draw a better comparison with Rwanda, learners should also obtain showcasing the attractiveness of Rwanda. For instance, the factor such as the presence of beautiful physical features should be explained using attractions such as the Alps Mountains and the lakes. Also identify photographs showing attractions such as the u-shaped valleys,

skiing and other tourist related photos.

Let them group these photographs side by side, to compare similar attractive sites in Rwanda and Switzerland. For example, they can have photos for mountains together, wildlife, infrastructure and tourist activities.

Learners should also prepare notes on factors influencing tourism in Switzerland. They also need to be guided by questions as learn through the section. Ensure they prepare answers to the activities in the section.

Synthesis

Use **Activity 18.3.7** in the Learner's Book for this section to analyse learner's understanding of the theme of discussion. Working in groups, let them prepare responses that they will discuss further during their remedial learning.

Assessment

Activity 18.3.8 in the Learner's Book is a good basis for comparison of the factors influencing tourism in Switzerland and Rwanda. Each learner should prepare draw clear comparisons, citing examples in each case.

LESSON 3: THE IMPORTANCE OF AND PROBLEMS AFFECTING TOURISM AND POSSIBLE SOLUTIONS IN SWITZERLAND

(Refer to Learner's Book Page 405 - 407)

Leaning objective

By the end of this lesson, the learner should be able to explain the importance of tourism Industry and identify the problems facing the tourism industry in Switzerland.

Introduction

In any country, tourism is a source of foreign exchange. About 5% of the total export earnings for Switzerland are from tourism. It is also a major source of employment. Many people are employed in hotels, transport systems, tourist sites and as tour guides. Others are employed as tour guides, ski instructors, drivers and travel coordinators.

Tourism encourages development of towns as well as transport and other forms of infrastructure.

One of the problems that the tourist industry in Switzerland faces is competition from other countries such as her neighbours like France and Germany, which are equally well developed. The other problem is the cold winters, which discourage some tourists other than those attracted by winter sports. Occasionally, accidents have occurred as snow melts on the mountain slopes causing avalanches that are a threat to human lives.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Photographs showing some of the tourist attractions in Switzerland

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

It is the responsibility of every learner to prepare notes on the importance and problems of tourism in Switzerland. Let the also compare this with Rwanda so that learners can appreciate the differences between the two countries.

As you supervise them, use questions to guide them. Ensure they also prepare answers to the activities in the section. Some of these activities are:

- a) **Activity 18.3.8** in the Learner's Book. This is an activity that every learner is supposed to research on and provide answers to be shared with others during remedial learning.
- b) **Activity 18.3.9** in the Learner's Book, which should be done in pairs, and responses compiled for presentation in class during the learning session.

It is important to emphasise **research work** as it helps learners to develop skills necessary to look for solutions to different dilemmas they may be faced with.

Pair work on the other hand is a demonstration that working together with others lightens the burden of having to depend on ourselves all the time. It also creates awareness on the need for **cooperation** and **improved interpersonal relations** as well as dependency. Remember to cater for learners will special needs while proposing pairs for class work, to ensure that all learners benefit from this arrangement in learning.

Synthesis

Create two lists, one for Switzerland and the other for Rwanda.

All learners should carry out a research to answer the following questions in relation to the two countries:

Switzerland: Importance of tourism in Switzerland
Problems affecting tourism in Switzerland
Possible solutions to the problems affecting tourism in Switzerland

Rwanda: Importance of tourism in Rwanda
Problems affecting tourism in Rwanda
Possible solutions to the problems affecting tourism in Rwanda

They should then compile their findings for comparisons, as they discuss them in class.

Assessment

Activities 18.3.10 in the Learner's Book are appropriate for assessing learner's understanding of the lesson under discussion.

For each activity, every learner is expected to generate notes and ensure that appropriate conclusions are made in reference to Rwanda and Switzerland.

END OF UNIT

Summary of the Unit

In Switzerland, tourism is a very important industry. It started slowly in the 18th century with a few Europeans such as the British and Germans who liked the country for its Alpine scenery and a nice place for holiday. The major destinations include Bern, Zurich, Geneva, Lucerne, Interlaken and others. Currently, tourism is highly developed and Switzerland has utilised the advantages of nature to the fullest.

To effectively guide learners through this unit, you need to identify a suitable map of Europe showing the location of Switzerland in relation to other neighbouring countries. Since there are similarities in location and size of Switzerland and Rwanda, you could also identify a map of Africa showing the location of Rwanda for ease in comparison. At all points of discussion, encourage learners to prepare notes on the location, size and population of the two countries to make comparisons. They also need to respond to some of the questions given as a guide through the entire unit. What is mandatory for them is to prepare answers to the activities in the section.

With a suitable map of Switzerland, learners should be able to identify some of the tourist attractions such as the Alps Mountains and the lakes on the map. Let them also identify photographs showing attractions such as the u-shaped valleys skiing and other tourist related photos. All through the unit, they should prepare notes on tourist attractions and compare with those in Rwanda.

End unit assessment

1. Map of Switzerland showing the country's location in relation to Germany, France, Italy and Austria.
2. Explain four ways in which tourism is important to Switzerland.
3. Explain three problems associated with tourism in Switzerland.
4. Suggest possible solutions to the problems identified in question 4 above.

Answers to End unit assessment

1. Draw a map of Switzerland showing the country's location in relation to Germany, France, Italy and Austria.
Refer to the **map** in the Learner's Book, **Figure 18.3.2**.

2. Ways in which tourism is important to Switzerland

- Tourism is a very good source of foreign exchange to the country. This is obtained from tourists who move to Switzerland from different countries.
- A good number of nationals are able to get employment opportunities because of tourism. They are employed as tour guides, ski instructors, drivers and travel coordinators.
- Tourism ensured the development of towns such as Zurich, Geneva, Laussane and Basel. These have served other purposes like administration, education and trade activities.
- There has been the emergency of a well trained personnel that can handle tourists and all their related requirements.
- Infrastructure such as hotels, roads, railways, air transport and cable cars and other related facilities have been developed in order to provide sufficient needs to tourists.
- It has promoted the growth of craftsmanship as people develop antiques and crafts pieces of crafts that are highly demanded by tourists.

3. Problems associated with tourism in Switzerland

- a) In Switzerland, the tourism industry faces a problem of stiff **competition** from other world countries such as USA, France, Germany and Australia.
- b) Some tourists get **accidents** in the Alps. This may be due to heavy rains or rising temperatures that result into the melting of glaciers and avalanches. These eventually flow down slope and cause accidents.
- c) The Swiss franc is very **expensive** yet all foreign tourists have to buy it in order to use it in the country. This limits some people who can't afford it from touring in Switzerland.
- d) **Some areas are potentially too dangerous and risky** to tour despite the security features put in place. For example, the transport system on high mountains, which uses cable cars, is susceptible to malfunctioning, which may incur accidents to tourists.

4. Possible solutions to the problems associated with tourism in Switzerland

- a) For competition, the government may finance special teams to move to other countries with a well developed tourism industry such that they can find out what they are missing and make adjustments as necessary
- b) Cable cars are regularly checked before people board them so that unnecessary accidents are avoided.
- c) For accidents due to melting ice, meteorology stations should often first forecast before tourists move to far way areas that are mountainous and snow covered.
- d) On a high rate of foreign exchange, some subsidies should be given to those who regularly visit Swiss tourist attractions.

Remedial activities for slow learners

Compare tourist attraction sites in Switzerland and Rwanda.

Answers to Remedial activities for slow learners

Compare tourist attraction sites in Switzerland and Rwanda.

Switzerland	
<i>Natural attractions</i>	<i>Human factors</i>
Scenery Temperate climate Flora and fauna Rivers and lakes	- Developed infrastructure - Advanced developments in the hospitality sector - Diversity of languages - Political stability - Presence of trained and skilled personnel - Heavily funded publicity campaigns worldwide - Modern financial and banking sector
Rwanda	
<i>Natural attractions</i>	<i>Human factors</i>
Scenery Equatorial climate Flora and fauna Rivers and Lakes	- Developed infrastructure - Advanced developments in the hospitality sector - Political stability - Presence of trained and skilled personnel - Modern financial and banking sector - Diverse culture, for example Kwita Izina - Availability of antiques and African crafts

Extended activities for gifted and talented learners

Explain the factors that led to the development of tourism in Switzerland.

Answers to Extended activities for gifted and talented learners

Factors that have led to the development of tourism in Switzerland

- **Varied climates:** Switzerland has a varied altitude and relief features and the combination of this created many types of climates that change from one area to another. Mountains are too cold during winter and winter games such as skiing and skating attract people. It is warm in summer and therefore an ideal for tourism.
- **Diversity of languages:** The country of Switzerland has different languages, cultures and religions. Languages spoken include French, German, Rhaeto Romansch and Italian, English, Latin and Spanish. All these make it easy for tourists because they feel at home.

- **Hospitality:** The Swiss people are very friendly people who are always willing to serve and help tourists. This has also favoured the development of tourism industry.
- **Political instability:** Switzerland is a neutral country as far as international politics are concerned. This has saved the nation from political instability and tourists feel secure to visit the country at any time of their choice.
- **Transport and communication system:** There is well developed network of transport and communication in Switzerland. Railways, roads and water ways reach even the most remote areas and this makes movement of tourists to different areas possible.
- **Rivers and lakes:** Switzerland consists of a variety of lakes and rivers that have played an important role in tourism industry. Lakes include Geneva, Lucern, Zurich and others. Rivers such as the Rhine and Rhein possess beautiful waterfalls such as Rhine falls is situated near the town of Schaffhausen and Rheinfall that attract many tourists from different regions of the World.
- **Fauna and flora:** Switzerland is well endowed with a variety of animals and plants for example in the cooler climate north of the Alps a mix of deciduous and coniferous trees common. In this place, forests have remained more natural or have been re-naturalised. Those re-naturalised include coniferous trees like spruce, pine and fir. Animals such as Deer and stag, fox and marten, wolves and bears, wild Ibex and Marot are all common. A variety of almost 200 species of birds are breeding in Switzerland.
- **Beautiful scenery/landscape:** Most of the country's landscape consists of the Alpine mountain ranges that cover over 60% of the total land area. This provides Switzerland with a variety sceneries such as snow capped peaks and u-shaped valleys. In winter, many tourists go skiing on the snow covered mountain slopes while in summer many are attracted y the beautiful scenery of the mountain peaks and steep sided valleys.

18.4. POPULATION IN CHINA

Key Unit Competence

By the end of this unit, the learner should be able compare population problems of China and control measures taken in relation to Rwanda.

Prerequisite of this unit

As you teach this unit, you should ensure that the learners acquire the following knowledge, skills and attitudes:

Population studies were first introduced to the learner in Senior One (Unit 12). From these studies, learners already know the meaning of distribution, population structure and density, types of settlements and migration. Senior Two provided them with a platform to understand population from their local environment and Rwanda in General.

In order to expand their understanding of population studies, they also studied Population and settlement, with a focus on Population in Africa (Unit 8) and Urban Settlement in Africa (Unit 9). These units gave them enough exposure in relation to population studies beyond Rwanda. They must have realised that some of the factors affecting population settlement are not just limited to Rwanda, but are recurrent in many other countries on the continent.

China is one of the most populous countries not only on the continent of Asia, but around the world at large. This unit aims to help learners understand China's population in comparison to world population, factors influencing population distribution in China, problems and possible solutions to problems posed by population changes and policies for population control in China.

Learners will be better equipped with knowledge if allowed to compare various aspects of the population, for example along the following:

- Population structure and composition
- Population distribution and density
- Factors influencing growth of the population
- Problems and suggested solutions to the problems facing population
- Policies for population management

Cross - cutting issues

Population studies is all about people. In this unit therefore cross cutting issues of *peace, gender and value of education* will be highly applicable. This is because people are expected to coexist in peace. At the same time population structure is viewed from the point of view of gender distribution. Education is valuable when considering issues such as family planning as people should understand the advantages and disadvantages of small and large families vis a viz their income and the country's economy. Population studies are closely tied to social and economic resources of the country. This unit will therefore touch on *financial education*, as it will look at issues of how population relates to levels of income and

economic development. *Comprehensive sexuality education* will be touched on when leaning about birth rates, fertility rates and death rates. Also related to population is *environment, climate change and sustainability* as these are directly influenced by human activities and how much people care about the environment.

Generic competences

Critical and problem solving skills	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>Overpopulation comes with a myriad of problems related to housing, pressure on social amenities and food production and consumption. By thinking critically, learners are expected to suggest some of the things people can do to ease each at the challenge identified. Guide their research and information generated to ensure only the correct information is gathered.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>There are many aspects of this unit that will require research from the internet and other sources of information. This will include analysing causes and consequences of overpopulation in China and suggesting possible solutions to problems related to overpopulation in China.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. The teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. <i>In helping learners come up with correct conclusions, ensure that their languages, (both written and spoken) is grammatical. This will help them develop and perfect their communication skills.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. <i>In working in pairs and groups, learners are expected to develop this competence. Allow them to form groups freely, but help them to include those learners with various learning difficulties to ensure that all of them benefit from this dependance.</i>

Vocabulary/key words/concepts

Population density	The number of people per unit of area usually quoted per square kilometre or square mile (which may include or exclude, for example, areas of water or glaciers). Commonly this may be calculated for a county, city, country, another territory, or the entire world.
Contraception	It is a method of birth or fertility control used to prevent pregnancy.
Sterilise	Deprive a person of the ability to produce offspring, typically by removing or blocking the sex organs.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) Explain the location, size and population of China.
- (ii) What is the size of the population compared to the world population?
- (iii) Which factors actors influencing population distribution in China?
- (iv) Which are the problems of population in China?
- (v) What are the policies for population Control in China?

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lessons commence. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Leaners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Introduction to china
Lesson 2	Size of population compared to the world population section and factors influencing population distribution in China
Lesson 3	Problems of population in china and policies for population control in China

LESSON DEVELOPMENT

LESSON 1: INTRODUCTION TO CHINA

Learning objective

By the end of this lesson, the learner should be able to explain the location, size and population of China.

Introduction

China is located on the Eastern part of Asia and borders the Pacific Ocean to the east. It borders 14 other countries such as Mongolia, Russia, India and Myanmar. The total area of China is 9,596,961 km². The estimated population of China is over 1.357 billion making the country the most populous in the world. When teaching this section, you have to bear in mind that one cannot effectively learn about location of a place without use of maps. Thus a map of the world, map of Asia and a map of China will be of great use.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the location of China

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Start the lesson by asking one of the learners to read through the introductory section given in the Learner's Book.

In groups, learners should answer the following questions, out of a research they will carry out about China:

- | | |
|--|---------------------------------------|
| i) The continent where its found | ii) Her estimated population |
| iii) Her estimated size in km ² | iv) Her population density |
| v) Her neighbours | vi) Major water bodies surrounding it |

Let them prepare notes during the discussions.

Each group should identify relevant maps and Internet sites where to obtain more information related to this section.

To summarise their research, let them draw the map of China, complete with all the good qualities of a map.

Synthesis

In groups, ask learners to find carry out a research on the questions given under **Activity 18.4.1** in the Learner's Book. Afterwards, they should compile their findings for class presentation.

Assessment

Describe unique characteristics of Rwanda and China.

LESSON 2: SIZE OF POPULATION COMPARED TO THE WORLD POPULATION AND FACTORS INFLUENCING POPULATION DISTRIBUTION IN CHINA

Learning objectives

By the end of this lesson, the learner should be able to:

- Analyse the causes and consequences of overpopulation in China
- Explain the factors influencing population distribution in China

Introduction

The estimated population of China is over 1.357 billion making the country the most populous in the world. Being a large country, China is bound to have many people but that is not a justification for such a large number. When teaching this section, you have to bear in mind that the learners should be able to explain why China has such a large population.

Like any other country, the distribution of the population of China is influenced by both physical and human factors. Among the physical factors are **relief**. The lowland areas in the eastern China have a higher population than the western half of the country where the land is more rugged. **Climate** is another factor. The areas that receive low rainfall such as Gobi Desert have very low population. Areas that have fertile soils have high population, for example, the valley of rivers such as the Yellow River and Yangtze where there is accumulation of silt. Other factors include historical factors, urbanisation and industrialisation.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Population pyramids of China over different periods

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Introduce the lesson with question 1 of **Activity 18.4.2** given in the Learner's Book. Learners should attempt to provide answers in groups, with reference to information obtained from sources such as Geography and Environment Senior 2 Learner's Book. Let them compare their findings amongst themselves.

With the statistics provided in **Activity 18.4.3** in the Learner's Book, learners should state the population sizes of China and India, as required in the second question of **Activity 18.4.2**.

Guide them in calculating the population densities of different countries of the world so as to compare them to China.

Learners must have already realised that China is one of the countries around the world with the highest population densities. Let them study some of the factors that have contributed to this from different sources then attempt **Activity 18.4.4** in the Learner's Book.

As they discuss, ask them to prepare notes to be presented in class.

Synthesis

Let learners find out areas that are densely populated and those that are sparsely populated. Try to find out the reasons for this distribution. They should then prepare short notes to be shared amongst themselves during remedial learning.

Assessment

Divide the class into two groups. The first group should draw a map of China showing population distribution. The other groups will draw the map of Rwanda showing population distribution. Ensure that their maps have all the good qualities of a map.

In a class discussion, let them compare their maps, and explain reasons for the distribution. It is your responsibility to ensure that the correct map is adopted for use during remedial learning.

LESSON 3: PROBLEMS OF POPULATION IN CHINA AND POLICIES FOR POPULATION CONTROL IN CHINA

Learning objectives

By the end of this section the learner should be able to:

- Evaluate the possible solutions to the problems related to over population in China.
- Analyse the different Population control methods used in China.

Introduction

Although the economy of China has grown very highly in the last decade, the country still faces problems related to high population. Like any other country, China faces various problems as a result of the high population. These include unemployment, overcrowding and traffic congestion especially in the urban areas and outmigration to different parts of the world.

Due to the rapid growth of population in China, the government had to put in place measures to control further growth. The government put in place the “one-child policy” per couple, to control the growth of population. This has reduced the birth rate greatly, enabling the once explosive population to stabilise from an average child per couple 5.9 to 2.1. This is the rate needed to maintain a stable population. To reduce congestion in the large cities, other areas have been developed to attract population. This has also been done to divert migration from large cities. China has also implemented a new type of urbanisation policy where small and medium-sized cities have been helped to expand and rural areas also developed into urban centres. This has reduced rural-urban migration. Family planning is highly encouraged and sometimes enforced.

Teaching aids

- Recommended learner’s book
- Relevant reference materials
- Photographs showing some of the consequences of overpopulation like congested houses

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

With reference to Senior 2 Learner’s Book, ask learners to find out some of the problems of population in Rwanda. They should use this information to answer questions given in **Activities 18.4.5** and **18.4.6** in the Learner’s Book.

In their various discussion panels, learners are expected to read through the following information about China:

- i) Problems of population in China (outlined in the Learner’s Book)
- ii) Policies for population control in China (outlined in the Learner’s Book)

While maintaining membership of these panels, let them discuss **Activity 18.4.7** in the Learner’s Book. They should then summarise their findings for class presentation.

Synthesis

With the help of a map, let learners show the areas in China that are densely populated. Let them show areas such as large cities and rural areas where population distribution is high.

Assessment

Research widely to find out how the following measures may have been effective in taming runaway population in China:

- Family based old age care system
- One child policy
- Sterilisation of parents
- Legalising abortion

Prepare brief notes to explain each measure, which should be presented in class during remedial learning.

END OF UNIT

Summary of the Unit

Over the years, China has been experiencing population increase which reached a billion in 1982. Between 1060 and 1980 the increase was very rapid but from the 1990s, some drastic laws were enacted in an effort to control the growth. Since then the trend has been reducing and by 2016 the population estimate was 1.36 billion up from 664.5 million in 1960.

China is located in East Asia. It is bordered by the Pacific Ocean on its east coast and by 14 countries, including Russia, Mongolia and India. Its total land area is 9,640,821 square kilometres with population equivalent to 1,382,323,332 according to 2016 UN data.

Like any other country, the distribution of the population of China is influenced by both physical and human factors. Among the physical factors are **relief**. The lowland areas in the eastern China have a higher population than the western half of the country where the land is more rugged. **Climate** is another factor. The areas that receive low rainfall such as Gobi Desert have very low population. Areas that have fertile soils have high population, for example, the valley of rivers such as the Yellow River and Yangtze where there is accumulation of silt. Other factors include historical factors, urbanisation and industrialisation.

Due to the rapid growth of population in China, the government had to put in place measures to control further growth. The government put in place the “one-child policy” per couple, to control the growth of population. This has reduced the birth rate greatly, enabling the once explosive population to stabilise from an average child per couple 5.9 to 2.1.

End Unit Assessment

1. Describe the location of China on the Asian continent.
2. Explain three natural/physical factors that have influenced population distribution in China.
3. Briefly explain the problems caused by a large population in China.
4. Describe the policies that have been put in place in China to control population growth.

Answers to End Unit Assessment

1. **Location of China on the Asian continent**

China is located on the eastern part of Asia. It borders the Pacific Ocean on the eastern side. On other directions, it shares boundaries with fourteen other countries, including Russia, Mongolia, Nepal, Kazakhstan and India.

For the map showing the location of China, refer to Learner's Book, **Figure 18.4.1**.

2. **Physical factors that have influenced population distribution in China**

- **Relief:** It is the east region that is densely populated due to relief. In the east and south east the coastal areas are flat and human settlement is possible unlike the western section where relief is hostile because construction is very difficult.
- **Climate:** Dry areas such as Gobi desert and other desert fringes are not favourable for population settlement because it is too hot on top of limited trade poor communication. High population density is in the east where climate is friendly with better rainfall.
- **Soil fertility:** In areas where soil is fertile for example the north due to deposits of Yellow river, north east and the southern part, population density is high compared to where soil is infertile like in the west.
- **Natural resources:** Plenty of water (from rivers such as *Yellow River, Yangtze River and Guangzhou River*), timber and minerals such as coal, oil and copper also influence population distribution. People are more attracted to areas well endowed with these resources than in areas where resources are scarce.

3. **Problems caused by a large population in China**

- It has an aging population, increasing at a rate of 4% a year. For instance, the number of its citizens aged over 65 is high, more so, increasing every year.
- There is pressure on resources. Due to high population, the resources were no longer enough for the people.
- There is government over expenditure on social services such as healthy, schools and others. It also spends a lot on educating and sensitising people on dangers of having a high population.
- Increased prostitution in major towns and cities of China is high. This has resulted to pressure on social amenities and dwindling food supplies.
- There has been a problem of unemployment problem due to overpopulation.

4. Policies that have been put in place in China to control population growth

- a) It has come up with the “family-based old-age care system”, a strategy that is intended to supplement and support old-aged people. The government has also proposed to gradually increasing the retirement age so as to limit financial expenditure on old people.
- b) The government has revised the policy to control birth rate. With “one-child policy” per couple, birth rate has been reduced from 5.9 to 2.1. This is the rate needed to maintain a stable population.
- c) It has implemented the urbanisation policy where small and medium-sized cities have been helped to expand, with a shifting to upgrading rural areas as well. This has reduced congestion in cities.
- d) Education regarding family planning and the various methods of contraception has been emphasised. This adds more knowledge to the population on how they can handle the population issues.
- e) The government provides free sterilisation to parents who are satisfied with their family sizes.
- f) Financial incentives have been provided to encourage people to be sterilised. This has increased the number of people being sterilised.
- g) China has legalised abortion. This helps in controlling the number of children who would have been born unwanted.

Remedial activities for slow learners

Compare the influence of the following factors influencing population distribution in China and Rwanda:

- a) Relief
- b) Climate
- c) Soil fertility
- d) Natural resources

Answers to Remedial activities for slow learners

Factor	Rwanda	China
Relief	Although there are many people living on the slopes of the hills, they avoid areas that are very steep. This is because these areas may be prone to landslides. Places like Gicumbi and Gakenke have fewer people because of the steep slopes which are prone to landslides. The central and eastern plains are densely populated.	Areas that have valuable minerals attract clusters of population as people seek employment in the mining industries. Limestone mines at Rusizi and tin mining at Ruhango are examples of population clusters that result due to mining activities.

Climate	Most people in Rwanda are farmers. This is why they are mainly found in areas that receive sufficient rainfall which support crop farming. For example, there are more people living in areas such as Musanze and Rubavu, which receive high rainfall. On the other hand, drier areas such as Bugesera are sparsely populated.	The western half of the country receives little rainfall. In addition, the area experiences extreme temperatures with very cold winters reaching -40°C and very hot summers with up to 50°C . The Gobi Desert is found in this region. The eastern half of the country is favourable for settlement because it has sufficient rainfall and mild temperatures.
Soil fertility	Since most people in Rwanda are farmers, they settle mainly in areas that have fertile soils. Areas such as Burera, Musanze and Nyabihu have high population densities compared to Nyagatare and Bugesera where soils are generally poor. Swampy areas are generally avoided	The eastern half of China has fertile soils such as loess and silts, deposited by rivers in the lowlands. These soils are ideal for farming unlike the on west where soils are poor and infertile.
Natural resources	Areas that have valuable minerals attract clusters of population as people seek employment in the mining industries. Limestone mines at Rusizi and tin mining at Ruhango are examples of population clusters that result due to mining activities.	The eastern part of China has plenty of rivers which provide water. Other resources in this part include timber and minerals such as coal, oil and copper.

Extended activities for gifted and talented learners

Give learners the following statement to discuss:

Rapid population growth in Rwanda has led a wide range of problems. These problems are not only felt by individuals but also by the government and country as a whole. Carry out a research to find out some of these problems.

Answers to Extended activities for gifted and talented learners

Problems associated with population growth in Rwanda

- **Pressure on land:** Land for farming in Rwanda has become so scarce that people have encroached on to the forests and swampy areas. Other people have settled on steep slopes like Gakenke where there are dangers of landslides. Others who are landless have migrated to towns in search of employment.
- **Land fragmentation:** The piece of land owned by a family keeps being subdivided over generations. Currently, many families own very small pieces of land that cannot yield enough food for the members.

- **Declined soil fertility:** Cultivation on a piece of land is carried out year after year with little use of manure. This has caused soil exhaustion leading to low crop yields. In turn there is shortage of food.
- **High expenditure by the government:** The government spends large amounts of money to be able to provide social amenities such as health facilities, clean water, sufficient food and schools. These amenities are never enough. It is also difficult for the government to plan effectively for a rapidly growing population.
- **Environmental degradation:** When people migrate in large numbers to one area, they degrade the environment. It can be deforestation by people looking for building materials; it can be water pollution or soil erosion. Nyacyonga settlement scheme and Nyamirambo area in Kigali City are examples of areas where there has been environmental degradation.
- **Development of informal settlements:** Those who move to towns and fail to get employment are not able to afford good houses. They end up creating shanties to live in. This explains why there are slums in large towns. In such crowded areas, diseases spread easily.
- **Increase in crime rate:** The unemployed turn to criminal activities to be able to survive. Some become drug dealers while some turn to prostitution.
- **Higher levels of unemployment:** Not all those who move to towns in search of employment are lucky to get jobs. Job opportunities do not increase as fast as population increase. Many people remain unemployed.
- **Pressure on amenities:** The areas where people migrate to experience an increase in the population. This could lead to congestion and strain on social amenities.

18.5. URBANISATION IN U.S.A

Key Unit Competence

By the end of this unit, the learner should be able to explain the levels of Urbanisation in U.S.A.

Prerequisite of this unit

As you teach this unit, you should ensure that the learners acquire the following knowledge, skills and attitudes:

When studying urban settlement, it is important that you emphasise the knowledge they gained from the study of the same in Senior Two Unit 14, under the following sections:

- Major urban centres in Rwanda
- Major characteristics of urban settlement
- Functions of urban settlements
- Factors influencing the growth of urban centres in Rwanda
- Problems faced by urban centres and their possible solutions
- The environmental protection measures in urban centres in Rwanda

This knowledge was further reinforced through the study of Urban Settlement in Africa in Unit 9. In this unit mentioned, learners expanded the knowledge they had on urban settlement from their country to include other countries in Africa. They studied characteristics of urban centres in Africa, functions and importance of urban centres, factors responsible for rapid urban growth, problems and solutions to urban centres in Africa. They also learnt about some urban centres in Africa, including Nairobi, Kampala, Cairo and Johannesburg.

In this unit, against a strong background of the studies on urbanisation, learners are expected to compare the knowledge they have of their country and of the various African countries to that of USA.

USA has some of the established and most sophisticated urban centres, which have grown over a long period of time. Of importance is that learners need to appreciate the developments in their locality, country, Africa and USA.

To foster understanding, enable learners to learn through comparisons, from their knowledge to newer information provided in this unit.

Cross-cutting issues

The study of urbanisation is equal to studying one form of the ways that people interact with the environment. This interaction such as disposal of waste, building of roads, houses and drainage systems often leads to environmental degradation. Thus *conservation of the environment* becomes a necessity in urban settings. In addition, the study of urbanisation involves learning about people striving to generate income in different ways. This study will help the learners to acquire knowledge on *financial education* as they study about growth and development of urban centres.

Generic competences

Creativity and innovation	The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding. <i>While discussing the consequences of urbanisation in USA, learners are expected to think critically and suggest possible solutions to each consequence identified.</i>
Research skills	This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information. <i>Much of the information required in this unit is available in various geographical documents, the internet and media. It is up to each learner to carry out extensive research to discover concepts to be learnt. This can range from analysing the concepts and characteristics of urban growth to the importance of urban centres in USA.</i>
Communication in official languages	Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. <i>When compiling their findings from various class assignments, let learners express themselves both in written and verbally in a way you will guide them.</i>
Cooperation, Inter-personal management and life skills	This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. <i>In working in pairs and groups, learners will develop this competence. Encourage them to cultivate interdependence by forming discussion groups and research forums.</i>

Vocabulary/key words/concepts

Conurbation	An extended urban area, typically consisting of several towns merging with the suburbs of one or more cities
Central business district	A central business district (CBD) is the commercial and business centre of a city. In larger cities, it is often synonymous with the city's "financial district"
Trams	A tram (also tramcar; and in North America streetcar, trolley or trolley car) is a rail vehicle which runs on tracks along public urban streets, and also sometimes on a segregated right of way. The lines or networks operated by tramcars are called tramways
Urbanisation	The process of making an area more urban
Boroughs	Generally, a borough is a town or district that is an administrative unit, in particular. It also means an incorporated municipality in certain US states. With reference to New York, it is an administrative division.

Guidance on the problem statement

In this unit, the following are the key inquiry questions that will be the guide to the problem statement:

- (i) What are the major urban areas in U.S.A?
- (ii) What are the characteristics of urban centres in U.S.A?
- (iii) What are the functions of urban centres in USA?
- (iv) What are the factors influencing urban growth and development in U.S.A?
- (v) What is the importance and consequences of Urbanisation in U.S.A?
- (vi) **Case study:** New York

Attention to Special Education Needs

For the special needs learners, it is important to have the different equipment that they need to be able to learn. For the visually impaired, have braille materials and recorders. For the deaf, have the sign language alphabet symbols and sign language interpreters if they are in an integrated school so they can also be part of the lesson.

Before the start of the lesson, ensure learners with special needs are sufficiently catered for before each of the lesson commences. For instance:

- i) **Learners with partial visual impairment** need to be appropriately positioned in the class to see the writings on the board – short sighted learners should be positioned on front seats while long sighted learners should be given positions where they can easily read and see what is being written on board or activities being carried out in front of the class.
- ii) **Leaners with physical disability** may need to be assisted to find places appropriate enough to participate fully in the learning process. They should also be strategic enough to allow them freely to mingle with the rest of the classmates.
- iii) **Slow and fast learners** are equally important in the teaching and learning process. Ensure that they are strategically positioned to allow them move learn and swiftly with others, ensuring that with normal learners, they are allowed to share experiences especially during interactive sessions.

List of Lessons

Lesson 1	Major urban areas in U.S.A Characteristics of urban centres in the USA
Lesson 2	Functions of urban centres in the USA and factors influencing urban growth and development in the USA
Lesson 3	Importance and consequences of urbanisation in the USA
Lesson 4	Case study: New York

LESSON DEVELOPMENT

LESSON 1: MAJOR URBAN AREAS IN U.S.A AND CHARACTERISTICS OF URBAN CENTRES IN THE USA

Learning objectives

By the end of this lesson, the learner should be able to:

- a) Locate the major urban areas of U.S.A
 - b) Analyse the characteristics of urban centres in U.S.A
-

Introduction

Urbanisation means the growth and spread of towns. There are many towns in USA and each has its unique reasons why it grew. In this section, learners are expected to learn and master the location of the major towns in USA. You will notice that each of the fifty states has a major town, which is a major commercial centre. The capital cities are not necessarily the largest towns in the states. Give the learners the task to study a map of the USA showing the location of the major cities and the states where they are located. Some of the towns such as New Orleans and Chicago grew as coastal or lake ports handling trade along the waterways. Other towns such as Pittsburgh grew as industrial towns in mining areas. Other towns grew as agricultural collecting centre.

Different towns in USA grew due to a variety of factors. With time, they developed and now have some characteristics, which are common to all. For example, these urban centres have the characteristic of being congested, even though with well developed infrastructure. They also have entertainment facilities among other common characteristics.

Many of the learners are familiar with urban settlements in Rwanda. You should build on to this knowledge as you teach about the urban centres in USA.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the distribution of urban centres in USA

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

In a quiet session, learners should read through the introduction of this unit given in the Learner's Book. Prior to this, ask them to look out for the meaning of the following words:

- a) Urbanisation b) Urban area/centre c) Conurbation

Working in groups, ask learners to work on **Activity 18.5.1** in the Learner's Book. Where possible, provide them with a **statistical abstract** of Rwanda. Together with other sources of information, they should mention and rank the major urban centres in Rwanda. For each of the centre, they should establish its population and the approximate area it covers.

In order for them to find out the number of cities around USA, ask learners to use their atlases to locate some of the major cities in USA. Ensure they identify the sea ports and other major cities inland.

Cities around the world have some common characteristics that need to be discussed in this lesson. In a brainstorming session, let learners mention some of these common characteristics, in reference to those found in Rwanda. Let them compare their findings with the characteristics given in the Learner's Book.

In conclusion, ask one of the learners to lead a discussion on the functions of urban centres in Rwanda, in comparison to those of the USA. The notes given in the Learner's Book should shape the discussion.

Synthesis

As part of their individual work, ask learners to do **Activity 18.5.2** in the Learner's Book. As an extra engagement, let them draw sketches of the map showing the various states of America. Ensure that you check learners' work, picking out areas not well understood to organise how to help each of them individually.

Assessment

Let learners carry out a research on the major urban areas in Rwanda, for them to be able to respond to **Activity 18.5.3** in the Learner's Book. Let them pick the characteristics discussed in this section about cities in USA as points of discussion. They should then present their findings in class for further discussion.

LESSON 2: FUNCTIONS OF URBAN CENTRES IN THE USA AND FACTORS INFLUENCING URBAN GROWTH AND DEVELOPMENT IN THE USA

Learning objectives

By the end of this lesson, the learner should be able to:

- Analyse the functions of urban centres.
- Explain the factors influencing urban growth and development in the USA

Introduction

There are common functions that most towns have. For instance towns are residential centres. They also have education function as they have learning institutions. Another common function is related to health facilities. However, while some of the towns are administrative centres, others are industrial centres while others have other forms of functions. Different towns in USA grew due to a variety of factors. With time they developed and have dominant functions among other functions.

Important to note is that some urban areas grow due to unique factors. For example, some develop as trading centres, others as recreation centres, administrative centres among others. After a town has started, there are other factors that cause them to expand. Trading activities are general to all.

Ask the learners to discuss the two types of factors that lead to growth and expansion of urban settlements with specific examples. Ask the learners work on the activities and make class presentation on the same. Ensure all class members have participated in the discussions on the presentations.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- The Internet

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Activity 18.5.4 in the Learner's Book should be the opening activity for this lesson. Working in groups, ask learners to obtain atlases from which they will locate Karongi and Kigali. Using their knowledge of their motherland, let them suggest what they think contributed to the growth of these two urban centres. In a table with two columns, let them list these factors, while picking out similar factors and those unique to the two centres.

In discussion panels, let them read through the information provided in the Learner's Book. Within their respective panels, assign them **Activity 18.5.5** in the Learner's Book, which they should prepare a presentation afterwards.

For questions 1 and 3 given in this activity, ask them to use maps to identify the areas being discussed. It is also necessary that where photographs are available, the use them to support their answers.

Conclude the lesson with factors influencing urban growth and development in USA by guiding learners through the information provided in the Learner's Book. As they discuss, have guiding question.

Synthesis

The factors influencing the growth of various urban areas in Rwanda are varied. In groups, learners should identify these factors, while referring to specific areas. This will provide answers to **Activity 18.5.6** in the Learner's Book. Encourage learners to document their work to enable you guide them appropriately on areas now well understood.

Assessment

Activity 18.5.7 addresses one of the unique factors influencing some of the factors influencing urban growth and development in the USA. Relate the information obtained from these discussions to the growth of Kigali, encouraging each learner to summarise their findings to be compared with those of colleagues in class during remedial learning.

LESSON 3: IMPORTANCE AND CONSEQUENCES OF URBANISATION IN THE USA

Learning objectives

By the end of this lesson, the learner should be able to:

- a) Evaluate the importance urbanisation in U.S.A.
- b) Explain the consequences of urbanisation in U.S.A.

Introduction

Urban centres are important to a country because they are a focal point or a centre of attraction for economic activities. Trading activities, manufacturing industries and social amenities are usually concentrated in urban centres. This causes them to attract large clusters of population. Some of the people are business people others are employed in different sectors within the town. However, although there are many positive things about towns, there are also negative results of urban development. Crime increases if there are too many unemployed people. Environmental degradation occurs due to poor disposal of waste, air pollution, traffic congestion and overcrowding are all negative effects of urban growth.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Newspaper cuttings

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

Initiate a discussion on the importance of urban areas in Rwanda through a brainstorming session, guided by questions. This will require that you pair the learners appropriately for them to discuss **Activity 18.5.7** in the Learner's Book.

Some of the reasons why urban centres in Rwanda are important also apply to other urban centres in other parts of the world including USA. For this reason, let them read and discuss the points explained in the Learner's Book, while comparing them to the Rwandan scenario.

Despite the many benefits urban centres have on the people, they have a fair share of problems that comes along with them. The information on some of these consequences of urbanisation have been listed in the Learner's Book. By studying the photograph within this section, let learners discuss some of the problems equally experienced in Rwanda, with matching photos where possible. They can obtain photos showing areas where litter may have been inappropriately dumped, or traffic congestion in one of the urban areas. It is at this point that you will be required to introduce the various **crosscutting issues** that come up due to urbanisation. These may include **environmental conservation**, **responsible sexual behaviour** and need for **family planning** to avoid large populations that the available resources may not comfortably sustain.

Synthesis

Learners should discuss **Activity 18.5.8** in the Learner's Book then prepare a class presentation. During the presentation, other learners should summarise the points then relate them to consequences of urbanisation in USA.

Assessment

Ask learners to summarise some of the challenges facing urban areas. Each learner should attempt this activity then prepare brief notes for sharing later in class. In addition, ask learners to obtain other photographs showing the consequences of urban areas in the USA. Let them acquire even more photos from Rwanda, to help them compare the situation in USA and that in Rwanda.

LESSON 4: CASE STUDY: NEW YORK

Learning objective

By the end of this lesson, the learner should be able to discuss various aspects of New York City.

Teacher's notes

New York is one of the largest cities in the world. Learning about the city as a case study should begin with its location in USA. Also important are the functions such as being a commercial centre, a seaport and housing headquarters of many international organisations, a tourist centre, educational centre and industrial centre among many other functions. Despite all the good attributes of the town, it has a high crime rate, slums and traffic is extremely congested.

Teaching aids

- Recommended learner's book
- Relevant reference materials
- Map showing the local of New York

The effectiveness of the teaching aids will depend on the teaching methods used. The following methods are recommended:

- Discussion method
- Question and answer
- Reviewing reference materials

Learning activities

In groups, learners should sketch the map of New York on their notebooks. The map should have all the qualities of a good map. Allow them to make a reference to the one shown in the Learner's Book, especially in situations where atlases available may not be enough for all learners.

Under their sketches, let them summarise their findings from **Activity 18.5.9** in the Learner's Book.

Through a brainstorming session, let learners mention the various administrative regions of Kigali. While referring them to the Learner's Book, let them mention the five boroughs of New York.

Administer **Activity 18.5.10** in the Learner's Book, where learners will carry out a research on the factors that contributed to the growth of New York. As they discuss, let them prepare brief notes for presentation in class afterwards. Refer them to the points listed in the Learner's Book that they will be required to discuss in detail.

Synthesis

In groups, ask learners to discuss **Activity 18.5.3** on **page 416** of the Learner's Book then prepare a class presentation. It is important that they go through the notes provided on pages **417** of the Learner's Book before (on characteristics of urban centres in USA and function of urban centres in the USA) concluding their discussion. Let them discuss about New York in particular, as this activity is on all cities in USA.

Assessment

Just like other urban areas in Rwanda and around the world, New York similarly experiences a number of problems due to its status as one of the mega areas in urbanisation. Some of these problems have been summarised in the Learner's Book. Let learners read widely on these problems then prepare a class presentation.

More importantly, let them find out how these problems are being handled in New York, then compare the approaches to those used in Rwanda. In a table, let them present their comparisons for further discussion during remedial lesson. Ensure you are available during these discussions to guide them accordingly.

END OF UNIT

End of unit summary

United States of America is located between Mexico to the south and Canada to the north. To the west is the Pacific Ocean while to the east is the Atlantic Ocean the country has an area of 9,826,630km². It is the 3rd largest country in the world after Russia and Canada. The country's 2016 census indicate that the total population was 323,730,000. This population is ethnically very diverse. It consists of White Americans who constitute the majority. African Americans form the second largest group. The others are Asian Americans and the Latino Americans.

The country is made up of 50 states, 48 of which form the mainland while Alaska is to the north west of Canada and Hawaii is made up of several islands in the Pacific Ocean. In terms of area, Alaska is the largest state followed by Texas. The smallest state is Rhode Island which is one of the states that form the region called New England.

Urbanisation in the USA is not complete without mentioning New York. New York ranks number one in all states of USA in land and population. It consists of five boroughs, each of which is a separate county of New York state. The five boroughs include Brooklyn, Queens, Manhattan, The Bronx and Staten Island. It is the financial capital of US because it harbours the World Trade Centre and also the UN Headquarters is found in this state.

As you teach this section, you must ensure the learners have access to a map that is large enough to show the details of the country including the states and population distribution. Identify suitable maps of USA that have comprehensive information on position, size and population. It would be wise to also identify a regional map of the world to use as you compare the size of USA in relation to other countries of the world. You could also draw a sketch of the same which the learners can later copy in their note books. Prepare questions to guide class discussion and ensure you have notes on the section. Ensure you have worked out the answers to the activities in the section.

End unit assessment

1. Explain three characteristics of urban centres in USA.
2. Explain four functions of urban centres in USA.
3. Summarise some of the consequences of urbanisation in USA.
4. a) Describe the location of New York City.
b) Briefly explain how the location of New York has supported its growth.

Answers to End unit assessment

1. **Characteristics of urban centres in USA**

- (i) They are well planned with zones such as industrial, residential, recreation and central business districts clearly set out.
- (ii) Some of the largest conurbations in the world are found in USA.
- (iii) Most of the towns have straight streets and avenues intersecting at right angles.
- (iv) The large cities have efficient public transport in form of trains, trams and buses.
- (v) There are no earth roads in the urban centres.
- (vi) Some of the tallest skyscrapers in the world are found in cities in USA.

2. **Functions of urban centres in USA**

- The towns serve as residential areas. Many people live in different urban centres such as New York, Dallas, Washington and Miami.
- They are transport and communication centres. Some have large international airports while the smaller towns have airports that serve domestic flights only.
- They serve as health centres. Many health facilities are located in different parts of urban centres.
- They are cultural and educational centres. There are many educational institutions such as universities, well established libraries and museums in different cities such as New York, Los Angeles and Chicago.
- They are tourist centres. People come from all over the world to see such attractions as historical sites, art galleries, skyscrapers, games and sports. Examples of such attractions are Lake Placid, Salt Lake City and New York.
- Many of the cities are industrial centres.
- They all have trading activities.
- In each of the states, there is a capital city with offices of the state government. The federal government offices are in Washington DC.
- They act as entertainment centres. Large entertainment joints are in cities such as Miami, Las Vegas, Bloomington and New York.

3. **Some of the consequences of urbanisation in USA**

- (i) Development of urban centres in USA leads to encroachment on land that would otherwise be used for farming especially the large cities that are located in rich agricultural areas.
- (ii) The towns lead to pollution of the environment. This is caused by the exhaust fumes from vehicles and by gases emitted from industries.
- (iii) The very large cities such as New York experience traffic congestion causing delays as commuters move from one part of the city to another. There is also overcrowding in social areas such as entertainment places like clubs.
- (iv) Urban development causes rural-urban migration. A high percentage of people in USA live in urban areas.
- (v) Urban development leads to increased incidents of criminal activities especially in the very large cities.
- (vi) Where the old residential buildings of the cities are neglected they become slums.
- (vii) Unemployment is witnessed in towns such as Detroit where old industries have closed down.

4. **Location of New York City and how this has supported its growth**

Located at the southern tip of the state of New York, the city is the centre of the New York metropolitan area, one of the most populous urban centres in the world. New York City can also be described as being on one of the world's largest natural harbours, because it's a coastal city located on the east coast of USA. New York City consists of five boroughs, each of which is a separate county of New York State.

Its location has supported growth in the following ways:

- a) Its location on the western side of Atlantic Ocean made it easy for her to trade with other regions. It is not surprising that the Port of New York is one of the largest ports in the world.
- b) The presence of Hudson River enabled New York to navigate into inland and access the interior.
- c) Its harbours are ice free since they never freeze, which makes loading and off-loading possible throughout the year.
- d) Its relief is flat, which ensures easy construction of warehouses, roads and docks.
- e) The hinterland is very fertile and this enabled a successful agriculture.
- f) It is the world's political capital because UN headquarters is located in New York. This gives New York advantages of getting a lot of foreign exchange from Foreign Diplomats.

Remedial activities for slow learners

Briefly explain some of the contributions that urban centres in USA make to the country.

Answers to Remedial activities for slow learners

Some of the contributions that urban centres in USA make to the country

- a) The large urban population provides market for manufactured goods and agricultural products.
- b) They provide employment opportunities as various economic activities grow.
- c) They promote trading activities.
- d) Urban population is provided with residential facilities in the towns.
- e) They attract the development of industries.
- f) They encourage cultural integration. This is because they attract people from different regions and nationalities who come along with varied cultures.
- g) Urban centres make it easy for governments to provide social services to the people.
- h) Some urban centres have facilities that are tourist attractions.

Extended activities for gifted and talented learners

Discuss the factors influencing urban growth in the USA.

Answers to Extended activities for gifted and talented learners

Factors influencing urban growth in the USA

- a) **Population growth:** The main reason that continuously contribute to urban growth is increase in urban population. This factor also contributed to the growth of urban areas in the United States of America. Population increase occurred from migration of people into urban areas. This increased construction and hence urban growth.
- b) **Economic growth:** There was an expansion of the economic base, leading to a higher per capita income. This increased the number of working persons which created demand for new housing and more housing space hence the growth of urban centres.
- c) **Industrialisation:** The establishment of new industries in the countryside increased urban growth. This is because industries required more workforce, creating a demand for housing facilities. As housing increased, so did the urban centres.
- d) **Physical Geography:** In some cases, urban centres developed because of unsuitable physical terrain (such as rugged terrain, wetlands, mineral lands or water bodies). When physical features such as water bodies stood on the way of expansion, people could skip it and construct beyond it.
- e) **High cost of living:** Some urban centres experienced an increase in the cost of living, forcing people to shift to cheaper centres. The ones they shifted to kept on increasing with time.
- f) **Development of transportation:** Improved transportation led to an increase in the rate at which people accessed the some cities. Places along these routes also developed due to various economic activities that were established to serve passengers.

- g) ***Government developmental Policies:*** Some areas developed into urban areas because the government restricted movement of people from one area while encouraging movement into the other.
- h) ***Housing investment:*** As people in urban centres accumulated wealth, they began to invest in rural areas by constructing additional housing. This gave chance to some places to grow, especially those that were villages, expanding to become urban centres.

REFERENCES

1. Adimola, B., Gahima, C., Kivuva, M., & Mmbando J S (2006). *Atlas for East Africa*. Longman: Harlow.
2. Buckle, C. (2007). *Landforms and landscapes in Africa. An introduction to geomorphology*. Edinburgh: Pearson Education Limited.
3. Bunnett R.B. (2004). *Physical geography in diagrams for Africa*. Longman.
4. Crispin, J., & Jegede, F. (2000). *Population, Resources and Development*. London: Collins Publishers.
5. Dove, J., Guinness, P., Martin, C., Nagle, G., Payne, D., & Witherick, M. (2008). *Geography*. Edinburgh: Pearson Education Limited.
6. Faniran A. & Ojo O. (1980). *Man's Physical Environment*. London: Heinemann Educational Books Ltd.
7. Gotanegre J.F. & Prioul C, Sirven P. (1974). *Géographie du Rwanda*. Bruxelles: éd. A. De Boeck.
8. Larousse (2000). *Encyclopédie des Jeunes Larousse*. France: La terre, une planète active.
9. Le Callennec, S. (1997). *Histoire géographique, 8ème année*. Paris: Hâtier.
10. Le Callennec, S. (1997). *Histoire géographique, 9ème année*. Paris: Hâtier.
11. Le Callennec, S. (1997). *Histoire géographique, 10ème année*. Paris: Hâtier.
12. Leong, G.C. (1996). *Certificate physical and Human Geography*. Hong Kong: Oxford University Press.
13. Master, D.N. (2000). *Map Reading for East Africa*. Edinburgh: Longman.
14. McMorgan, G. C., & Leong, L. G. (1982). *Human and Economic Geography, 2nd ed.* New York: Oxford University Press.
15. Minns W. J. (1984). *A geography of Africa*. Macmillan.
16. Monkhouse, F. J. (2008). *Principles of Physical Geography*. London: Hodder Education