

**Geography and
Environment
For Rwanda Schools**

Senior 2

Teacher's Guide

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FOREWORD

Dear teacher,

Rwanda Basic Education Board is honoured to present Senior Two Geography Teacher's Guide which serves as a guide to competence-based teaching and learning to ensure consistency and coherence in the learning of the Geography subject. The Rwandan educational philosophy is to ensure that learners achieve full potential at every level of education which will prepare them to be well integrated in society and exploit employment opportunities.

In line with efforts to improve the quality of education, the government of Rwanda emphasizes the importance of aligning teaching and learning materials with the syllabus to facilitate their learning process. Many factors influence what they learn, how well they learn and the competences they acquire. Those factors include the relevance of the specific content, the quality of teachers' pedagogical approaches, the assessment strategies and the instructional materials available. We paid special attention to the activities that facilitate the learning process in which learners can develop ideas and make new discoveries during concrete activities carried out individually or with peers. With the help of the teachers, learners will gain appropriate skills and be able to apply what they have learnt in real life situations. Hence, they will be able to develop certain values and attitudes allowing them to make a difference not only to their own life but also to the nation.

This is in contrast to traditional learning theories which view learning mainly as a process of acquiring knowledge from the more knowledgeable who is mostly the teacher. In competence-based curriculum, learning is considered as a process of active building and developing of knowledge and understanding, skills and values and attitude by the learner where concepts are mainly introduced by an activity, situation or scenario that helps the learner to construct knowledge, develop skills and acquire positive attitudes and values.


In addition, such active learning engages learners in doing things and thinking about the things they are doing and they are encouraged to bring their own real experiences and knowledge into the learning processes. In view of this, your role is to:

- Plan your lessons and prepare appropriate teaching materials.
- Organize group discussions for learners considering the importance of social constructivism suggesting that learning occurs more effectively when the learner works collaboratively with more knowledgeable and experienced people.
- Engage learners through active learning methods such as inquiry methods, group discussions, research, investigative activities and group and individual work activities.

- Provide supervised opportunities for learners to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation.
- Support and facilitate the learning process by valuing learners' contributions in the class activities.
- Guide learners towards the harmonization of their findings.
- Encourage individual, peer and group evaluation of the work done in the classroom and use appropriate competence-based assessment approaches and methods.

To facilitate you in your teaching activities, the content of this teacher's guide is self-explanatory so that you can easily use it. Even though this teacher's guide contains the answers for all activities given in the learner's book, you are requested to work through each question and activity before judging learner's findings.

I wish to sincerely extend my appreciation to REB staff who organized the editing process of this Teacher's Guide. Special gratitude also goes to lecturers, teachers, illustrators and designers who supported the exercise throughout. Any comment or contribution would be welcome to the improvement of this textbook for the next edition.




Dr. MBARUSHIMANA Nelson
Director General, REB

ACKNOWLEDGEMENT

I wish to express my appreciation to all the people who played a major role in the editing process of this Geography Teacher's Guide for Senior Two. It would not have been successful without their active participation.

Special thanks are given to those who gave their time to read and refine this textbook to meet the needs of competence based curriculum. I owe gratitude to different universities and schools in Rwanda that allowed their staff to work with REB to edit this book. I therefore, wish to extend my sincere gratitude to lecturers, teachers, illustrators, designers and all other individuals whose efforts in one way or the other contributed to the success of this edition.

Finally, my word of gratitude goes to the Rwanda Basic Education Board's staff particularly those from the Curriculum, Teaching and Learning Resources Department who were involved in the whole process of editorial work.



Joan Murungi,
Head of CTLRD

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PART 1

1. INTRODUCTION

1.1 Background to the Syllabus review

Geography is part of Ordinary level curriculum. It is designed for learners who have completed primary level and are pursuing the lower secondary school level. It also lays a strong foundation for learners wishing to pursue Geography at upper secondary level. The former curriculum was knowledge based and needed to be modified with the skills of higher order thinking.

The lower secondary level curriculum has therefore been reviewed in 2014 to ensure that it is active and competence based and prepares learners to become competent with new skills, attitudes and values. This curriculum provides a platform for learners to explore and discover the content where the teacher facilitates the learning. It also develops other educational initiative skills on critical thinking, creativity and innovation, research and problem solving, communication and co-operation, literacy and numeracy.

Despite the fact that the former curriculum integrated environmental issues within the Geography syllabus, this curriculum review was done with special focus on environmental management. This is why the subject name was changed into “Geography and Environment.”

1.2 Rationale of teaching and learning of Geography

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.

Geography is one of the disciplines that are concerned with the real world in which learners live and are capable of solving problems and developing knowledge, skills, attitudes and values which are relevant to their present and future lives.

Geography 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.

1.2.1 Geography and society

Geography is a subject which allows people to understand the physical and social environment in which they are growing up. It equips people with knowledge about diverse places, resources, natural and human environments.

Geography provokes and answers questions about the society, using different techniques of inquiry to view these societies from different perspectives. It develops knowledge of places and the environment throughout the world. As such, it prepares young people for adult life and employment.

Geography is a focus within the curriculum for understanding and resolving issues about the environment and sustainable development. It is also an important link between the natural and social sciences. Geographical studies help to acquire knowledge and skills on different societies and cultures. This also helps to realise how nations rely on each other. It can inspire the people to think about their own place in the world, their attitudes, values, and their rights and responsibilities towards other people and the environment.

1.2.2 Geography and learners

Geography and environment competence based curriculum is developed for the purpose of extending the learners' knowledge, sharpen their intellectual capacities, strengthen their study skills and to incorporate the objectives of Rwanda government education sector and the strategic development plans for Rwanda.

Geography and environment competence based curriculum will enable learners to acquire a variety of functional and sustainable knowledge, skills, and experiences which will help them to develop into citizens with positive attitudes, a sense of curiosity, creativity, capacity and ability to fit in the local, national, and international community.

Geography and environment competence based curriculum helps learners to understand the physical and social environment in which they are growing up and appreciate diversities/differences and similarities in their communities, country, region, continent and the world.

This curriculum is also aimed at developing learners 'critical thinking mind that will enable them to participate in the development of their country and to face major challenges like environmental degradation and overpopulation.

1.2.3 Geography and developing competences

A competence is the ability to perform a particular task successfully, resulting from having gained an appropriate combination of knowledge, skills and attitudes. The national policy documents, based on national aspirations, identify 'Basic Competencies' alongside the 'Generic Competencies' that will develop higher order thinking skills.

Basic competences are addressed in the stated broad subject competences and in objectives highlighted year on year basis and in each of units of learning. Both

the generic and basic competences that must be emphasised and reflected in the learning process are briefly described below and teachers will ensure that learners are exposed to tasks that help the learners acquire the skills.

a) Basic competences

Basic competences are addressed in the stated broad subject competences and in objectives highlighted year on year basis and in each of units of learning. They include:

i) Literacy

- Reading a variety of texts accurately and quickly.
- Expressing ideas, messages and events through writing legible texts in good hand-writing with correctly spelt words.
- Communicating ideas effectively through speaking using correct phonetics of words.
- Listening carefully for understanding and seeking clarification when necessary

ii) Numeracy

- Computing accurately using the four mathematical operations.
- Manipulating numbers, mathematical symbols, quantities, shapes and figures to accomplish a task involving calculations, measurements and estimations.
- Use numerical patterns and relationships to solve problems related to everyday activities like commercial context and financial management.
- Interpreting basic statistical data using tables, diagrams, charts and graphs.

iii) ICT and digital competences

- Locating, extracting, recording and interpreting information from various sources.
- Assessing, retrieving and exchanging information via Internet or cell phones.
- Using cell phones and Internet for leisure and for money transactions.
- Using computer keyboard and mouse to write and store information.
- Using information and communication technologies to enhance learning and teaching(all subjects)

iv) Citizenship and national identity

- Relating the impact of historical events on past and present national and cultural identity.
- Understanding the historical and cultural roots of Rwandan society and how the local infrastructure functions in relation to the global environment.
- Demonstrating respect for cultural identities and expressing the role of the national language in social and cultural context.
- Advocating for the historical, cultural and geographical heritage of the nation within the global dimension.

- Showing national consciousness, a strong sense of belonging and patriotic spirit.
- Advocating for a harmonious and cohesive society and working with people from diverse cultural backgrounds.

v) *Entrepreneurship and business development*

- Applying entrepreneurial attitudes and approaches to challenges and opportunities in school and in life.
- Understanding the obligations of the different parties involved in employment.
- Planning and managing micro projects and small and medium enterprises.
- Creation of employment and keeping proper books of accounts.
- Risk-taking in business ventures and in other initiatives.
- Evaluating resources needed for a business

vi) *Science and technology*

- Apply science and technology skills to solve practical problems encountered in everyday life including efficient and effective performance of a given task.
- Develop a sense of curiosity, inquisitiveness and research to explain theories, hypotheses and natural phenomena
- Reason deductively and inductively in a logical way.
- Use and experiment with a range of objects and tools of science and technology and draw appropriate conclusions.

1.2.4 Cross-cutting issues to be infused during learning

These are emerging issues which need to be incorporated in the learning process. Each of the cross-cutting issues has its own important programme of learning reflecting key national priorities. This learning is integrated into the syllabuses of subjects across the curriculum rather than each issue having a dedicated timetable slot of its own. As a result of this integration, the learning activities in the units of subjects across the curriculum incorporate all the learning associated with the cross-cutting issues. The eight cross-cutting issues are:

a) Peace and Values Education

The need for Peace and Values Education in the curriculum is obvious. Peace is clearly critical for society to flourish and for every individual to focus on personal achievement and their contribution to the success of the nation. Values education forms a key element of the strategy for ensuring young people recognize the importance of contributing to society, working for peace and harmony and being committed to avoiding conflict.

b) Financial Education

Financial education makes a strong contribution to the wider aims of education. It makes learning relevant to real life situations. It aims at a comprehensive financial education program as a precondition for achieving financial inclusion target and

improves the financial capability of Rwandans. Financial education has a key role of not only improving knowledge of personal but also transforming this knowledge into action. It provides the tools for sound money management practices on earnings, spending, saving, borrowing and investing. Financial education enables people to take appropriate financial services both formal and informal that are available to them and encourages financial behaviours that enhance their overall economic well-being.

c) Standardisation culture

Standardisation Culture develops learners' understanding of the importance of standards as a pillar of economic development and in the practices, activities and lifestyle of the citizens. It is intended that the adoption of standardisation culture should have an impact upon health improvement, economic growth, industrialisation, trade and general welfare of the people. While education is the foundation and strength of our nation, standards are one of the key pillars of sustainable economic development.

d) Genocide studies

Genocide Studies provides young people with an understanding of the circumstances leading to the genocide and the remarkable story of recovery and re-establishing national unity. Genocide Studies helps learners to comprehend the role of every individual in ensuring nothing of the sort ever happens again.

The intent of a cross-cutting curriculum around the topic of genocide is to fight against genocide, genocide denial, and genocide ideology; and to equip students with a more fundamental and comprehensive understanding of the genocide, thereby preventing further human rights violations in the future and enabling Rwanda's population of young people to more competently and thoughtfully enter the workforce. So, it needs to be emphasised.

e) Environment and sustainability

The growing awareness of the impact of the human race on the environment has led to recognition of the need to ensure our young people understand the importance of sustainability as they grow up and become responsible for the world around them. Hence Environment and Sustainability is a very important cross-cutting issue. Learners need basic knowledge from the natural sciences, social sciences and humanities to understand and interpret principles of sustainability. They also need skills and attitudes that will enable them in their everyday life to address the environment and climate change issue and to have a sustainable livelihood.

f) Gender education

There is a strong moral imperative to afford every individual their basic human rights and gender inequality results in women and girls being treated less favourably than men. A strongly negative impact of unequal treatment, which affects the nation as a whole, is the fact that it results in women being held back and their talents and

abilities not being fully realised. With a good understanding of the principles of Gender Equality, it is intended that future generations will ensure that the potential of the whole population is realised.

g) Comprehensive sexuality education (HIV and AIDS, STI, Family planning, Gender equality and reproductive health)

Comprehensive sexuality education, which is age appropriate, gender sensitive and life skills based can provide young people with the knowledge and skills to make informed decisions about their sexuality and life style. Preparing children and young people for the transition to adulthood has been one of humanity's greatest challenges with human sexuality and relationships at its core. Few young people receive adequate preparations for their sexual lives. This leaves them potentially vulnerable to coercion, abuse and exploitation. Unintended pregnancy and sexually transmitted infections (STIs) including HIV and AIDS. Many young people approach adulthood faced with conflicting and confusing messages about sexuality and gender. This is often exacerbated by embarrassment, silence, disapproval and open discussion of sexual matters by adults (parents, teachers) at very time when it is most needed.

Comprehensive sexuality education supports a rights - based approach in which values such as respect, acceptance tolerance, equality, empathy and reciprocity are inextricably linked to universally agreed human rights. A clear message concerning these dangers and how they can be avoided, from right across the curriculum, is the best way to ensure that young people understand the risks and know how to stay healthy.

h) Inclusive Education

Inclusive education involves ensuring all learners are engaged in education and that they are welcomed by other students so that everyone can achieve their potential. Inclusive practice embraces every individual regardless of gender or ability including those with learning difficulties and disabilities. The almost focus of inclusive curriculum is on ensuring participation in education of learners with different learning styles and other difficulties. To be successful, it entails a range of issues including teacher's positive attitudes, adapting the learning resources, differentiation of teaching and learning methods and working together. Overall, the benefits of an inclusive curriculum extend to all learners.

1.3 Generic competences

a) 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.

b) 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.

c) Research

This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information.

d) 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.

e) 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. Advocate for personal, family and community health, hygiene and nutrition and responding creatively to a variety of challenges encountered in life.

f) 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 fulfillment in areas that are relevant to their improvement and development.

1.3.1 Broad Geography competences

During and at the end of learning process, the learner can:

- a) Develop a strong interest in their own surroundings at a local, regional and global level.
- b) Appreciate the variety of physical and human aspects in the world and acquire a commitment to sustainable development.
- c) Appreciate the relationships between people and environments, and appreciate the importance of geographical location to human activities.
- d) Demonstrate an understanding of the physical and social environment in which they live and appreciate diversities and similarities in their communities, country, region, continent and the world.
- e) Be aware of land use practices and resource utilisation and the consequences in Rwanda and around the world.
- f) Analyse the impact of various socio-economic activities on sustainable development.
- g) Develop a variety of other skills including those of critical thinking, research and problem solving, creativity and innovation, communication and co-operation, and how to present their conclusions in the most appropriate way.

- h) Demonstrate awareness and show concern for environmental conservation and sustainability and act accordingly.
- i) Be competent in a range of skills and techniques necessary to carry out geographical research with data and interpret geographical phenomena;
- j) Read and interpret geographical data from geographical sources like maps, photographs, diagrams and field study.

1.3.2 Geography and developing competences

The national policy documents basing on national aspirations identify some 'Basic Competencies' alongside the 'Generic Competencies' that will develop higher order thinking skills and which will help subject learning and application of what has been learnt in real life situations.

Through research using textbooks and other geographical documents, Internet, observation, group discussions and presentations, the learners will develop critical thinking, research and problem solving, creativity and innovation, communication and cooperation skills in order to understand and harmonise the findings on physical and human aspects and to make conclusions.

2. PEDAGOGICAL APPROACH

Learners understand best when they are actively involved in the learning process through a high degree of participation, contribution and production. Each learner is an individual with his/her own pace of learning, experience and ability. Teaching strategies must therefore be varied and flexible with a well structured sequence of lessons. Learner-centred education involves full participation of the learners under the guidance of the teacher.

Since each learner is an individual with his/her own needs, pace of learning, experiences and abilities, teaching strategies must be varied but flexible within well-structured lesson sequences.

However, learner-centred education does not mean that the teacher no longer has responsibility for seeing that learning takes place. Teachers will find useful suggestions to implement the child centred and interactive learning approach in the activities and methodology columns of this curriculum.

Language learning is a process. By the time they reach this level, a student is expected to have achieved the English language basics. When they make errors, the teacher should support them accordingly but also accept their attempts to use the language correctly.

At this stage, students are also encouraged and expected to further develop the culture of reading for both information and enjoyment.

Schools should provide a conducive environment for students to practise their English by participating in different clubs such as debating, drama and music. This is essential

as students learn well when they are actively involved in the learning process through a high degree of participation, contribution and production.

With strong language abilities at this level and continued teacher to student support, learners will be able to read more fluently and write more accurately. Teachers must also bear in mind that students learn in different ways and at different rates.

Teachers need to provide a variety of learning experiences to support all learners. The classroom should be a safe and friendly place in which to learn and experiment with the language. This can be achieved by:

- Ensuring constant access by students to the library and encouraging them to read and write within and beyond the framework of the curriculum with comprehension.
- Writing accurately for both functional and creative writing purposes.
- Integrating into other English speaking communities with sufficient command of the English language characterised by adequate competences, knowledge and attitudes.

2.1 Role of the teacher

The new geography curriculum will enable teachers to develop a variety of functional knowledge, skills and experience which will help them to develop learners into citizens with skills, positive attitudes and values in a particular sense of curiosity, creativity and innovative, capacity and ability to fit in the local, national and international community.

The competence-based curriculum will transform learning, ensuring that learning is deep, active and enjoyable. The teacher shifts from the traditional method of instruction and plays the role of a facilitator. The teacher identifies the needs of the learners, the nature of the learning to be done, and the means to shape learning experiences accordingly.

The teacher organises the learners in the classroom or outside and engages them to participate and interact in the learning processes. The teacher guides learners to work individually or in groups to explore or discover the content. This ensures that the learning is personalized, active, participative and co-operative.

The teacher designs and introduces the tasks to the class for research, discussion and group presentation. The teacher guides the learners in developing their own knowledge, skills, attitudes and values.

The teacher selects and develops appropriate learning and teaching materials like geographical documents, maps, atlases, local materials, teaching models, charts, talking and tactile materials which learners use in their work.

In fieldwork studies, the teacher identifies the appropriate topic for study, the area of study and outlines the methods to be used for study. He organizes the study,

accompanies and guides the learners during the real field study. After the field study, the teacher guides learners in group discussions and presentation of the findings.

2.2 Special needs education and inclusive approach

All Rwandans have the right to access education regardless of their different needs. The underpinnings of this provision would naturally hold that all citizens benefit from the same menu of educational programs. The possibility of this assumption is the focus of special needs education. The critical issue is that we have persons/learners who are totally different in their ways of living and learning as opposed to the majority. The difference can either be emotional, physical, sensory and intellectual learning challenged traditionally known as mental retardation.

These learners equally have the right to benefit from the free and compulsory basic education in nearby ordinary/mainstream schools. Therefore, the schools' role is to enroll them and also set strategies to provide relevant education for them. The teacher therefore is requested to consider each learner's needs during the teaching and learning process. Assessment strategies and conditions should also be standardised to the needs of these learners. Below is some guidance on how to cater for each category of learners with special education needs:

(a) Learners with physical difficulties

In this group of learners, the affected areas are normally some body parts, especially the limbs. There may be partial or total loss of use of the limbs. In case the legs are affected, the learners will need assistance during activities that involve movement. This could be during a nature walk and other activities that learners have to stand for some reason. The teacher should organise for the learner's ease of movement around. The learner should also be given time to catch up with the others.

In case the hands are affected, the learners should be given more time to finish their work. In both cases, the learners should not be pressurised to do things that can cause injury or ridicule.

(b) Learners with visual difficulties

These learners normally have problems with their eyesight. They should sit in a position where they are able to see the chalkboard without straining.

NOTE: The learner could be longsighted or short sighted.

The material to be observed should be brought closer to the learner and a magnifying lens used where necessary. The teacher should use large diagrams, charts and labels. In some cases, the learners can be allowed to touch and feel whatever they are looking at. Other learners can assist by reading aloud. The lighting system in the classroom can also be improved.

The teacher should read aloud most of the things he/she writes on the chalkboard.

(c) Learners with hearing difficulties

The affected part in this case is the ear. The learner should have hearing aids. The teacher should use as many visual aids as possible. They should also project their voice and always talk while facing the learners. Use of gestures and signs while talking helps the learner figure out what the teacher is saying as well.

(d) Learners with speech difficulties

A common example in a normal class is the stammerer. They always speak with a lot of difficulties. The teacher should be patient with them and encourage such learners to express themselves in their own way. Such learners should be given more written exercises.

(e) Learners with mental difficulties

The teacher should try to identify the nature and level of the mental difficulty. Learners with mental difficulties should then be given special assistance and attention at an individual level. They can be given special tests or assessments. In general, all the learners with difficulties should be reinforced promptly. This encourages and motivates them. The teacher and the rest of the class should never ridicule learners with any of the difficulties. Note that generally, people with any kind of disability can be very sensitive to any kind of negative comments or criticism.

NOTE: Remind them that disability is not inability.

The teacher should avoid giving privileges where the learners do not deserve them. Treat them fairly but not with undue favours. In extreme cases it can be recommended for the learners to join a special school.

(f) Genocide traumatised learners

Studies have shown that learners from families that were affected by genocide suffer post-traumatic stress disorder (PTSD). As such, they need to be treated as a special case. As a teacher, you need to be careful when dealing with such learners. Also, the teacher needs to be in control especially when the topic under discussion touches on genocide issues. Any language that may elicit emotional reactions from learners either by fellow learners or by the teacher him or herself should be avoided.

2.3 Role of the learner

The activities of the learner are indicated in each learning unit and reflect appropriate engagement in the learning process.

Teaching and learning processes will be tailored towards creating a learner friendly environment based on the learners' capabilities, needs, experience and interests.

Learners use the textbooks, internet and other resource materials to research for and make use of the findings to improve their knowledge, skills, attitude and values.

In fieldwork studies, the learners apply the knowledge and methods acquired to observe, ask questions, interpret and write down the findings from study. After

the field study, the learners discuss in group and make written presentation on the findings. Learning activities will be organised in a way that encourages learners to construct their knowledge, either individually or in groups, in an active and engaging way.

Learners will work on key competences in the form of concrete units with specific learning outcomes broken down into knowledge, skills and attitudes.

In practical lessons learners will work in groups where the availability of the apparatus will not permit working individually but they will be encouraged to do simple project work individually.

3. ASSESSMENT APPROACH

Assessment is the process of evaluating the teaching and learning processes through collecting and interpreting evidence of individual learner's progress in learning and to make a judgment about a learner's achievements measured against defined standards. Assessment is an integral part of the teaching learning processes. In the new competence-based curriculum assessment must also be competence-based, whereby a learner is given a complex situation related to his/her everyday life and asked to try to overcome the situation by applying what he/she learned. Assessment will be organised at the following levels: School-based assessment, District examinations, National assessment (LARS) and National examinations.

3.1 Item writing in summative assessment

Before developing a question paper, a plan or specification of what is to be tested or examined must be elaborated to show the units or topics to be tested on, the number of questions in each level of Bloom's taxonomy and the marks allocation for each question. In a competence based curriculum, questions from higher levels of Bloom's taxonomy should be given more weight than those from knowledge and comprehension level.

Before developing a question paper, the item writer must ensure that the test or examination questions are tailored towards competence based assessment by doing the following:

- a) Identify topic areas to be tested on from the subject syllabus.
- b) Outline subject-matter content to be considered as the basis for the test.
- c) Identify learning outcomes to be measured by the test.
- d) Prepare a table of specifications.
- e) Ensure that the verbs used in the formulation of questions do not require memorisation or recall answers only but testing broad competences as stated in the syllabus.

3.1.1 Structure and format of the examination

There will be two papers in Geography Subject. Duration: 3 hours each.

Paper I: Physical Geography

Map Reading and Photographic Interpretation. General Physical Geography, Physical Geography of Rwanda and Physical Geography of Africa.

Paper II: Human and Economic Geography

Human and Economic Geography of Rwanda, Human and Economic Geography of Africa and Development case studies.

NOTE: On Development case studies, questions will be optional: Questions from two of the three continents: Europe, America and Asia.

3.2 Types of assessment

3.2.1 Formative and continuous assessment (assessment for learning)

Continuous assessment involves formal and informal methods used by schools to check whether learning is taking place. When a teacher is planning his/her lesson, he/she should establish criteria for performance and behaviour changes at the beginning of a unit. Then at the end of every unit, the teacher should ensure that all the learners have mastered the stated key unit competences basing on the criteria stated, before going to the next unit. The teacher will assess how well each learner masters both the subject and the generic competences described in the syllabus and from this, the teacher will gain a picture of the all-round progress of the learner. The teacher will use one or a combination of the following: (a) observation (b) pen and paper (c) oral questioning.

3.2.2 Summative assessment (assessment of learning)

When assessment is used to record a judgment of a competence or performance of the learner, it serves a summative purpose. Summative assessment gives a picture of a learner's competence or progress at any specific moment. The main purpose of summative assessment is to evaluate whether

learning objectives have been achieved and to use the results for the ranking or grading of learners, for deciding on progression, for selection into the next level of education and for certification. This assessment should have an integrative aspect whereby a student must be able to show mastery of all competencies.

It can be internal school based assessment or external assessment in the form of national examinations. School based summative assessment should take place once at the end of each term and once at the end of the year. School summative assessment average scores for each subject will be weighted and included in the final national examinations grade. School based assessment average grade will contribute a certain percentage as teachers gain more experience and confidence in assessment techniques and in the third year of the implementation of the new curriculum it will contribute 10% of the final grade, but will be progressively increased. Districts will be supported to continue their initiative to organise a common test per class for all the schools to evaluate the performance and the achievement level of learners in

individual schools. External summative assessment will be done at the end of P6, S3 and S6.

3.2.3 Assessment requirements

The success of the competence curriculum will also depend to a great extent on the quality and frequency of formative assessment which gauge learners' progress towards achievement of learning objectives. Formative assessment is used to identify where students are having difficulty so that barriers to learning can be overcome and so that teachers' lesson planning can be adapted accordingly. Textbooks will therefore need to include questions within units that teachers and learners can use formatively. A key feature of assessment in this learner-centred curriculum is that students take significant responsibility for their own learning so formative assessment strategies should actively involve learners as well as teachers.

In this curriculum, assessment focuses upon the learning objectives within each unit: i.e. the knowledge and understanding, skills, attitudes and values. Learners who are successful in meeting these learning objectives in these three categories in a unit will also achieve the subject competence (the key unit competence). Also assessed within each unit are the basic and generic competences which are taught across the curriculum and developed through learning activities in every subject.

Textbooks will need to be designed so that they develop all of these aspects of learning, including a balance of the basic and generic competences. Teachers' Guides will have to offer practical guidance relating to how learning activities can address the range of learning objectives and the competences.

The competence approach has implications for the tasks learners will be engaged in; the questions asked of learners both in textbooks and orally by teachers; the way teachers gauge learners' progress and the way progress is recorded. The following sections provide some detail on the implications under each of these headings.

Summative assessment is familiar to teachers and is used to check how well students have met learning objectives at the end of an episode of learning. Traditionally many of the assessment questions in textbooks have had a focus on knowledge rather than what learners can do but with a competence curriculum this must change. Knowledge is no less important in a competence curriculum but there must be assessment questions which require learners to apply their knowledge.

3.2.4 Learner Tasks

As competences are at the heart of the new curriculum, assessments need to involve tasks and tests that engage learners so they can actively demonstrate the full range of their abilities, including what they can do rather than just recall of facts. Achieving a competence requires a learner to have relevant knowledge, the skills to apply this knowledge and the attitudes to bring the two together successfully. Tasks provided in the textbooks and teachers' guides should reflect the importance of all three of these elements of competences.

Many tasks will involve learners in activities which focus on more than one competence at a time. For example, a problem-solving task may also involve critical thinking, creativity, communication and cooperation. It is therefore important that each task in textbooks should clearly direct teachers and learners to the particular competence that is being targeted so that there is an appropriate balance of all the competences over time.

Tasks should also be designed so that learners progress in terms of competences as they work through the curriculum. The level of challenge involved in each competence is determined mainly by the knowledge component so progression in terms of competences is largely built into syllabuses. Content providers do not have to be constrained by the learning activities in the syllabuses and may wish to amend them or add to them in order to improve learning opportunities. These tasks will often be assessed through listening or observation, rather than through written answers. Guidance in Teachers' Guides on assessing competences through observation and listening is essential.

3.2.5 Questioning skills

Questioning needs to reflect the importance of competences in the curriculum. A successful textbook will include questions that target the achievement of competences and the three components of competences: the knowledge and understanding, the skills and the attitudes and values. A good Teachers' Guide will provide guidance on how questioning can engage learners and how they can target questions to develop each of the competences and each of the components.

For the generic competences, questions in textbooks must require learners to engage in problem solving, creativity and critical thinking so that they routinely use higher order thinking and develop these important competences. They must also require learners to work with others so that they improve their communication and cooperation competences. Questions should also focus on developing and assessing basic and subject competences.

Although there is a place for closed questions, most questions need to be open so that they encourage learners to think for themselves, exploring possibilities, justifying solutions and accepting that there is not always one single right answer.

Content providers should consider how they can provide answers to questions (where there is a right answer) or provide guidance to approaches to questions (where there is not). Teachers' guides might include an answer section or this could be covered in a different way.

3.2.6 Observation and Listening

Formative assessment of competences will often require teachers to use observation and listening to gauge learners' progress. For example, a teacher may observe group work to see how well individuals are cooperating and communicating with each other. In a problem-solving exercise, teachers may need to listen to group discussion

to gauge the quality of the contribution of different participants. These techniques are unfamiliar to many teachers and guidance will be needed in Teachers' Guides to help them improve their skills.

3.2.7 Self and Peer Assessment

Many of the learning activities in the units involve group and paired work. Learners can make a considerable contribution to their own progress and that of others if they are actively engaged in formative assessment, particularly in relation to cooperation and communication. Textbooks should provide opportunities for learners to self-assess and to assess their peers. This is a key element of the drive to encourage learners to understand assessment expectations and to take responsibility for their own learning.

3.2.8 Grading of Competences

Assessing competences is clearly different from assessment of knowledge and this should be reflected not only in the way assessment takes place but also in how it is recorded. When engaged in regular, frequent formative assessment in lessons, it is not appropriate for teachers to grade skills and competences against a numerical scale. Instead learners should be recorded as having met, exceeded or failed to meet expectation. Hence a RAG (red, amber, green) rating such as the one shown in the table below is one possible method.

Student	Literacy	Numeracy	ICT	Communication	Creativity	Critical thinking	Research and problem solving	Cooperation
A	R		A	R	A	R		G
B	G	G	R	G	A	A		G
C	A		R	G	G	R		A
D	G	A	A	G	G	R	R	R

Teachers need to record students' progress with the basic and generic competences shown in the table and with the subject competences, which are the key unit competences that are the focus of each unit. Learners' exercise books and folders of work could act as portfolios of evidence of their progress. Guidance in Teachers' Guides on suggested approaches to grading formative assessment of competences will be very helpful to teachers who are unfamiliar with these techniques.

Assessment of competences does not have implications for established approaches to grading of knowledge using numerical scales.

3.2.9 Record Keeping

This is gathering facts and evidence from assessment instruments and using them to judge the student's performance by assigning an indicator against the set criteria or standard. Whatever assessment procedures used shall generate data in the form of scores which will be carefully be recorded and stored in a portfolio because they

will contribute for remedial actions, for alternative instructional strategy and feed back to the learner and to the parents to check the learning progress and to advice accordingly or to the final assessment of the students.

This portfolio is a folder (or binder or even a digital collection) containing the student's work as well as the student's evaluation of the strengths and weaknesses of the work. Portfolios reflect not only work produced (such as papers and assignments), but also it is a record of the activities undertaken over time as part of student learning. The portfolio output (formative assessment) will be considered only as enough for three years of Advanced level. Besides, it will serve as a verification tool for each learner that he/she attended the whole learning before he/she undergoes the summative assessment for the subject. The results from the portfolio will contribute 50% on summative assessment of each year.

3.3 Reporting to parents

The wider range of learning in the new curriculum means that it is necessary to think again about how to share learners' progress with parents. A single mark is not sufficient to convey the different expectations of learning which are in the learning objectives. The most helpful reporting is to share what students are doing well and where they need to improve.

4. RESOURCES

4.1 Learning and teaching materials

- 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, brailled equipment and materials.

4.2 Skills for the teacher of this subject

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.

5. ORDINARY LEVEL GEOGRAPHY AND ENVIRONMENT SYLLABUS UNITS

5.1 Presentation of the structure of the syllabus units

GEOGRAPHY subject is taught and learned in lower secondary education as a core subject, i.e. in S1, S2 and S3 respectively. At every grade, the syllabus is structured in Topic Areas, sub-topic Areas where applicable and then further broken down into Units. The units have the following elements:

1. Unit is aligned with the Number of Lessons
2. Each Unit has a Key Unit Competence whose achievement is pursued by all teaching and learning activities undertaken by both the teacher and the learners.
3. Each Unit Key Competence is broken into three types of Learning Objectives as follows:
 - (a) **Type I:** Learning Objectives relating to Knowledge and Understanding (Type I Learning Objectives are also known as Lower Order Thinking Skills or LOTS)
 - (b) **Type II and Type III:** These Learning Objectives relate to acquisition of skills, Attitudes and Values (Type II and Type III Learning Objectives are also known as Higher Order Thinking Skills or HOTS)

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

4. Each Unit has a Content which indicates the scope of coverage of what a teacher should teach and learner should line in line with stated learning objectives.
5. 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).
6. 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). As for units, they are 13 in S1, 22 in S2 and 18 in S3.

5.2 Competences at the end of Senior Two

- a) Demonstrate an understanding of the earth and the elements of physical geography
- b) Explain the relationship between physical geography and human activities
- c) Apply knowledge and understanding of physical and human geography theory
- d) Read and identify the elements of a map and interpret them.

5.3 Teaching methods

The particular technique that a teacher may choose to use is 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

There is a variety of possible ways in which a teacher can help the learners to learn. These include:

- (a) Question and answer
- (b) Discovery or practical activity
- (c) Group, class or pair discussion
- (d) Project method
- (e) Educational visit/field trips
- (f) Demonstration
- (g) Experimentation

Each of these teaching methods is explained below:

(a) Question and answer

This is the traditional way of teaching whereby the teacher explains something while the learners listen. After the teacher has finished, the learners may ask questions. However, remember that in competence-based curriculum, this technique should be used very minimally.

(b) Guided discovery

In this technique, the teacher encourages learners to find out answers to problems by themselves. The teacher does this by:

- Giving learners specific tasks to do
- Giving learners materials to work with
- Asking structured or guided questions that lead learners to the desired outcome

Sometimes learners are given a problem to solve and then left to work in an open-ended manner until they find out for themselves.

With the introduction of the new curriculum, this is the preferred method of teaching.

(c) Group or class discussion or pair work

In this technique, the teacher and learners interact through question and answer sessions most of the time. The teacher carefully selects his questions so that learners are prompted to think and express their ideas freely, but along a desired line of thought. Discussion method should take learners from known to unknown in a logical sequence; and works well with small groups of learners. The disadvantage of this method is that some learners maybe shy or afraid to air their opinions freely in front of the teacher or their peers. This may give them more confident learners a chance to dominate the others. However, the method should be embraced as it intends to eliminate the lack of confidence in learners. Further, it is hoped that it will help improve interpersonal and communication skills in learners.



(d) Project method

In this approach, the teacher organises and guides a group of learners or the whole class to undertake a comprehensive study of something in real life over a period of time such as a week or several weeks.

Learners using the project method of studying encounter real life problems which cannot be realistically brought into a normal classroom situation. A project captures learners' enthusiasm, stimulates their initiative and encourages independent enquiry. The teacher, using the project method, must ensure that the learners understand the problem to be solved and then provides them with the necessary materials and guidance to enable them carry out the study. In upper primary, a teacher can use the

project method for topics, which cannot be adequately studied during the normal time-tabled school lessons.

The main disadvantages of the project method is that if a project is not closely supervised, learners easily get distracted and therefore lose track of the main objective of their study. Studying by the project method does not work well with learners who have little or no initiative.

(e) Educational visits and trips/nature walks

This is a lesson conducted outside the school compound during which a teacher and the learners visit a place relevant to their topic of study. An educational visit/nature walk enables learners to view their surroundings with a broader outlook that cannot be acquired in a classroom setting. It also allows them to learn practically through first-hand experience. In all “educational visit/nature walk lessons”, learners are likely to be highly motivated and the teacher should exploit this in ensuring effective learning. However, educational visits are time consuming and require a lot of prior preparation for them to succeed. They can also be expensive to undertake especially when learners have to travel far from the school.

(f) Demonstration lessons

In a demonstration, the teacher shows the learners an experiment, an activity or a procedure to be followed when investigating or explaining a particular problem. The learners gather around the teacher where each learner can observe what the teacher is doing. It is necessary to involve the learners in a demonstration, for example by:

- Asking a few learners to assist you in setting up the apparatus.
- Requesting them to make observations
- Asking them questions as you progress with the demonstration.

This will help to prevent the demonstration from becoming too teacher-centred.

A teacher may have to use a demonstration, for example when:

- The experiment/procedure is too advanced for learners to perform.
- The experiment/procedure is dangerous
- The apparatus and materials involved are delicate for learners to handle.
- Apparatus and equipment are too few

6. PLANNING TO TEACH

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

6.1 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 (DOS)

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 e.g. 1,2,3, etc.

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 e.g. lesson 1,2,3 and 4, etc. 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 e.g. 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.

A sample scheme of work is provided for your familiarisation.

6.2 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. In science, one should distinguish between knowledge, skill and attitude objectives.
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
	20/02/ 2017	Geography	S2	3	3 of 3	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							
Interpretation of photographs and video images							
Key Unit Competence:							
By the end of the lesson, the learner should be able to interpret the relationship between physical and human features on photographs and draw sketch diagrams of a photograph							
Title of the lesson							
Reduction and enlargement of photographs							
Instructional Objective							
Given a photograph showing a place or an image of an object, the learner should be able to:							
<ul style="list-style-type: none"> • Draw a sketch diagram of a photograph on a scale of 1:2 (or enlarge a photograph to twice its original size) correctly • Draw a sketch diagram of a photograph on a scale of 1:0.5 (or reduce a photograph by half of its original size) correctly 							
Plan for this Class (location: in / outside)							
In class							
Learning Materials (for ALL learners)							
Learner's Book A variety of photographs Rulers Plain papers (A4 size)							
References							
<i>Mastering Photograph Work</i> by Winfred Williams (2006). Longhorn 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; <i>Geography by Jane Dove Et Al</i> (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's activities: Guiding learners through stages followed in the drawing of sketches of enlarged and reduced photographs.	Learners' activities: Drawing sketches of enlarged and reduced photographs following the procedure given in the Learner's Book under your guidance.	
Introduction 5 min	Teacher activities		Inclusive Education: This requires that learners, irrespective of their physical shortcomings, participate in the learning process meaningfully so as to achieve their potential.
	Guide learners in a brainstorming session using question and answer the previous lesson on drawing of sketch diagrams from photographs	In pairs, practically drawing sketches of selected photographs following the procedure discussed in the previous lesson.	
Development of the lesson 25 minutes	Ask learners to work in pairs to draw a sketch of the photograph you'll have given them.		Critical thinking: This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way. Foster this
	1. Working in pairs to draw a sketch of a photograph provided using the procedure given in the		

	<p>Guide their presentation while correcting their language and pronunciation to promote good communication skills</p>	<p>Learner's Book on Reduction of Photographs.</p> <p>2. Working in pairs to draw a sketch of a photograph provided using the procedure given in the Learner's Book on Enlargement of Photographs.</p> <p>Each pair, using a different type of photograph, should demonstrate how their sketch complies to the standards of a good sketch.</p> <p>3. Allow for class presentation the explanation of how they arrived at each of the two sketches they will have come up with.</p>	<p>competence by guiding their work without necessarily informing them of what they need to achieve. Let them discover the concepts by themselves.</p> <p>Cooperation: This is the ability to work together in pairs to achieve the set goal. Ensure that learners of different abilities are paired up to ensure that learning actually takes place.</p> <p>Research skills: This is looking for information from various sources to explain the concepts being learnt about. Guide the acquisition of this competence as they look for the information from their Learner's Book and other reference books</p>
<p>Conclusion: - Summary - Assessment</p>	<p>Display two sketches of a reduced and enlarged photograph with a brief procedure of how each is developed at the learning corner of the class for later reference and revision.</p>	<p>Select some learners to summarise the procedure to be followed in enlarging and reducing photographs. Let them write in point form on the board as others copy in their notebooks.</p> <p>Assign learners the activity in the Learner's Book as homework.</p>	<p>Communication skills and critical thinking: These are developed when learners summarise the procedure followed in enlarging and reducing maps. Observe this competence as they present their work to the entire class. Correct their vocabulary, pronunciation as well as body language as presentations go on.</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 2

TOPIC AREA: PRACTICAL GEOGRAPHY

SUB-TOPIC AREA: MAP READING AND
PHOTOGRAPHIC INTERPRETATION

UNIT 1: MAP WORK INTERPRETATION

UNIT 2: TYPES OF PHOTOGRAPHS

UNIT 3: INTERPRETATION OF PHOTOGRAPHS
AND VIDEO IMAGES

Key unit competence

*At the end of the **three periods**, the learner should be able to demonstrate how to measure distance and area on a map.*

Introduction

Map work involves map reading and map interpretation. Map reading refers to identifying, interpreting and analysing geographical information on maps.

The kind of maps used in map reading are known as topographical maps. These maps indicate 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 will study how to interpret information contained on topographic maps by studying the following sub-topics:

- (i) Location of places and features on maps
- (ii) Direction and bearing
- (iii) Use of grid references
- (iv) Measuring distances and areas on a map
- (v) Description of relief on a map (Use of contours, use of colours, use of trigonometric stations and spot heights)

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills and attitudes summarised in the table below.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Identify places and features on a map. 	<ul style="list-style-type: none"> • Locate places and features on a map using grid references. 	<ul style="list-style-type: none"> • Appreciate the importance of measuring distances and calculating areas on actual ground using a map
<ul style="list-style-type: none"> • State the bearings and directions of places and features on a map. 	<ul style="list-style-type: none"> • Demonstrate how to determine bearings and directions on topographic maps 	<ul style="list-style-type: none"> • Appreciate the importance of measuring bearings and directions to locate places and features on a map

<ul style="list-style-type: none"> • Use different scales to measure distance and calculate areas from topographical maps 	<ul style="list-style-type: none"> • Measure the distances and calculate areas on the map in relation to the actual distance on the surface ground area 	
<ul style="list-style-type: none"> • State different ways of representing relief on maps 	<ul style="list-style-type: none"> • Describe the relief of the area shown on a topographic map 	

Information to the teacher

Geography is the study of the earth as a home of man. This means that the subject

explores various components of the environment to explain concepts that at first may be abstract. This being the first unit for Senior 2 Geography class, it is important that the teacher captivates the learners' interest in the subject at this stage. This can be done by emphasising **the importance of map work interpretation**. Learners should be made to realise that Geography enables us to understand the natural and human systems that affect our everyday life. This means the subject helps us understand our surroundings - the environment and how to make use of it without destroying it. Since we cannot always be going out of class to study various topics in Geography, maps have been used as an alternative because they condense information on the ground. This is the reason why maps are an integral part in the study of Geography.

Links to other subjects

While teaching this unit, ensure you draw a link to Mathematics, specifically in *Bearing, Direction and Distance*.

Generic competences

In this unit, ensure that you achieve

one or a combination of the following generic competences:

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) **Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) **Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) **Communication skills:** This involves understanding the language through listening and reading, using oral and written

language in discussing, arguing and debating a variety of themes in a logical manner and exchanging ideas confidently and effectively.

- e) **Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) **Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.
- g) **Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Geography is all about the environment. It is important that as you introduce Geography to the Senior 2 learners, you ensure that they understand and appreciate that they need to cooperate by working together in solving classroom challenges, such as reading and interpreting information on maps. This will help them work together regardless of each of their capabilities. This way, they will appreciate each other's contribution in the learning process, thereby fostering *inclusivity*

in learning processes.

As learners work together in groups, they will achieve cooperation amongst themselves as well as saving on cost that will have seen you acquire maps for use by each of the learner. This will promote *financial education or awareness*, especially if mentioned to the learner on the need to share the resources you'll have given them (in this case being topographical maps).

At the same time, help the learners appreciate that Geography is *a career subject*. Both male and female learners can benefit from the study of Geography. In this unit, encourage them to develop an interest because it can enable them become cartographers or even land surveyors. Remote sensing and professions such as being pilots or navigators also depend on the knowledge gained from the study of this unit. Through its applicability and practicability, it fosters career development in more than one way.

Assessment criteria

By the end of this unit, the learner should be able to correctly measure distances and calculate areas and bearings on maps.

End of unit notes

Emphasize key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this unit.

1.1 LOCATION OF PLACES AND FEATURES ON MAPS

Learning outcome

By the end of this section, the learners should be able to identify places and features on a map.

Additional information for the teacher

Before starting this unit, ensure that learners have relevant learning materials such as notebooks, pencils, rulers, rubbers and pens. If they have access to colours, ask them to obtain them early enough for **Activity 1.1**.

This activity will remind learners of the qualities of a good map they learnt in Senior One as they draw the sketch of their school.

Before the actual drawing, ask them to list all the features they see in the school compound which they intent to include on the sketch. You can ask them to think of the symbols they intent to use to represent the features on the sketch map drawn.

Use this activity to explain how to locate places and features on maps.

Preparation for teaching

Acquaint yourself with the environment around the school and make notes of the Geographical features that you expect the learners to be able to identify. Ensure that the preparation you make will enable learners to acknowledge that there is need to study map work.

Teaching and learning resources

- Learner's Book
- Topographic maps
- Rulers
- Pencils
- Chalkboard
- Tactile displays for learners with visual impairments

Interactive learning and multi-ability learning

Using **Activity 1.1** as your introductory point for this type of learning, group the learners into five. You must involve slow learners and ensure that groups are made up of learners of different abilities.

Let them draw the sketch maps under your supervision.

While discussing their findings, use question and answer and discussion methods ensuring that all learners participate. **This will promote cooperation** among the learners.

Activity 1.2 should be done in pairs as part of their assignment for class discussion. Let them present their findings to the class. This activity is aimed at promoting **creativity and innovativeness** as they learn new knowledge about maps as well as **cooperation** as they work together in pairs.

For both activities, guide the learner into learning correct information by giving summarised explanation as per the expected learning outcomes.

Teaching and learning methods

- Discussion method
- Demonstration
- Question and answer
- Guided discovery

Teaching and learning activities

- a) Drawing the sketch map of the school compound
- b) Observing the school environment to identify features to be drawn
- c) Using available reference materials to search for information about map work
- d) Asking and answering questions and taking notes

Extension/Remedial Activities

As other learners will be doing class activities in the Learner's Book, the following activities are recommended for fast and slow learners respectively:

Fast learners

Ask them to draw the sketch of their compounds at home. Ensure they include all the qualities of a good map on the sketch.

Slow learners

Let them list, with examples, the qualities of a good map using the sketch maps drawn in **Activity 1.1**.

1.2 DIRECTION AND BEARING

Learning outcomes

By the end of this section, the learners should be able to:

- a) State the bearings and directions of places and features on a map.

- b) Demonstrate how to determine bearing and direction on a map.

Additional information for the teacher

Introduce this lesson by reviewing briefly what the class learnt during the last lesson.

Proceed to explain the meaning of the terms '*direction*' and '*bearing*' as stated in the Learner's Book. You can ask two learners to read out in class loudly the meaning of each term, after which you explain them in detail.

Take the learners through the steps followed when finding direction on a map.

Appoint one of the fast learners to guide the class through question 1 of **Activity 1.3**. On their own, let them attempt question 2 of the same activity.

Discuss the answers they will have given, correcting those that are wrong, even as you reinforce correct responses. While the presentation will be going on the first question of this activity, ensure that the presenter pays attention to communication skills and public speaking abilities.

Preparation for teaching

Make comprehensive notes on *Direction and Bearing* using different reference materials. The notes should be simplified, though with emphasis on the direction and bearing.

Organise the class so that they can be able to tackle **Activity 1.3** and **1.4**.

Ask them to individually attempt **Activity 1.5**. Collect their notebooks for marking.

Teaching and learning resources

- a) Learner's Books
- b) Chalkboard
- c) Topographic maps
- d) Rulers and protractors
- e) Pencils

Ensure use of appropriate materials for learners with special needs.

Interactive and multi-ability learning

As they tackle **Activity 1.5**, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Extension/Remedial Activity

- a) Guided discovery
- b) Discussion
- c) Demonstration
- d) Question and answer method

Attitudes and values to be attained at the end of the lesson

The learner should appreciate the importance of measuring bearings and directions to locate places and features on maps.

Further activities

Organise the learners into groups of five. Let each group use one of the sketch maps they drew in **Activity 1.1** to give direction and bearing of major features from each other in the school compound. For example:

- (a) The playing ground from classrooms
 - (b) The gate from the staffroom
- A team leader from each group should present the findings in class.

1.3 USE OF GRID REFERENCES

Learning outcome

By the end of this section, the learner should be able to locate places and features on a map using grid references.

Additional information for the teacher

Make a brief review of what the class learnt during the last lesson through question and answer method. Comment on the learners' assignment (**Activity 1.5**), correcting those who did not get the concept of Direction and Bearing right.

Introduce the topic of grid references by grouping the learners into five. Let each group attempt **Activity 1.6**. However, start by explaining the definition and application of the knowledge on grid references. Take them through **Activity 1.6**, while relating vertical lines to eastings and horizontal lines to northings. Explain why each category of lines is referred to by the name they are given.

Allow for class presentation from each group. As they present, correct the information being provided, while allowing the rest of the class to take notes on what you confirm as correct. By doing this, you will be **promoting cooperation and communication.**

Preparation for teaching

As you prepare, take into account learners with special needs. Ensure that learners have access to the material they will require for **Activity 1.6**. This will include:

- Graph paper
- Red and blue marker pens
- Ruler

Teaching and learning resources

- Topographic map
- Chalk board

Interactive or multi-ability learning

Ensure the groups are made of fast and slow learners. Guide the activity of drawing the grid to be used in this lesson. Let all learners be part of a group which has all the materials necessary for the activity.

Teaching and learning methods

- Guided discovery
- Guided discussions
- Question and answer
- Demonstration
- Discovery or practical work

Learning activities

Using **Activities 1.7** and **1.8**, explain how to give both the four figure and six figure grid reference.

As an assignment, let them try to give the grid reference of all the other points given in the grids provided in the Learner's Book.

Mark the assignment as you correct those who will not have understood how grid referencing is done.

In some cases, you can ask bright learners to stand in front of the class to explain to the rest how they managed to give correct grid references. You can introduce as many points on the grid as possible, asking them to state the grid references over and over again until when they will all grasp the concept.

Extension/Remedial Activities

Use the sketch map you drew in **Activity 1.1** (of your school).

Number the vertical lines and horizontal lines, on the squared piece of paper on which you drew the sketch. Indicate the flag post using a point/dot. Give the four figure grid reference of the point where the flag is.

1.4 MEASURING DISTANCES AND AREAS ON A MAP

Learning outcomes

By the end of this section, the learners should be able to:

- Use different scales to measure distance and calculate areas on topographic maps.
- Measure distances and calculate areas on the map in relation to the actual distance on the surface ground area.
- Appreciate the importance of measuring the actual distances and calculating areas on maps.

Additional information for the teacher

Start the lesson by explaining that a scale is one of the five elements of a good map. Brainstorm with the learners what the other elements of a good map are. Remind them of what they learnt in Senior One about *Elements of a good map* in Unit 2. Ask one of them to explain what a scale is. You can pick another learner to give examples of scales used on topographic maps. Do this with the help of **Activity 1.9** in the Learner's Book.

At random, let learners speculate on the importance of measuring distances of various features on the map.

Preparation for teaching

Distance along straight edges

Ensure that learners have the following requirements for this lesson:

- Topographical map
- A pair of dividers
- A straight edge of a piece of paper
- A ruler
- A non-elastic cotton thread

Guide the learners through the processes of measuring distances along straight lines on the map, using a pair of dividers, a straight edge of a paper, a ruler and a non-elastic cotton thread. The Learner's Book has this information. Explain each step, while demonstrating how it is done.

On the topographic map provided in the Learner's Book, let them measure the straight lines marked XY and MN.

Distance along curved features

Note: You will require a metre rule, borrowed from the Physics or Mathematics teacher for this lesson.

Measuring of distance along curved lines is usually done using a non-elastic thread or straight edge of a paper.

To demonstrate how this is done, draw a river on the chalk board, ensuring that it has convenient curves to be measured. Ask a learner, probably one known to you as a fast learner, to explain to the rest of the class how measurement along such a feature can be done using a string. Ensure the metre rule is readily provided for the measurement to be taken.

Afterwards, ask the learners to work in pairs and attempt to measure the distance along the river given on the map between points A and B. Using the scale provided, guide them to convert the map distance to the ground distance. They can first measure using a string, then a straight edge of a paper. Let them practice applying the knowledge gained working on **Activity 1.10**.

Measuring areas on a map

i) Areas of regular shapes

Take them through **Activity 1.11** by giving them figures to determine their areas such as squares, rectangles, trapezium and a circle. Ensure that they grasp the appropriate mathematical formulae for this. Some of these formulas are:

- Square ($S \times S$)
- Rectangle ($L \times W$)
- Triangle ($1/2B \times H$)

- Trapezium ($1/2(a + b) \times H$)
- Circle (πr^2)

ii) Areas of irregular shapes

Natural features such as lakes and forests appear as irregular shapes on topographic maps.

To find areas of such features, we count the number of full squares then assume that all other incomplete squares are half squares. The total of full squares plus half the number of incomplete squares give the area of the feature represented on the map in km^2 .

Remember, the squares that appear on topographic maps are usually 1km^2 .

After this explanation, learners should attempt **Activity 1.12** individually. Assist slow learners in calculation as fast learners take on **Activity 1.13**.

Choose one of the learners who has fully understood to explain the findings of **Activity 1.13**.

Teaching and learning resources

- Learner's Books
- Chalkboard
- Topographic maps
- Rulers
- Non-elastic cotton thread
- Pencils

Interactive and multi-ability learning

As they tackle **Activity 1.13**, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- Guided discovery
- Discussion
- Demonstration
- Question and answer method

Extension/Remedial Activities

Organise the learners into groups of three. Let each group use one of topographic map you will give them to measure the distances between places along curved lines you will mark for them.

Ensure you check their books before the next lesson. Have fast learners help the slow learners to understand how this measurements are done before moving to the next lesson.

1.3 DESCRIPTION OF RELIEF ON A MAP

Learning outcomes

By the end of this section, the learners should be able to:

- State different ways of representing relief on maps
- Describe the relief of an area shown on a topographical map.

Additional information for the teacher

Build on the knowledge learners have from the study of the *representation of relief on maps* in Senior One (Unit 2). Let them mention some of the relief features that topographical maps show. This should come out clearly through **Activity 1.14**. Allow those who can have access to Senior One Learner's

Book to cross reference and give answers to this activity.

For question 1(b) of this activity, they can use topographical maps you have provided together with the atlases they have to explain how colour is used to represent relief on maps. Let them give examples of features that are represented by certain colours. Mention that mountains are represented by purple, hills and uplands by brown and mountain tops by white.

Before attempting question 2 of this activity, brainstorm on the difference between trigonometric stations and spot heights as indicators of relief on topographic maps. Make it simpler and enjoyable for them by ensuring that they understand the symbols that accompany each representation of relief respectively. Using the map provided in the Learner's Book, let them mention the stations they can see. Before explaining the meaning of the numbers besides each station, ask them to mention these figures, as one of them lists them on the chalkboard. Fast learners are likely to understand the meaning of these figures. Therefore, ensure they participate in the discussion by allowing them to attempt to explain what the numbers are meant for. Guide the discussion so that there are no unnecessary deviations from what should be learnt.

Proceed to the last aspect of the lesson: Use of contours on a topographical map to calculate vertical interval. Use the third question of this activity to summarise the lesson.

Teaching and learning resources

- Map extract in the Learner's Book
- Chalkboard
- Topographic maps

Interactive and multi-ability learning

As they tackle **Activity 1.14**, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- Question and answer
- Discussion
- Demonstration
- Question and answer method
- Guided discovery

Extension/Remedial Activities

1. Give learners another map extract with a key for certain features such as a school, church or market for them to give their six figure grid reference.
2. Give the **End of unit assessment** as an assignment. Ensure you go through the answers they have provided before the next lesson.

Answers to End unit assessment

1.
 - Join points G and F with a straight line.
 - At point G, draw a compass point, with an elongated north to south line.
 - Place a protractor on point G, and read the angle in a clockwise direction from the North-South line, to where the line joining G and F is.
 - Remember to state the angle in three digits.
2. Grid references are the numbers given to the lines that form the grid squares on a topographic map.
3. **a) Relief:** The nature of the slope of land

b) Contours: Lines that join places of the same height above sea level on a topographical map

c) Contour interval: The difference between two successive interval lines on a topographic map.

d) Trigonometric station:

A point represented on a map by an inverted triangle or circle with a dot at its centre, to show the height of an elevated area on a topographic map, with the altitude written besides it.

4. Spot heights assist a map reader to tell the altitude (that is height above sea level) of the places where they are positioned on topographic maps. Other indicators of relief include contours, colours and trigonometric stations.

Key unit competence

At the end of the three periods, the learner should be able to interpret different types of photographs.

Introduction

In Senior One, we learnt about the differences between maps and aerial photographs. This year, we will learn more about photographs by studying the following:

- (i) Definition of photographs
- (ii) Types and parts of photographs
- (iii) Importance of photographs

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge	Skills	Attitudes and values
<ul style="list-style-type: none"> • Name different types of photographs • State different parts of a photograph • Identify the importance of photographs. 	<ul style="list-style-type: none"> • Observe and interpret photographs of the local environment. • Explain how different types of photographs are taken • Describe the different parts of photographs. • Evaluate the importance of photographs 	<ul style="list-style-type: none"> • Appreciate the importance of photographs in their environment. • Show respect for the study of photographs in the subject of Geography.

Information to the teacher

Introduce the unit by revisiting what they learnt in Unit 2 of Senior One about the differences between a *map* and a *photograph*. Ensure that you are equipped with a dictionary to support your definition. Ask the learners to

read loudly from their dictionaries the meanings of the two terms. Help the learners to compare the definitions given in the dictionaries.

Ensure that you give the learners the expected definition, which can read as follows:

A **map** is a representation of part or the whole of the earth's surface on a flat sheet of paper or board. A **photograph** is a picture made using a camera.

Ensure that you carry examples of each (that is, a map and a photograph) to display as you explain.

Narrow your discussion to the topic of study by pairing learners up for **Activity 2.1**. After their work in this activity, ensure that each of them is well conversant with the correct answers about this particular work.

For the types and parts of photographs, let learners identify the main images in each photograph A and photograph B as indicated in **Activity 2.2**. After this activity, go ahead and explain how photographs can be categorised and how the types of photographs are taken. That is basing on the position and location of the camera.

Let all learners realise that it is photographs in **Activity 2.2** that will be used even for **Activity 2.3**. Furthermore, after **Activity 2.3**, make sure that learners are again given more explanation on sub-divisions of ground photograph namely; ground general, ground close-ups and ground oblique.

The explanation to learners is required after **Activity 2.4** and this should be directed at how three sub-divisions of ground photographs differ from each other. Explain that in ground general photographs, the objects keep

on reducing in size (the further they are from the camera), ground close-ups where a single object is the major centre of focus and ground oblique where the camera is higher than the object captured.

Group learners for **Activity 2.5** and thereafter, explain the three parts of a photograph so that they are able to tackle **Activity 2.6**. Group learners for **Activity 2.7** and guide the discussion in a question and answer approach.

Links to other subjects

While teaching this unit, remember to link it with optics in Physics.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) **Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) **Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems.

This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.

- d) Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.
- e) Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.
- g) Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Since this unit involves a lot of activities with photos, there is need for learners to appreciate why they have to cooperate in working together. This inculcates in them the sense of togetherness hence *inclusivity in learning processes* and *financial awareness* just because a

photographs for example are shared among learner groups formed.

Assessment criteria

By the end of this unit, the learner should be able to properly differentiate types and parts of photographs and evaluate the importance of photographs.

End of unit notes

Emphasize key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this unit such as financial education or awareness and inclusivity in learning process.

2.1 DEFINITION OF PHOTOGRAPHS

Learning outcome

By the end of this section, the learners should be able to define a photograph.

Additional information for the teacher

Before starting this unit, ensure that learners have relevant learning materials such as Senior 2 Learner's Book so that they have access to the photograph which has to be used to tackle **Activity 2.1**, notebooks and a pen.

Use this section to explain to the learners the images in the photograph such as those of people, caterpillar truck and human settlements. This activity will even remind learners about the types of economic activities studied in Senior 1 Learner's Book, Unit 13.

Preparation for teaching

Before the time for this lesson, avail yourself with the learner book that contains the photograph for **Activity 2.1** so that you are well versed with the images in it. This will help you to even ease planning for Unit 3 which also involves parts of a photograph. When you critically observe the photograph before the time for you to be in class, you will easily solve any question a learner may raise. A learner should also be informed the use of knowing the definition of a photograph.

Teaching and learning resources

- Learner's Book
- Samples of photographs
- Pens
- Chalkboard

Interactive learning and multi-ability learning

Using **Activity 2.1** as your introductory point for this section, organise learners into pairs so that photographs are enough to all of them. It is more advisable you pair a slow learner with a fast learner such that all categories are involved in learning process. In this case the fast learner is helping the slow learner to grasp what they are looking for as regards what the question is asking for.

Let them list all images they see in the photograph under your supervision, state the activity taking place in the photograph and estimate the time of the day when the photograph was taken.

Endeavour to see that all learners are involved in the discussion to find out the images of features in the photograph so that no one is left behind, be it fast learners or slow learners.

For this activity, guide the pairs of learners into coming up with the correct information from the photograph.

Teaching and learning methods

- Discussion method
- Demonstration
- Question and answer
- Discovery or practical activity

Teaching and learning activities

- a) Listing down the things in the photograph.
- b) Stating the activity taking place in the photograph.
- c) Estimating the time of the day when the photograph was taken.

Extension/Remedial Activities

As average learners will be carrying class activities in the Learner's Book, the following activities are recommended for fast and slow learners respectively:

Fast learners

Ask them to list down the importance of the activity carried out in the photograph. And try to give the difference in the photographs shown in **Activity 2.2**.

Slow learners

Let them count and write down the number of people in the photograph and what would be their use in this activity.

2.2 TYPES AND PARTS OF PHOTOGRAPHS

Learning outcomes

By the end of this section, the learners should be able to:

- a) Name different parts of the photographs
- b) State different parts of a photograph
- c) Observe and interpret photographs of the local environment
- d) Explain how different types of photographs are taken
- e) Describe the different parts of photographs

Additional information for the teacher

Introduce this lesson by reviewing briefly what the class learnt during the last lesson.

Proceed to explain that photographs can be categorised depending on the view point. It is from here that the two types of photographs are obtained.

Let the learners work on **Activity 2.2**. You can have **Activity 2.3** done alongside.

Attend to learners individually to observe their progress with **Activity 2.3** as they attempt to classify photo A and photo B. Avail them with the photographs for **Activity 2.4**.

Appoint one of the fast learners to read the definition for each of the three types of ground photographs so that they are all able to classify them. After this activity, make your

explanation concerning the types of aerial photographs.

Guide learners to make groups and start on **Activity 2.5**. When the reading is going on, ensure that the presenter pays attention to communication skills and public speaking abilities.

Involve learners in explaining parts of a photograph by asking them some questions. After this use the first diagram for **Activity 2.6** to demonstrate these parts of a photograph. This skill will guide them in attempting **Activity 2.6**.

After that, discuss the answers they will have given, correcting those that are wrong, even as you reinforce correct responses. Answer the questions they might raise from activities they attempted and from the explanation you made.

Preparation for teaching

Equip yourself with all solutions for **Activity 2.2** and all Learner's Books should be made available in time so that activities are well done with photographs to which questions refer. Organise the class so that all the activities in this section are done.

Teaching and learning resources

- a) Learner's Books
- b) Chalkboard

Interactive and multi-ability learning

Much emphasis should be put on slow learners and those who have disabilities.

Even in groups ensure that slow

learners are mixed with fast learners and still make a follow up on how they are participating and picking up the theme.

Ensure that learners with special needs are catered for.

Teaching and learning methods

- Guided discovery
- Discussion
- Demonstration
- Question and answer

Further activities

To encourage learners to read ahead of the teacher, ask them to find out the importance of photographs.

2.3 IMPORTANCE OF PHOTOGRAPHS

Learning outcomes

By the end of this section, the learner should be able to:

1. Identify the importance of photographs
2. Evaluate the importance of photographs

Additional information for the teacher

Make a brief review of the parts of a paragraph and use the photograph on **Activity 2.6** on how features in it were placed in its three different parts. For **Activity 2.7**, make groups considering mixing slow learners and fast learners and let these groups brain storm the importance of photographs. Remember this was given to them as an assignment

in the previous lesson on an individual basis.

After brainstorming, each group gets one learner to present its work in front of others. Thereafter, you summarise this exercise in a question and answer method. In this summary, use the Learner's Book to correct them.

Preparation for teaching

As you prepare, take into account learners with special needs. Ensure that learners have access to the material they will require for **Activity 2.7**.

This will include note books, pens and the chalkboard.

Teaching and learning resources

- a) Geographical documents
- b) Chalk board

Interactive or multi-ability learning

Ensure the groups are made of fast and slow learners. Guide them in brainstorming and even orient those presenting group work to be confident and emphasise communication skills.

Teaching and learning methods

- a) Guided discussions
- b) Question and answer
- c) Demonstration
- d) Guided discovery

Extension/Remedial Activities

Provide learners with different types of photographs, that is:

- (i) Ground general view photograph
- (ii) Ground close-ups photograph
- (iii) Ground oblique photograph
- (iv) Actual oblique photograph
- (v) Vertical aerial photograph

With reasons, let them classify each photo into its appropriate category correctly. Guide their participation in this activity.

Unit 3

INTERPRETATION OF PHOTOGRAPHS AND VIDEO IMAGES

Key unit competence

At the end of the three periods, the learner should be able to interpret the relationships between physical and human features on photographs and draw sketch diagrams of a photograph.

Introduction

In Unit 2, we learnt about the types of photographs. In this unit, we will learn more about photographs and their divisions by covering the following sections:

- i) Types and divisions of a photograph
- ii) Identification of human and physical features on photographs and video images.
- iii) Relationships between different features (human and physical aspects)
- iv) Drawing sketch diagrams of photographs
- v) Reduction and enlargement of photographs

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills and attitudes summarised in the table below.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none">• Identify sections of a photograph.• Identify physical and human features on a photograph or video image.• Inter-relate human and physical features in a photograph or video image.• Draw a sketch diagram of a photographs• State ways to reduce and enlarge photographs	<ul style="list-style-type: none">• Locate different sections of a photograph.• Differentiate human and physical features in a photograph with the help of a key• Interpret the relationship between human and physical features in a photograph or video image• Apply knowledge to draw a sketch of a photograph• Apply knowledge to reduce and enlarge photographs.	<ul style="list-style-type: none">• Appreciate the use of a photograph to interpret physical and human features• Develop the ability to associate human and physical phenomena using photographs• Appreciate the importance of reducing and enlarging photographs

Information to the teacher

Start this section with a reference to Unit 2 since both units are related. Remember in unit 2, we defined photographs, identified different types of photographs and pointed out different parts of a photograph. Also in this unit, other divisions of a photograph are tackled. Check on the previous assignment left with them and base on their findings to come with the right answers they should have come up with.

Organise learners into groups so that they are able to handle **Activity 3.1**. Ensure that they have pencils, rulers, dictionaries or Internet and pens to successfully workout this activity. After this go ahead to explain types and divisions of photographs.

Guide learners in **Activity 3.2** so as they observe carefully the set of photographs in order to categorise them and give reasons for every individual's categorisation. Continue to diagram with divisions of photographs and explain the importance of these nine parts of a photograph. This will help them to handle **Activity 3.3** since they will have known the use of subdividing the photograph (*to precisely state or locate the position of objects*)

Explain how photographs and video images differ from each other. Remind them about Unit 13 of Learner's Book 1. You can refresh their minds by asking oral questions about the types of economic activities and the examples that belong to each type. This will enable them solve questions for **Activity 3.4**.

For Activity 3.5, you can use any possible means to play a video showing milk processing. Even phones may serve the purpose. Ensure all learners view the video. This is because without this, tackling this activity is impossible. In **3.6**, explain to them how to observe critically in order to come up with the rightful physical features. Like you did for **Activity 3.5**, still improvise for question 2 of **Activity 3.6**.

Proceed to explain for them examples of relief features that can be found in photographs. Organise your learners into groups and let them work out **Activity 3.6**. continue and explain physical aspects of the land. At this time learners have ability to handle **Activity 3.7** with little monitoring.

Explain to them how sketch maps are drawn after activity 3.7 because they need this will be needed to tamper with **Activity 3.8**. From here, explain thoroughly how reduction and enlargement of photographs is done.

Links to other subjects

This unit links with physics as far as convective and radioactive currents, forces of pressure and heat are concerned. Keep this in mind when dealing with this unit.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in

a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.

- b) Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.
- e) Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.

- g) Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Since this unit involves a lot of activities with photos, there is need for learners to appreciate why they have to team up in groups in order to use few copies of photographs. This trains them how to save hence bringing *financial education or awareness* into practice. The groups formed to tackle activities in this unit have to involve both girls and boys in case of mixed Schools and this instils in learners' minds the aspect of *gender and comprehensiveness*. When learners master the procedures for enlargement and deduction of photographs, they capture *standardisation culture or quality principles to shape responsible and straight forward society*.

Assessment criteria

By the end of this unit, learners should be able to draw sketches from photographs and critically analyse photographic interpretation.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this unit such as financial education or awareness, inclusivity in learning process and standardization culture or quality principles to shape responsible and straight forward society.

3.1 TYPES AND DIVISIONS OF A PHOTOGRAPH

Learning outcomes

By the end of this section, learners should be able to:

- a) Identify the sections of a photograph
- b) Locate different sections of a photograph

Additional information for the teacher

Before starting this unit, ensure that learners have relevant learning materials such as Learners' Book Senior 2 so that they have access to the photograph which has to be used to tackle **Activity 3.1**, notebooks, pencils, rulers, pens, internet if possible and access to the library. Explain types of photographs to the learners properly and endeavour to use as simple English as you can.

Go through photographs for the various activities so that by the time work presented from learners arrive to your table, you already know what and how to guide them. Make enough explanation on divisions of a photograph and assist them to refer to a photograph of **Activity 2.6** so that **Activity 3.3** is done with much ease.

Preparation for teaching

As you organise yourself for this unit, revise the Learner's book on this particular section so that your explanation on types and divisions of photographs flows like water. You should be able to memorise the

divisions of a photograph to easily demonstrate it on a chalk board.

Teaching and learning resources

- i) Learner's Book
- ii) Samples of different types of photographs
- iii) Pens
- iv) Chalkboard
- v) Pencils
- vi) Rulers

Interactive learning and multi-ability learning

Using **Activity 3.1** as your introductory point for this section, organise learners into groups so that all learners understand the theme of the section.

Guide learners in **Activity 3.2** and **Activity 3.3**. Remember to assist them in case the photograph for **Activity 3.3** may not be easily accessed by some of them. Slow learners here should be closely monitored to ensure they are moving together with other learners.

Teaching and learning methods

- Guided discovery
- Discussion method
- Demonstration
- Question and answer

Teaching and learning activities

- a) Brainstorming on the differences between photographs and video images
- b) Observing and writing reasons for the way photographs are categorised
- c) Explaining the missing category of photographs.

d) Positioning features in different divisions of the photograph

c) Appreciate the use of a photograph to interpret physical and human features

Extension/Remedial Activities

Average and slow learners will draw the table in their notes books while fast learners are searching the internet or checking in the dictionary for the difference between photographs and video images.

Fast learners

Ask them to discuss their findings with normal and slow learners and then copy the table into their note books. For **Activity 3.2**, they try to raise reasons why photographs are categorised in the way they are.

Slow learners

These write down the findings of fast learners and listens to their explanation. Join the fast learners in positioning features in nine divisions of the photograph as required by **Activity 3.3**.

3.2 IDENTIFICATION OF HUMAN AND PHYSICAL FEATURES ON PHOTOGRAPHS AND VIDEO IMAGES

Learning outcomes

By the end of this section, the learners should be able to:

- Identify physical and human features on a photograph or video image
- Differentiate human and physical features in a photograph with the help of a key

Additional information for the teacher

This section will be commenced with an explanation for the difference between the photograph and a video image. Ensure that the classroom is set for **Activity 3.4** and all learners have access to the photographs the activity requires.

Ensure you have all the necessary materials for **Activity 3.5** as well. If to improvise is a necessity, then do it prior to the lesson time.

Do not limit yourself to the photographs given in the Learner's Book only. Have other photographs relevant to the topic of study. Before the lesson, you can ask learners to obtain photographs from newspapers that may have almost similar qualities as those in the Learner's Book.

Teaching/learning resources

- Learner's Books
- Selected photographs
- Video clips
- Class discussions

Interactive and multi-ability learning

Display the photographs in class for all learners to see. Have several of them, but a selected few for instructional purposes.

This should supplement what is in the Learner's Book.

Use question and answer method ensuring that you involve both slow and fast learners. Organise the learners in groups to work on activities for class discussion.

Ensure that learners with special needs are catered for. For example, the short sighted learners should be made to sit in front of the class so that they can watch the video clips with ease.

In case you have a difficult obtaining suggested video clips, use your smart phone to replay some of the videos that may illustrate what you need to teach.

Teaching/learning methods

- Guided discovery
- Photograph and video analysis
- Class discussion
- Demonstration
- Question and answer methods

Further activities

Ask the learners to tackle question 2 of **Activity 3.5** and question 2 of **Activity 3.6** in groups. Remember, group work promotes *interpersonal relationships and cooperation among learners*.

Guide them on what to look out for, by mentioning that relief features that can be shown by photographs include mountains, hills, slopes, valleys, plateaus and plains.

3.3 RELATIONSHIP BETWEEN DIFFERENT FEATURES (HUMAN AND PHYSICAL ASPECTS)

Learning outcomes

By the end of this section, the learners should be able to:

- a) Interrelate human and physical features on a photograph or video image
- b) Interpret the relationship between human and physical features on a photograph or video images
- c) Develop the ability to associate human and physical phenomena using photographs

Additional information for the teacher

Make a brief review of what the class learnt during the last lesson through question and answer method.

Check the learners' assignment to ensure it is completed.

Introduce the topic by dividing the learners into groups. To each group, assign two photographs given in the Learner's Book.

Guide their discussion by pointing out what to look out for when trying to establish a relationship between different features and human/physical aspects.

This may include influence of relief on:

- Agricultural activities, such as crop farming and livestock keeping
- Infrastructural development
- Settlement

- Fishing
- Tourism
- Power generation
- Trade
- Soil conservation and utilisation

After the discussion, let them prepare their findings for class presentation.

During the presentation, guide their speech, correcting their grammar and reinforcing public speaking skills.

Listen carefully to their assertions, and give additional information where necessary. Ensure incorrect assumptions are corrected immediately.

Teaching/learning resources

- a) Photographs given in the Learner's Books
- b) Information from other reference books
- c) Newspaper cuttings

Interactive/multi-ability learning

For the learners who will be participating in the class presentation, ensure all learners of different abilities are catered for. Gender balance is also to be considered when teaching a class with both sexes.

As presentations are ongoing, emphasise on the points the learners need to learn, as you guide them in taking notes.

Summarise the lesson by explaining the information given in the Learner's Book, explaining how relief dictates land use and natural resource distribution.

Teaching/learning methods

- Presentations from the learners
- Guided discovery
- Class discussion
- Interpretation and identification of information on newspaper cutting
- Question and answer method

Suggested learning activities

- i) Studying and analysing and interpreting each photograph provided.
- ii) Working in groups on activities.

Extension/Remedial activities

Ask learners to have newspaper cuttings and photographs that shows the relationship between different features (both human and physical aspect). This will help you tell whether they understood this area of study.

3.4 & 3.5: DRAWING SKETCH DIAGRAMS OF PHOTOGRAPHS AND REDUCTION AND ENLARGEMENT OF PHOTOGRAPHS

a) *Drawing sketch diagrams of photographs*

Make a brief review of what the class learnt during the last lesson through question and answer method. Follow up to find out if the further activity given in the previous lesson was done. Ensure you guide learners who did not understand the concept before starting this lesson. Just like the previous lesson, this session will require photograph analysis, but with a different intention.

Take them through the process of drawing sketch diagrams using **Activity 3.7**. First, ask them to identify the main features in the photographs provided to them in the Learner's Book. After learning this, let them attempt **Activity 3.8** during their remedial learning.

b) Reduction and enlargement of photographs

For practicality purposes, it is suggested that you teach one aspect of resizing photographs then let learners try to work on their own on the second aspect on their own.

Reduction of photographs

- Draw a smaller frame than that of the original photograph.
- Identify the main features to be shown on the sketch.
- While paying attention to how they are positioned on the original photo, sketch them within the frame you will have drawn.
- Ensure your sketch has a title and a key.

Enlargement of photographs

- Draw a larger frame than that of the original photograph.
- Identify the main features to be shown on the sketch.
- While paying attention to how they are positioned on the original photo, sketch them within the frame you will have drawn.
- Ensure your sketch has a title and a key.

Note: Use the photographs given in the Learner's Book for this activity.

Summarise the lesson by informing the learners that reduction or enlargement of photographs can be done to any given ratio, for example:

- 1:0.25
- 1:0.5
- 1:0.75
- 1:1.25
- 1:1.50
- 1:1.75
- 1:2

Ask them to use the ratios above to resize the photographs you will give them. Help them understand that the first four ratios are for reduction while the last four are for enlargement.

As an assignment, let them calculate the percentage of reduction and enlargement respectively.

Preparation for teaching

As you prepare, remember to cater for the learners with special needs. Collect relevant photographs and newspaper cuttings from both rural and urban settlements, prepare comprehensive notes and guiding questions. Ensure you are familiar with the activities in the section and the possible answers to the same.

Teaching/learning resources

- Photographs taken from different places, both rural and urban settings
- Learner's Textbook
- Pencils and rulers
- Learner's notebooks

Interactive/multi-ability learning

Use question and answer and discussion methods on each mode of resizing - whether enlarging or reducing.

Organise the learners into groups ensuring that fast and slow learners are in each of the groups. Ensure learners with special needs are allocated to groups.

Teaching/learning methods

- a) Demonstration
- b) Guided discovery
- c) Discussion
- d) Photograph interpretation
- e) Question and answer

Suggested learning activities

Working in groups on activities in the section.

Extension/Remedial Activities

Ask learners to state with a reason the best type of photograph to use for this activity. This activity will also serve to remind the learner of the types of photographs they learnt before.

In groups, ask learners to resize the photographs you will give them according to the ratios provided above.

TOPIC AREA: PHYSICAL GEOGRAPHY

SUB-TOPIC AREA: UNDERSTANDING THE EARTH

UNIT 4: TECTONIC PROCESSES

UNIT 5: THE EXTERNAL LAND FORM PROCESSES

UNIT 6: RELIEF IN RWANDA

UNIT 7: WEATHERING AND ROCKS

UNIT 8: SOILS IN RWANDA

**UNIT 9: CLIMATE AND CLIMATE CHANGE IN
RWANDA**

UNIT 10: VEGETATION IN RWANDA

UNIT 11: DRAINAGE IN RWANDA

**UNIT 12: ENVIRONMENTAL CONSERVATION IN
RWANDA**

Key unit competence

At the end of the ten periods, the learner should be able to explain the tectonic theory that has shaped the landscape that we see.

Introduction

The theory of plate tectonics attempts to explain to us how the earth was formed. The theory also explain some of the earth movements we still experience today.

In this unit, we will study the following sub-topics:

Internal land forming processes (Tectonic movements)

- i) Folding (causes of folding, resultant features, examples of areas of folding and effects of folding)
- ii) Faulting (causes of faulting, types of faults, landforms and examples of areas of faulting and effects of faulting)
- iii) Warping (definition and landforms resulting from warping)
- iv) Vulcanicity and volcanicity (definition of vulcanicity and volcanicity, landforms resulting from vulcanicity, distribution and types of volcanoes, types and causes of volcanic eruptions and effects of vulcanicity)
- v) Earthquakes (definition, instruments for measurement, distribution, causes and consequences of earthquakes)

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills and attitudes summarised in the table below.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Explain the internal landform processes in the Earth's crust. • Differentiate between faulting, folding and warping. • Locate areas of folding, faulting and warping in Africa. 	<ul style="list-style-type: none"> • Infer landforms in their environments. • Evaluate causes and consequences of faulting, folding and warping. • Describe the types of volcanoes. 	<ul style="list-style-type: none"> • Demonstrate an understanding of the internal structure of the earth • Show concern for the effects of internal processes on landform evolution

<ul style="list-style-type: none"> • Outline the causes and effects of vulcanism and earthquakes • Name the major world regions affected by vulcanism and earthquakes. 	<ul style="list-style-type: none"> • Examine the types and causes of volcanic eruptions. • Locate the major world regions affected by vulcanism and earthquakes. 	<ul style="list-style-type: none"> • Show concern for the causes of natural disasters and the need to put in place protection measures. • Appreciate the importance of volcanic features on the landscape
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Information to the teacher

Internal land-forming processes (or tectonic processes) are those processes operating inside the earth. These processes result in the formation of features on the surface of the earth. They are caused by **tectonic forces**. This results into tectonic movements, also called **earth movements**.

Tectonic movements can be horizontal (lateral) or vertical. They cause the following processes to occur within the earth, namely:

- (i) Folding
- (ii) Faulting
- (iii) Warping
- (iv) Vulcanicity
- (v) Earthquakes

Links to other subjects

While teaching this unit, ensure you draw a link to convective and radioactive currents, forces of pressure and heat in physics.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

a) Critical thinking: This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability

to make appropriate decisions based on experience and relevant learning.

b) Creativity and innovation: This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.

c) Problem solving: In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.

d) Communication skills: This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.

e) Lifelong skills: This is described as coping with evolution of knowledge and technology advances for personal fulfillment.

It is also exploiting all opportunities available to improve on knowledge and skills.

f) Research skills: This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.

g) Cooperation: Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Geography is all about the environment. It is important that as you introduce Geography to the Senior 2 learners, you ensure that they understand and appreciate that they need to work together in solving classroom challenges, such as reading and interpreting information on maps. This will help them work together regardless of each of their capabilities. This way, they will appreciate each other's contribution in the learning process, thereby fostering *inclusivity in learning processes*.

As learners work together in groups, you will achieve cooperation amongst the learners as well as saving on cost that will have seen you acquire maps for use by each of the learner. This will promote *financial education or awareness*, especially if mentioned to the learner on the need to share the resources you'll have given them (in this case being topographical maps).

Assessment criteria

By the end of this unit, the learner should be able to correctly explain the

tectonic theory that has shaped the landscape that we see.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this unit.

4.1 INTRODUCTION TO INTERNAL LAND FORM PROCESSES

Learning outcomes

By the end of this lesson, the learner should be able to:

- Identify various physical features
- Describe tectonic movements

Additional information for the teacher

Before starting this unit, ensure that learners have relevant learning materials such as notebooks, pencil, ruler, rubber and pen. Before introducing learners to tectonic movements, take them through a review of physical features they know of using **Activity 4.1**.

Help learners distinguish between the different types of tectonic movements as in **Activity 4.2**.

Preparation for teaching

Acquaint yourself with the environment around the school and make notes of the Geographical features that you

expect the learners to be able to identify. Ensure that the preparation you make will enable learners to acknowledge that there is need to study this unit.

Teaching and learning resources

Learner's Book, photographs, rulers, pencils, chalkboard and tactile displays for learners with visual impairments.

Interactive learning and multi-ability learning

Using **Activity 4.1** as your introductory point for this type of learning, group the learners into five. You must involve slow learners and ensure that groups are made up of learners of different abilities. Let them identify various physical features under your supervision.

While discussing their findings, use question and answer and discussion methods ensuring that all learners participate. **This will promote cooperation** among the learners.

Activity 4.2 should be done in pairs as part of their assignment for class discussion. Let them present their findings to the class. This activity is aimed at promoting **creativity and innovativeness** as they learn new knowledge about maps as well as **cooperation** as they work together in pairs.

For both activities, guide the learner into learning correct information by giving summarised explanation as per the expected learning outcomes.

Teaching and learning methods

- Guided discovery
- Discussion
- Observation
- Question and answer

Teaching and learning activities

- a) Drawing the sketch map of the school compound
- b) Observing the school environment to identify features to be drawn
- c) Using available reference materials to search for information about map work
- d) Asking and answering questions and taking notes

4.2 FOLDING

Learning outcomes

By the end of this section, the learners should be able to:

- Explain the causes of folding
- Describe the resultant features of folding
- Discuss the effects of folding

Additional information for the teacher

Introduce this lesson by reviewing the meaning of folding. Use **Activity 4.5** to help learners understand the concept of folding better. Having explained the concept of folding, let learners explain what is represented by the paper as in **Activity 4.3**. This activity will help learners understand the causes of folding.

The process of folding causes sizeable features that can be seen on the surface of the earth. The most common features resulting from folding are

fold mountains. They form the world's highest mountains. You will then group them and let them carry out **Activity 4.4** through discovery method. Let learners use their Atlases to give a list of fold mountains. Let them do **Activity 4.5**.

Guide learners to discuss the effects of folding in groups.

- (a) Severe folding distorts the land turning it into a rugged landscape that is unsuitable for farming and settlement.
- (b) During folding, valuable minerals could be brought closer to the surface, making their mining easier. However, some valuable minerals could also end up being buried deep and therefore inaccessible.
- (c) The process of folding weakens the crustal rocks causing them to develop cracks. These provide weak areas through which molten magma can escape from the interior of the earth thus triggering volcanic activity.
- (d) Fold mountains form a barrier to transport and communication.
- (e) The mountains, especially in the olden days, form a protective barrier against enemies on the other side of the mountain.
- (f) The mountains formed from folding modify the climate of the area where they exist. Some areas receive abundant rain while others receive less. Higher areas are cooler than lower areas.

- (g) Mountains are a good water catchment area and are therefore a source of rivers whose water can be utilised in various ways in the surrounding areas and far places.
- (h) The scenery created by fold mountains is unique and attractive to look at. Therefore fold mountain areas are a tourist attraction.

Preparation for teaching

Make comprehensive notes on folding using different reference materials. The notes should be simplified, though with emphasis on the process of folding and its significance.

Organise learners to identify the zones of folding on continents from their atlases and other geographical sources.

Teaching and learning resources

- a) Learner's Books
- b) Chalkboard
- c) Atlases
- d) Pieces of paper
- e) Ensure use of appropriate materials for learners with special needs.

Interactive and multi-ability learning

As they find out the zones of folding, ensure that both slow and fast learners are actively involved.

Ensure that learners with special needs are always catered for.

Teaching and learning methods

- Guided discovery
- Discussion
- Demonstration
- Question and answer

Attitudes and values to be attained at the end of the lesson

The learner should appreciate the features formed from folding and their significance.

Extension/Remedial Activities

Organise the learners into groups of five. Let each group draw the map of Africa showing the areas of folding. A team leader from each group should present the findings in class.

4.3 FAULTING

Learning outcomes

By the end of this section, the learner should be able to:

- Explain the causes of faulting
- Describe the resultant features of faulting
- Discuss the effects of faulting

Additional information for the teacher

Demonstrate the process of faulting to the learners as given in **Activity 4.6**. This activity will help learners understand faulting by compression.

Organise learners into groups and let them carry out **Activity 4.6**. This

activity will help learners understand faulting by tensional forces.

Guide learners through the types of faults and provide illustrations for how they are formed. Let learners discuss this in detail as in **Activity 4.7**. Provide learners with a map to show the extent of the Great Rift Valley. Pair learners up and guide them in the discussion about the effects of faulting. **Activity 4.9** will facilitate this exercise.

Using **Activity 4.10**, let learners identify the areas of faulting in Africa.

Allow for class presentation from each group. As they present, correct the information being provided, while allowing the rest of the class to take notes on what you confirm as correct. By doing this, you will be promoting cooperation, promoting communication.

Preparation for teaching

As you prepare, take into account learners with special needs. Ensure that learners have access to the material they will require for **Activity 4.6**. This will include:

- Moulding clay
- Ruler

Teaching and learning resources

- Photographs
- Chalk board
- Moulding clay
- Rulers
- Atlases
- Charts

Interactive or multi-ability learning

Ensure the groups are made of fast and slow learners. Guide the activity of drawing making plasticine ribbons to used in this lesson. Let all learners be part of a group which has all the materials necessary for the activity.

Teaching and learning methods

- a) Guided discussions
- b) Question and answer
- c) Demonstration

Extension/Remedial Activities

While you explain the extent of the Great Rift Valley to the slow learners, let the fast learners draw the map of Africa showing the Great Rift Valley in their note books.

4.4 WARPING

Learning outcomes

By the end of this section, the learners should be able to:

- Define warping
- Identify areas of warping in Africa

Additional information for the teacher

Start the lesson by reviewing the meaning of warping. Pair learners and let them identify the areas of warping in Africa. Use **Activity 4.10** for this exercise.

Preparation for teaching

Read widely about faulting from geographical sources. Ensure you have

a chart with a map showing the areas of warping in Africa to be provided to learners at the end of the lesson.

Teaching/learning resources

- Atlases
- Pencils
- Note books
- Charts

Interactive and multi-ability learning

As they tackle **Activity 4.15**, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- i. Teacher exposition
- ii. Discussion
- iii. Demonstration
- iv. Question and answer method

Extension/Remedial Activities

Provide learners with a chart showing areas of warping in Africa. Let the fast learners draw the map as the slow learners understand these areas deeper.

4.5 VULCANICITY AND VOLCANICITY

Learning outcomes

By the end of this section, the learners should be able to:

- State different ways of representing relief on maps
- Describe the relief of an area shown on a topographical map

Additional information for the teacher

Review the meaning of volcanicity and vulcanicity with the learners. Let learners draw difference between the two terms.

Group learners and guide them to understand the types of volcanic eruptions. **Activity 4.12** will facilitate this exercise.

Use an illustration of the features of volcanicity. Let learners identify the intrusive landforms on the diagram in **Fig 4.13**.

Guide learners through **Activity 4.14 and 4.15** to help them understand the difference between a crater and a caldera. Let learners find out about the formation of craters and calderas and give examples. Take learners through the types of volcanoes. Let them do **Activity 4.16**.

Using **Activity 4.17** let learners discuss the effects of volcanicity.

Let learners identify the volcanic features in the world.

Teaching and learning resources

- Atlases
- Chalkboard
- Charts

Interactive and multi-ability learning

As they identify the volcanic features, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- Guided discovery
- Discussion
- Demonstration
- Question and answer

4.6 EARTHQUAKES

Learning outcomes

By the end of this section, the learners should be able to:

- Account for the causes of earthquakes
- Discuss the consequences of earthquakes
- Identify earthquake zones of the world

Additional information for the teacher

Review the meaning of an earthquake with the learners. Let learners find out the meanings of the terminologies given in **Activity 4.18**. Explain the causes of earthquakes to the learners.

Introduce learners to the measurement of earthquakes. Group them and let them do **Activity 4.19**. Having

understood magnitude and intensity of earthquakes, let learners discuss the effects of earthquakes.

- (a) The effect of earthquakes in densely populated areas can be disastrous. Loss of human life and destruction of property are common effects of earthquakes.
- (b) Some powerful earthquakes cause development of violent motions in the earth making the surface look like a series of waves.
- (c) Violent earthquakes can set off the processes of folding, faulting and even volcanicity. It should be noted however, that these processes also cause earthquakes.
- (d) When a massive earthquake occurs on the sea bed, it rocks the sea floor resulting in development of a very unusually very powerful wave called a tsunami. These are common in Japan and surrounding ocean.
- (e) Earthquakes are known to cause vertical or lateral displacement of parts of the land. Parts of the sea floor can be raised or lowered as well.
- (f) Landslides are common effects after occurrence of strong earthquakes.

Teaching and learning resources

- Atlases
- Charts
- Dictionaries
- Chalkboard
- Notebooks

Interactive and multi-ability learning

As they tackle **Activity 4.26**, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- Guided discovery
- Discussion
- Demonstration
- Question and answer

Extension/Remedial Activities

Give the learners an assignment. Let them draw the map of the world showing the distribution of earthquake zones.

Unit 5

THE EXTERNAL LAND FORM PROCESSES

Key unit competence

At the end of the six lessons, the learners should be able to investigate how erosion and weathering have shaped the landscape.

Introduction

In this unit, we will study the following sub-topics:

External land forming processes: (erosion, weathering and mass wasting)

- i) Erosion (Agents of Erosion: running water, wind, glaciers, man, animals and gravity. Types of Erosion: gully, rill, splash and sheet. Causes and effects of erosion on landscape (landforms)
- ii) Weathering (definition, forms, causes and impact of weathering on landscape)
- iii) Mass wasting (Forms of mass wasting, Causes and effects of mass wasting)
- iv) Measures of controlling erosion and mass wasting

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills and attitudes summarised in the table below.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none">• Identify the agents of erosion• Identify different forms of weathering, causes and effects.• State the forms of mass wasting, causes and effects.• State the measures of controlling erosion and mass wasting	<ul style="list-style-type: none">• Differentiate among the agents of erosion• Analyse different forms of weathering, causes and their effects.• Explain the forms of mass wasting, causes and effects.• Analyse the measures used to control erosion and mass wasting	<ul style="list-style-type: none">• Advocate for the awareness concerning the need to protect the landscape against erosion.• Show concern for the effects of human activities on soil erosion and mass wasting.• Show continual desire to mitigate soil erosion and mass wasting

Information to the teacher

Internal and external processes of the earth are responsible for the continuous physical changes that are taking place on the Earth's surface from time immemorial. External land forming processes are forces that operate on the surface of the earth.

External land forming processes include:

- (i) Erosion
- (ii) Weathering
- (iii) Mass wasting

Links to other subjects

While teaching this unit, ensure you draw a link to acceleration, speed and gravity in physics and chemical reactions in chemistry.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.

- c) Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.

- d) Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.

- e) Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.

- f) Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.

- g) Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Ensure that learners understand and appreciate that they need to work together in solving classroom

challenges, such as reading and interpreting information on maps. This will help them work together regardless of each of their capabilities. This way, they will appreciate each other's contribution in the learning process, thereby fostering *inclusivity in learning processes*.

Environmental conservation will be an important issue raised in this unit. Let learners appreciate the need for environmental care as they discuss erosion.

Assessment criteria

By the end of this unit, the learner should be able investigate how erosion and weathering have shaped the landscape.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this unit.

5.1 EXTERNAL LANDFORMING PROCESSES

Learning outcomes

By the end of this lesson, the learner should be able to:

- Identify various forms of external land forming processes
- Describe each process

Additional information for the teacher

Before starting this unit, ensure that learners have relevant learning materials such as notebooks, pencil, ruler, rubber and pen. Before introducing learners to external land forming processes, let them do **Activity 5.1** in order for them to understand various terminologies that will be used.

Preparation for teaching

Acquaint yourself with the environment around the school and make notes of the external landforming processes that you expect the learners to be able to identify. Ensure that the preparation you make will enable learners to acknowledge that there is need to study this unit.

Teaching and learning resources

Learner's Book, photographs, rulers, pencils, chalkboard and tactile displays for learners with visual impairments.

Interactive learning and multi-ability learning

Using **Activity 5.1** as your introductory point for this type of learning, group the learners into five. You must involve slow learners and ensure that groups are made up of learners of different abilities. Let them identify various physical features under your supervision.

While discussing their findings, use question and answer and discussion methods ensuring that all learners participate. **This will promote cooperation** among the learners.

Activity 5.1 should be done in pairs

as part of their assignment for class discussion. Let them present their findings to the class. This activity is aimed at promoting **creativity and innovativeness** as they learn new knowledge about maps as well as **cooperation** as they work together in pairs.

For both activities, guide the learner into learning correct information by giving summarised explanation as per the expected learning outcomes.

Teaching and learning methods

- Guided discovery
- Discussion
- Observation
- Question and answer

Extension/Remedial Activities

Learners should find out the various forms of soil erosion.

5.2 SOIL EROSION

Learning outcomes

By the end of this section, the learner should be able to:

- Identify the agents of soil erosion
- Describe types of soil erosion
- Explain the causes of soil erosion
- Discuss the effects of soil erosion

Additional information for the teacher

Introduce this lesson by reviewing the meaning of soil erosion. Use **Activity 5.2 (a)** to help learners understand the agents of soil erosion through supervised group discussions. To further understand the agents of

soil erosion, assign learners question **Activity 5.2 (b)**. Give room for class presentations.

Use photographs to introduce learners to types of soil erosion. The local environment will also be of help to the learners for better understanding. Assign **Activity 5.2 (c)** to learners for them to discuss about the causes of soil erosion, effects and possible ways of curbing soil erosion,

Preparation for teaching

Make comprehensive notes on agents of soil erosion using different reference materials. The notes should be simplified, though with emphasis on the soil erosion and its effects.

Teaching and learning resources

- a) Learner's Books
- b) Chalkboard
- c) Ensure use of appropriate materials for learners with special needs.

Interactive and multi-ability learning

As they discuss the effects of soil erosion, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- a) Exposition
- b) Discussion
- c) Demonstration
- d) Question and answer

Attitudes and values to be attained at the end of the lesson

The learner should thoroughly explain soil erosion and its effects.

Extension/Remedial Activities

Organise the learners into groups of five. Let each group draw the map of Africa showing the areas of folding. A team leader from each group should present the findings in class.

5.3 WEATHERING

Learning outcomes

By the end of this section, the learner should be able to:

- Identify forms of weathering
- Explain causes of weathering
- Evaluate the impact of weathering

Additional information for the teacher

Review **Activity 5.1** to let learners understand weathering. Let learners do **Activity 5.3** in groups. This will help them to differentiate between soil erosion and weathering.

Introduce learners to the different forms of weathering. This will help learners to know the causes of weathering through guided discussions.

Engage learners in a question and answer session when talking about the effects of weathering.

Allow for class presentation from each group. As they present, correct the information being provided, while allowing the rest of the class

to take notes on what you confirm as correct. By doing this, you will be promoting cooperation, promoting communication.

Preparation for teaching

As you prepare, take into account learners with special needs. Read exhaustively about the processes of weathering and make summarised notes for easier content delivery.

Teaching and learning resources

- a) Photographs
- b) Chalk board
- c) Charts

Interactive or multi-ability learning

Ensure the groups are made of fast and slow learners. Guide and supervise learners during group discussions. Let all learners be part of a group which has all the materials necessary for the activity.

Teaching and learning methods

- a) Guided discovery
- b) Guided discussions
- c) Question and answer
- d) Demonstration

Extension/Remedial Activities

As an assignment, let learners go and make notes on the different forms of weathering.

5.4 MASS WASTING

Learning outcomes

By the end of this section, the learner should be able to:

- Identify forms of mass wasting
- Explain causes of mass wasting
- Evaluate the impact of mass wasting

Additional information for the teacher

Start the lesson by reviewing the meaning of mass wasting.

Review **Activity 5.1** to let learners understand mass wasting. Explain to learners about the types of mass wasting. In a guided discussion, assign learners **Activity 5.4** for them to discover possible causes of mass wasting.

In **Activity 5.5**, let the learners identify the various effects of mass wasting, classifying them as either negative or positive.

Allow for class presentation from each group. As they present, correct the information being provided, while allowing the rest of the class to take notes on what you confirm as correct. By doing this, you will be promoting cooperation, promoting communication

Preparation for teaching

As you prepare, take into account learners with special needs. Read exhaustively about the processes of mass wasting and make summarised notes for easier content delivery.

Teaching/learning resources

- Pencils
- Note books
- Charts

Interactive and multi-ability learning

As they tackle **Activity 5.6**, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- i. Guided discovery
- ii. Discussion
- iii. Demonstration
- iv. Question and answer

Extension/Remedial Activities

Provide learners with a chart showing forms of mass wasting. Let the fast learners draw the map as the slow learners understand these areas deeper.

5.5 MEASURES OF CONTROLLING SOIL EROSION AND MASS WASTING

Learning outcomes

By the end of this section, the learner should be able to discuss ways of controlling soil erosion and mass wasting.

Additional information for the teacher

In a question and answer session, review the effects of soil erosion and mass wasting.

Let learners discuss ways of controlling soil erosion and mass wasting. **Activity 5.4** will facilitate this exercise.

Teaching and learning resources

- Local environment
- Chalkboard
- Photographs

Interactive and multi-ability learning

As they tackle **Activity 5.6**, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- Guided discovery
- Discussion
- Demonstration
- Question and answer

Extension/Remedial Activities

Give the learners an assignment. Let them carry out a field visit with the objective of observing measures put in place to mitigate soil erosion and mass wasting.

TOPIC AREA: PHYSICAL GEOGRAPHY

SUB-TOPIC AREA: RELIEF

UNIT 6: RELIEF IN RWANDA

Key unit competence

At the end of the four lessons, learners should be able to distinguish different forms of relief features of Rwanda and their relationship with human activities.

Introduction

Rwanda is referred to as ‘a land of a thousand hills’. This is because of the fascinating relief of Rwanda, that is beautifully rugged, especially on the western part. The ruggedness eases as one moves towards the eastward part of the country.

In your local environment, you will realise that there are different landform such as mountains, hills, plains or valleys. These landforms determine the terrain of a given area. In addition, they influence the human activities in these areas.

Thus, this unit, we will explore the following key sections to help the learner understand the different forms of relief in Rwanda:

- i) *General presentation of Rwanda*: Location, size, administrative sub-divisions, population)
- ii) *Land locked*: Definition, disadvantages and possible solutions
- iii) The major forms of relief in Rwanda – Relief map of Rwanda
- iv) Advantages and disadvantages of relief features in Rwanda
- v) Relationship between relief and human activities/Land use in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills and attitudes summarised in the table below.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Give the coordinates and size of Rwanda • Compare the different forms of relief in Rwanda • Give the relationship between relief and human activities in Rwanda 	<ul style="list-style-type: none"> • Locate Rwanda on the map of Africa and give its geographical coordinates. • Draw sketch diagrams of different forms of relief in Rwanda • Evaluate the advantages and disadvantages of relief features. 	<ul style="list-style-type: none"> • Appreciate the size and location of Rwanda • Appreciate the importance of relief to Rwanda • Show respect for proper use and management of relief features in Rwanda • Appreciate the relationship existing between relief and human activities

Links to other subjects

The unit is related to coordinates and algebra in Mathematics.

Generic competencies

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) **Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) **Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) **Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.

e) **Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.

f) **Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.

g) **Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Relief determines the various ways in which people utilise the land. As you teach this unit, emphasise on the need for sustainable land use. For example, contour ploughing on slopes and avoiding crop cultivation near river banks. By doing so, you will enable the learner appreciate the need for *environmental conservation and sustainability*.

In your explanation, mention that it is our collective responsibility to conserve the environment regardless of gender.

Assessment criteria

Learners to be able to correctly differentiate the forms of relief in Rwanda and analyse their relationship with human activities.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues of environment and sustainability and Inclusive Education.

6.1 & 6.2 GENERAL PRESENTATION OF RWANDA: LOCATION, SIZE, ADMINISTRATIVE SUB-UNITS, POPULATION

Learning outcomes

By the end of this lesson, the learner should be able to:

- i) Give the coordinates and size of Rwanda
- ii) Locate Rwanda on the map of Africa and give its geographical coordinates

Additional information for the teacher

This unit is a continuation of what learners learnt in Senior One in Unit 5 (Forms of relief). Relate the information to what they already know, in a way that will enable you move from the known to unknown in a seamless way.

a) Location of Rwanda

Start the lesson with **Activity 6.1**. Ensure learners are prepared for the lesson by having atlases, pencils, graph papers and notebooks. In their atlases, let them locate Rwanda on the administrative map of Africa.

Let them trace the map of Africa on the graph paper, and proceed to trace Rwanda as well, with her neighbours: Uganda, Tanzania, DRC and Burundi. Supervise this activity so that they accurately draw the maps, with correctly placed maps of Rwanda and her neighbours.

Using the lines on the graph paper, let them estimate the position of latitudes and longitudes between which Rwanda is found. Check the maps drawn to verify the accuracy of what they have. The country should be found between $1^{\circ} 04'$ and $2^{\circ} 51'$ of latitude south of the equator and between $28^{\circ} 53'$ and $30^{\circ} 53'$ east of the Greenwich Meridian. Give a sneak preview of what they will learn later about land lockedness of Rwanda. Let learners identify other countries that neighbour Rwanda that are landlocked.

As an assignment and a way of encouraging them to read ahead, let them discuss question three of **Activity 6.1**.

b) Size of Rwanda

Ask one learner to stand before the class and read the information in the Learner's Book about the size of Rwanda.

For **Activity 6.2**, emphasise what they need to learn from this, which includes:

- Size of Rwanda $\approx 26,338 \text{ km}^2$
- Size of Burundi $\approx 27,830 \text{ km}^2$
- Size of Tanzania $\approx 945,203 \text{ km}^2$
- Size of DRC $\approx 2,345,000 \text{ km}^2$
- Size of Uganda $\approx 236,040 \text{ km}^2$

Use this statistics to tackle exhaustively **Activity 6.2**.

c) Administrative sub-divisions of Rwanda

Introduce the sub-topic by use of **Activity 6.3**.

Let learners work in groups in this activity. Ensure you group the learners while keeping in mind their abilities. Slow learners and fast learners should be mixed to ensure uniformity in learning.

Encourage the use of research using the internet and other geographical materials for this Activity, especially question 2.

Check the table drawn by learners for question 3 and correct any wrong responses. The use of local names to refer to the administrative sub-divisions in Rwanda is important because it help them relate easily with what they may already know.

d) Population of Rwanda

Using the 2012 population census report, guide the learners through **Activity 6.4**.

Explain to the learners what is required of them in question (b). Differentiate between population in terms of sex and age. For question (c), relate it to the topic of study - influence of relief features on human activities, including settlement.

e) Rwanda, a landlocked country

In **Activity 6.1**, learners were introduced to the fact that Rwanda is a land locked country. Leverage on this by brainstorming on the meaning of the term 'landlocked'.

Summarise learning under this section using **Activity 6.5**. Ensure you look at learners' work before the next lesson.

Disadvantages of being landlocked

Explain the following points to the learner as obtained from the passage in the Learner's Book.

Being land locked has the following disadvantages:

- It cuts off a country from important sea resources such as fishing
- It prevents direct access to seaborne trade.
- Landlocked countries have higher costs of international cargo transportation as compared to coastal countries.
- They depend on neighbouring transit countries for their external trade and suffer from high trade transaction costs.
- Huge transport costs, inadequate infrastructure and bottlenecks associated with importation and exportation requirements can be a serious stumbling block to their integration into the global economy, impairing export competitiveness or the inflow of foreign investment.

Possible solutions of being landlocked

- Rwanda has made agreements on getting subsidised transport levies for goods through neighbour countries.
- The United Nations Convention on the Law of the Sea gives a landlocked country a right of access to and from the sea without taxation of traffic through transit states. This is part of the United Nations' programme of action to assist landlocked developing countries.

- Rwanda has a comprehensive policy on improving the quality of roads and expanding and upgrading railways. This part of Vision 2020, whose results are already realised. In partnership with neighbouring countries, Rwanda is expected to directly benefit from the Northern Corridor, which is the busiest and most important transport route in East and Central Africa. This route provides a gateway through Kenya to the landlocked economies of Uganda, Rwanda, Burundi and Eastern DR Congo. It also serves Southern Sudan since it broke away from Khartoum.
- Improving energy supply and Internet access to harmonising legal frameworks.
- Reducing travel time along main corridors to enable transit cargo to move between 300km and 400km in a 24-hour period.
- Landlocked countries depend on strong political relations with transit countries. If a landlocked country and its transit neighbour are in conflict, either military or diplomatic, the transit neighbour can easily block borders or adopt regulatory impediments to trade. Even when there is no direct conflict, landlocked countries are extremely vulnerable to the political vagaries of their neighbours.

Preparation for teaching

Ensure that learners have access to an atlas, wall charts showing Rwanda's neighbouring countries and pencils for drawing of the maps.

Carry out research beforehand on the population of Rwanda. You can as well do comparisons using statistics from the 2002 and 2012 population census to establish population trends in Rwanda. When you know more than what is ordinarily required in class, you will have more confidence and a better command of the class.

Encourage learners to ask questions on areas that seem unclear. Always link learning to other sections, units or even subjects for clarity purposes.

Suggested learning resources/ materials

- a) Wall map showing the map of Rwanda and her neighbours
- b) Atlas
- c) Pencils
- d) Learner's Books

Interactive learning

- i) Discussing the activities in the Learner's Book
- ii) Tracing the map of Rwanda and her neighbours
- iii) Drawing the map of Rwanda with administrative sub-divisions (districts)
- iv) Learners writing the meaning of the term map in their notebooks
- v) Comparing findings from the various activities in the Learner's Book

Teaching and learning methods

- Question and answer
- Group discussions
- Brainstorming
- Observation
- Teacher exposition

Values and attitudes to be attained at the end of the lesson

Learners should appreciate the size and location of Rwanda.

Extension/Remedial Activities

Let the learners summarise the information learnt in this section about Rwanda in the following table:

Location	Size	Neighbouring countries	Administrative sub-divisions	Population

6.3 THE MAJOR FORMS OF RELIEF IN RWANDA

Learning outcomes

By the end of this section, the learner should be able to:

- Compare the different forms of relief in Rwanda
- Draw sketch diagrams of different forms of relief in Rwanda.
- Appreciate the importance of relief to Rwanda

Additional information for the teacher

Relief is the general appearance or the nature of the landscape.

The east is a plateau landscape that rises between 1000m and 1500m

The Rwandan relief is hilly and mountainous with an altitude varying between 900 metres and 4,507 metres above sea level. For instance, the central and western parts are dominated by mountains. The highest mountains lie in the west and north western areas. These are part of the **Birunga volcanic mountain chain** that rises to slightly over 4,500 metres above

sea level. The highest point is the **Kalisimbi peak** which is at 4,507 metres above sea level. To the east is a **plateau** landscape that rises between 1,000 metres and 1,500 metres above sea level.

Rwanda shares part of the **Great African Rift valley**. The branch runs from north to south along Rwanda's western border with part of it occupied by Lake Kivu. The lowest point in Rwanda is **Bugarama plain** at 900 metres above sea level. The eastern border region consists of **lowlands** that are characterised by swamps.

In general, there are five major forms of relief that can be shown on the relief map of Rwanda.

These are:

- Volcanic region
- Plateau region
- Plains region
- The Rift Valley region
- The Congo-Nile peak region

For Activity 6.7, let the learners work in pairs or groups as you:

- Guide them in to list all the relief features in Rwanda.
- Make sure they draw a map of Rwanda showing the relief regions.
- Ensure that all maps drawn by the learners have the good qualities of

a map.

Remember, by asking them to work in pairs, they will be learn **the value of cooperation**.

Activity 6.8 requires that the learners have access to the map of Rwanda showing the administrative boundaries (specifically provinces). With the help of this map, let them identify the provinces that each relief feature in Rwanda is found.

Learning resources and materials

- i. Administrative map of Rwanda
- ii. Learner's Books
- iii. Internet (if available)
- iv. Pencils for drawing the maps

Interactive and multi-ability learning

- i. Listing in their note books the various relief features in Rwanda
- ii. Drawing the map of Rwanda showing the relief features, while paying attention to the qualities of a good map
- iii. Identifying specific areas where relief features in Rwanda are found.

Teaching and learning methods

- a) Question and answer
- b) Class discussions
- c) Guided discovery

Teaching and learning activities

- i) Discussing the various relief features of Rwanda
- ii) Studying the relief map of Rwanda to appreciate the general outlook of land in Rwanda

- iii) Drawing maps showing relief regions of Rwanda

Extension/Remedial Activities

As an additional activity, let each learner attempt answering the following questions:

- (a) Explain why some areas in Rwanda are densely populated than others.
- (b) Discuss reasons why some areas in Rwanda do not have many roads as compared to others.
- (c) Discuss reasons why some areas on Rwanda support dairy farming while others support pastoralism or wildlife conservation.

Information obtained from this activity is important because it forms a basis upon which learning in the next lesson will start from.

Encourage learners to read ahead of what is scheduled for class work for them to have a better understanding as they progress. This also helps them understand with ease concepts they may find abstract at first.

Knowledge and skills to be attained

Learners are expected to have knowledge of how to compare the different forms of relief in Rwanda.

Skills to be acquired from the study of this section will include how to draw sketch diagrams of different forms of

relief in Rwanda

6.4 ADVANTAGES AND DISADVANTAGES OF RELIEF FEATURES IN RWANDA

Teaching and learning outcomes

By the end of this section, the learner should be able to:

- i) Evaluate the advantages and disadvantages of relief features
- ii) Show respect for proper use and management of relief features in Rwanda

Additional information for the teacher

Relief features may hinder or encourage certain human activities in an area. The following information summarised from the Learner's Book will be found helpful:

Advantages of relief features in Rwanda

- Plains are easier to cultivate. Areas such as Nyabarongo have deep, fertile soils that support crop cultivation.
- Farming in highland areas is done carefully, for example by employing the use of terraces, specifically bench terraces. This is a common practice in all the highland areas of Rwanda.
- Mining takes place on the sand beaches on Lake Kivu in Western Rwanda that has alluvial minerals in clay and sand.
- Human settlement is clearly visible on gentle slopes, for example

in Kigali. Affluent settlement and housing for the rich is witnessed in Kiyovu, Nyarutarama, Rebero and Kacyiru. Settlement on hilltops is partly because such areas are relatively secure.

- Communication masts are constructed on hilltops and summits. For example, Rwanda Telecommunication Services have built these masts on many hills and highland areas such as Mt Karisimbi and Kagarama Hills in Kigali.
- For ease of distribution of water using natural gravity, water tanks have been built on hilltops.
- Gentle slopes attract a wide range of activities, including road construction. An example is the central plateau. Airports are also built on plains, including the Kigali International Airport.

Disadvantages of relief features in Rwanda

- Building roads, railways, electricity lines, data cables and coming up with different forms of infrastructure on sloping land is expensive. This is because the land needs to be flattened before construction. Roads constructed on steep slopes are winding in nature.
- Inappropriate farming methods on hillsides and mountain slopes can trigger soil erosion, causing loss of the fertile top soil. Landslides and are also a potential risk in slopy areas.

- Thick vegetation on the sides of some hilly and mountainous areas discourages settlement. For instance, there is no human settlement on the slopes of mounts Sabyinyo, Karisimbi, Bisoke, Gahinga and Muhabura.
- The low temperatures experienced on some of the mountains such as Sabyinyo, Karisimbi, Bisoke, Gahinga and Muhabura make human habitation impossible. On the other hand, the leeward sides of the mountains are unsuitable for crop farming. These areas experience low temperatures and rainfall respectively.

Preparation for teaching

You can have photographs, video images or newspaper cuttings showing various activities that take place in different parts of the country, but dictated by relief.

Mention the need for environmental conservation as a cross-cutting issue.

Teaching and learning resources

- Photographs showing land use
- Newspaper cuttings
- Video images
- Local environment

Interactive and multi-ability learning

For the learners who will be involved in the dramatisation of the passage in **Activity 6.9**, ensure learners of all abilities are represented.

Teaching and learning methods

- Question and answer
- Guided discovery
- Class discussions
- Group work

Teaching and learning activities

Organise a short drama from information given in **Activity 6.9**. Identify the advantages and disadvantages of relief in Rwanda from what the learners in the Activity will have reported.

Make the session as interesting as possible, by asking learners to pick a character they will pretend to be. Tonal variation, facial expression and gestures can effectively be used to dramatise the session.

During this activity, pay attention to pronunciations of words and encourage fluency in the reading.

Use this session to promote public speaking skills and building confidence in the learners who will volunteer to participate.

As a further activity, ask learners to work in pairs and pick from the points you summarised that brings out the advantages of relief features in Rwanda. They also have those that brings out the disadvantages of relief features in Rwanda.

Apart from this, ensure they are familiar with examples across the country, from the activity as well as other additional

areas they will participate in pointing out.

Attitudes and values to be attained

The students should appreciate the importance of relief to Rwanda.

Extension/Remedial Activities

Using relief maps and geographical documents, ask learners to locate the major relief features of Rwanda and write down their characteristics and importance.

6.5 RELATIONSHIP BETWEEN RELIEF AND HUMAN ACTIVITIES/ LAND USE IN RWANDA

Learning outcomes

By the end of the section, the learner should be able to:

- i) Give the relationship relief and human activities in Rwanda
- ii) Describe the influence of relief on human activities and show how land use affects relief
- iii) Appreciate the relationship existing between relief and human activities

Additional information for the teacher

Start the lesson by explaining that relief determines the way people make use of that land.

Mountain slopes and hillsides are set aside for forestry and for conservation of wildlife. Examples are the Volcanoes National Park and Birunga National

Parks. This promotes tourism.

Where natural forests have been cleared, for example in Gishwati forest, more trees have been planted as a form of environmental conservation.

Extensive agriculture on the plateaus is possible because these areas are flat and are easy to cultivate. Examples of such places are Nyagatare and Kayonza in Eastern Rwanda. For instance, Rwanda is the third largest producer of pyrethrum in the world. Other crops grown in Rwanda on a large scale are barley and oats. On the other hand, farming takes place on broad valleys such as Nyabugogo (where rice is grown), Nyacyonya (sugarcane), Nyagasambu and Nyabisindu (cattle rearing) and Akanyaru in Huye and generally in Kigali where vegetables and rice are grown.

In most cases, people avoid land that has steep slopes because it is not suitable to establish settlements, farms or roads and railways. Steep land is only used if people have no other areas to make use of. For instance, in some parts of Rwanda, people have farms that are on hillsides because the land is hilly. They farm using contour method to avoid soil erosion. Crops like tea is grown on sloping land where soil is well drained. Tea is grown on 11 estates. A total area of approximately 12,500 ha is planted in Gicumbi, Rusizi, Rubavu and Karongi.

Teaching and learning resources

- Photographs showing various

economic activities in different places

- Newspaper cuttings highlighting different activities in Rwanda dictated by relief
- The local environment

Interactive learning

- i. Discussing in groups the relationship between relief and human activities
- ii. Comparing the information contained on the photographs and newspaper cuttings

Suggested teaching and learning methods

- Field discussions
- Pair work
- Guided discovery
- Photograph interpretation

Suggested teaching and learning activities

- a) Working in pairs for selected learners especially those with physical disability
- b) Analysing the information contained on the photographs and newspaper cuttings

Attitudes and values be attained

The learners should appreciate the relationship existing between relief and human activities.

Answers to Unit Revision Exercise

1. **Relief** refers to the general appearance or the nature of the landscape.
2. i) Mountains
ii) Plateaus
iii) Plains
iv) The rift valley region
3. - Slopes of mountains
- Reason: To prevent soil erosion
- Examples of such areas include Karongi, Rutsiro, Nyamagabe and Ngororero.

Extension/Remedial Activities

For this activity, ensure that learners with different learning abilities are put in well represented in all groups. This will ensure quick understanding of concepts across the class.

Organise a field study in the nearby school environment where learners will observe and record the relief features around the school or local environment. Working in pairs, let them discuss the relationship between relief and human activities. This should be followed by a class presentation, supported by question and answer method.

TOPIC AREA: PHYSICAL GEOGRAPHY

SUB-TOPIC AREA: ROCKS, WEATHERING
AND SOILS

UNIT 7: WEATHERING AND ROCKS

Key unit competence

Key competence: At the end of the three lessons, the learners should be able to distinguish between different types of weathering and their relationship with rocks.

Introduction

In this unit, we will study the following sub-topics:

- i) Definition of weathering
- ii) Types of weathering (physical, chemical and biological)
- iii) Factors influencing weathering (climate, rock types, vegetation, relief)
- iv) Relationship between weathering and different rock types

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills and attitudes summarised in the table below.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • State and define different types of weathering • Explain the difference that exists between different types of weathering • State the factors influencing weathering • State the relationship that exists between weathering and rock types. 	<ul style="list-style-type: none"> • Describe the different types and processes of weathering • Explain the main factors influencing the type and character of weathering. • Analyse the relationship between weathering and rock types. 	<ul style="list-style-type: none"> • Appreciate the relationship that exists between weathering and rock types. • Appreciate the factors influencing type and character of weathering in rock and soil formation.

Information to the teacher

One of the natural processes that cause changes in the environment is weathering. This is because weathering is the process in which rocks break down or decompose near the earth's

surface. The rocks break or disintegrate *in situ* (that is, the particles do not move from their original position). This is the reason why Sonia's uncle said they rocks were thought to be sinking.

This is because after weathering, the rock materials accumulate around the rock they break from.

The process of weathering may be caused by the exposure of rocks to elements such as temperature changes, rain or human activities.

Links to other subjects

While teaching this unit, ensure you draw a link to chemical elements in Chemistry, pressure release and forces of compression in Physics.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.

d) Communication skills: This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.

e) Lifelong skills: This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.

f) Research skills: This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.

g) Cooperation: Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Ensure that learners understand and appreciate that they need to work together in solving classroom challenges, such as reading and interpreting information on maps. This will help them work together regardless of each of their capabilities. This way, they will appreciate each other's contribution in the learning process, thereby fostering *inclusivity in learning processes*.

Environmental conservation will be an important issue raised in this unit. Let learners appreciate the need for environmental care as they discuss erosion.

Assessment criteria

By the end of this unit, the learner should be able to distinguish between different types of weathering and their relationship with rocks.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this unit.

7.1 TYPES OF WEATHERING

Learning outcomes

By the end of this lesson, the learner should be able to:

- Define weathering
- Describe types of weathering

Additional information for the teacher

Before starting this unit, ensure that learners have relevant learning materials such as notebooks, pencil, ruler, rubber and pen. Before introducing learners the unit, read the story in **Activity 7.1** with the class. This will help learners understand how the physical environment changes. At this stage, help learners define the process of weathering.

Preparation for teaching

Acquaint yourself with the environment around the school and make notes of the changes that occur in the environment that you expect the learners to be able to identify. Ensure that the preparation you make will enable learners to acknowledge that there is need to study this unit.

Teaching and learning resources

- Learner's Book
- Photographs
- Rulers
- Pencils
- Chalkboard
- Tactile displays for learners with visual impairments.

Interactive learning and multi-ability learning

Using **Activity 7.1** as your introductory point, you must involve slow learners and ensure that groups are made up of learners of different abilities.

Group learners and assign them **Activity 7.2**. This will introduce them to the agents of weathering.

Guide learners through types of weathering. Use photographs where possible for better understanding. There are three types of weathering.

These are:

- Physical weathering
- Chemical weathering
- Biological weathering

PHYSICAL WEATHERING	CHEMICAL WEATHERING	BIOLOGICAL WEATHERING
<ul style="list-style-type: none"> • Exfoliation • Block disintegration • Granular disintegration • Pressure release • Frost action • Rainwater action 	<ul style="list-style-type: none"> • Hydrolysis • Oxidation • Solution • Carbonation • Hydration 	<ul style="list-style-type: none"> • Plants • Animals

Use **Activity 7.3** and **Activity 7.4** to help learners the types of weathering better as explained.

While discussing their findings, use question and answer and discussion methods ensuring that all learners participate. **This will promote cooperation** among the learners.

Activity 7.4 should be done in pairs as part of their assignment for class discussion. Let them present their findings to the class.

This activity is aimed at promoting **creativity and innovativeness** as they learn new knowledge about maps as well as **cooperation** as they work together in pairs.

Teaching and learning materials

- Photographs
- Local environment
- Learner's Book
- Rulers
- Pencils
- Chalkboard
- Tactile displays for learners with visual impairments

Teaching and learning methods

- Discussion method
- Observation

- Question and answer

Extension/Remedial Activities

Learners should find out the various changes that take place in the environment.

7.2 & 7.3 FACTORS INFLUENCING WEATHERING AND THE RELATIONSHIP BETWEEN WEATHERING AND ROCK TYPES

Learning outcomes

By the end of this section, the learners should be able to:

- Describe factors that influence weathering
- Explain the relationship between weathering and rock types

Additional information for the teacher

Introduce this lesson by reviewing the agents of weathering. Guide learners through **Activity 7.5** to help them understand the factors that facilitate the processes of weathering. These factors include:

- Climate
- Rock types
- Vegetation
- Relief

Use photographs to introduce learners to types of rocks. The local environment will also be of help to the learners for better understanding.

Different rock types have different structures. It is these structures that determine the rate of weathering. The structure can be explained in terms of:

- i) Rock permeability
- ii) Mineral composition
- iii) Joints in the rock
- iv) Rock pH
- v) Colour of the rock

Preparation for teaching

Make comprehensive notes on the factors that influence weathering and the relationship between weathering and different rock types using different reference materials. The notes should be simplified, though with emphasis on the soil erosion and its effects.

Teaching and learning resources

- a) Learner's Books
- b) Chalkboard
- c) Ensure use of appropriate materials for learners with special needs.
- d) Photographs
- e) Local environment

Interactive and multi-ability learning

As they discuss the factors that influence weathering, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- a) Guided discovery
- b) Discussion
- c) Demonstration
- d) Question and answer

Attitudes and values to be attained at the end of the lesson

The learner should thoroughly explain soil erosion and its effects.

Extension/Remedial Activities

Organise the learners into groups of five. Let each group conduct a research on types of rocks. A team leader from each group should present the findings in class.

Key unit competence

At the end of the five lessons, the learner should be able to apply appropriate measures of soil conservation and soil erosion control in Rwanda.

Introduction

The earth supports livelihoods by providing what is needed for human survival. Soil grows food and fibre, regulates water flow and quality, stores water, provides minerals and raw materials; it is a platform for the landscape and all human development, holds much of our cultural heritage and is where the majority of the earth’s living organisms live. However, increased pressure on existing agricultural areas, mono-cropping, overstocking and ploughing of the marginal lands unsuitable for cultivation are some of the factors causing rapid soil degradation in Rwanda. For this reason, the Government of Rwanda emphasises the use of land in a productive way; to **protect it from erosion, safeguard its fertility and ensuring its production in a sustainable way.** This Unit is therefore designed to enhance the basic knowledge and understanding of soils.

The topics covered under this Unit include:

- i) Types of soils in Rwanda
- ii) Importance and characteristics of different types of soils in Rwanda
- iii) Soil erosion and impoverishment (reduced soil productivity) in Rwanda, causes and effects
- iv) Causes and effects of soil erosion in Rwanda
- v) Soil conservation methods in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • State the different types of soils in Rwanda. • State the importance of soils in Rwanda. 	<ul style="list-style-type: none"> • Classify different types of soils in Rwanda • Evaluate the importance of soils in Rwanda 	<ul style="list-style-type: none"> • Appreciate the importance of conserving soils in Rwanda

<ul style="list-style-type: none"> • Locate areas of poor and fertile soils. • Identify the causes and effects of soil erosion in Rwanda. • State different soil conservation methods in Rwanda 	<ul style="list-style-type: none"> • Distinguish between poor and fertile soils and their characteristics • Observe areas at risk of soil erosion and describe attempts to maintain, conserve or improve the quality of the soils • Carry out a research in a local environment to understand the soil conservation methods in Rwanda 	<ul style="list-style-type: none"> • Show concern for the effects and causes of soil erosion and impoverishment and suggest measures for soil conservation in Rwanda • Show concern for soil conservation and its impact on agriculture as an important economic activity
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Additional information for the teacher

Soil is the top layer of loose materials that is found on the surface of the earth. It is a natural resource that is essential for production of food, industrial raw materials as well as for generation of energy resources. It is also a natural value, which is protected as natural heritage. It is unique for development and survival of humans.

Soil is an important part of the landscape and determines how the natural vegetation, crops and human settlements are distributed in Rwanda.

The preservation of this natural resource from physical destruction and pollution as well as the management, preservation of balance between it and other parts of the ecosystem represents one of the significant activities in Rwanda.

8.1 TYPES OF SOILS IN RWANDA

Learning outcomes

By the end of this section, the learner should be able to:

- a) State the different types of soils in Rwanda
- b) Classify different types of soils in Rwanda

Additional information for the teacher

Generally, soil consists of a combination of solid particles, water and air. However, different types of soils differ in colour, size of grain particles, the pore spaces and amount of water the soil can hold. All these are referred to as soil characteristics. It is from these characteristics that we derive different types of soils.

Ensure you read widely on the following types of soils and their distinguishing characteristics:

- a) Kaolisols
- b) Valley soils
- c) Highland/inceptisols
- d) Loamy soils

Ask learners to work in groups and obtain different soil samples. Supervise the collection of soils so that you end up with different types of soils.

During this lesson, let them compare the characteristics of soil basing on the characteristics stated above, that is: colour, size of grain particles, the pore spaces and amount of water the soil can hold.

Using the procedure given in **Activity 8.1** of the Learner's Book, ensure they fill the table which is also provided in the Learner's Book.

Having gathered information about different types of soils, expound on the characteristic of each type of soil, while ensuring that you link this exposition to the findings after the field study. Listen to each point from those mentioned by the learners and clarify where possible. To help you in this task, use **Activity 8.2**.

Preparation for teaching

Plan to use one lesson on the field study. Discuss the objectives of the study, the time frame and class presentations. Ensure you have a collection of relevant soil samples to be further analysed in class.

Suggested learning resources/materials

- i. Learner's Books
- ii. Internet sources
- iii. Flash cards with key characteristics of soil
- iv. Local environment
- v. Soil samples

Interactive learning

- Comparing elements that make up soil
- Examining different types of soil samples

- Class discussions while comparing types of soils

Suggested teaching and learning methods

- Field study
- Class discussions
- Group work
- Guided discovery

Suggested teaching and learning activities

- a) Discussing the types of soils
- b) Studying the soil samples
- c) Sharing information on soils as obtained from the field study
- d) Reading the flash cards/chalkboard on different characteristics of soil
- e) Identifying different types of soils

Extension/Remedial Activities

Integrate the knowledge gained by displaying one soil sample to clearly show the visible elements of soil. This can be done by putting the sample in a transparent container/bag. The sample should be placed in the learning area/corner/space.

Key skills

- Data analysis
- Field research
- Creative thinking

Cross-cutting issue(s) associated with the lesson

Soil is a natural resource. Stress the value of responsibility in protecting

and preserving the soil for future generations.

IMPORTANCE OF SOIL IN RWANDA

Soil is essential for human life and the main contributing factor to development. Rwanda has a wide range of soils resulting from the difference in geology (parent material), relief and climate. Soil resources in Rwanda vary from sandy to clayey, shallow to very deep and low to high fertility. Soils are effectively a non-renewable resource because erosion occurs at rates that outpace soil formation.

Preparation for teaching

Ensure you have a collection of relevant photographs and real items from soil. You may need to consider the materials/resources that you will need for the learners with special needs.

Using the various resources you will have collected, brainstorm with learners the importance of soil. They are aware of how soil is useful, though they may not have a way of expressing the importance.

Suggested learning resources/materials

- i. Approved textbooks and other references
- ii. Real items from soil
- iii. Photographs on importance of soil
- iv. Local environment

Interactive learning

- a) Working in groups
- b) Answering questions

- c) Discussion on importance of soil
- d) Exploring items made of soil
- e) Essay writing on importance of soil

Suggested teaching and learning method(s)

- Question and answer
- Class discussions
- Group work
- Brainstorming on the importance of soils

Suggested teaching/learning activities

- Discussion on importance of soils
- Teacher exposition
- Learners taking notes from the explanation of the teacher

Suggest further activities if appropriate

Guide learners to develop a journal on importance of soil and why soil should be conserved. Use a range of geographical documents and the Internet to get information for the journal.

Attitudes and values to be attained

Learners should be able to appreciate the importance of conserving soils in Rwanda.

Cross-cutting issue(s) associated with the lesson

Soil has economic and cultural value. Healthy and fertile soils are the cornerstones of food security,

key environmental services, national cohesion and the economy of Rwanda. However, the failure to use soil sustainably has led to desertification, famine, civil unrest and economic inconsistency. In teaching this section, reinforce and deepen the learner's knowledge of the cultural importance of soil and how civil war in Rwanda was disruptive in conserving and management of soil hence disrupting national cohesion and the economy of the country. Further emphasise the importance of peace in conserving natural resources like soil.

8.2 SOIL EROSION AND IMPOVERISHMENT IN RWANDA

Learning outcomes

By the end of this section, the learner should be able to:

- a) Locate areas of poor and fertile soil
- b) Distinguish between poor and fertile soils and their characteristics

Preparation for teaching

Activity 8.3 should be your starting point. Explore with learners the difference between these phrases by defining each of them.

Plan to teach the causes then the effects of soil erosion. Ensure you have a collection of relevant photographs showing soil erosion and its effects. You may need to use photographs showing different types of erosion. Consider the materials/resources that you will need for the learners with special needs.

Note: Help learners to establish the difference between soil erosion and soil impoverishment.

You can ask them to make a table to differentiate between the two phrases, that is, soil erosion and soil impoverishment.

Additional information for the teacher

Soil erosion is the process by which loose soil is carried away by wind, water or waves and deposited somewhere else. The hilly landscape, poor land use and intensive rainy seasons make the erosion problem difficult and widespread in Rwanda. Other causes of erosion include:

- Overstocking
- Deforestation
- Poor methods of farming such as monocropping and ploughing along the contours
- Mining/quarrying

Explain the following predisposing factors of erosion:

- a) *Soil texture:* Soils with small grains and open structures are more likely to get eroded than those with larger grain and closed structures.
- b) *Ground slope:* Steeper slopes gets eroded faster than the ground having mild slope due to increased speed of run off than infiltration.
- c) *Intensity and amount of rainfall:* More the intensity of rainfall more will be the soil erosion.

- d) *Mismanaged utilisation of soil resources*: The soil erosion is enhanced by improper surface drainage, removal of forest litter, overgrazing etc.
- e) *Distribution of rainfall and landscape*: If the ground surface is such that rainfall distributes evenly, there is not plenty rainfall, the erosion will be less.
- f) *Deforestation*: It is one of the major factors responsible for soil erosion. Removal of forest cover which function as a binder of the top layer of the soil with increasing land demand have resulted in enhancing extent of soil erosion.

The purpose of this section is to help the learner gain in-depth understanding of the causes of soil erosion and impoverishment (reduced soil productivity) in Rwanda.

Extension/Remedial Activities

1. To the *slow learners*, give them **Activity 8.4** as an assignment to the learners.
2. To the *fast learners*, give them the task of finding out causes of soil impoverishment and measures that can be taken to reverse this.

Ask both categories of learners to research widely and prepare their presentations to be done in the next lesson.

Suggested learning resources/ materials

- a) Approved textbooks and other references
- b) Newspaper cutting highlighting cases of soil erosion in Rwanda
- c) Charts summarising causes of soil erosion in Rwanda
- d) Photographs showing soil erosion in Rwanda

Suggested teaching and learning method(s)

- Question and answer
- Guided discovery
- Class discussions
- Group work

Suggested teaching and learning activities

- a) Discussing the causes of soil erosion
- b) Studying photographs and newspaper extracts showing soil erosion
- c) Analysing newspaper articles highlighting effects of soil erosion

Key skills

- Distinguish between poor and fertile soils and their characteristics
- Observe areas at risk of soil erosion

Attitudes and values to be attained

The learners should show concern for the effects and causes of soil erosion and impoverishment.

The cross-cutting issue(s) associated with the lesson learnt

Soil is a natural resource.

There should be emphasis on the value of responsibility to protect and preserve the soil for future generations. Bring out clearly the need for **environmental conservation and sustainability**.

To show concern for soil erosion we need to advocate for positive cultural practices and good morals.

Remember: “*The Earth provides enough to satisfy every man’s needs, but not every man’s greed.*” – Mahatma Gandhi

8.3 SOIL CONSERVATION METHODS IN RWANDA

Learning outcomes

By the end of this section, the learner should be able to:

- State different soil conservation methods in Rwanda
- Attempt to maintain, conserve or improve the quality of the soils
- Suggest measures for soil conservation in Rwanda
- Show concern for soil conservation and its impact on agriculture as an important economic activity

Additional information for the teacher

Soil erosion control involves measures which aim at stopping or slowing down erosion processes. Rwanda Vision 2020 states that “*in order to ensure sustainable development, Rwanda will implement adequate land and water management techniques, coupled with a sound biodiversity policy*”. This includes both direct and indirect erosion control,

such as land use planning, which aims at using land in ways that prevent and or reduce the risk of erosion occurring. The purpose of this section is to acquaint the learner with conservation and management measures. It is envisaged that the content will also help the learner to evaluate the country’s need to utilise the land resources efficiently while protecting its natural environment.

Preparation for teaching

Teach the soil conservation and management as independent periods. Ensure you have a collection of relevant photographs showing methods of soil conservation in Rwanda. You may need to use the resources used in the previous lesson on soil erosion. Video Clips on soil conservation are preferred. Consider the materials/resources that you will need for the learners with special needs.

Suggested learning resources/materials

- Approved textbooks and other references
- Popular version of Rwanda Vision 2020
- Excerpt on soil conservation
- Timeline chart on soil erosion in Rwanda
- Map of Rwanda showing the distribution of soil
- Photographs on soil conservation

Interactive learning

- Discussion on soil erosion
- Answering in-text questions
- Analysis and synthesising information provided in the learners

book to create a new communication on soil conservation

- iv) Display the picture showing soil conservation

Suggested teaching and learning methods

- Question and answer
- Class discussions
- Group work

Suggest improvisations/ alternative locally available materials.

Make improvised materials for use by special needs learners.

Suggested teaching and learning activities

- i. Discussing soil erosion
- ii. Answering in-text questions
- iii. Analysing information provided in the learners book
- iv. Interpreting pictures showing soil conservation
- v. Listening to the reading of the script

Extension/Remedial Activities

Assign group work on writing a Radio Script on soil conservation for class presentation. Guide learners on the following:

1. *Writing a concise aim of the communication*
2. *Understanding the target audience*
3. *The audio message which should seize the listeners' attention*

4. *The nature of message (right choice of words) that will net change in attitude make the message memorable and lead to action!*

5. *The message should be gender responsive*

The most appropriate time to air and format that will provide a vehicle for releasing important information

Key skills

- Creative and critical thinking skills
- Application of information to real life situations

Values and attitudes to be attained at the end of the lesson

Appreciate the importance of soil conservation in Rwanda

The cross-cutting issue(s) to be learnt

In teaching this topic, give emphasis to: The 1994 Genocide against the Tutsi and displacement of people. The migration to the forests, increase in pressure on land and consequent degradation and decreased yields. Underscore the importance of peace and careful use of the soil. Remember: *“A nation that destroys its soils destroys itself.”– Theodore Roosevelt*

Answers to the Exercise

1. **Soil** is the name for the loose material above the parent rock. Soil has four constituents namely:
 - Mineral matter from weathering of the parent rock
 - Organic matter or

humus formed from the decomposition of plant remains or organisms in the soil

- Air and water

2. **Soil impoverishment** refers to removal of nutrients and nitrogen from the soil which results to the poor quality of soil. This in turn affects its productiveness because of being exhausted in its fertility. Impoverishment may result from poor farming methods such as monocropping or even heavy rains.

Heavy rains cause impoverishment by:

- Causing soil erosion, which is the loss of the top, fertile soils
- Causing leaching, which is downward movement of minerals to levels where plant roots cannot reach
- Causing water logging in soils, which alters the pH of the soil, making the soil unable to support plant growth
- Causes deposition of poor soils transported from other areas that are unsuitable for plant growth

3. a) i) Lack of application of fertiliser
ii) Planting the same type of

crops over a long period of time

- iii) Lack of crop rotation
- iv) Inability to control soil erosion on the farm
- v) Using the same methods of farming that breaks down the soil making it unable to retain water for long

- b) - Apply fertiliser
- Practice crop rotation
 - Control soil erosion
 - Use modern methods of farming that promote the structure of the soil

4. **Benefits of soil conservation**

- Improved food production
- Sustainable land use
- Increased vegetation cover
- Increased soil fertility
- Better pastures for the livestock
- Increased value of land
- Increased land for settlement
- Reduced costs of dealing with poor soils
- Reduced emphasis on use of fertilisers which protects soil structure

TOPIC AREA: PHYSICAL GEOGRAPHY

SUB-TOPIC AREA: WEATHER AND CLIMATE

**UNIT 9: CLIMATE AND CLIMATE CHANGE IN
RWANDA**

Key unit competence

At the end of the five periods, the learner should be able to analyse the climate of Rwanda and how climate change has impacted on it. Compare and contrast the impacts on Rwanda with other countries.

Introduction

In Senior One, we learnt about weather and climate in Unit 8. In this unit, we shall expound on that work by covering the following key sections:

- (i) Types of climate and seasons in Rwanda
- (ii) The concept of climate change: Causes of climate change in Rwanda
- (iii) Effects of climate change in Rwanda
- (iv) Climate change adaption and mitigation in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills, attitudes and values in the table below:

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Describe the climate of Rwanda and the concept of climate change. • Identify the indicators for climate change in Rwanda • State the causes and effects of climate change in Rwanda. • Outline the adaptation and mitigation measures for climate change in Rwanda 	<ul style="list-style-type: none"> • Observe the climate map of Rwanda and examine the climatic regions of Rwanda. • Explain the factors influencing climate change in Rwanda. • Analyse the effects of climate change in Rwanda. • Carry out research on adaptation and mitigation measures for climate change in Rwanda. 	<ul style="list-style-type: none"> • Show concern for the effects of climate change in Rwanda and the need for mitigation measures. • Appreciate the importance of climate change and mitigation measures in Rwanda. • Show concern for man’s misuse of the environment and show continual desire to mitigate climate change.

Information for the teacher

To be able to understand facts about climate, one must be knowledgeable about weather. This was covered in unit 8 of Learner's book 1. Weather keeps changing every moment. One moment it is hot then suddenly it cools. The elements that make up the weather are the ones that are consistently recorded over a long period; the average of each element is worked out to derive the climatic conditions of a place. The period has to be as long enough, about 30 years because within that time the place will have experienced all types of weather some of the conditions repeated a number of times such as extremes in rainfall, temperatures humidity and all types of changes of all the elements of weather.

Before this unit, read well Learner's book 2 so that you have enough examples concerning types of climate and other related sections. In **Activity 9.1**, ensure that learners have access to necessary materials such as dictionary and internet if you can. Guide learners for **Activity 9.3** on the map by ensuring that they are all at the right page of this activity.

Explain for the learners the four climatic zones in Rwanda, Learners book 2 will be of great help here. Proceed to types of seasons in Rwanda and don't forget they are two. In **Activity 9.3**, remember that Unit 13 of Learner's book 1 is linked to number 2 of this activity.

Handle the concept of climatic change as you prepare for **Activity 9.4** where learners will be grouped and provided with geographical documents and internet if conditions allow. In class presentation, remember gender sensitivity as you choose learners to represent group findings.

Continue and explain what causes climatic change as you throw light on how human activities enhance this change. Thereafter, let learners attempt **Activity 9.5**. Here they will be assisted by the teacher's explanation.

Effects of climatic change in Rwanda are due to changing weather patterns over time. You let learners understand this after you have explained sufficiently and then **Activity 9.6** comes in. at this time assess your learners by simply telling them to group themselves and see if they consider the issue of gender and disability. If not help them and remind them that it is very necessary.

Explain the effects of drought and continue to landslides, floods, aridity and desertification. In **Activity 9.7**, a dictionary is necessary before the lesson begins. Don't be caught offside without their location. Number three on this activity demands for you to be so innovative if access to internet is impossible. Opt for cell phones of other documents that may have the information they are looking for.

As you wind up this unit, explain climate change adaptation and mitigation in Rwanda and cite on major sections of

the unit in general and ask for questions where learners may not have captured what is necessary.

Links to other subjects

While teaching this unit, ensure to draw a link to environmental adaptation and determinism which are all found in biology.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) **Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) **Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) **Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and

exchanging ideas confidently and effectively.

- e) **Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) **Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.
- g) **Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross cutting issues

In this topic learners will appreciate the importance of *environmental conservation and sustainability* as it will be evident especially as you teach about the effects of climate change in Rwanda. In addition, the topic will endow learners with the knowledge of how human misuse is a disadvantage to the country there by enhancing *standardisation culture or quality principles to shape responsible and straight forward society*. Sometime very heavy rainfall occurs while other times the dry seasons extend longer than expected. This can be attributed to global climate change or global warming. Therefore you cannot ignore *climate change and sustainability* as you teach this unit.

You also need to help learners relate *financial education* to the processes involved in the efforts being put in place to ensure how human activities are controlled to avoid contributing to climatic change which may be costly and even lead to global warming.

Assessment criteria

By the end of this unit, learners should be able to draw sketches from photographs and critically analyse photographic interpretation.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this. You also need to help learners relate financial education to the processes involved in the efforts being put in place to ensure how human activities are controlled to avoid contributing to climatic change which may be costly and even lead to global warming.

9.1 CLIMATIC REGIONS AND SEASONS IN RWANDA

Learning outcomes

By the end of this section, the learners should be able to:

- a) Identify types of climate and seasons in Rwanda
- b) Observe the climate map of Rwanda and examine the climatic regions of Rwanda

Additional information for the teacher

Introduce the unit to the learners by giving them the background information using a climatic map of Rwanda. This will enable the Learners to have a generalised view of climate in Rwanda and the general climatic zones of Rwanda.

Using this knowledge it will be easier for the learners to understand types of climate in Rwanda.

Engage the learners in analysing the difference between climate and seasons as **Activity 9.1** demands. Be as close as possible for **Activity 9.2** such that any arising question from a learner is immediately responded to.

Explain four major Rwandan zones of climate and trace out two types of seasons in Rwanda. Give an explanation here and guide learners in **Activity 9.3**.

Preparation for teaching

Ensure that you have appropriate notes and guiding question to tune the learners on. Avail climatic maps of Rwanda. Use the climate map of Rwanda and knowledge from local environment to find out more about the location of different climatic zones of Rwanda. Ensure you have details about the characteristics of the climatic zone where your school is located. Avail climatic data of the different zones in Rwanda.

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 and learning resources

- a) Learner's Book
- b) Climate maps of Rwanda
- c) Climate maps
- d) Local environment
- e) Pens
- f) Chalkboard
- g) Pencils
- h) Rulers

Interactive and multi-ability learning

Ensure that each learner has worked on the activities. At this point, involve the class in discussions ensuring that all members participate. Ensure that slow learners and those with special needs also participate in any way possible. Fast learners may guide slow learners on matters concerning the map of Rwanda showing climatic zones.

Teaching and learning methods

- Guided discovery
- Discussion
- Map and data analysis
- Question and answer

Teaching and learning activities

- a) Checking the dictionary or internet or any other material to get a difference between climate and seasons
- b) Analysing the maps and data on climate asking and answering questions

- c) Listing in their notebooks periods when Rwanda experience dry and wet seasons

Extension/Remedial Activities

Learners should be asked to read through the section of the topic, and apply the knowledge to local conditions draw the relevant maps and make notes. Ask fast learners to discuss their findings with the medium and slow learners such that they all benefit from this section.

9.2 & 9.3 THE CONCEPT OF CLIMATE CHANGE AND CAUSES OF CLIMATE CHANGE IN RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

- a) State the causes of climate change in Rwanda
- b) Explain the factors influencing climate change in Rwanda

Additional information for the teacher

The learners will need to go outside to view the environment around the school and take note and discuss the possible factors that are responsible for the climate of the region where the school is located.

They should note the relief features that are visible from the school, large water bodies, forests, and if possible the direction of the prevailing winds.

For **Activity 9.4**, will need to organise the class in groups, avail geographical documents and internet for them to research about the concept of climate in Rwanda and write down their findings.

Proceed and explain causes of climate change in Rwanda. Your explanation will make it easy for them to handle **Activity 9.5**. Cite out as many local examples as you can.

Ensure that learners have given their presentations and all class members have participated in the discussions on each presentation.

Preparation for teaching

Ensure that you have appropriate notes and guiding question to kick off this section. Set the learners off.

Identify a suitable place where learners will visit to be able to identify the factors that influence the climate in the local area and the zone in general.

Avail the relevant resource materials for learners to use to carry out this research.

Ensure you have details about the factors to be able to guide the learners on the field.

Teaching and learning resources

- a) Learner's Book
- b) Relevant climate maps of Rwanda
- c) Relevant resource materials on climate of different zones in Rwanda
- d) Local environment
- e) Chalk board

- f) Pens
- g) pencils

Interactive and multi-ability learning

Ensure that each group has done the research and let them make presentations. Involve the class in discussions ensuring that all members participate. Ensure that **fast learners** exhaust research such that they can easily guide **slow and medium learners** and those with special needs.

Teaching and learning methods

- (i) Guided discovery
- (ii) Group presentations
- (iii) Class discussions
- (iv) Question and answer

Extension/Remedial Activities

Learners should be asked to continue with the research and find out more causes and relevant local examples on causes of climate change in Rwanda and the likely effects of such a change to the economic performance of the country. If this is done, then the next section will be a walk over both for you and for the learners.

9.4 EFFECTS OF CLIMATE CHANGE IN RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

- a) State the effects of climate change in Rwanda
- b) Analyse the effects of climate change in Rwanda

- c) Show concern for the effects of climate change in Rwanda and the need for mitigation measures

Additional information for the teacher

The learners will need to be involved in discussing the weather patterns over time and its big effect on various human activities in Rwanda. This will awaken them and pick skills needed for **Activity 9.6**. Organise learners into groups so that they can effectively discuss the factors in **Activity 9.6** exhaustively.

After this activity, explain these factors to the learners such that they can correct challenges they met in their discussion for solutions. Check in time if the required materials to facilitate **Activity 9.7** are available. Then pair learners a girl and a boy as much as possible and let them work out the activity.

Preparation for teaching

Avail climatic data for different climatic zones of the country, graphs and maps for different parts of Rwanda for analysis and discussion.

Any other relevant resource materials for learners to use for comparison will help in widening knowledge on climatic effects on Rwanda. Read about effects of climate not only in Rwanda but even in other regions of the world. You may need this data to expand your explanation as you try to compare Rwanda climatic effects with those of other regions.

Read through all activities in this section and think of what other materials you may need to handle it properly. This may depend on where you are and the resources you can and cannot access.

You can also arrange learners in pairs and avail them with reference materials such that they can work out **Activities 9.9, 9.10 and 9.11**.

Teaching and learning resources

- a) Learner's Book
- b) Relevant climatic data and maps of Rwanda and other relevant resource materials on climate
- c) Climate photographs
- d) Local environment

Interactive and multi-ability learning

Use question and answer method to ensure all learners are involved in class discussions. Allow the **slow and medium learners** and those with **special needs** sufficient time to participate. You may reach them during activities and further simplify the language for them.

Teaching and learning methods

- (i) Guided discovery
- (ii) Class discussions
- (iii) Photograph analysis
- (iv) Question and answer method

Extension/Remedial Activities

Learners should be asked to continue and research more about effects of climate change in Rwanda and how can this situation be mitigated such that climate remains friendly to man as a major beneficiary.

9.5 CLIMATE CHANGE ADAPTATION AND MITIGATION IN RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

- a) Outline the adaptation and mitigation measures for climate change in Rwanda
- b) Carry out research on adaptation and mitigation measures for climate change in Rwanda
- c) Appreciate the importance of climate change and mitigation measures in Rwanda
- d) Show concern for man's misuse of the environment and show continual desire to mitigate climate change

Additional information for the teacher

The learners will need to recap on the effects of climate in Rwanda because this will be a base for them to comprehend how such effects can be transformed into human friendly situation. After this, pair the learners and let them handle **Activity 9.12**.

Then explain to them showing that all effects of climate change can be transformed into a situation where Rwandans and other people living in the country can still manage the environment. Refer to Learner's Book 2 for such ways of a possibility.

Preparation for teaching

Organise yourself well by making enough research discuss the relationship between climate and human activities. Explain the impact of climate change on agricultural activities in Rwanda. Prepare notes and guiding questions to assist in the learners to acquire a full glimpse of this section. Avail climatic data for different climatic zones of the country for them to relate to the human activities in different parts of the country.

Teaching and learning resources

- a) Learner's Book
- b) Relevant climatic photographs and maps of Rwanda and other relevant resource materials on climatic data
- c) Chalk board
- d) Dictionaries
- e) Pens

Interactive and multi-ability learning

Organise the class into pairs, **slow and medium learners** may handle questions 1 and 2 of the **End of unit assessment** and they check in the dictionary for the meaning of mitigation.

Fast learners should handle questions 3 and 4 of the End of Unit Revision Questions while those with special needs may be distributed between these teams. There after a class discussion should be conducted to harmonise the outcome from both teams.

Teaching and learning methods

- (i) Guided discovery
- (ii) Research work
- (iii) Group presentations
- (iv) Discussions
- (v) Question and answer

Extension/Remedial Activities

Learners should be asked to continue with research work on other effects of climate change in Rwanda and in other countries such that they can make comparison and try out strategies to mitigate its effects.

Ask them to research about types of vegetation both within and outside the school compound. Remember this links them to Unit 10.

TOPIC AREA: PHYSICAL GEOGRAPHY

SUB-TOPIC AREA: VEGETATION

UNIT 10: VEGETATION IN RWANDA

Key unit competence

At the end of the four lessons, the learner should be able to explain the importance of different types of vegetation in Rwanda.

Introduction

In this unit, the main sub-topics to be covered are:

- (i) Types of natural vegetation in Rwanda
- (ii) Factors that influence vegetation distribution in Rwanda
- (iii) Importance of different vegetation types
- (iv) Impacts of man's activities on vegetation in Rwanda
- (v) Measures to conserve natural vegetation in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge	Skills	Attitudes and values
<ul style="list-style-type: none"> • Locate the major vegetation types in Rwanda. • State the factors that influence distribution in Rwanda. • State the impacts of man's activities on vegetation in Rwanda. • Outline the measures of conserving natural vegetation in Rwanda. 	<ul style="list-style-type: none"> • Classify the different types of natural vegetation in Rwanda. • Explain the factors influencing vegetation distribution in Rwanda. • Discuss the impact of human activities on vegetation and suggest conservation measures. 	<ul style="list-style-type: none"> • Appreciate the importance of different types of natural vegetation in Rwanda. • Show concern for the impacts of man's misuse of vegetation and control measures. • Appreciate the importance of conserving vegetation.

Information for the teacher

One of the aims of teaching this topic is to enable the learner to appreciate the importance of different types of natural vegetation in Rwanda. This should

then make them show concern for the impacts of man's misuse of vegetation and the control measures that have been or should be put in place. Learners should also appreciate the importance of conserving vegetation.

In this unit, you are expected to emphasise the importance of different types of vegetation in Rwanda. As you teach each section, ensure that the learners appreciate the value of vegetation and display concern for the mismanagement of vegetation.

Generally, vegetation is like the outer garment of the earth. Like we care for garments that we use to cover our bodies, in the same way, we should care for the earth's covering garment. This will then keep the earth protected from natural phenomena like rain and floods, strong winds and misuse by humans.

There are different types of vegetation in Rwanda and each has its importance thus requiring proper use, conservation and management to avoid depletion. Rwanda has experienced extensive depletion of forests leaving only a small percentage of the country under forest cover. This has been as a result of rapid population growth creating a high demand for forest products. The natural forests reserves are under government management and conservation. There has been campaigns to plant as many trees as possible to replace the depleted areas and to increase the area under forest cover. The campaigns have yielded positive results. Many areas have planted forests which are in form of plantations.

Rwanda has a large area under woodlands in the eastern parts of the country. Here the trees are under threat due to demand for charcoal in the nearby towns.

To humans, forests are useful sources of building and construction material, wood fuel, herbal medicine and honey. Trees absorb carbon dioxide and produce oxygen that all living things cannot survive without. To wild animals, forests provide shelter and food. To the environment, forests protect soils from agents of erosion. They also make the environment appealing to the eye.

Grasslands are also important in that both wild and domestic animals feed on grass. Grass is also used as thatch for houses. Some grasses such as reeds are used as raw materials for making mats and baskets. Grass is also a cover that protects soils from agents of erosion. There are many other uses of vegetation and as such, vegetation is a resource we cannot afford to care for.

Link to other subjects

When teaching this unit, ensure you draw a link to Biology.

Generic competences

- Lifelong skills
- Research skills
- Problem solving
- Critical thinking

Cross-cutting issues

Vegetation is a natural resource. There should be emphasis on the value and responsibility to protect, manage and conserve vegetation to sustain the supply of the products as we protect the environment. Thus *environmental conservation and sustainability* is a key issue to be emphasised in this unit.

Failure to conserve vegetation could easily lead to desertification. Also important in this unit is to emphasise on *financial education/awareness*. As you are aware, depletion of vegetation is directly related to financial needs. For instance, burning of charcoal to sell and raise income and cutting of reeds to make baskets for sale. *Genocide studies* cannot be ignored in this unit as we are aware that the 1994 genocide against the Tutsi had adverse effects on forests in Rwanda especially when the refugees returned to the country.

10.1 TYPES OF NATURAL VEGETATION IN RWANDA

Learning outcome

By the end of this section, the learner should be able to classify the different types of natural vegetation in Rwanda.

Additional information for the teacher

Begin the lesson by finding out how much the learners know about different types of vegetation. Let the learners carry out Activity 10.1 and ensure that they make correct interpretation of the questions. Ensure they also discuss the differences and similarities between the types of vegetation. Follow this by guiding them to study the map of Rwanda on vegetation and ensure they copy the map in their note books correctly. This should enable them to locate and name the different areas in Rwanda and the corresponding type of vegetation.

Different types of vegetation in Rwanda are:

- i) Forests which include natural forests found in the forest reserves, riverine forests and planted forests;
- ii) Woodlands mainly found in parts of eastern and southern areas of the country;
- iii) Grasslands that occur in the areas that receive low seasonal rainfall;
- iv) Swamp vegetation that include reeds, papyrus and water weeds.

Preparation for teaching

Read widely about vegetation and make comprehensive notes for reference as you teach. Write the key words related to vegetation that require definitions. You may draw an enlarged map of Rwanda's vegetation for use as you discuss the distribution of different types of vegetation. Prepare the answers to the activities in the section for reference.

Safety

As the learners walk out of class to view the vegetation, ensure you avoid steep areas that may not be safe to walk. Have in mind the learners with physical disability.

Teaching and learning resources

- a) Approved text books and other references
- b) Atlases
- c) Local environment

Interactive and multi-ability learning

Ensure that you initiate discussions and question and answer sessions where all members of the class participate. Encourage the slow learners to participate while also catering for the learners with special needs. Ask learners to work on **Activity 10.2**.

Teaching and learning methods

- a) Question and answer
- b) Discussions
- c) Viewing of local environment

Teaching and learning activities

- a) Studying the vegetation in the local environment
- b) Discussing the local vegetation types
- c) Drawing of map showing vegetation
- d) Asking/answering questions
- e) Taking notes

Extension/Remedial Activities

Let the learners work on **Activity 10.3** and complete making notes and drawing the map. Ensure they complete the answers to the activities in the section for discussion. You may also give an assignment for the learners to research on specific characteristics of different types of vegetation giving specific examples of areas where they occur.

10.2 FACTORS THAT INFLUENCE VEGETATION DISTRIBUTION IN RWANDA

Learning outcome

By the end of this section, the learner should be able to explain the factors influencing vegetation distribution in Rwanda.

Additional information for the teacher

Review briefly what the class learnt during the last section. Let the learners give the key points learnt. Build on the ideas so that you relate the current section to the last one for flow. Let learners work on **Activity 10.4**. Ensure you engage the learners to give suggestions of the factors that influence vegetation distribution. They could look at the photographs in the unit to get ideas of some of the factors. For instance the forests that are next to a river should give a clue of the related factors.

Preparation teaching

Teaching of this section should start from the familiar factors so that learners can be able to comprehend when they learn about any new factors. It is important to make a list of the factors to be discussed relating to each type of vegetation. This will enable learners understand why different areas in Rwanda have different types of vegetation. Prepare leading questions that guide the flow of the lesson and

have the key points noted.

Acquaint yourself with the activities in the section to be prepared for the way to handle the questions. This will also help you to judge how much time you require for the activities.

Safety

As you plan for any lesson, it is important to always ensure that the learning environment is safe for the learners whether inside the class or outside. More so if you have learners who are physically challenged.

Teaching and learning resources

- Approved text books and other references
- Atlases
- Map of Rwanda showing distribution of vegetation

Interactive and multi-ability learning

Ensure that each group has done its research on the factors that influence the vegetation around the school. Let them make their presentations for discussion. Involve all the learners in the discussion ensuring that the slow ones also participate. Group learners to work on **Activity 10.5**.

Teaching/learning methods

- Research
- Group discussion
- Map interpretation
- Question and answer

Teaching/learning activities

- Research work

- Asking and answering questions
- Class presentation
- Note taking

Extension/Remedial Activities

Learners to finalise the report writing and notes on the section. Ask learners to work on **Activity 10.6**.

10.3 IMPORTANCE OF DIFFERENT VEGETATION TYPES

Learning outcome

By the end of this section the learner should be able to explain the importance of each type of vegetation in Rwanda.

Additional information for the teacher

You must ensure that the learners are clear about the characteristics of each type of vegetation and its location in Rwanda as this will enable them to comprehend and relate the importance of each type to the environment where it is found. Let learners work on **Activity 10.7**.

Learners should give their own ideas of the importance of the different types of vegetation while giving specific examples from their own experiences. At this juncture, you should guide them to reasons why conservation of each type of vegetation is necessary. Also, consider the effects of failure to conserve the vegetation.

Preparation for teaching

Ensure you have appropriate notes on each of the types of vegetation. In addition you should have guiding question that will help the flow of ideas. Obtain relevant photographs that will help in enabling the learners to understand the concepts. Prepare a map of the different types of vegetation for display as reference during the lesson. Organise the class into groups to work on the activity.

Teaching/learning resources

- Approved text books and other references
- Map of Rwanda
- Relevant photographs

Interactive and multi-ability learning

Ensure that each group has done its research on the importance of each type of vegetation in Rwanda. Let them make their presentations for discussion. Use question and answer method to involve all the learners. Also involve all the learners in the discussion ensuring that the slow ones and those with special needs are fully involved.

Teaching/learning methods

- Research
- Group discussion
- Map interpretation question
- Question and answers

Teaching/learning activities

Research work, asking and answering, class presentation and note taking.

Extension/Remedial Activities

Learners to finalise the report writing and notes on the section. They should also read more on the importance of vegetation to individuals and to the government. Ask learners to work on **Activity 10.8**

10.4 IMPACT OF MAN'S ACTIVITIES ON VEGETATION IN RWANDA

Learning outcome

By the end of this section, the learner should be able to discuss the impact of human activities on vegetation and suggest conservation measures.

Additional information for the teacher

Let learners work on **Activity 10.9**. There are many examples of areas where different measures are being taken to conserve vegetation in Rwanda. For example there is a focus to increase the areas under forest cover by planting trees where forests had been cleared and gazetted some forest reserves.

In addition the government has measures in place to fight fires that destroy forests, woodlands and grasslands especially during the wet seasons. It is only through conservation of vegetation that we can guarantee sustainability of the vegetation.

You must ensure that the learners

are clear about what is being done in different parts of the country and more so the local environment which you could arrange to visit for study. Let them give suggestions on what they are familiar with and later research further on the same. This will give them awareness and appreciation of the impact of human activities on vegetation and the care that should be taken to ensure sustainability.

Preparation for teaching

Prepare comprehensive notes to guide you as you take the learners through the section. Obtain relevant photographs and together with what is in the learner's book, you could prepare questions to help them interpret the activities in the photographs. In addition you need to be ready with the possible answers to the activities to elaborate during the discussions in class.

Teaching/learning resources

- Approved text books and other references,
- Map of Rwanda
- Relevant photographs
- Local environment

Interactive and multi-ability learning

As you interpret the photographs, ensure that each learner is fully involved in answering the questions. Use question and answer method to involve all the learners. Also involve all the learners in the discussion ensuring that the slow learners are not left behind.

Teaching/learning methods

- Photograph analysis
- Discussion
- Question and answer

Teaching/learning activities

- Photograph reading
- Asking and answering questions
- Note taking

Extension/Remedial Activities

Learners to do further reading on the impact of human activities on vegetation in Rwanda and make notes. Let them research on the precautions taken to control the misuse of vegetation in Rwanda.

10.5 MEASURES TO CONSERVE NATURAL VEGETATION IN RWANDA

Learning outcome

By the end of this section the learner should be able to explain the measures being taken to conserve natural vegetation in Rwanda.

Additional information for the teacher

Let learners present their findings on **Activity 10.10**. Rwanda has a lot of examples of areas where different types of vegetation have been carelessly exploited and the impact on the people and on the environment is very clear. You must ensure that the learners are clear about possible impact of human activities on vegetation if care is not taken to ensure sustainability.

Let learners give their own ideas of the importance of conserving the different types of vegetation and where they have specific evidence, let that be emphasised.

Preparation for teaching

Obtain relevant photographs to add to the one in the learner's book so as to help in enabling the learners to understand the concepts. Ensure you have appropriate notes on the impact of misuse of each of types of vegetation. In addition you should have guiding question that will help the flow of ideas. Acquaint yourself with the photographs and prepare guiding questions to help the progression of the section.

Safety

If you plan to take the learners out for outdoor learning, take safety precaution such as avoiding areas that may be dangerous. Very steep slopes and bushes should be avoided as much as possible. The learning environment should always be safe for the learners whether inside the class or outside.

Teaching/learning resources

- Approved text books and other references
- Local environment
- Map of Rwanda
- Relevant photographs

Interactive and multi-ability learning

Ensure that each learner is fully involved as you interpret the photographs. Use question and answer method to involve all the learners. Also involve all the learners in the discussion.

Teaching/learning methods

- Photograph analysis
- Discussion
- Question and answer

Teaching/learning activities

- Photograph reading
- Discussion
- Asking and answering questions
- Note taking

Extension/Remedial Activities

Learners to do further reading on the topic and write a paragraph on an area they are familiar with where vegetation is under conservation. This should be presented for discussion in class. Ask learners to work on **End of unit assessment**.

TOPIC AREA: PHYSICAL GEOGRAPHY

SUB-TOPIC AREA: DRAINAGE

UNIT 11: DRAINAGE IN RWANDA

Key unit competence

At the end of the five periods, learners should be able to investigate the importance of drainage and the challenges of obtaining sustainable and clean water in Rwanda.

Introduction

In this unit the main sub-topics to be covered are:

- (i) Major types of rivers in Rwanda
- (ii) Major rivers, swamps and lakes in Rwanda
- (iii) Mode of formation of lakes in Rwanda
- (iv) Importance of water bodies in Rwanda
- (v) Challenges to obtaining sustainable and clean water in Rwanda
- (vi) Conservation and management methods of water bodies in Rwanda

Learning objectives:

As you teach this unit, you should ensure that learners acquire the following skills, values and attitudes.

Knowledge	Skills	Attitudes and values
<ul style="list-style-type: none"> • Identify the major rivers, swamps and lakes of Rwanda. • State the mode of formation of lakes in Rwanda. • Suggest the importance of drainage in Rwanda. • Explain the challenges of obtaining sustainable and clean water in Rwanda. • State methods of conserving water resources. 	<ul style="list-style-type: none"> • Draw a sketch map of Rwanda to show the major rivers, swamps and lakes. • Explain the mode of formation of different types of lakes in Rwanda. • Evaluate the importance of water bodies. • Carryout a research to find out the ways of purifying water. • Apply different conservation methods in protecting water bodies. • Apply different conservation methods in protecting water bodies. 	<ul style="list-style-type: none"> • Appreciate the importance of water resources in Rwanda. • Show concern for proper use and management of water resources in Rwanda

Information to the teacher

Drainage can be defined as the removal of surface and sub-surface water from an area either naturally or using artificial means. **Drainage system** on the other hand refers to the pattern that is formed by the streams, rivers, and lakes in a particular **drainage** basin. The streams, rivers and lakes in one basin have some interconnection in that the stream may be tributaries of the main river or may be independent small rivers. The rivers may all be flowing into the lakes but also, the lakes could be the sources of the rivers. The common denominator is that all these water features are found in one drainage basin.

On the surface of the earth we have many large rivers, lakes, seas and oceans. The rivers get water from rain, snow melt, lakes or from springs and swamps. The rivers flow into lakes, seas oceans. This pattern is replicated in Rwanda where we have many large and small rivers with numerous tributaries, springs, swamps and lakes.

Lake Kivu is one of the Great Lakes in Eastern Africa within the western branch of the rift valley. It lies on the border between the DRC Congo and Rwanda. Lake Kivu is the source of River Rusizi, which flows southwards into Lake Tanganyika. The word “**Kivu**” is a Bantu name for “lake.” The lake covers a total surface area of some 2,700 km² (1,040 sq mi) and stands at a height of 1,460 metres (4,790 ft) above sea level. Some 1 370 km² or 58% of the lake’s waters lie within the borders

of DRC.

The natural drainage systems in Rwanda contribute significantly towards the economy of the country benefiting individuals as well as the nation. Drainage system is the main source of water for domestic and industrial use. The water is also used for agricultural activities such as irrigation and watering the livestock. The lakes and swamps are major sources of Fish. In addition, swamps provide ideal environment for growing some of the traditional crops that require large amounts of water in the soil.

Links to other subjects

While you teach this unit, ensure you draw a link to water purification and treatment in Chemistry.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) **Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) **Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to

questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.

- d) Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.
- e) Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.
- g) Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Assessment criteria

At the end of the lesson the learners should be able to correctly locate the major water bodies of Rwanda, investigate the importance of drainage and challenges of obtaining sustainable clean water in Rwanda.

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 and *conservation of water* in particular. 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.

INTRODUCTIO TO DRAINAGE IN RWANDA

Learning outcome

By the end of this lesson, the learner should be able to identify the major rivers and drainage basins in Rwanda.

Additional information for the teacher

Introduce the unit to the learners by building on the knowledge on study done in the lower classes. At this stage the learners have knowledge about what drainage entails but have to study in details as they apply the concept to the Rwandan situation.

Give the learners the task to define drainage and drainage basin. They can

use a dictionary or other source of information to get the meaning.

Ask the learners to work on **Activity 11.1** and ask them to make class presentation on the same. Ensure as many of them as possible have given their presentations and all class members have participated in the discussions on each presentation.

Preparation for teaching

Ensure that you have appropriate maps of the countries that you wish to use to compare with Rwanda in terms of drainage systems found. You also need to have comprehensive notes and questions to use as you introduce the topic to the class.

Prepare a sketch map of Rwanda similar to the one that you will ask the learners to draw to show the major drainage systems in the country.

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/learning resources

Learners book, wall maps, sketch map of Rwanda, photographs and Atlases.

Interactive and multi-ability learning

Ensure that each learner has worked on the activities. At this point, involve the class in discussions ensuring that all members participate. You

could appoint one student to lead the discussion for the activity and ensure that slow learners and those with other challenges may be appointed to lead.

Teaching/learning methods

Guided discovery, discussions, photograph and map analysis and question and answer.

Teaching/learning activities

Using the Atlas, rivers, lakes and swamps, studying photographs, asking/answering questions, class presentations, discussions, drawing maps and taking notes.

Extension/Remedial Activities

Learners should be asked draw a map of Rwanda showing rivers, lakes and swamps. In addition, they should read through the sections of the topic so far covered and if possible read ahead in preparation for the next lesson.

11.1 MAJOR RIVERS, SWAMPS AND LAKES IN RWANDA

Learning outcome

By the end of this lesson, the learners should be able to identify and the major rivers, swamps and lakes in Rwanda.

Additional information for the teacher

Review briefly what the class learnt during the last lesson and let the learners give some of the key points they learnt. The learners should be engaged in naming the rivers, swamps and lakes in Rwanda and where possible their sources of water. They should draw and study table given in **Activity 11.2** in the learner's book which shows the rivers and their mode of formation. They should then identify and name the lakes, rivers and swamps in their Atlases as instructed on their sketchy maps.

In Rwanda swamps are found in the highland areas such as Kamiranzovu, Gishoma and Mushaka. They are present in the Central Plateau and the river basins of major rivers such as Ngenda, Mugesera and Sake. They are also found at the edges of Lake Kivu.

Preparation for teaching

Ensure that you have appropriate maps of Rwanda showing the major lakes, rivers and swamps. You could also collect aerial photographs of the lakes. You also need to have comprehensive notes and questions to use as you introduce the topic to the class. Read widely on formation of lakes to be able to notes for use in class.

Acquaint yourself with the activities in 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/learning resources

Learners Book, wall maps, sketch map of Rwanda, photographs and Atlases.

Interactive and multi- ability learning

Ensure that each learner has worked on the activities. You should involve the class in discussions ensuring that all members participate. Let members of each group present their findings on the activities and allow class discussion on each groups work. Ensure that slow learners and those with other challenges participate in the discussions.

Teaching/ learning methods

Guided discovery, discussion method, photograph and map analysis and question and answer.

Teaching/learning activities

Identifying lakes in the Atlas, studying photographs, asking/answering questions, and class presentations, discussions, drawing maps and taking notes.

Extension/Remedial Activities

Learners should be asked to work on **Activity 11.3**. In addition, they should reading and researching on mode of formation of lakes.

11.2 FORMATION OF LAKES IN RWANDA

Learning outcome

By the end of this lesson, the learners should be able to state the mode of formation of lakes in Rwanda.

Additional information for the teacher

Review briefly what the class learnt during the last lesson and let the learners give some of the key points they learnt. Let the class give names of the lakes that they know other than the major ones given in the unit. For each lake named, they should explain how the lakes were formed. Ask them to work on **Activity 11.3**.

Preparation for teaching

Ensure that you have appropriate maps of Rwanda showing where the major lakes are found. You could also collect aerial photographs of the lakes and where they are found. You also need to have comprehensive notes and questions to use as you introduce the topic to the class. Read widely on lakes including those in other parts of Eastern Africa for comparison.

Acquaint yourself with the activities in 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/learning resources

Learners Book, wall maps, sketch map of Rwanda, photographs and Atlases.

Interactive and multi-ability learning

Ensure that each learner has worked on the activities. Involve the class in question and answer and discussions to ensure that all members are actively involved in the learning process.

Ensure that slow learners and those with other challenges participate in the discussions and asking and answering questions.

Teaching/learning methods

Guided discovery, discussion method, photograph and map analysis and question and answer.

Teaching/learning activities

Identifying lakes in the Atlas, studying photographs, asking/answering questions, and discussions, drawing maps and taking notes.

Extension/Remedial Activities

Learners should read through the section and find out more information on lakes in other parts of the world from the internet or other geographical sources.

Ask learners to work on **Activity 11.5**. Ensure that you check their work before the next lesson.

11.3 IMPORTANCE OF WATER BODIES IN RWANDA

Learning outcome

By the end of this lesson, the learners should be able to suggest the importance of drainage in Rwanda.

Additional information for the teacher

Rwanda government recognises the value of water bodies as a resource that is important especially for a developing

economy. The management and conservation of Gikondo swamp was as a result of this recognition. Gikondo swamp represents the best example of conservation of a swamp that has yielded good returns for local population.

Briefly review what the class learnt on water bodies during the last lesson. Ask the learners to give some of the key points they learnt. Let the class give names of the major lakes, swamps and the rivers. Ask them to give the economic activities carried out in these water bodies. Ask learners to work on **Activity 11.6**.

From the class discussion it is evident that water bodies such as lakes, rivers and swamps are of significance to Rwandans as follows:

- i. Water is important for good health. Our body needs about 8 glasses of clean and safe water every day
- ii. Rwanda gets water for domestic and industrial use such as irrigation and hydro-electric power production
- iii. Water bodies are natural habitats for a variety of unique plants and animals. They form tourist attraction sites for recreation. Sport fishing, and boat racing are also practiced. The picture below shows a chain of hotels at the shores of Lake Kivu.
- iv. Lake Kivu modifies the climatic conditions of the adjacent areas. Sea breezes and convectional rainfall are common.
- v. The water bodies provide natural route ways to transport goods and peoples and linking Rwanda to the neighbouring countries.
- vi. Swamps provide an important function of water treatment and purification and serve as sources of water for lakes. They connect rivers in the country such as Kamiranzovu in Nyungwe and Rugenzi in Bulera. The swamps also help in ground water recharge.
- vii. Water bodies form major inland fresh water fisheries which is a source of food, and income for families and communities.
- viii. Some lakes are sources of minerals. For example, methane gas is mined from Lake Kivu which is a source of energy.
- ix. Sand and clay scooped around the water bodies is used in building and construction.

Preparation for teaching

Ensure that you have appropriate maps and aerial photographs you used in the previous lesson on the major water bodies in Rwanda. You also need to have comprehensive notes and questions on the importance of water bodies to use as you introduce the topic to the class. Ensure you have information on how other countries use their water bodies so that you can compare them with Rwanda.

Acquaint yourself with 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.

Teaching/learning resources

Learners book, wall maps, sketch map of Rwanda, photographs and Atlases.

Interactive and multi- ability learning

Involve the class in question and answer and discussions to ensure that all members are actively involved in the learning process. Ensure that slow learners and those with special needs participate in the discussions and asking and answering questions.

Teaching/learning methods

Question and answer, guided discovery, discussion method, photograph and map analysis.

Teaching/learning activities

Asking/answering questions identifying water bodies in the Atlas, studying photographs, discussions and taking notes.

Extension/Remedial Activities

Learners should read through the section and find out more information on the uses of water bodies in other parts of the world from the internet or other geographical sources.

11.4 CHALLENGES TO OBTAINING SUSTAINABLE AND CLEAN WATER IN RWANDA

Learning outcome

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

Additional information for the teacher

Rwanda government has water bodies awareness through policy implementations, in collaboration with the public by educating people on the values and functions of water bodies. However, economic development has outweighed water bodies benefits thus leading to their utilisation and exploitation. This has led to the over utilisation of these resources resulting in water bodies loss and degradation.

Make a review of what the class learnt on the importance of water bodies during the last lesson. Ask the learners to give some of the key points they learnt. Let the class give some of the uses of water bodies and ask them how such uses could lead to destruction of the water bodies.

Ask learners to work on **Activity 11.7**. Although Rwanda possesses abundant water resources nevertheless, there are challenges to obtaining sustainable clean water. Some of the challenges are:

- i. People lack comprehensive information and awareness on the importance of careful use of water resources. They also lack adequate infrastructure to harvest and store water.
- ii. Climate change has contributed to degradation of water bodies with a decrease in amount and quality of water. For example, the quality of water deteriorates during floods and drought occurrences.

- iii. The change of wetlands to agricultural production has increased rapidly due the acute scarcity of agricultural land. This has led to enormous pressure on the wetlands as sustainable sources of water.
- iv. With agricultural intensification, excessive fertilisers run into lakes and rivers. This encourages the rapid growth of thick mats of aquatic plants or water hyacinth on water surfaces. This is not only threatening to the lifespan of lakes and rivers in but also has detrimental effects on water quality.
- v. The discharge of untreated waste (both domestic and industrial) is directly deposited or ends up in water resources causing water pollution. This has rendered water unsuitable for direct consumption and increased the cost of treatment before utilisation.
- vi. Increased housing developments associated with urbanisation, directly affects the soils' physical characteristics thus lowering water infiltration and increasing runoff and soil erosion with increased potential for floods. This has happened in Kigali and to a lesser extent in other provincial towns across the country.

Preparation for teaching

Ensure that you have appropriate notes and photographs of water bodies that have been destroyed. You also need to have questions on the misuse of water bodies to use as you introduce the topic to the class. Ensure you have

read widely on other countries to find out if they have any water bodies that have dried up and why so that you can compare with Rwandan situation.

Teaching/learning resources

Learner's Book, wall maps, sketch map of Rwanda, photographs and Atlases and other geographical sources.

Interactive and multi- ability learning

Involve the class in question and answer and discussions to ensure that all members are actively involved in the learning process. Let the groups discuss the activity and present their findings to the class. Ensure that slow learners and those with special needs participate in the discussions and asking and answering questions.

Teaching/learning methods

Guided discovery, question and answer, discussion, photograph and map and document analysis.

Teaching/learning activities

Asking/answering questions identifying uses of water bodies by studying photographs, discussions and taking notes.

Extension/Remedial Activities

Learners should read through the section and find out more information on the challenges facing water bodies in other parts of the world from the Internet or other geographical sources.

11.5 CONSERVATION AND MANAGEMENT METHODS OF WATER BODIES IN RWANDA

Learning outcome

By the end of this lesson, the learners should be able to describe methods of conserving and managing water resources.

Additional information for the teacher

How can water bodies be sustained? Remember they have a very delicate ecosystem yet they are on demand for use to sustain people's livelihood. This is true for Rwanda and may other parts of the world.

Make a review of what the class learnt on the importance of water bodies during the last lesson and for each use, let the learners discuss challenges to the water body. Let the class discuss the best way to use the water bodies without destroying them.

Ask learners to work on **Activity 11.9** and guide through it.

Water can be conserved through:

- i. *Recycling/re-use*: Utilising wastewater from one process to another where lower-quality water is acceptable as a way to reduce the amount of wastewater, pollution and all together increase water supplies
- ii. *Treating or disinfecting* community wells and boreholes during drought and floods events to maintain water quality. Water treatment is

the process of cleaning water. Treatment makes the water safe for people to use. Treatment includes **disinfection** with chlorine or other chemicals to kill any germs in the water.

- iii. *Removing invasive plants*: Physical removal of the alien plants is a low-cost measure to improve an area's water quality.
- iv. *Promoting community empowerment initiatives* through high value economic activities such as fishing, beekeeping as well as value addition so that communities are motivated to protect the water catchment areas
- v. *Protecting water catchment areas/ water towers, river banks and water bodies* from destruction and contamination

Preparation for teaching

Ensure that you have appropriate notes on how wetlands in other parts of the world are conserved or rehabilitated. You also need to have more information on how the misused water bodies can be rehabilitated. Collect photographs showing people using waterbodies. Use these as you introduce the topic to the class. Ensure you have read widely on other countries on this area.

Teaching/learning resources

Learners book, wall maps, sketch map of Rwanda, photographs and Atlases and other geographical sources.

Interactive and multi-ability learning

Involve the class in question and answer and discussions to ensure that all members are actively involved in the learning process. Ensure that slow learners and those with special needs participate in the discussions and asking and answering questions.

Teaching/learning methods

Question and answer, expository approach, discussion method, photograph and map and document analysis.

Teaching/learning activities

Asking/answering questions identifying water bodies in the Atlas, studying photographs, discussions, and taking notes.

Extension/Remedial Activities

Learners should read widely on conservation of water bodies in Rwanda and in other parts of the world from the internet or other geographical sources.

Assign learners **End of unit assessment** as homework. Ensure that you check the learners work before the next lesson.

Answers to End of unit assessment

1. Rivers, lakes and swamps
2.
 - Permanent rivers
 - Temporary rivers
 - Intermittent rivers

3. Drainage map of Rwanda

4.

- Water is important for good health. Our body needs about 8 glasses of clean and safe water every day
- Rwanda gets water for domestic and industrial use such as irrigation and hydro-electric power production
- Water bodies are natural habitats for a variety of unique plants and animals. They form tourist attraction sites for recreation. Sport fishing, and boat racing are also practised.
- Lake Kivu modifies the climatic conditions of the adjacent areas. Sea breezes and convectional rainfall are common.
- The water bodies provide natural route ways to transport goods and peoples and linking Rwanda to the neighbouring countries.
- Swamps provide an important function of water treatment and purification and serve as sources of water for lakes. They connect rivers in the country such as Kamiranzovu in Nyungwe and Rugezi in Burera. The swamps also help in ground water recharge.
- Water bodies form major inland fresh water fisheries which is a source of food, and income for families and communities.

- Some lakes are sources of minerals. For example, methane gas is mined from Lake Kivu which is a source of energy.
- Sand and clay scooped around the water bodies is used in building and construction.

5.

- Developing and maintaining strategic boreholes, traditional dug wells, water pans and supply lines to improve access to water.
- Increasing capture and storage of rainwater to ensure availability of water during the

dry season, particularly roof harvesting at household level.

- Organising focused awareness campaign that simplifies the need for sustainable use of water resources, in a language that is clearer to people particularly those in rural areas.
- Involving water users including gender groups, administrators and non-governmental organisations in water resource management.
- Enforcing laws against destruction of water resources.

6.

Activity	Water management	Water Conservation
Using water from the Kitchen to grow Vegetables		
Training people on careful use of water		y
Storing water for use during the dry season		
Protecting water catchment areas		y
Digging wells		
Disinfecting water		y

TOPIC AREA: PHYSICAL GEOGRAPHY

**SUB-TOPIC AREA: MAN AND HIS
ENVIRONMENT**

**UNIT 12: ENVIRONMENTAL CONSERVATION IN
RWANDA**

Key unit competence

At the end of the 4 lessons, the learners should be able to investigate the factors responsible for environmental degradation and consequences of excessive use (over-exploitation) of environmental resources

Introduction

In this unit, the main sub-topics to be covered are:

- (i) Definition of environmental resources and environmental degradation
- (ii) Types of environmental resources in Rwanda
- (iii) Ways of exploiting environmental resources
- (iv) Causes and consequences (effects) of overexploitation of environmental resources
- (v) Environmental conservation measures (ways of upgrading the environment)

Teaching objectives

As you teach this unit, you should ensure that learners acquire the following skills, values and attitudes.

Knowledge	Skills	Attitudes and values
<ul style="list-style-type: none"> • Explain the meaning of environmental resources and environmental degradation. • Identify the various ways of environmental resource exploitation • Explain the causes and consequences of overexploitation of environmental resources • State the measures of environmental conservation 	<ul style="list-style-type: none"> • Suggest proper ways of exploiting environmental resources to protect their school and home environments • Analyse the causes and effects of overexploitation of environmental resources • Analyse measures taken for environmental conservation 	<ul style="list-style-type: none"> • Appreciate the importance of various environmental resources • Show concern for overexploitation of environmental resources and its effects • Show respect for environmental measures (ways of upgrading the environment)

Information for the teacher

Environmental conservation and sustainability involves making decisions and taking actions that are in the interests of protecting the environment. This is emphasised in the key competences that the learner is expected to acquire.

The main emphasis is on preserving the capacity of the environment to support life. Environmental sustainability is therefore about making responsible decisions that will reduce the negative impact that human activities have on the environment.

Human activities are responsible for reducing the capacity of the environment to support life. This happens when:

- Forests and woodlands are cleared through logging and setting up agricultural land.
- There is pollution and over-fishing of oceans, rivers, lakes and wetlands
- The atmosphere is polluted through the burning of fossil fuels.
- There are use unsustainable farming practices which damage even the prime agricultural land.

The government, organisations and local communities have to take deliberate initiatives to ensure the environment is cared for not only for the current population but also for future generations.

Cross cutting issues

This topic has touched on what happened to the environment when refugees returned to Rwanda. However, it is worth noting that research carried out by some scholars show a link between unsustainability of the environment and the conflict. Their findings indicate that during the years before the conflict, the population pressure was so high that the cultivated land could not produce sufficient food to feed the people. Many people had invaded the hills and forested areas as the only other available land for cultivation. They applied poor methods of cultivation leading to extreme soil erosion. Increased poverty due to unproductive land created tension among the people. They only needed an excuse to turn onto one another.

The effect during the conflict was that there was no one to protect environmental resources, especially forests. People descended on it clearing large areas of the former forest land. It has taken the combined effort of the government, non-governmental environment biased organisations and local communities to bring the Rwandan environment to where it is today.

The other issue is about the population pressure that has led to widespread land degradation. As a result, the ministry of Education has been petitioned to include Family Planning and Reproductive Health education in the school teaching curriculum, to help educate the public on run-away population.

12.1 DEFINITION OF ENVIRONMENTAL RESOURCES AND ENVIRONMENTAL DEGRADATION

Learning outcome

By the end of this section, the learner should be able to explain the meaning of environmental resources and environmental degradation.

Additional information for the teacher

This is an area that requires use of the local environment for learners to identify whether there is sufficient protection, preservation and proper utilisation of natural resources that make up the environment. In addition, learners will be able to identify the renewable and non-renewable resources in their local environment. This is the starting point and reference will be made when teaching the rest of the unit. Thus, the using the principle of teaching/learning from known to unknown.

Preparation for teaching

Start the lesson by asking learners to find out the meaning of the following terms:

- Environment
- Environmental resources
- Renewable resources
- Non-renewable resources
- Environmental degradation

Ensure you summarise what learners will have obtained from the dictionary, Learner's Book and other geographical

documents with summarised definitions. Ensure they understand this definitions because the information will form an important part in the understanding of the entire topic.

Summarise the lesson by organising the class in pairs to work on **Activity 12.1**. Ask them to prepare class presentations, to be done in the next lesson.

Safety

In case you need to use the local environment to for the class to see the resources such as vegetation and water bodies in their natural environment, it is important to ensure that care is taken as the learners walk to areas within or away from the school compound. Steep slopes should be avoided.

Suggested teaching/learning resources

- Learner's Book
- Maps showing locations of resources to be used as examples (such as drainage map of Rwanda, mineral distribution in Rwanda, tourism or even physical features such as mountains)
- Photographs of some of the resources

Interactive learning

Ensure you pair learners of different abilities as they work on the activities. During class presentations, all learners should make contributions.

Suggested teaching/learning methods

- (i) Guided discovery
- (ii) Question and answer
- (iii) Researching
- (iv) Class presentations and discussions

Suggested teaching/learning activities

- a) Locating areas on maps
- b) Identifying samples of the resources displayed in class or those learners have seen in their local environment.
- c) Discussing the meaning of key terms and phrases
- d) Taking notes

Extension/Remedial Activities

Reading further from available documents and researching from internet about what is being studied. Let them find out more on the specific human activities that cause environmental degradation.

12.2 & 12.3 TYPES OF ENVIRONMENTAL RESOURCES IN RWANDA AND WAYS OF EXPLOITING THEM

Specific learning outcomes

By the end of this section, the learner should be able to:

- Identify various ways of environmental resource exploitation
- Suggest proper ways of exploiting environmental resources to protect their school and home environments
- Appreciate the importance of various environmental resources.

Additional information for the teacher

This section is quite wide and every specific way of exploiting each resource must be taught individually using local examples. It requires that learner get to fully understand why natural resources especially those in their local environment must be exploited. This can be supported by **Activity 12.3**, which should be done by learners individually. Choose learners at random to present their findings.

As indicated in the Learner's 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 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 Learner's 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.

Preparation for teaching

Types of environmental resources in Rwanda

Remind the learners the various types of resources. Let them group them either as living or non-living. (Living: Vegetation and animals: Non-living: Land, soil, minerals and air)

Ensure you have samples that you used in Section 1 and identify areas within the

local environment that are suitable for teaching/learning this section. Make appropriate notes to guide the learners during class discussions.

Emphasise on the importance of these resources. Let them appreciate the need to utilise them sustainably, while paying attention to conservation.

Ensure learners with different learning abilities are in the groups that you will help learners form in order to tackle **Activities 12.4, 12.5 and 12.6.**

Safety

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.

Ways of exploiting environmental resources

The following are some of the ways the environment resources are exploited. Ask learners to come up with a table with the type of resource in one column and its exploitation in the other column. The following analysis will help you score their responses. Remember, the list is not exhaustive, and therefore learners are likely to come up with more information that you should verify.

1. **Land** - Has national forest reserves, wildlife conservation parks, protected water catchment areas, national wetlands and areas of urban settlement.
2. **Soil** - Farming (crop farming and livestock keeping), mining, settlement, industrial establishments.

3. **Vegetation** - Forests have been conserved to preserve the environment, national parks have been set up in protected areas with different types of vegetation, grass provides pasture, trees provide timber and other building materials.
4. **Wildlife** - National heritage as they tourist attractions, are basis for setting up national reserves, provide food to people and animals.
5. **Water resources** - Provide water for human and animal use, used in agricultural activities, used as industrial coolants, used as fishing grounds, generates HEP.

Suggested teaching/learning resources

- Local environment
- Maps showing various economic activities
- Photographs
- Learner's Book

Interactive learning

Ensure you pair learners of different abilities as they work on the activities. During class presentations, all learners should make contributions.

Suggested teaching/learning methods

- Guided discovery
- Question and answer
- Researching
- Class discussions and presentations
- Cross-reference with other sources of geographical information

Improvisation

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

Suggested teaching/learning activities

- Locating areas on maps
- Drawing of maps
- Identifying samples
- Class presentations, and discussions
- Note taking

Extension/Remedial Activities

Attempting **Activities 12.7, 12.8 and 12.9**. Learners' responses should be checked and corrected where necessary.

12.4 CAUSES AND CONSEQUENCES (EFFECTS) OF OVER-EXPLOITATION OF ENVIRONMENTAL RESOURCES

Learning outcomes

By the end of this sub-topic, the learner should be able to:

- a) Show concern for over-exploitation of environmental resources and its effects
- b) Explain the causes and consequences of over-exploitation of environmental resources

Additional information for the teacher

This is yet another part of the unit that can be taught effectively using the

local environment. This is because the causes and consequences may vary from one area to another. The ones outlined in the Learner's Book are very general and may not apply to all the districts or local areas.

It is advisable to find out and include the consequences that affect the local area and add them for learners to note. 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.

Preparation for teaching

If you are able to get a resource person for this section, organise this arrangement early enough and prepare the questions you need answered. Organise the class into groups to work on **Activity 12.10**. Make appropriate notes to guide the learners during class discussions after the activity.

Safety

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.

Suggested teaching/learning resources

- Local environment
- Resource person
- Atlas maps
- Photographs
- Learner's Book

Interactive learning

Learners of different abilities should be included in each group as they work on **Activity 12.2**.

All learners should take part during class presentations and any other activities.

Suggested teaching/learning methods

- Photograph analysis of areas where consequences of overexploitation can clearly be seen, for example, derelicted land after mining
- Guided discovery
- Question and answer
- Map analysis (Using maps showing areas such as Gishwati Forest before and after exploitation, and after reforestation efforts)
- Local environment
- Class discussions and presentations
- Note taking

Improvisation

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

Suggested teaching/learning activities

Teacher exposition, question and answer, researching to identifying challenges of conservation, class presentations, and discussions, note taking.

Extension/Remedial Activities

Further reading from available relevant documents and researching from Internet and other available relevant materials.

Ask all learners to prepare a table similar to the one show below and fill it with appropriate information from the knowledge gained during the study of this section.

Resource	Cause of exploitation	Consequences of over-exploitation

Ensure you check learners work before the next lesson. Guide those who will not have grasped the concepts clearly.

12.3 ENVIRONMENTAL CONSERVATION MEASURES (WAYS OF UPGRADING THE ENVIRONMENT)

Learning outcomes

By the end of this sub-topic, the learner should be able to:

- a) State the measures of environmental conservation
- b) Analyse measures taken for environmental conservation
- c) Show respect for environmental conservation

Information for the teacher

Introduce this section with **Activity 12.13**. Group learners into four, with each group identifying one of them to

present their findings before the class. Make sure that all the five aspects of the Activity are conclusively handled, which are:

- (i) Importance of conserving forests and water resources
- (ii) The need for preparing tree nurseries and tree planting
- (iii) Importance of preventing forest fires
- (iv) Dangers of illegal tree cutting
- (v) Importance of agroforestry

Read widely about environment conservation measures for resources such as:

a) *Land and minerals*

You can identify appropriate areas within the local environment where learners can visit to learn practically about soil conservation and minerals if available. Make appropriate notes to guide the learners during class discussions after the field activity.

b) *Water and aquatic resources*

Ensure you identify appropriate water resources within the local environment where learners can visit to learn practically about water conservation and aquatic life. Make appropriate notes to guide the learners during class discussions after the field activity. Come up with any other relevant practical activities that you can engage learners in.

c) *Wildlife*

Have the map of Rwanda showing wildlife conservation areas. Let learners mention the benefits of wildlife conservation, by explaining the benefits people get from engaging in wildlife conservation. Let them have the benefits the government gets and those that people derive from it.

Improvisation

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

Suggested teaching/learning activities

- Study of areas within the local environment
- Identifying methods of conservation
- Class presentations and discussions
- Note taking.

Extension/Remedial Activities

Divide learners into study groups after learning this section. Assign each group **Activities 12.14, 12.15 and 12.16.**

Summarise the unit by asking learners to tackle **the End of unit assessment.**

Answers to End of unit assessment

1. **a) *Environmental resources:***

This is what exists in the environment that can be exploited for use by human beings. Examples: Soil, minerals, wildlife, air, water, physical features

b) *Environmental degradation:*

This is the reduction in the usefulness of the environment due to misuse or careless use of the environment leading to deterioration of the quality of the environment

2. - Contour ploughing
- Terracing
- Planting cover crops
- Crop rotation
- Use of organic fertilisers
3. i) Population increase
ii) Demand for wood fuel
iii) Need for building materials
iv) Need for raw materials for furniture
4. a) Avoiding discharge of industrial and domestic wastes into water resources
b) Protecting and increasing the vegetation around water sources
c) Avoiding wastage of water
d) Water harvesting during the rainy season for later use
e) Controlling soil erosion
f) Building dams to hold storm waters

**TOPIC AREA: HUMAN AND ECONOMIC
GEOGRAPHY**

**SUB-TOPIC AREA: POPULATION,
SETTLEMENT AND
URBANISATION**

UNIT 13: POPULATION IN RWANDA

**UNIT 14: RURAL AND URBAN SETTLEMENT IN
RWANDA**

Key unit competence

At the end of the seven lessons, the learner should be able to discuss the demographic problems and possible solutions in Rwanda.

Introduction

In this unit, the following key areas of population in Rwanda will be covered:

- (i) Factors influencing population distribution and density in Rwanda
- (ii) Population structure in Rwanda (composition, age, and sex)
- (iii) Population movements/migration in Rwanda (causes and effects)
- (iv) Population growth and associated problems in Rwanda
- (v) Measures for population control in Rwanda (discouraging early sex, encouraging small families, abstinence, encourage monogamy, delayed marriage, discourage prostitution)
- (vi) Impact of early sex, health risks, HIV and Aids, STDs in Rwanda and possible prevention measures
- (vii) Demographic problems in Rwanda and their solutions

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge	Skills	Attitudes and values
<ul style="list-style-type: none"> • Outline the factors influencing population distribution and density in Rwanda. • Identify the reasons for the type of population structure of Rwanda. • Identify the causes and effects of migration/ population movements in Rwanda. • State the reasons for rapid population growth and its effects in Rwanda. 	<ul style="list-style-type: none"> • Analyse the factors influencing population distribution in Rwanda. • Describe the population structure of Rwanda. • Explain factors for population movements in Rwanda. • Evaluate the possible solutions to the problems related to population growth in Rwanda. 	<ul style="list-style-type: none"> • Show concern for the effects of population growth and the reasons for population control in Rwanda. • Appreciate the importance of population control measures in Rwanda • Show respect for early sex education and delayed marriage in Rwanda

<ul style="list-style-type: none"> • State the different types of family planning methods. • Outline the causes, effects and possible control measures for early Sex, health risks, HIV and Aids and STDs. 	<ul style="list-style-type: none"> • Apply knowledge on control of rapid population growth in Rwanda. • Analyse the impact of early sex, health risks, HIV and Aids, STDs and propose different ways of their prevention in Rwanda. • Analyse demographic problems in Rwanda and suggest solutions. 	<ul style="list-style-type: none"> • Show concern for the consequences of migration and desire to control population movements in Rwanda.
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Information for the teacher

The study of population involves learning about the total number of people living in a given area. In this unit it is about the population of Rwanda. Different characteristics of the population which include composition, growth, migration and distribution among others are studied. This gives a picture of the human environment that a government is tasked to care about. The study enables us to understand and appreciate the challenges that a country is likely to experience while catering for its population. A government is expected to have proper plans to be able to provide adequate healthcare, education, employment opportunities and food security for its people. In the developing nations like Rwanda, countries face numerous challenges related to population because in many cases, the population growth rate outweighs the available resources. We must remember that it is possible to keep population growth controlled if people change their attitude and embrace family planning positively. Governments may have good plans in place but shortage of financial

resources may lead to inability to meet the expectations if the population growth rate is too high. The terms overpopulation, under population and moderate population are used to describe population in different areas. Population studies is all about the society. Learners have to be made to appreciate social issues such as avoidance and protection against diseases that are transmitted from one person to the next. It is not possible for the government to reach every individual to provide protection. People must exercise individual responsibility to keep healthy.

When teaching aspects of population such as migrations in Rwanda it will be important to emphasize the movements that have been experienced periodically due to civil strife in the country. These are movements that have retarded the economic growth of the country. It takes more financial and material resources to recover after civil strife and this should be avoided at all cost. Also important to lay emphasis on is the need to live in peace with neighbours to avoid conflicts. Other

forms of migrations such as tourism may be for economic reasons and could be encouraged in order for the government and individuals to generate revenue.

In this unit, learners should be able to show concern for the effects of population growth and the reasons for population control in Rwanda. They should also appreciate the importance of population control measures that are being promoted in Rwanda.

Generic competences

- a) Co-operation
- b) Research skills
- c) Critical thinking
- d) Lifelong learning

Cross-cutting issues

As discussed earlier, population studies is about the society and its dynamics. In this unit, *genocide studies* as human related disaster that has been experienced in Rwanda will be discussed. In addition, *peace gender and value of education* will be applicable in that to avoid civil strife we must learn live peacefully with one another. *Financial education* is applicable in this unit because individuals have to engage in income generating activities for survival while the government has to raise revenue to be able to provide for the population.

Comprehensive sexual education cannot be left out in this unit because it is all to do with human behaviour. In addition, a mention on *environment and climate change* which are directly influenced by human activities cannot be ignored in this unit.

13.1 FACTORS INFLUENCING POPULATION DISTRIBUTION AND DENSITY IN RWANDA

Learning outcome

By the end of this section the learner should be able to analyse the factors influencing population distribution in Rwanda.

Additional information for the teacher

Population distribution refers to the way people are spread out over a given area. There is no country where the spread of population is uniform. In Rwanda, some areas are very densely populated while in other areas people are widely scattered. Towns have clusters of population which reduces in density as one moves away from the town.

Let the learners study the map in the Learner's Book **Activity 13.2** and identify and name the areas that have large population as well as those with low population. After identifying the areas, let them use their knowledge of the country to give reasons for sparse and dense population in different areas. The reasons that they identify can then be stated as factors. You will then elaborate on these factors while also adding whatever others that the learners may have failed to name. It is also important that they draw the distribution map in their note books. Ensure that the maps are labeled.

Preparation for teaching

Make comprehensive notes on population distribution and have a map ready for use as you discuss the

factors and the specific areas where each factor applies. You need prepare to have the class stand outside to view the countryside and identify the area of their school in relation to population distribution zones. Familiarise yourself with **Activity 13.1** so that you will be able to guide the learners as they answer the questions.

Teaching/learning resources

Population map of Rwanda, atlas, recommended text books, appropriate learning resources for learners with special needs.

Interactive and multi-ability learning

Let all the learners be involved in the discussion and question answering. Allow time for the slow learners to participate to avoid the fast learners to dominate.

Teaching/learning methods

Guided discovery, discussion, map analysis, question and answer method.

Teaching learning activities

Map reading and drawing, text book referencing, note taking answering and asking questions.

Extension/Remedial Activities

Ask the learners to work on **Activity 13.3**.

13.2 POPULATION STRUCTURE IN RWANDA (COMPOSITION, AGE AND SEX)

Learning outcome

By the end of this section, the learner should be able to describe the population structure of Rwanda.

Additional information for the teacher

Ask learners to work on **Activity 13.4**. Population structure refers to the characteristics of population in terms of different ages of the people who make up the population and their gender. The structure is usually identified after a census has been taken where each individual's characteristics are recorded. This information is represented using graphs called population pyramid or age/sex graphs. Each population cohort is represented using a bar that shows the total number of people within the group or a percentage of the total population that falls within that age group. The bars are drawn horizontally with bars representing females drawn to the right while those for males are to the left. The central part of the graph is a vertical column that has age groups beginning from zero years.

Begin the topic by reviewing to find out how much the learners know about population structure. You could draw a sketch pyramid to represent the population of your school if it is mixed. If not mixed use an example of a school that learners are familiar with. This will enable the learners to grasp the concept of the pyramid before you come specific pyramid for Rwanda. You will need to go over each bar and what it specifically stands for in terms of age, gender and numbers. You must remember to stress on the effect of high birth rate and high death rate on the shape of the pyramid.

Preparation for the teacher

Ensure you have sketches of pyramids to use as you discuss the concept of population structure. Prepare questions that will guide the flow of the lesson. Prepare your answers for the activities in the section in readiness for discussion.

Teaching/learning resources

Population graphs of Rwanda, population statistics, recommended text books, appropriate learning resources for learners with special needs.

Interactive and multi-ability learning

Let all the learners be involved in the discussion and question answering. Allow time for the slow learners to participate.

Teaching/learning methods

Guided discovery, discussion, analysis of statistics and graphs, question and answer method.

Teaching learning activities

Pyramid drawing, text book referencing, discussion, note taking answering and asking questions.

Extension/Remedial Activities

Ask the learners to ensure they complete the activities in the section. Give them statistics to use for drawing of population pyramid for practice.

13.3 POPULATION MOVEMENTS/ MIGRATION IN RWANDA (CAUSES AND EFFECTS)

Learning outcome

By the end of this section, the learner should be able to explain factors for Population movements in Rwanda.

Additional information for the teacher

Population migration is the movement of people from one place to another either permanently or temporarily. The movement can be within the country or outside the country. It can also involve local citizens or people from other countries. It can be voluntary or forced movement. Migration can involve individuals, families or entire community.

Population migration can be as a result of political social or economic factors. Make a review of what the class has so far learnt on population then move on to the migration aspect. You may introduce by talking about the movement of learners to and from

school, movement of workers every day to and from work and then migrations caused by political conflicts. Ensure you classify the different types such as international and local migrations, then temporary and permanent ones. Let learners work on **Activity 13.5**.

Preparation for teaching

Ensure you have studied the history of the migration and settlement of the early settlers in Rwanda with their origin, routes and where they settled in Rwanda. You may collect information from the internet and any other relevant sources to subsidise information given in the recommended text books.

Collect relevant data on population migrations in Rwanda and prepare question to guide the flow of the lesson. Ensure you have comprehensive notes on reasons why people migrate from one place to another and why they settle or prefer certain areas as their destinations.

Teaching/learning resources

Maps on Population migration, population migration statistics, recommended text books, appropriate learning resources for learners with special needs.

Interactive and multi-ability learning

Involved all the learners in the discussions and question answering sessions. Allow time for the slow learners to participate and ensure learners with special needs are also actively involved. In groups, ask learners to work on **Activity 13.6**.

Teaching/learning methods

Guided discovery, discussion, analysis of maps and migration statistics, group discussions, question and answer methods.

Teaching/learning activities

Migration route map drawing, text book referencing, discussion, note taking answering and asking questions.

Extension/Remedial Activities

Ask the learners to work on **Activity 13.7**. They should research further for more information on the section.

13.4 POPULATION GROWTH AND ASSOCIATED PROBLEMS IN RWANDA

Learning outcome

By the end of this section the learner, should be able to state the reasons for rapid population growth and its effects in Rwanda

Additional information for the teacher

Rwanda is one of the countries in Africa with a rapid population growth. Most of the families are large with many children. A rapidly growing population creates challenges not only to individual families but also to the government which is expected to provide social amenities for the people. The government has to provide health and education facilities and ensure food security for the citizens. This becomes a challenge if the rate of population growth outweighs the growth of the economy.

Introduce the topic by asking the learners to discuss family sizes in the villages where they come from. They can also discuss the challenges that individual families that have many children face. Make a review of what the class has so far learnt on population then link to the growth and associated problems. The problems can be grouped into categories such as social and economic related types. Let learners work on **Activity 13.8**.

Preparation for teaching

Ensure you have relevant statistics on population growth for Rwanda and various other countries for purpose of comparison. Make notes that will guide to have logical flow of the topic. You may collect information from the internet and any other relevant sources to subsidise information given in the recommended text books. Prepare guiding questions to ensure learners are involved in the teaching/learning process. You must also ensure you have answers to the graph activity to guide you as you discuss.

Teaching/learning resources

Statistical data on population growth, recommended text books, appropriate learning resources for learners with special needs.

Interactive and multi-ability learning

Involved all the learners in the discussions and question answering sessions. Allow time for the slow learners to participate and ensure learners with special needs are also

actively involved. In groups, ask learners to work on **Activity 13.9**.

Teaching/learning methods

Guided discovery, discussion, analysis of graphs, group discussions, question and answer methods.

Teaching /learning activities

Drawing and analysing graphs, text book referencing, discussion, note taking answering and asking questions.

Extension/Remedial Activities

Ask the learners to research further on the consequences of rapid population growth. Ensure they draw the graph on the activity and give a description of the trend.

13.5 POSSIBLE SOLUTIONS TO POPULATION GROWTH IN RWANDA

Learning outcome

By the end of this section, the learner should be able to evaluate the possible solutions to the problems related to population growth in Rwanda.

Additional information for the teacher

Ask learners to work on **Activity 13.10**. There are different measures that are taken in different countries to control rapid population growth. Countries such as china and India used painful measures such as passing laws to govern the number of children that a family should have. Since Rwanda is such a small country, if the population is allowed to continue growing so rapidly there will be more serious consequences

than has been experienced. It is for that reason that Rwanda has used some of the measures such as introducing aspects of sex education in the curriculum to enable learners to gain knowledge on the possible consequences of irresponsible sexual behaviour.

Introduce the topic by asking the learners to discuss family sizes in the villages where they come from. They can also discuss the challenges that individual families that have many children face. Let them suggest what can be done to control the rapid population growth in Rwanda.

Preparation for teaching

Prepare comprehensive notes capturing the various measures that different countries have used to control high population growth rates.

In your notes you have to make a list of the effects of such things as delayed marriages, abstinence, monogamy and discouraging prostitution. Invite a health worker to give a talk and ask learners to work on **Activity 13.11**. Let them make presentations in class.

Prepare guiding questions that you will use to facilitate class participation during the lesson. Ensure you have answers to the activities in the section.

Teaching/learning resources

Recommended text books, relevant resource materials such as internet and government documents, appropriate learning resources for learners with special needs.

Interactive and multi-ability learning

Ensure all the learners participate in class discussions and question answering sessions. Ensure slow learners not intimidated and freely participate in the discussions.

Teaching/learning methods

Guided discovery, discussion, group discussions, question and answer methods.

Teaching learning activities

Text book referencing, discussion, note taking and asking and answering questions.

Extension/Remedial Activities

Further reading on the topic. Ask the learners to complete the activities and making notes.

13.6 & 13.7 IMPACT OF EARLY SEX, HEALTH RISKS, HIV/AIDS, STDs IN RWANDA AND POSSIBLE PREVENTION MEASURES

Learning outcome

By the end of this section the learner should be able to analyse the impact of early sex, health risks, HIV and Aids, STDs and propose different ways of their prevention in Rwanda.

Additional information for the teacher

Ask learners to present their findings on **Activity 13.11**. The impact of early sexual activities include risking ones health and life as well as getting unplanned pregnancies which

contribute to rapid population growth. HIV and AIDs and other sexually transmitted diseases can only be avoided if the right behaviour is observed by individuals. The government has also a role to play in educating the citizens and where possible by passing and enforcing laws that could hinder the negative social behaviour among the citizens. In Rwanda the rate of HIV infection is worrying and the young people have to avoid this disease by keeping off the irresponsible behaviour that puts them at risk.

Briefly discuss this issue with the class to establish their level of understanding based on what they may have witnessed in the local communities. Pose the question of the challenges that the infected people are facing. They should also give suggestions of what they think the young generation should do to keep off the infections of such diseases. What challenges is the government facing in the fight against these diseases? This is a wide area for class discussion.

Preparation for teaching

Prepare comprehensive notes and guiding questions capturing the various measures that the Rwanda government and countries have used to control the spread of sexually transmitted diseases and unplanned pregnancies.

Prepare discussion points for the activity in the section.

Teaching/learning resources

Recommended text books, relevant resource materials such as internet and

government documents, appropriate learning resources for learners with special needs.

Interactive and multi-ability learning

Ensure all the learners participate in class discussions and question answering sessions. Ensure slow learners not intimidated and freely participate in the discussions. Let learners work on **Activity 13.12**.

Teaching/learning methods

Guided discovery, discussion, group discussions, question and answer methods.

Teaching/learning activities

Text book referencing, discussion, note taking and answering and asking questions.

Extension/Remedial Activities

Ask the learners to research further on the measures that are being taken to prevent the spread of STDs in the country. They also should complete the activities and make notes.

13.8 DEMOGRAPHIC PROBLEMS IN RWANDA AND THEIR SOLUTIONS

Learning outcome

By the end of this section, the learner should be able to analyse demographic problems in Rwanda and suggest their solutions.

Additional information for the teacher

There are many types of demographic problems in Rwanda. Some of these problems cannot be solved within a short term. They require time for planning and putting structures in place. Problems such as high fertility rates and high birth rates lead to large families, high dependency rates and high poverty levels.

The government has given set aside resources in an effort to address different types of demographic problems in Rwanda. It will take time to change the attitude of a large section of the society to accept radical changes that will yield fruits in solving some of the problems. For instance, high birth rates and spread of diseases require attitude change.

Briefly discuss the problems with the class and for each, let the learners give suggestions of what part the government should play and what the role of individuals should be. The problems can be classified as per those that can be solved immediately, medium term and long term solutions.

Preparation for the teacher

Ensure you carry out a comprehensive research on the demographic problems affecting Rwanda. Find out what is being done in other countries since

these are not unique to Rwanda. Prepare comprehensive notes and guiding questions capturing each of the demographic problems and possible solutions.

Teaching/learning resources

Recommended text books, relevant resource materials such as internet and relevant government documents, appropriate learning resources for learners with special needs.

Interactive and multi-ability learning

Ensure all the learners participate in class discussions and question answering sessions. Ensure slow learners freely participate in the discussions.

Teaching/learning methods

Guided discovery, discussion, group discussions, question and answer methods.

Teaching learning activities

Text book referencing, discussion, note taking answering and asking questions.

Further activities

Ask the learners to research further on the demographic problems and how different countries solve them. Are these solutions applicable in Rwanda? They should answer the questions in the activity in the section.

Key unit competence

At the end of the five lessons, the learner should be able to explain the impact of rural and urban settlement on the sustainable development of Rwanda

Introduction

The sections covered under this unit include:

Rural settlement

- a) Rural settlement (grouped, nucleated, linear, isolated and planned settlements
- b) Characteristics of rural settlements
- c) Problems affecting rural settlements and their solutions
- d) Advantages and disadvantages of rural settlement schemes (Imidugudu)

Urban settlement

- e) Major urban centres in Rwanda
- f) Major characteristics of urban settlements
- g) Functions of urban centres in Rwanda
- h) Factors influencing the growth of urban centres in Rwanda
- i) Problems faced by urban centres and their possible solutions
- j) The environmental protection measures in urban centres in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge and Understanding	Skills	Attitudes and Values
<ul style="list-style-type: none"> • Identify the different settlement patterns in Rwanda and outline their characteristics • State the problems affecting rural settlements • State the advantages and disadvantages of planned settlements (Imidugudu) 	<ul style="list-style-type: none"> • Categorise various settlement patterns • Investigate the problems affecting rural settlements and their solutions • Explain advantages and disadvantages of rural settlements 	<ul style="list-style-type: none"> • Appreciate the importance of settlement patterns in Rwanda. • Show concern for the advantages of planned settlements in Rwanda • Show concern for the effects of urbanisation on the sustainable development of Rwanda

<ul style="list-style-type: none"> • Identify the major urban centres of Rwanda and outline their functions • State the factors which favour the growth and development of urban centres • List the problems of urban centres in Rwanda and suggest possible solutions • Outline the environmental protection measures applied in urban centres 	<ul style="list-style-type: none"> • Evaluate the impact of urbanisation on sustainable development of Rwanda and suggest possible solutions • Analyse the factors which have favoured the growth and development of urban centres in Rwanda • Evaluate the problems faced by urban dwellers and possible remedies • Explain the environmental protection measures applied in urban centres 	<ul style="list-style-type: none"> • Appreciate the functions of urban centres • Show concern for the problems or challenges experienced in urban centres of Rwanda and show desire for proper urban planning • Appreciate the importance of environmental protection in urban areas
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Information for the teacher

Human settlement means the built up environment. It refers to villages, towns and other places where human activities take place. It is human habitation. There are two types of settlements, rural and urban types. Rural settlements are built up area in the rural settings which are predominantly based on agricultural activities. The settlements may be a few clustered homes or scattered homesteads. Other rural settlements include fishing villages which are usually found along rivers or shores of lakes. Such villages may have some farming alongside the fishing activities. For instance, there are fishing villages along the shores of Lake Kivu. Rural settlements are the oldest forms of settlements. In prehistoric time people lived in caves but as evolution of economic activities continued to change, people started building temporary shelters next to where they were tilling the land. With time they began to build permanent shelters as the tilling of land became more permanent.

Urban settlement implies towns. These are settlements that are predominantly commercial centres where trade, industry and office activities are dominant. These settlements consist a large built up area with few empty spaces. Apart from the many buildings that are close to each other, there are many people and a large number of vehicles. Towns grow up for different reasons. Among some of the reasons, some grow as religious centres, others as administrative centres, and others grow as a result of manufacturing activities. Some urban centres have very large population. For instance, population estimates of selected towns is as follows: London: 8.63 million, Lagos: 15.12 million, Nairobi: 4 million and Kigali: 1.13 million people.

Generic competences

- (i) Research skills
- (ii) Problem solving
- (iii) Critical thinking
- (iv) Creativity

- (v) Co-operation
- (vi) Lifelong learning

Cross cutting issues

The study of settlement is equal to studying one form of the ways that people interact with the environment. This interaction more often leads to degradation. Thus *conservation of the environment* becomes a necessity. In addition, the study of settlement is all 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 settlement. Some urban settlements in Rwanda changed their names after the 1994 genocide against the Tutsi and many villages were destroyed or abandoned. Thus *Genocide studies* is an integral part of this unit.

The recent trend where urban centres have been expanding poses a challenge to the institutions concerned with reproductive health, as well as family planning, HIV and AIDS awareness as well as other STI's. This unit provides a teacher with an opportunity to deal with this cross-cutting issue.

As you teach this unit, you are not limited to the above cross cutting issues alone. It is therefore important to keep in mind other cross cutting issues that you may bring out in your diverse teaching methods and techniques as opportunity may arise. These include:

- a) Peace and values education
- b) Financial education
- c) Standardisation culture
- d) Inclusive education

Links to other subjects

This topic links with statistics in Mathematics and Population in Economics.

14.1 RURAL SETTLEMENT

14.1.1 & 14.1.2 TYPES AND CHARACTERISTICS OF RURAL SETTLEMENT

Learning outcomes

By the end of this section, the learners should be able to:

- (i) Identify the different settlement patterns in Rwanda and outline the characteristics of rural settlements
- (ii) Categorise various settlement patterns
- (iii) Appreciate the importance of settlement patterns in Rwanda

Additional information for the teacher

Many of the learners are familiar with rural settlements in Rwanda. Some come from such environments while others must have travelled to the rural areas and seen these settlements. Build on this knowledge as you introduce the topic to the class. At this stage, introduce to them the following types of settlements:

- Grouped settlements
- Nucleated settlements
- Linear settlements
- Isolated settlements
- Planned settlements

It is important that at this stage you give the learners the task to differentiate

between rural and urban settlement. They can use a dictionary or other sources of information.

Referring to the map of Rwanda, let them discuss the possible reasons why certain villages and towns are located at the given sites. Let them describe the distribution of the rural settlements and the patterns they form.

As the learners work on the activities in groups and make class presentation on the same. Ensure as many of them as possible have given their presentations and all class members have participated in the discussions on each presentation.

Preparation for teaching

Activity 14.2 should start your discussion on types of rural settlements. Ensure that you have appropriate answers to set off the lesson and notes on the section. Organise the class into groups to work on this activity and make presentations. Acquaint yourself with the local rural settlement within the vicinity of the school to use as examples as you teach this unit.

Teaching/learning resources

- Learner's Book
- Sketch diagrams of settlements
- Local environment
- Photographs

Interactive and multi-ability learning

As you take learners through this section, ensure you conclusively handle **Activities 14.3, 14.4 and 14.5**. Give the activities to the learners as assignment after taking them through this section.

When giving their responses, involve the class in discussions ensuring that all members participate. You could appoint one learner to lead the discussion for each activity and ensure that slow learners and those with other challenges may be appointed to lead.

Teaching/learning methods

- Group discussions
- Photograph analysis and question and answer
- Viewing local environment

Teaching/learning activities

- Viewing the local environment
- Studying photographs
- Asking/answering questions
- Class presentations
- Discussions and taking notes

Extension/Remedial Activities

Learners should be asked to read through the sections of the topic so far covered.

Ask them to work on **Activity 14.6** during their remedial learning and present their findings in the next lesson.

14.1.3 & 14.1.4 PROBLEMS AFFECTING RURAL SETTLEMENTS AND THEIR SOLUTIONS

Learning outcomes

By the end of this lesson, the learners should be able to:

- (i) State the problems affecting rural settlements
- (ii) Investigate the problems affecting rural settlements and their solutions

Additional information for the teacher

Rural settlements in Rwanda face many challenges. Many of the learners are familiar with these challenges. Some come from such settlements and have experienced these challenges. Others must have interacted with people from rural areas or have read from newspapers about the problems faced in rural areas.

Give the learners the task to discuss the problems faced in rural settlements and how people overcome them. What is the government doing to help people in the rural areas?

As the learners work on the activities in groups and make class presentation on the same. Ensure they given their presentations and all class members have participated in the discussions on the presentation.

Preparation for teaching

Using **Activity 14.7**, develop comprehensive notes on problems, solutions and government policy on rural settlement in Rwanda. Organise materials for learners to use as they research on the government policy towards rural settlement. Make sure you have the possible answers to the activities in the section. Acquaint yourself with the problems faced in the local rural settlements within the vicinity of the school to use as examples as you teach the section.

Teaching/learning resources

- Learner's Book
- Reference materials
- Sketch diagrams of settlements

- Local environment
- Photographs

Interactive and multi-ability learning

Ensure that learners have worked on the activities. At this point, involve the class in discussions ensuring that all members participate. Encourage the slow learners to participate in the discussion.

Teaching/learning methods

- Guided discovery
- Discussion
- Photograph analysis
- Question and answer
- Viewing local environment

Teaching/learning activities

- (i) Viewing the local environment
- (ii) Studying photographs
- (iii) Asking/answering questions
- (iv) Class presentations and discussions
- (v) Taking notes

Extension/Remedial Activities

Learners should be asked to read as they research on government policy on rural settlement (particularly on rural settlement schemes or Imidugudus).

14.2 URBAN SETTLEMENT

14.2.1 & 14.2.2 MAJOR URBAN CENTRES IN RWANDA AND THEIR CHARACTERISTICS

Learning outcomes

By the end of this lesson, the learners should be able to:

- Identify the major urban centres of Rwanda and outline their functions
- Evaluate the impact of urbanisation on sustainable development of Rwanda and suggest possible solutions
- Show concern for the effects of urbanisation on the sustainable development of Rwanda

Additional information for the teacher

Urbanisation means the growth and spread of towns. How fast are urban centres in Rwanda growing? There are many towns in Rwanda and each has its unique characteristics although there are other characteristics which they have in common. For example, urban centres have the characteristic of being congested, they have entertainment facilities among other common characteristics.

Many of the learners are familiar with urban settlements in Rwanda. They may not have visited all of them but they are familiar with some of the characteristics.

Give the learners the task to discuss the characteristics of urban settlements

with specific examples. As the learners work on the activities in groups and make class presentation on the same. Ensure they give their presentations and all class members have participated in the discussions on the presentation.

Preparation for teaching

Ensure that you have specific examples of towns that you will use as case studies. Those that the learners are familiar with would be the best to use as they understand them better. Prepare notes and questions to use during the lesson. Avail newspaper articles, maps and photographs of the towns to be studied. 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. Use the map in **Activity 14.8** to identify the major urban areas in Rwanda.

With the help of **Activity 14.9**, have a class discussion on the characteristics of urban settlements.

Teaching/learning resources

- Learner's Book
- Newspaper articles
- Photographs
- Maps
- Local environment

Interactive and multi-ability learning

Involve the class in discussions ensuring that all members participate. Encourage the slow learners to participate in the discussion.

Teaching/learning methods

- a) Learner expository
- b) Discussion
- c) Newspaper article analysis
- d) Viewing local environment

Teaching/learning activities

- Viewing the local environment
- Studying photographs
- Asking/answering questions
- Taking notes

Extension/Remedial Activities

Learners should be asked to read further and work on the activities that they may not have completed in the section.

Ask learners to summarise the information to be studied in the next section about *Functions of urban centres in Rwanda*. Let them know that you will choose any of them at random to present to the class their findings. This will encourage learners to remain focused on this topic of study.

14.2.3 & 14.2.4 FUNCTIONS OF URBAN CENTRES AND FACTORS INFLUENCING THE GROWTH OF URBAN CENTRES IN RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

- a) State the functions of urban centres in Rwanda

- b) State the factors which favour the growth and development of urban centres
- c) Analyse the factors which have favoured the growth and development of urban centres in Rwanda

Additional information for the teacher

Different urban centres have grown due to different reasons. There are some common factors for different urban centres but there some unique factors that apply to specific centres. Some urban centres 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. Then some towns expand due to unique reasons.

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.

Preparation for teaching

Review the previous lesson before starting introducing this section.

Having given the learners an assignment in relation to this section, choose at least three learners at random to do their presentations. As they will be presenting, guide their explanations,

emphasising on what you intend the learners to understand. Correct any wrong information, as you encourage other learners to add even more points to what they already have if what is being discussed is new. Ensure wrong responses are effectively corrected.

Ensure that you have specific examples of towns that you will use as case studies. Prepare notes questions to use before this lesson. Ensure you have 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.

Teaching/learning resources

- Learner's Book
- Photographs
- Maps
- Local environment

Interactive and multi-ability learning

Involve the class in discussions ensuring that all members participate. Encourage the slow learners to participate in the discussion.

Teaching/learning methods

- a) Class presentations
- b) Guided discovery
- c) Discussion
- d) Photograph review
- e) Question and answer
- f) Viewing local environment

Teaching/learning activities

- Viewing the local environment
- Studying photographs
- Asking/answering questions

- Class presentations
- Discussions
- Taking notes

Extension/Remedial Activities

Learners should be asked to read further and work on the activities in the section.

14.2.5 PROBLEMS FACING URBAN CENTRES IN RWANDA AND THEIR POSSIBLE SOLUTIONS

Learning outcomes

By the end of this lesson, the learners should be able to:

- a) List the problems of urban centres in Rwanda and suggest possible solutions
- b) Evaluate the problems faced by urban dwellers and possible remedies
- c) Show concern for the problems or challenges experienced in urban centres of Rwanda and show desire for proper urban planning

Additional information for the teacher

Although towns attract so many people, they have a myriad of problems which 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 crime. 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.

As you discuss the problems experienced in towns, you will need to research on the details as applies to the various towns. Ask the learners to research on problems in specific towns. Ask them to work on the activities and make class presentation on the same. Ensure all class members have participated in the discussions on the presentations.

Preparation for teaching

Ensure that you avail reference materials for research by the learners. Ensure you have comprehensive notes on each of the problems that applies to

Prepare questions to use during the lesson. You need also to work on the answers to **Activity 14.9** in the section. This Activity should be the basis of the group discussion by learners, where you should ensure that they are grouped appropriately. Let each group choose one of them to present the findings of **Activity 14.9**.

Teaching/learning resources

- Learner's Book
- Relevant reference materials

Interactive and multi-ability learning

Involve the class in discussions ensuring that all members participate. Encourage the slow learners to participate in the discussion.

All learners should copy the table in

the Learner's Book, which summarises the problems facing urban centres in Rwanda and their solutions.

Teaching/learning methods

- (i) Guided discovery
- (ii) Discussion
- (iii) Question and answer
- (iv) Reviewing reference materials

Teaching/learning activities

- a) Asking/answering questions
- b) Class presentations
- c) Discussions
- d) Taking notes

Extension/Remedial Activities

Learners should be asked to research further on each of the towns in question. They should also answer the questions in the revision exercise.

14.2.6 ENVIRONMENTAL PROTECTION MEASURES IN URBAN CENTRES IN RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

- (i) Outline the environmental protection measures applied in urban centres
- (ii) Explain the environmental protection measures applied in urban centres
- (iii) Appreciate the importance of environmental protection in urban areas

Additional information for the teacher

Due to the many problems facing the urban centres highlighted in the previous section, it is necessary to seek for solutions to each of them. Environmental sustainability is one of the many reasons we need to care for our surrounding, to the benefit of the current generation and for the future. Refer learners to the previous section where problems in urban areas were categorised into four:

- Economic problems
- Social problems
- Environmental problems
- Land use problems

Let them single out the environmental problems and explain further, while giving examples in cases they can easily recall.

Preparation for teaching

Ensure that you are prepared for this lesson by collecting teaching and learning materials from a wide range as suggested in **Activity 14.10**. This will help you instruct the learners better, as you will have an expanded understanding to summarise the information required better.

Using the Learner's Book, discuss the specific environmental protection measures taken by at least two towns in Rwanda, including Kigali to ensure urban centres are comfortable to stay in. Ensure you have comprehensive notes on each of the protection measure as applies to different towns. Prepare questions to use during the

lesson. You also have worked on the answers to the activities in the section.

Teaching/learning resources

- Learners book
- Relevant reference materials
- The Internet

Interactive and multi-ability learning

Using **Activity 14.10**, involve the class in discussions ensuring that all members participate. Encourage the slow learners to participate in the discussion.

Teaching/learning methods

- Guided discovery
- Discussion method
- Question and answer
- Reviewing reference materials

Teaching/learning activities

- (i) Asking/answering questions
- (ii) Class presentations
- (iii) Group discussions
- (iv) Taking notes

Extension/Remedial Activities

Learners should be asked to research further on each of the towns in question. They should also answer the questions in the **End of unit assessment**

Emphasise key skills, values and attitudes to be attained at the end of each lesson. Also, sensitise the learners on the cross cutting issue of environmental conservation.

**TOPIC AREA: HUMAN AND ECONOMIC
GEOGRAPHY**

**SUB-TOPIC AREA: ECONOMIC ACTIVITIES
AND DEVELOPMENT STUDIES**

UNIT 15: AGRICULTURAL SYSTEMS IN RWANDA

UNIT 16: FORESTRY IN RWANDA

UNIT 17: FISHING AND FISH FARMING IN RWANDA

UNIT 18: MINING AND QUARRYING IN RWANDA

UNIT 19: POWER AND ENERGY IN RWANDA

UNIT 20: INDUSTRY IN RWANDA

**UNIT 21: TRANSPORT, COMMUNICATION AND
TRADE IN RWANDA**

UNIT 22: TOURISM IN RWANDA

Key unit competence

At the end of the 28 lessons, the learner should be able to investigate the impact of various agricultural activities on sustainable development in Rwanda.

Introduction

In this unit the main sub-topics to be covered are:

- i) Definition of agriculture
- ii) Types of agriculture
- iii) Agricultural systems in Rwanda (subsistence, commercial, irrigation farming)
- iv) Major crops grown in Rwanda (food crops and cash crops)
- v) Livestock farming (traditional and modern)
- vi) Problems and solutions of agriculture in Rwanda
- vii) Agriculture modernisation: factors favouring its implementation, advantages and disadvantages
- viii) Impact of agriculture on sustainable development of Rwanda
- ix) The advantages and disadvantages of plantation farming in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire the following skills, values and attitudes.

Knowledge	Skills	Attitudes and values
<ul style="list-style-type: none"> • List the different agricultural systems in Rwanda. • State the major crops grown in Rwanda. • Identify the problems facing livestock farming in Rwanda. • State the problems affecting agriculture and solutions. 	<ul style="list-style-type: none"> • Classify different agricultural systems in Rwanda. • Draw a map of Rwanda showing the major crops grown in the country. • Explain the problems faced by livestock farming and suggest possible solutions. 	<ul style="list-style-type: none"> • Show respect for the solutions to the problems affecting livestock farming in Rwanda. • Show concern for the challenges affecting the development of agricultural sector of Rwanda and the need to modernise agriculture.

<ul style="list-style-type: none"> • Outline the reasons for agricultural modernisation in Rwanda. • State the advantages and disadvantages of plantation farming 	<ul style="list-style-type: none"> • Explain the factors hindering the agricultural modernisation and suggest possible solutions. • Carry out a research to find out the reasons for agricultural modernisation and modern methods of agriculture in Rwanda. • Analyse the advantages and disadvantages of plantation farming in Rwanda 	<ul style="list-style-type: none"> • Show concern for the impact of agriculture on development of Rwanda. • Appreciate the advantages and disadvantages of plantation farming in Rwanda
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Information for the teacher

Guide learners through **Activity 15.1** to help learners understand land uses. Agriculture is one way in which land is used.

Agriculture is one of the most ancient human activities. However, long time ago, people practised gathering of fruits and roots from plants that grew in the wild. They also hunted wild animals for meat. As time went by, population increased and people had to start growing crops because the wild food was becoming scarce. With time the type of crops grown and the methods of production slowly improved. With the discovery of steam engines, machinery used in farming were introduced. These allowed cultivation of large tracts of land. The types of agricultural machinery continue improving such that in the developed countries, very few farm activities are done manually.

Both livestock rearing and crop production are nowadays carried out in both small and large-scale farms. Where there is surplus, some of it is sold in local or international markets. In most African countries, small-scale farming

is widespread since most people do the work manually since they cannot afford agricultural machinery. In addition, there are areas where the population is so high that there is not enough land for large-scale farms to be set up.

Agriculture in Rwanda contributes about 35% of the country's gross domestic income. It is also the mainstay for the rural population. About 90% of the food consumed in the country is locally produced. It has contributed to agricultural-based industries which employ a large labour force. It is described as the backbone of the country's economy.

Links to other subjects

While teaching this unit, ensure you draw a link to production in Economics, statistics in Mathematic and crop and animal husbandry in Agriculture.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in

a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.

- b) Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.
- e) Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.

g) Cooperation: Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross cutting issues

In this unit, learners will appreciate the importance of *environmental conservation* as it will be evident especially as you teach about the effect of the deep gullies that have come about on the slopes of the hills as result of soil erosion whose main cause is poor method of cultivation and deforestation. Farmers practice terracing, contour farming and planting of cover crops on the steep hill slopes. In addition, you must ensure that learners appreciate *Genocide studies* as you discuss the effect of the 1994 Genocide against the Tutsi as it affected agriculture in that people abandoned their farm as they ran away to safe places.

You also will need to help learners relate *financial education* to all the processes involved in the agriculture since most people depend on it for food and for income. The farmers and government also earns revenue from sale of farm products. It also spends about 10% of its revenue on agriculture.

Anybody can train to become a farmer, both male and female. This unit therefore encompasses *inclusive education*.

Assessment criteria

By the end of this unit, the learner should be able to investigate the impact of various agricultural activities on sustainable development in Rwanda.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each lesson. Also, sensitise the learners on the cross cutting issue of environmental conservation.

15.1 & 15.2 TYPES OF AGRICULTURAL SYSTEMS AND MAJOR CROPS PRODUCED IN RWANDA

Learning outcomes

By the end of this lesson, the learner should be able to:

- a) Define agriculture
- b) Identify the types of agricultural systems in Rwanda

Additional information for the teacher

Agriculture as also termed as farming. It is the practice of growing crops and rearing livestock. This includes keeping of small animals.

In Rwanda, most people are small-scale farmers producing mainly food crops. The farms are small because the population is high and many parts of the country are hilly. However there are some plantations in a few areas as we shall study in this unit.

The environment around the school must be having areas where subsistence agriculture that the learners can use as examples. Ensure that the preparation you make will enable learners to acknowledge that there is need to study subsistence farming as this can be

assumed to be insignificant for study. Having defined agriculture at the beginning of this topic, Let learners do **Activity 15.2** at desk level. Ensure to check the findings written in their notebooks. This will help learners distinguish between cash crops and food crops.

Introduce learners to the agricultural systems in Rwanda namely subsistence, irrigation and commercial agriculture.

Activity 15.3 will introduce learners to irrigation farming. In **Activity 15.4**, let them draw a table showing the cash crops and food crops grown in Rwanda. Rwanda has favorable climatic conditions and the generally fertile soils that allow cultivation of a wide range of crops. Main food crops include maize, beans, rice, banana (cooking, beer and fruit), Irish potato, sweet potato, cassava, groundnuts, sorghum and beans. Vegetables such as onions, cabbages and eggplants are also widely grown. Rwanda's other main high-quality crop is **coffee**. Together, tea and **coffee** make up nearly four-fifths of the country's agricultural exports. **Barley** for beer and green beans are also grown as cash crops; two-thirds of Rwanda's farmers grow beans. In the marshier areas, **rice** is becoming important.

Preparation for teaching

Acquaint yourself with the environment around the school and make note of the agricultural activities that you expect the learners to be able to identify. Ensure that the preparation you make will enable learners to acknowledge that there is need to study agricultural systems in Rwanda.

Safety

It is important to ensure that if you have to take learners out of class you take the learners to a place where there is minimum or no risks at all. Steep slopes should be avoided. Learners should be guarded as much as possible during outdoor activities.

Always have in mind the learners who are challenged in one way or another as you plan for outdoor activities.

Teaching/learning resources

Learner's Books, local environment, Atlases.

Interactive learning and multi-ability learning

Use question and answer and discussion methods ensuring that all pupils participate. You must involve the slow learners and ensure that groups are made up of learners of different abilities.

Teaching/learning methods

Guided discovery, discussion, local environment studies and question and answer.

Teaching/learning activities

Studying the local environment, identify asking/answering questions and taking notes.

Extension/Remedial Activities

Learners to research on the characteristics of commercial agriculture in Rwanda and make notes.

15.3 LIVESTOCK FARMING

Learning outcomes

By the end of this lesson, the learners should be able to:

- Identify the modern and traditional methods of livestock farming
- State the types of livestock reared in Rwanda
- State the problems facing livestock farming in Rwanda

Additional information for the teacher

Livestock farming is the keeping of animals on large or small scale for sale or home use. There are two types of livestock farming namely: Traditional or subsistence livestock farming in which farmers keep the livestock primarily for family consumption such as eggs, milk, meat, honey among others. Commercial livestock farming is practiced mainly for monetary gains. Livestock farming is further divided into ranching and dairy farming.

Guide learners through **Activity 15.5**. This will introduce the learner to types of livestock farming with their characteristics.

Using **Activity 15.6**, group learners and let them discuss factors that hold back development of dairy farming in Rwanda. In **Activity 15.7**, learners will discuss ways of improving livestock farming in Rwanda.

Factors that hinder the development of dairy farming in Rwanda are:

- i) Frequent droughts, which reduce pasture and water for the cattle

- ii) Animals are at times attacked and killed by Nagana which is carried by tsetse flies.
- iii) The exotic breeds reared are expensive keep particularly during the dry season.
- iv) Ranching requires skilled labourers that are in short supply.

In **Activity 15.7** let learners identify the small animals kept in Rwanda. This should be done at desk level. Small animals that are commonly kept in homes include pigs, goats, sheep, rabbits, chicken, rats and bees. The government has introduced these small animals to most families who have benefited from it.

For each small animal identified, let the learners give the economic benefits of keeping those particular animals. This will be the case for **Activity 15.7**.

Rabbits are reared for their meat which generally called white meat, white meat is more delicious and more nutritious than chicken. Rabbit skin is also used to make carpets, jackets, carpets and rugs plus High graded furs have a place in the international market.

Bee keeping plays a major role in the livelihoods of the rural communities for its medicinal value, nutritive as well as lucrative income-generating activity, and in some communities, for brewing local beer.

Guide learners through **Activity 15.5**. This activity will help them to understand how various factors affect the keeping of small animals.

The factors affecting the keeping of smaller animals include the following:

- a) *Favourable climate*: Livestock such as goats, hens, pigs and rabbits are favoured by the wide range of weather conditions. For example, hens live in all conditions.
- b) *Relief*: Areas of high relief such as Northern and Western regions have favoured the rearing of animals such as pigs and bee keeping. Lowlands with bushes attract bee keeping.
- c) *Government policy*: Through its different programs aiming at agricultural modernization the government supports the keeping of small animals.
- d) *Traditional factors*: Originally Rwandans had small animals in their homes so they have a wide experience on how look after them.
- e) *Land*: population increase in Rwanda is high and this goes with high demand for land. This has forced people to resort to keep small animals.
- f) *Presence of pastures*: Most areas have enough natural pasture and supplementary feeds for the animals

Further, guide learners through the factors that affect livestock farming on a general scope as in **Activity 15.18**. Supervise learners as they discuss this activity in groups. For a long time Rwanda has experienced problems of hunger, food insecurity and poverty. The problems became serious after the 1994 genocide against the Tusti.

Improved agriculture is not only a source of livelihood to a large number of people but also men and women farmers get surplus crop and livestock yields for sale. This has significantly increased their income thus reducing poverty.

Agriculture is a major source of government revenue through the sale of agricultural commodities in the internal market. It is also a source of foreign exchange when the crops and animal products are exported. The table below shows the Agricultural exports of Rwanda.

Agriculture is a source of raw materials to processing and manufacturing industries, particularly those dealing with food processing, agricultural machinery.

Agriculture has led to the roads and communication system. In turn this has led to the growth of urban centres such as Kigali and Kibuye.

Preparation for teaching

Research on the factors and specific examples of areas where they apply. Make comprehensive notes on the relationship between the livestock keeping and the factors.

Teaching/learning resources

Learners' books, local environment, other relevant books such as agriculture books.

Interactive and multi-ability learning

Use question and answer method ensuring that you involve both slow and fast learners. Organise the learners

in pairs to work on activities for class discussion. Ensure that learners with special needs are always catered for.

Teaching/learning methods

Guided discovery, discussion, demonstration and question and answer.

Extension/Remedial Activities

Ask the learners to continue finding out and make notes on factors that influence farming.

15.4 PROBLEMS AND SOLUTIONS OF AGRICULTURE IN RWANDA

Learning outcomes

By the end of this lesson the learner should be able to:

- Identify problems facing agriculture in Rwanda
- Describe possible solutions to these problems.

Additional information for the teacher

Activity 15.10 presents learners to the problems facing agriculture in Rwanda. In a class discussion, talk about these problems in detail.

Group learners and let them come up with possible solutions for each problem discussed.

Solutions

Practicing irrigation and planting suitable crop for the given area
Harvesting and storing water for use during the dry season
<ul style="list-style-type: none">• Encouraging the use of organic and chemical fertilisers such as phosphates potash and nitrates• Encouraging mixed farming so that the organic materials from crops and dung from animals can be used to maintain soil fertility• Practicing crop rotation
Spraying and, dipping the animals to control pests. Using insecticides, pesticides and fungicides on crops
Extending credit facilities and aids to farmers
Changing the system land tenure to combine parcels of land into high productive units
Adding value to the products to fetch higher earnings from other countries in the region
Improving and expanding transport and communication networks

Preparation for teaching

Read widely on the problems facing agriculture in Rwanda. Prepare notes and questions. You may require photographs to show the extent of some of these problems. As you prepare, take account of learners with special needs

Teaching/learning resources

Local environment, Atlases, text books,, photographs, materials for learners with special needs.

Interactive/multi-ability learning

Use question and answer and discussion methods on each source of information. Involve all the learners ensuring that fast and slow learners participate.

Teaching/learning methods

Guided discovery, identification of information from photographs, discussion and question and answer.

Learning activities

Asking and answering questions, discussion, photograph interpretation.

Extension/Remedial Activities

Working on the activities revision exercise can be given as an assignment that will be marked in the section.

15.5 & 15.6 AGRICULTURE MODERNISATION AND IMPACT OF AGRICULTURE ON SUSTAINABLE DEVELOPMENT OF RWANDA

Learning outcomes

By the end of this lesson the learner should be able to:

- Outline the reasons for agricultural modernisation in Rwanda.
- Explain the impact of agriculture on sustainable development of Rwanda
- Explain factors favouring modernisation of agriculture
- Advantages and disadvantages of modernisation.

Additional information for the teacher

To help learners understand the concept of modernisation, let them work on **Activity 15.11**. This will help them separate modern tools of agriculture from the traditional tools. At this point explain to them the concept of modernisation of agriculture. Further, help learners understand factors that have facilitated the modernisation of agriculture in Rwanda.

The government has put in place several measures of modernising agriculture:

- i. Combining and reorganising the fragmented pieces of land into productive units.
- ii. Use of modern machinery and equipment during land preparation and other seasonal farm activities to reduce dependence on human

labour. Machines improve the efficiency of labour.

- iii. Planting certified seeds, cuttings and plant tissues that are high yielding varieties.
- iv. Planting varieties of crops that are suitable to the climatic zones.
- v. Engaging in commercial farming as opposed to subsistence farming.
- vi. Using better soil management methods such as adding manure or chemical fertilisers to conserve soil nutrients.
- vii. Using natural means, pesticides, and fungicides to control crop and animal diseases.
- viii. Improving transport and communication to help people get information on agriculture and marketing of commodities.
- ix. Reducing reliance on rain-fed agriculture to farm in all seasons. This is by storing water in dams and harvesting rain water for use during the dry season.
- x. Increasing credit facilities and financial services to the farmers.

Let learners compare and contrast traditional and modern agriculture. This way they will be able to state the advantages and disadvantages of modernisation of agriculture as in **Activity 15.11**.

Advantages of modernised agriculture

The advantages of modernised agriculture are:

- Communities grow crops, rear animal and engage in business to build better lives.

- The high yields from different types of farming leads to the desired degree of food security.
- There is expansion employment opportunities especially in the rural areas.
- Women and the young people make up a high percentage of population in rural areas. They supply a significant part of agricultural labour. Modern agriculture has created commercial opportunities for them. By earning income, poverty is reduced.
- Modern agriculture contributes raw materials for the growth of industries.
- Modern transport and storage facilities helps to reduce wastage.
- The country earn foreign exchange from the sale of agricultural commodities.
- The use of certified seeds and new animal breeds may in the long run cause the loss of the original (genetic) plants and animal species
- A lot of funds are required to support modern agriculture
- Intensive commercial farming and monoculture in large plantations causes impoverishment of soil

Teaching/learning resource

Local environment, photographs, maps of Rwanda, text books, materials for learners with special needs.

Interactive/multi-ability learning

Use question and answer and discussion methods and involve all learners ensuring that fast and slow learners participate. Ensure groups have learners of all abilities. Learners with special needs must also be assigned groups.

Teaching/learning methods

Guided discovery, identification of information from photographs, field visit, discussion and question and answer.

Learning activities

Asking/answering questions, discussion, photograph map interpretation.

Extension/Remedial Activities

Reading from reference books, writing the field reports, working on the activities.

There are several disadvantages of modernised agriculture which include:

- The use of chemical fertiliser has negatively affected the environment. For instance, the fertilisers washed down from farmlands enrich water bodies such as lakes. Consequently, weeds grow forming a green mat. It also causes the pollution of ground water sources
- The use of pesticides kills some useful insects
- Modern farming requires a lot of water particularly to irrigate the land. This causes lessening of water resources

15.7 ADVANTAGES AND DISADVANTAGES OF PLANTATION FARMING IN RWANDA

Learning outcomes

By the end of this lesson, learners should be able to:

- Describe the advantages of plantation farming
- Discuss the disadvantages of plantation farming

Additional information for the teacher

Let learners give examples of crops grown on plantations in Rwanda, giving examples of specific areas.

Activity 15.12 will facilitate this exercise done at desk level.

Plantation farming involves growing of a single crop on a large scale farm. Large farms are set up in areas where land is available, the terrain is ideal and there is sufficient capital. One cannot set up a plantation in a place where individuals own plots of land unless such people are allocated land elsewhere and compensated for disturbance. This explains why the densely populated hilly parts of Rwanda do not have plantation farms.

The major plantation crops in Rwanda are tea and sugarcane. Tea is grown in cool and wet parts of the country both in small and large scale. Large farms are found in places such as Cyohoha, Gisakura, Rubaya, Mukamira among others.

Like tea, sugarcane is grown in small and large farms in Rwanda. Nyabarongo river valleys and Akanyaru are examples of areas where sugarcane is grown on large scale.

Having explained the concept of plantation agriculture, help learners through **Activity 15.13**. They should come up with the advantages and disadvantages of plantation farming in groups.

Advantages of plantation agriculture

There are several advantages of plantation agriculture. Some of the advantages are:

- i. With the high level of mechanisation, the productivity is high.
- ii. The specialisation in the production process leads to high quality products.
- iii. Plantations grow cash crops which provide the much needed export earnings
- iv. A large number of labourers both skilled and semi-skilled are employed
- v. Industries that process the agricultural raw materials and agricultural machinery have grown
- vi. On some plantations infrastructure such as roads water supply and electricity is developed. Plantation owners may also provide schools, houses and hospitals for the workers.
- vii. Some plantations are research and demonstration centres for a wide range of crops.

Disadvantages plantation agriculture

- Plantation agriculture requires heavy investment to grow process and transport the crop to the market. Therefore, it is expensive to start and maintain.
- The cash crops use up land that could grow food for the local population.
- Natural disasters drought, floods pests and crop diseases may affect the crops leading to heavy losses.
- Monoculture exhausts the soil if it is not well managed
- Plantations are often affected by fluctuation of prices on the world market.

To set up these farms, large amounts of capital in form of finances and machinery was required for land acquisition and preparation, acquisition of the machinery and seedlings, fertilisers and to pay the labourers.

Some of the factors that favour plantation agriculture in Rwanda include availability of cheap labour force from the local community. Rwanda being a country with high population growth rate has enough labour both skilled and unskilled, presence of market both local and foreign and government policy to produce crops on a large scale in order to have food security and surplus for export. The modified equatorial climate provides ideal conditions for growing of tea and sugarcane.

Plantation farming is characterised by features such as growing only one crop in the farm, applying scientific methods of farming, producing a crop mainly

for commercial use and being able to process the crop where within the growing area.

Introduce the topic by talking about what the learners are familiar with, particularly what they may have witnessed in the local areas. Make a brief review of what the class learnt on small scale farming so that they will make comparisons with large scale farming.

Preparation for teaching

Read widely on plantation farming in Rwanda and in other countries like Uganda and Kenya and a developed country for comparison.

Prepare comprehensive notes and find out other reference books that you will recommend for learners to use. Identify a plantation farm which you will use as a specific example and make arrangements for field visit for the learners. For the visit, prepare guiding questionnaires for the learner to use as they conduct interviews. Organise the learners into groups for the field visit.

Avail photographs on plantations of any other farms unlikely to visit where other crops are grown and discuss them in class.

Teaching/learning resources

Learners' books, resource person, map of Rwanda, farm owner reports, internet, photographs local environment and atlases.

Interactive and multi-ability learning

Use question and answer and discussion methods ensuring that you involve both slow and fast learners. Ensure that learners in each group contribute to the final report for the group. Avoid a situation where fast learners could dominate or intimidate the rest of the group members.

Teaching/learning methods

Guided discovery, research activity, photograph interpretation discussion, observation, interviews and question and answer.

Extension/Remedial Activities

Ask the learners to write a report on their findings on the research undertaken. Organise class presentations and discussions on the project.

Answers to End of unit assessment

- 1. Commercial livestock farming** is the rearing of animals mainly for monetary gains.
- 2. Reasons for the keeping of small animals at home**
 - They are a source of food like meat, eggs and milk.
 - They are a source of manure.
 - They give hides and skins.
 - Bees are a source of honey which is used to make brews and medicine
 - They can be sold for money

3. Contributions of livestock farming in Rwanda

- Animals reared are imported breeds of dairy and beef cattle.
- Animals are kept for profit-making purposes. Products such as meat, milk, hides and skins are sold.
- They depend on natural pasture for extensive grazing. The pastureland is often fenced and divided into paddocks according to the number and movement of animals. The ranches have piped water and cattle dip.
- Artificial insemination and crossbreeding is done to improve the numbers and quality animals.
- Farmers care for natural pastures, fodder crops and use appropriate supplements such as vitamins for animals.
- There is spraying, dipping and proper vaccination of animals against diseases and pests like ticks, tsetse flies; East coast fever, foot and mouth disease among others.
- Research and experiments on diseases, new breeds and food supplements is practised.
- There is proper marketing and record keeping ensuring profitability.

4. Characteristics of dairy farming in Rwanda

- Animals are kept mainly for production of milk.
- It can be carried out in small or large scale.

5. Problems affecting cattle keepers in Rwanda and possible solutions

1. Crop failure or low yields due to frequent droughts.	Practicing irrigation and planting suitable crop for the given area. Harvesting and storing water for use during the dry season.
2. Soil erosion which leads to soil exhaustion and poor harvests.	<ul style="list-style-type: none"> • Encouraging the use of organic and chemical fertilisers such as phosphates potash and nitrates. • Encouraging mixed farming so that the organic materials from crops and dung from animals can be used to maintain soil fertility. • Practicing crop rotation.
3. Occurrence of pests and diseases which affects farmers, crops and animals.	Spraying and, dipping the animals to control pests. Using insecticides, pesticides and fungicides on crops.
4. lack of money to buy essential farm inputs such as certified seeds, fertilisers and quality breeds.	Extending credit facilities and aids to farmers.
5. Land fragmentation or subdivision into small scattered plots lowering farm productivity.	Changing the system land tenure to combine parcels of land into high productive units.
6. Variation of commodity prices which is at times low and demoralises farmers.	Adding value to the products to fetch higher earnings from other countries in the region.
7. Poor transport networks that hinder delivery of inputs to the farms and produce to the market.	Improving and expanding transport and communication networks.
8. Crop failure or low yields due to frequent droughts.	

- Most small scale dairy farmers practice zero grazing where animals are kept in an enclosure and provided with feeds and water.
- Large scale dairy farming involves keeping animals in open grazing fields divided into paddocks.
- The main dairy cattle breeds kept are Friesian, Jersey, Ayrshire and Guernsey.
- Dairy farming is carried out in areas that have good transport facilities and ready market for milk.

- Farmers grow fodder crops and also use manufactured feeds to boost milk production.
- Reproduction is facilitated through artificial insemination.
- Animals are well cared for to avoid attacks by parasites and disease.

6. Agriculture modernisation is the process of transforming the agricultural sector into one that is dynamic, technologically advanced and competitive, yet centered on human resource development, guided by the sound principles of social justice.

7. Ways of transforming agricultural practices in Rwanda

- Avoiding the use of chemical fertiliser, which has negatively affected the environment. For instance, fertilisers washed down from farmlands pollute water bodies such as lakes and also causes weeds (such as the water hyacinth) to grow.
- The use of pesticides kills some useful insects
- Modern farming requires a lot of water particularly to irrigate the land. This causes lessening of water resources
- The use of certified seeds and new animal breeds may in the long run cause the loss of the original (genetic) plants and animal species

- A lot of funds are required to support modern agriculture
- Intensive commercial farming and monoculture in large plantations causes impoverishment of soil

Key unit competence

At the end of the four lessons, the learner should be able to investigate the impact of various forestry activities on sustainable development of Rwanda.

Introduction

In this unit, the main sub-topics to be covered are:

- (i) Definitions of forest, forestry and silviculture
- (ii) Types of forests and major forest areas in Rwanda
- (iii) Importance of forests in Rwanda
- (iv) The concept of deforestation: causes, effects and control measures
- (v) Areas under the risk of deforestation in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge	Skills	Attitudes and values
<ul style="list-style-type: none"> • Define forest and forestry. • Name the major forest types and locate them in Rwanda. • State the importance of forests to the economic development of Rwanda. • Identify the causes of deforestation and its solutions in Rwanda. • Give examples of areas that are under risk of deforestation in Rwanda. • List the effects of forestry on sustainable development in Rwanda. 	<ul style="list-style-type: none"> • Apply knowledge of forestry to promote afforestation and reforestation. • Explain the importance of forests in Rwanda. • Carry out an investigation on causes, effects and solutions of deforestation. • Explain the effects of forestry on the sustainable development in Rwanda. 	<ul style="list-style-type: none"> • Appreciate the importance of forests and forest conservation in Rwanda. • Show concern for the effects of deforestation and continual desire to protect forests in Rwanda. • Show resilience for the areas faced with serious deforestation in Rwanda. • Show respect for the control measures on forestry for sustainable development in Rwanda.

Information for the teacher

After taking the learners through this unit, it is expected that they will appreciate the importance of forests and forest conservation and show concern for the effects of deforestation and continual desire to protect forests in Rwanda. They should also show resilience for the areas faced with serious deforestation in the country and develop respect for the control measures on forestry for sustainable development in Rwanda.

In this unit, the first task is to ensure that the learners are able to differentiate between forest and forestry. They should also be able to classify the different types of forests. Also important is to be able to locate areas in Rwanda where different types of forests are found and why the difference.

A forest is a type of vegetation consisting of trees that grow continuously in a large area. They could occur naturally as a natural forest or they could have been planted. Planted and natural forests differ in characteristic as the planted forest normally has one type of a tree, of the same age and little or no undergrowth. The trees may be planted in rows which makes it easy to harvest. Natural forests on the other hand have a mixture of tree species with different tree sizes and may have thick undergrowth. Exploitation of a natural forest is difficult in that the type of tree one wishes to cut may be scattered among the rest of the vegetation.

Forests are very important resources that human beings cannot do without.

This is because forest products are of economic use as well as very useful for protection of the natural environment.

The areas under natural forests in Rwanda has been decreasing over the years as a result of widespread human activities that lead to clearing of forests. It is for this reason that it has been found necessary to organise tree planting programmes and to encourage people to plant trees whenever possible.

Forestry is an economic activity that can be undertaken in natural forests as well as in planted forests. It involves planting, caring, protecting and carrying out organised tree harvesting for sustainability of the forest.

The study of forestry enables the learner to understand and appreciate the importance of proper management of forests so as to sustain the supply of the forest products.

Generic competences

- a) Critical thinking
- b) Creativity and innovation
- c) Problem solving
- d) Co-operation
- e) Research skills

Cross-cutting issues

Learning about forestry enables a learner to appreciate the importance of conserving forests. This is an aspect of *environmental conservation*. When we conserve forests, we are participating in fight against *global warming* and ultimately *climate change*. Forestry

is an income generating activity for individuals and for the government. Hence this study enables a learner to be informed to some degree on *financial education*.

16.1 & 16.2 DEFINITIONS OF FOREST, FORESTRY AND SILVICULTURE, TYPES OF FORESTS AND MAJOR FOREST AREAS IN RWANDA

Learning outcome

By the end of this section, the learner should be able to name the major forest types and locate them in Rwanda.

Additional information for the teacher

This section requires the use of a map of Rwanda that shows the distribution of forests. On identifying and noting that the forest areas are so small, learners will appreciate that there is need to increase the areas under forest in Rwanda for sustainability of supplies of forest products in future. You may need to compare the forest areas in Rwanda and those in the neighbouring countries.

Since forestry entails proper management of forests, learners should appreciate and have a desire to protect the existing forests as they see need to have more areas under forests.

Introduce the unit by asking learners to work on **Activity 16.1**. Begin by giving the learners the task to find out what forestry is and how the term differs from or is related to vegetation. Ask learners to work on **Activity 16.2**.

Preparation for teaching

Ensure you have a map of Rwanda showing the distribution of forests. Since the learners will eventually draw the map in their note books, you could have a simplified one that you can draw on the board for them to copy. You also need to prepare notes and guiding questions to ensure the flow of ideas is logical.

Acquaint yourself with the activity in the section to ensure you have points that can be discussed.

Safety

In case you wish 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.

Teaching/learning resources

Recommended learner's books, wall map/atlas photographs.

Interactive and multi-ability learning

Ensure that the learners have worked on the activities so that they are all fully involved in class discussion and answering questions. Ask learners to work on **Activity 16.3**.

Teaching/learning methods

Teacher exposition, map reading, discussion and question and answer methods.

Teaching/learning activities

Map analysis, note taking, map drawing and photograph analysis.

Extension/Remedial Activities

Learners to read through the section on their own and ensure the drawing and making of notes is completed. Ask learners to work on **Activity 16.4**.

16.3 IMPORTANCE OF FORESTS IN RWANDA

Learning outcome

By the end of this section, the learner should be able to explain the importance of forests in Rwanda.

Additional information for the teacher

Forest products are always on high demand in Rwanda and this is one of the reasons why forests have been declining in Rwanda. For this reason among others, natural forests in Rwanda are only patches which have been put under protection as reserves so that further deforestation is controlled.

Make a review of what the learners know so far so that you connect that knowledge to what is to be learnt in this section. Let the learners name the areas that are forested and suggest the usefulness of such areas to individuals, government and the environment. Let learners work on Ask learners to work on **Activity 16.5**.

Preparation for teaching

Plan on how you will group the class to work on the activity in the section. Prepare relevant photographs and

ensure you have a map of Rwanda showing the distribution of forests. You also need to prepare notes and guiding questions to ensure the flow of ideas is logical. Prepare yourself with points as answers to the activity in the section to ensure you guide the discussion on the same.

Teaching/learning resources

Relevant photographs, recommended learner's books and maps.

Interactive and multi-ability learning

Ensure that all the learners participate in the discussions and in answering questions. Encourage slow learners to participate. In groups, let learners work on Ask learners to work on **Activity 16.6**.

Teaching/learning methods

Teacher exposition, photograph analysis, map reading, discussion and question and answer methods.

Teaching/learning activities

Note taking and photograph analysis.

Extension/Remedial Activities

Learners to carry out further research and read through the section on their own and make notes.

16.4 THE CONCEPT OF DEFORESTATION (CAUSES, EFFECTS AND CONTROL MEASURES)

Learning outcome

By the end of this section, the learner should be able to carry out an investigation on causes, effects and solutions of deforestation.

Additional information for the teacher

Population pressure that leads to a high demand for land for agriculture and settlement and that for forest products are the main reasons why there is so much clearing of forests in Rwanda. By looking at the spread of forests in the 1960s and today in Rwanda one can see the effect of deforestation. So much of forest has been cleared leaving only a small areas still under natural forests with the largest one being the Nyungwe forest. Former areas such as Gishwati forest no longer exist except where tree planting has been done.

Make a review of what the learners know so far so on deforestation in Rwanda and build on that knowledge as you take the learners through this section. Ask learners to work on Ask learners to work on **Activity 16.7**.

Preparation for teaching

Plan on how you will group the class to work on the research activity in the section. Prepare comprehensive notes which should include the causes and effects of deforestation with specific

examples. Ensure you have a map of Rwanda showing the location of the forests in the past and the current forested areas. Also you need to prepare notes and guiding questions to ensure the flow of ideas is logical.

Teaching/learning resources

Local environment, recommended learner's books, map of the past and present forest areas.

Interactive and multi-ability learning

Group the learners and ensure each group member participates in the group and class discussions and in answering questions. Let learners work on Ask learners to work on **Activity 16.8**.

Teaching/learning methods

Teacher exposition, researching, observation map drawing, discussion and question and answer methods.

Teaching/learning activities

Research activity, note taking, map analysis, drawing.

Extension/Remedial Activities

Learners to complete their report on the research and read through the section on their own and make notes. Ask learners to work on Ask learners to work on **Activity 16.9**.

16.5 AREAS UNDER THE RISK OF DEFORESTATION IN RWANDA

Learning outcome

By the end of this section, the learner should be able to Give examples of areas that are under risk of deforestation in Rwanda.

Preparation for teaching

Plan on how you will group the class to work on the research activity in the section. Prepare comprehensive notes and photographs and ensure you have a map of Rwanda showing the location of the forests that the learners will research on. You also need to prepare notes and guiding questions to ensure the flow of ideas is logical.

Let learners work on Ask learners to work on **Activity 16.10**.

Safety

This section requires that learners carry out a research on the deforestation of a forest area in Rwanda. If they have to go out for the study, it is important to ensure their safety by avoiding areas such as bushes or steep slopes that may not be safe for them.

Teaching/learning resources

Local environment, relevant photographs, recommended learner's books, map of the forest area to be studied.

Interactive and multi-ability learning

Ensure that all the learners are in groups and participate in the group discussions and in answering questions.

Teaching/learning methods

Teacher exposition, researching, observation map drawing, discussion and question and answer methods.

Teaching/learning activities

Research activity, note taking, map analysis and drawing.

Extension/Remedial Activities

Learners to complete their report on the research and read through the section on their own and make notes.

Key unit competence

At the end of the four lessons, the learner should be able to investigate the impact of fishing and fish farming activities on sustainable development of Rwanda.

Introduction

In this unit, the main sub-topics to be covered are:

- (i) Major fishing and Fish farming areas in Rwanda
- (ii) Factors influencing fish farming in Rwanda
- (iii) Methods of fishing used in Rwanda (traditional and modern)
- (iv) Problems faced by fishing and fish farming in Rwanda and possible solutions
- (v) Fish preservation and conservation in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge	Skills	Attitudes and values
<ul style="list-style-type: none"> • Identify the major fish species caught and major fishing areas of Rwanda. • State the factors influencing the development of fishing and fish farming in Rwanda. • Name the methods of fishing used in Rwanda. • Outline the problems affecting fishing and fish farming in Rwanda. • State fish preservation and Conservation methods used in Rwanda 	<ul style="list-style-type: none"> • Analyse the role of pisciculture in the development of fishing industry. • Analyse the factors responsible for the growth of fishing industry in Rwanda. • Examine the fishing methods used in fishing sector in Rwanda. • Explain the problems of fishing in Rwanda. • Describe the fish preservation and conservation methods used in Rwanda. 	<ul style="list-style-type: none"> • Appreciate the importance of fishing and fish farming in Rwanda. • Appreciate the importance of conserving fish in Rwanda. • Show concern for low levels of fish harvesting in Rwanda and the desire to increase fish production

Information for the teacher

Fish provides the human body with protein that helps build the tissues of the body. We also get fish oil which has medicinal value to the body. It is used as food supplement. Fish bones and other leftovers are used to make animal feeds.

Fishing in Rwanda is carried out in different water bodies which include lakes which are more than twenty in number, rivers and wetlands. Since these water bodies are found in almost all parts of the country, many people are able to access the bodies to catch fish. While in some of the fisheries the methods used are modern, some people catch fish using traditional methods such as use of traps which enable them to catch one fish at a time. Fish farming is also increasingly being developed and this gives the farmers opportunity to carry out controlled fishing with relatively higher yields.

In this unit, the first task is to ensure that the learners are able to explain the impact of fishing and fish farming activities on sustainable development of Rwanda. For sustainability to be achieved in fishing, the activity has to be carried out in such a way that fish continue breeding for continued exploitation.

It is sad to note that some fisheries in Rwanda have been depleted because people use fishing methods that do not discriminate the young and mature fish. When young fish are removed the breeding cycle is cut off. This leads

to depletion and can take a long time for recovery of the fisheries unless a deliberate effort is made to restock the fishery.

Going over this unit should enable the learners to appreciate the importance of fishing and fish farming and the importance of conserving fish in Rwanda. This should then lead them to show concern for low levels of fish harvesting in Rwanda and develop a desire to increase fish production.

As you teach this unit you have to emphasise the appropriate fishing methods which is key in sustainability in fishing.

Generic competences

- Critical thinking
- Creativity and innovation
- Problem solving
- Cooperation
- Research skills

Cross-cutting issues

In this unit the issue of *standardisation of culture* is promoted in that people from different parts of the country are involved in catching and using fish for food. This is mainly because the people who live far from natural fisheries have been introduced to fish eating culture through fish farming. *Financial education* will be promoted as you teach this unit in that fishing is an economic activity from which many people earn their income. Fish conservation is an aspect of *environmental conservation*.

17.1 MAJOR FISHING AND FISH FARMING AREAS IN RWANDA

Learning outcome

By the end of this section, the learner should be able to analyse the role of pisciculture in the development of fishing industry.

Additional information for the teacher

Fish farming is the rearing of fish in enclosures called fish farms. This practice is also referred to as **pisciculture**. At the start of this unit, you need to have a large map of Rwanda showing the fisheries. This will help learners appreciate how widespread the fishing activity is in the country.

Introduce the unit by building on the learners' previous knowledge on fishing. Begin by giving the learners the task to find out the definition of fishing, the types of fish found in the fisheries in Rwanda and the different methods used to catch fish. Learners who may have experience in fishing can be asked to give an account of their experience.

Preparation for teaching

Ensure you have a map of Rwanda showing the distribution of fisheries. Since the learners will eventually draw the map in their note books, you could have a simplified one that you can draw on the board for them to copy.

You also need to prepare notes and guiding questions to ensure the flow of ideas is logical. Acquaint yourself with

the activity in the section to ensure you have points that can be discussed.

Ask learners to work on Ask learners to work on **Activity 17.1**.

Teaching/learning resources

- Learner's Book
- Wall map/atlas photographs of fish types

Interactive and multi-ability learning

Ensure that the learners have worked on the activities so that they are all fully involved in class discussion and answering questions. Let learners work on Ask learners to work on **Activity 17.2**.

Teaching/learning methods

- Guided discovery
- Map reading
- Discussion
- Question and answer

Teaching/learning activities

- Map analysis
- Note taking
- Map drawing
- Photograph analysis

Extension/Remedial Activities

Learners to read through the section on their own and ensure the drawing and making of notes is completed.

17.2 FACTORS INFLUENCING FISH FARMING IN RWANDA

Learning outcome

By the end of this section, the learner should be able to analyse the factors responsible for the growth of fishing industry in Rwanda.

Additional information for the teacher

This section requires that the factors that influence fishing in Rwanda are identified and analysed to establish why different areas differ from others. For instance the presence of water bodies is one of the factors but the type of water body determines whether fishing is commercial or subsistence. When we compare fishing in Lake Kivu and fishing in the swamps we find there is a contrast between the two environments. You will also need to elaborate on the commercial fishing versus subsistence fishing.

Preparation for teaching

Ensure you have comprehensive notes on the factors influencing fishing as well as appropriate questions to guide the lesson.

Teaching/learning resources

Recommended learner's books, map showing fisheries in Rwanda, relevant reference materials for learners with special needs.

Interactive and multi-ability learning

Ensure that the learners are all fully involved in class discussion and answering questions. In groups let learners work on **Activity 17.3**.

Teaching/learning methods

- (i) Teacher exposition
- (ii) Map reading
- (iii) Discussion
- (iv) Question and answer

Teaching/learning activities

- Map analysis
- Note taking
- Map analysis

Extension/Remedial Activities

Learners to read through the section on their own and research further on the section.

17.3 METHODS OF FISHING USED IN RWANDA (TRADITIONAL AND MODERN)

Learning outcome

By the end of this section, the learner should be able to examine the fishing methods used in fishing sector in Rwanda.

Additional information for the teacher

This section requires that the fishing methods used in Rwanda are identified and each described so that the learners understand how each works. It is important to use photographs and

where real objects are available you should bring them along to class. As you discuss the methods, ensure you give specific examples of the fisheries where the method is used. What the key difference between the traditional and modern fishing methods? Ask learners to work on **Activity 17.4**.

Preparation for teaching

Ensure you have relevant photographs of different fishing methods, comprehensive notes on the fishing methods as well as appropriate questions to guide the lesson.

Teaching/learning resources

Real objects, photographs, recommended learner's books, map showing fisheries in Rwanda, photographs relevant reference materials for learners with special needs.

Interactive and multi-ability learning

Ensure that the learners are all fully involved in class discussion and answering questions.

Teaching/learning methods

- (i) Guided discovery
- (ii) Photograph reading
- (iii) Discussion
- (iv) Question and answer

Teaching/learning activities

- Photograph analysis
- Note taking
- Map analysis

Extension/Remedial Activities

Learners to research further on the section and make notes.

17.4 PROBLEMS FACED BY FISHING AND FISH FARMING IN RWANDA AND POSSIBLE SOLUTIONS

Learning outcome

By the end of this section, the learner should be able to explain the problems of fishing in Rwanda.

Additional information for the teacher

This section requires that the various problems that are experience in open water and confined fishing areas are discussed. You may ask the learners to research on the problems then present their findings for discussion. You could also gather information from local fishing cooperatives to add to enrich your notes.

As you discuss the problems, ensure you give specific examples of the fisheries where the problem is more prevalent and why it is so common. Ask learners to work on **Activity 17.5**.

Preparation for teaching

Prepare comprehensive notes using resources from fishing cooperatives or government fishing department. Also prepare appropriate questions to guide the lesson. Plan for organising the class into groups to work on the activity in the section.

Teaching/learning resources

- a) Photographs
- b) Recommended Learner's Books
- c) Map showing fisheries in Rwanda
- d) Relevant reference materials for learners with special needs.

Interactive and multi-ability learning

Ensure that the learners are all fully involved in group and class discussions and in answering questions. In groups ask learners to carry out **Activity 17.6**.

Teaching/learning methods

- (i) Guided discovery
- (ii) Group discussion
- (iii) Question and answer

Teaching/learning activities

- Class presentations
- Document analysis
- Note taking

Extension/Remedial Activities

Learners to read more from documents from the fisheries department and from cooperatives.

17.5 FISH PRESERVATION AND CONSERVATION IN RWANDA

Learning outcome

By the end of this section, the learner should be able to describe the fish preservation and conservation methods used in Rwanda.

Additional information for the teacher

This section requires that the learners are able to differentiate between conservation and preservation of fish.

You may ask the learners to research on the methods used to preserve fish by large scale and small scale fishermen and why there is a difference and present their findings for discussion.

As you discuss the conservation methods ensure you give specific examples of the fisheries where given conservation measures are used.

Preparation for teaching

Ensure you have a collection of photographs showing the different methods used to preserve fish in Rwanda.

Prepare comprehensive notes on both conservation of fishing resources and preservation of fish. Also prepare appropriate questions to guide the lesson. Plan for organising the class into groups to work on the activity in the section.

Teaching/learning resources

- a) Photographs
- b) Recommended learner's books
- c) Map showing fisheries in Rwanda
- d) Relevant reference materials for learners with special needs.

Interactive and multi-ability learning

Ensure that the learners are all fully involved in group and class discussions

and in answering questions. In groups ask learners to carry out **Activity 17.6**.

Teaching/learning methods

- Teacher exposition
- Group discussion
- Question and answer

Teaching/learning activities

- Class presentations
- Document analysis
- Note taking

Extension/Remedial Activities

Ask learners to read and research on conservation and preservation of fish and make notes for class discussion

Key unit competence

To be able to investigate the impact of mining and quarrying activities on sustainable development of Rwanda.

Introduction

In this unit, we will study the following sub-topics:

- i) Definitions (mining and quarrying)
- ii) Minerals and mining areas in Rwanda (mineral map) Quarrying: sand, clay, rocks and limestone
- iii) Methods of mining in Rwanda
- iv) Factors influencing mineral exploitation in Rwanda
- v) Importance of mining and quarrying in Rwanda
- vi) Problems hindering mining and quarrying in Rwanda. Examples of areas affected by over exploitation of mineral resources
- vii) Effects of mining on the natural environment in Rwanda
- viii) Future prospects of mining and solutions to the problems affecting mining in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills and attitudes summarised in the table below.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Define mining and quarrying. • Name the major quarrying and mining places of Rwanda. • Explain the factors that influence mineral exploitation in Rwanda. • State the problems resulting from mining and quarrying in Rwanda. • Outline the future prospects for mineral exploitation in Rwanda. 	<ul style="list-style-type: none"> • Analyse the effects of mining on the environment. • Draw a map of Rwanda showing Minerals and mining areas in Rwanda • Analyse the factors influencing mineral exploitation in Rwanda and relate them with relief of the country. • Explain the future prospects of mining and solutions to the problems affecting mining in Rwanda 	<ul style="list-style-type: none"> • Appreciate the usefulness of mining and quarrying in Rwanda. • Show concern for areas under the risk of over exploitation of rock materials and the desire to protect the mining areas • Show respect for developing awareness on the problems caused by quarrying and mining in Rwanda

Information for the teacher

The mineral industries consist of mining and quarries. A mineral is a naturally occurring solid substance found in rocks of the earth. Minerals are part of natural resources in Rwanda. They are found in many parts of Rwanda especially areas of volcanic rocks. Minerals differ in appearance and chemical composition. They make second largest export in the Rwandan economy and are grouped into:

- Precious minerals such as Gold
- Mineral fuels such as Methane Gas
- Non-metallic minerals
- Gemstones including Beryl, Wolfram, Tin, Limestone and Colombite

More minerals are yet to be exploited following extensive explorations.

Links to other subjects

While teaching this unit, ensure you draw a link to mineral elements/ores in Chemistry.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.
- e) Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.
- g) Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Ensure that learners understand and appreciate that they need to work together in solving classroom challenges, such as reading and interpreting information on maps. This will help them work together regardless of each of their capabilities. This way, they will appreciate each other's contribution in the learning process, thereby fostering *inclusivity in learning processes*.

Environmental conservation will be an important issue raised in this unit. Let learners appreciate the need for environmental care as they discuss mining and quarrying.

Assessment criteria

By the end of this unit, the learner should be able to investigate the impact of mining and quarrying activities on sustainable development of Rwanda.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this unit.

18.1 & 18.2 DEFINITIONS AND MINING AREAS IN RWANDA

Learning outcomes

By the end of this lesson, the learner should be able to:

- Define mining and quarrying
- Identify areas with minerals in Rwanda

Additional information for the teacher

Introduce learners to the topic by defining the meaning of mining and quarrying.

Rwanda has a variety of minerals based on the type and distribution of ore bearing rocks. Rwanda's mineral industry includes mining and quarrying. Minerals may be found at or near the surface. Others lie at great depths in the earth's surface. The place where the minerals are dug out or drilled is referred as **a mine**. The process of obtaining the mineral is referred to as mining. The excavation of building stones, gravel, sand and clay from the ground is quarrying for the production of building materials; it also includes extraction and processing of semi-precious stones.

Group learners and let them find out the minerals mined in Rwanda using their atlases. Also, provide them with a chart which has the map of Rwanda showing the distribution of minerals. **Activity 18.1** will facilitate this exercise.

Preparation for teaching

Acquaint yourself with the environment around the school and make notes of the areas where quarrying can take place. Prepare a chart with the map of Rwanda showing the distribution of minerals. Ensure that the preparation you make will enable learners to acknowledge that there is need to study this unit.

Teaching and learning resources

- Learner's Book
- Photographs
- Rulers
- Pencils
- Chalkboard
- Tactile displays for learners with visual impairments
- Atlases
- Charts

Interactive learning and multi-ability learning

Using **Activity 18.1** as your introductory point for this type of learning, group the learners into five. You must involve slow learners and ensure that groups are made up of learners of different abilities.

Let them identify minerals found in Rwanda.

While discussing their findings, use question and answer and discussion methods ensuring that all learners participate. **This will promote cooperation** among the learners.

Activity 18.1 should be done in groups as part of their assignment for class discussion. Let them present their findings to the class. This activity is aimed at promoting **creativity and innovativeness** as they learn new knowledge about maps as well as **cooperation** as they work together in pairs.

For both activities, guide the learner into learning correct information by giving summarised explanation as per the expected learning outcomes.

Teaching and learning methods

- Guided discovery
- Discussion method
- Observation
- Question and answer

Further activities for slow and fast learners

Learners should find out the minerals mined in Rwanda.

18.3 & 18.4 METHODS OF MINING AND FACTORS INFLUENCING MINERAL EXPLOITATION IN RWANDA

Learning outcomes

By the end of this section, the learners should be able to:

- Name the major quarrying and mining areas in Rwanda
- Explain the factors that influence mineral exploitation in Rwanda

Additional information for the teacher

Introduce this lesson by reviewing the meaning of mining and quarrying. Assign learners **Activity 18.3**. This activity will serve as an eye opener into the methods of mining in Rwanda. Explain to learners the major methods of mining through a class discussion. Photographs and illustrations may be used.

Methods of mining include:

- Opencast mining
- Placer method
- Drifting method

- Under ground mining.

Group learners and assign them **Activity 18.4**.

Various factors influence the way in which minerals are mined. Using **Activity 18.6**, let learners explain how each factor influences mining.

The factors which influence mineral exploitation in Rwanda include:

- Government Plans
- Grade of the ore
- Value of the mineral
- The size of the deposit
- Mining method used
- Mining Costs
- Transport costs
- Labour

Preparation for teaching

Make comprehensive notes on methods of mining as well as factors which influence mineral exploitation in Rwanda. The notes should be simplified.

Teaching and learning resources

- Learner's Books
- Chalkboard
- Ensure use of appropriate materials for learners with special needs
- Charts

Interactive and multi-ability learning

As they discuss the factors influencing mineral exploitation, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- Guided discovery
- Discussion
- Demonstration
- Question and answer

Attitudes and values to be attained at the end of the lesson

The learner should thoroughly explain methods of mining and factors that influence mineral exploitation in Rwanda.

Extension/Remedial Activities

Let the learners draw the map of Rwanda showing the distribution of minerals in their notebooks.

18.5 & 18.6 IMPORTANCE OF MINING IN RWANDA AND PROBLEMS HINDERING MINING AND QUARRIES IN RWANDA

Learning outcomes

By the end of this section, the learner should be able to:

- Explain the importance of mining in Rwanda
- Describe problems hindering mining and quarrying in Rwanda

Additional information for the teacher

Assign learners **Activity 18.7**. Let them discuss the importance of mining to the economy of Rwanda.

Engage learners in a question and answer session when talking about the importance of mining. Let learners write an essay as in **Activity 18.8**.

In a class discussion, brainstorm with learners on the problems facing the mining industry in Rwanda. These include:

- a) Some minerals are found in small deposits or the grade of the ore is low such that it is not economical to mine.
- b) The country lacks sufficient funds to explore and carry out mining.
- c) Some valuable minerals are found in remote areas which are not easily accessible.
- d) There is shortage of qualified personnel to work in the mining industry.
- e) The minerals may be found near built-up areas which if mined may be harmful to the health of the people.
- f) Some corrupt people smuggle minerals out of Rwanda

Group learners and let them come up with a list of areas that have been affected by mining activities. This will be facilitated by **Activity 18.9**. Let learners present their findings.

Allow for class presentation from each group. As they present, correct the information being provided, while allowing the rest of the class to take notes on what you confirm as correct. By doing this, you will be promoting cooperation, promoting communication.

Preparation for teaching

As you prepare, take into account learners with special needs. Read exhaustively about the benefits of mining make summarised notes for easier content delivery.

Teaching and learning resources

- a) Photographs
- b) Chalk board
- c) charts

Interactive or multi-ability learning

Ensure the groups are made of fast and slow learners. Guide and supervise learners during group discussions.. Let all learners be part of a group which has all the materials necessary for the activity.

Teaching and learning methods

- a) Guided discovery
- b) Guided discussions
- c) Question and answer
- d) Demonstration

Extension/Remedial Activities

As an assignment, let learners go and do **Activity 18.5**.

18.7 & 18.8 EFFECTS OF MINING ON THE ENVIRONMENT AND FUTURE PROSPECTS OF MINING

Learning outcomes

By the end of this section, the learners should be able to explain the effects of mining on the environment

Additional information for the teacher

Start the lesson by reviewing the problems associated with mining. Most of these problems translate into the negative effects of mining.

Let learners discuss these as in **Activity 18.10**.

In a class discussion, brainstorm with learners on the future prospects of mining and quarrying in Rwanda.

Preparation for teaching

As you prepare, take into account learners with special needs.

Read exhaustively about the effects of mining and make summarised notes for easier content delivery.

Teaching/learning resources

- Pencils
- Note books
- Charts

Interactive and multi-ability learning

As they tackle **Activity 18.10**, ensure that both slow and fast learners are actively involved.

Ensure that learners with special needs are always catered for.

Teaching and learning methods

- i. Guided discovery
- ii. Discussion
- iii. Demonstration
- iv. Question and answer

Extension/Remedial Activities

Let learners write an essay on the prospects of the future of mining in Rwanda. Let them explain the measures that the Government of Rwanda has put in place in relation to this.

Answers to End of unit assessment

1. Precious minerals mined in Rwanda
 - a) Silver,
 - b) Platinum and
 - c) Gold

2. Complete the table below with the correct answers

Mineral	Method of mining used	Use of the mineral
Clay	Open-cast	Modelling
Salt	Open cast	Preservative
Methane	Underground	Production of biogas and electricity

Negative effects of this type of open cast mining on the environment.

- It leads to dereliction of land
- It makes land look ugly
- Derelict land leads to accidents if not filled up.

b) Solutions to the effects of open cast mining

- Mines should be filled up after mining activities are over
- To conserve the environment, trees may be planted on the derelict lands
- Derelict land should be rehabilitated and put into better use, for example irrigation farming.

3. Key things learnt from the study of the unit.

- a) Mining activities pollute the environment during the removal and processing of minerals. Smoke and dust particles are released into the air while poisonous industrial wastes are discharged. Some poisonous substances from mining also seep into water sources such as lakes, rivers or wetlands. All these poisonous substances cause air, water, land and noise pollution which are harmful to human health. The pollution may cause respiratory and skin diseases. For example, in quarrying of sand and limestone a lot of dust and noise is emitted. The landscape also becomes ugly from the pits left behind.
- b) To control pollution, the Government is enforcing laws to make mining all companies to abide fully with the set standards of a clean environment and also restore the damaged land. This is the way we can use our environment sustainably.

Key unit competence

To be able to investigate the impact of power and energy production on sustainable development of Rwanda.

Introduction

In this unit, we will study the following sub-topics:

- i) Renewable and non-renewable energy resources (Definition: energy resources, renewable and non-renewable energy resources)
- ii) Importance of power and energy resources in Rwanda
- iii) Problems and future prospects for power and energy production in Rwanda
- iv) Efficient utilisation of power and energy resources in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire knowledge, skills and attitudes summarised in the table below.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • State the various categories of renewable and non-renewable energy sources. • Explain the major sources of energy and power available in Rwanda. 	<ul style="list-style-type: none"> • Differentiate between renewable and non-renewable energy resources. • Explain the reasons for increased power and energy production in Rwanda. • Draw a map showing energy resources of Rwanda. 	<ul style="list-style-type: none"> • Appreciate the importance of renewable and non-renewable energy resources in Rwanda • Appreciate the importance of power and energy for sustainable development of Rwanda. • Show concern for the problems affecting power and energy production and desire to develop alternative sources of power in Rwanda.

<ul style="list-style-type: none"> • Outline the future prospects for mineral exploitation in Rwanda. • Outline problems and future prospects for power and energy production in Rwanda. 	<ul style="list-style-type: none"> • Analyse the problems hindering effective exploitation and utilization of power and energy in Rwanda. • Explain ways of efficient utilisation of power and energy resources in Rwanda 	<ul style="list-style-type: none"> • Show perseverance for the power shortages and its effects to the development of industries. • Show concern for appropriate utilisation of power and energy resources in Rwanda
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Information to the teacher

People depend on energy in order to change materials into a variety of products. Almost all products and devices in homes from furniture, clothes, and automobiles are made through the use of energy. Additionally, the development of any country is dependent on the availability and use of energy resources. Energy is the power required to do work. It is derived from wind, water, petroleum, coal and natural gas among other sources, mainly to provide light and heat or to drive machines.

The Government of Rwanda recognises that availability of efficient and reliable energy supply is a requirement for social, economic and political growth. For this reason, the government works closely with development partners and private organization to help in the generation, transmission and distribution of energy. Effort is also made to ensure the sustainability of energy sources for future generations.

Links to other subjects

While teaching this unit, ensure you draw a link to Power and mechanical energy sources in Physics.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) **Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) **Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) **Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.

- e) **Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) **Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.
- g) **Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross-cutting issues

Ensure that learners understand and appreciate that they need to work together in solving classroom challenges, such as reading and interpreting information on maps. This will help them work together regardless of each of their capabilities. This way, they will appreciate each other's contribution in the learning process, thereby fostering *inclusivity in learning processes*.

Environmental conservation will be an important issue raised in this unit. Let learners appreciate the need for environmental care as they discuss mining and quarrying.

Assessment criteria

By the end of this unit, the learner should be able to investigate the impact of power and energy production on sustainable development of Rwanda.

19.1, 19.2 & 19.3 ENERGY RESOURCES AND IMPORTANCE OF ENERGY IN RWANDA

Learning outcomes

By the end of this lesson, the learner should be able to:

- Define renewable and non-renewable energy
- Evaluate the importance of energy

Additional information for the teacher

Introduce learners to the topic by defining the meaning of energy as well as renewable and non-renewable sources of energy. Assign learners **Activity 19.1**, which should be done in pairs. Once learners have classified energy sources as either renewable or non-renewable sources of energy, learners should carry out a research on the types of energy that were used in the past.

Let learners discuss the importance of energy in groups using the head points on **Activity 19.2**, which are as follows:

- i. The energy sector creates direct job opportunities for those in construction of the dams, production and supply of the energy. Indirectly, there are those employed in energy related industries that supply equipment, provide repair works transport and communication among other opportunities, this raises people's standard of living.
- ii. Power is a source of revenue to the government of Rwanda through taxes generated from those employed directly or indirectly.

The Government also gains through energy pricing and direct investments in industries.

- iii. Development in the energy leads to the growth of urban centres as well as trade and commerce.
- iv. Production of power in Rwanda reduces the dependence of imported fuel such as petroleum. The country is able to focus low carbon energy for a **cleaner future**.

Preparation for teaching

Acquaint yourself with the environment around the school and make notes of the forms of energy used in Rwanda. Make detailed notes on the importance of energy. Ensure that the preparation you make will enable learners to acknowledge that there is need to study this unit.

Teaching and learning resources

- Learner's Book
- Photographs
- Rulers
- Pencils
- Chalkboard
- Tactile displays for learners with visual impairments
- Atlases
- Charts

Interactive learning and multi-ability learning

Using **Activity 19.1** as your introductory point for this type of learning, group the learners into five. You must involve slow learners and ensure that groups are made up of

learners of different abilities.

While discussing their findings, use question and answer and discussion methods ensuring that all learners participate. **This will promote cooperation** among the learners.

Let them present their findings to the class. This activity is aimed at promoting **creativity and innovativeness** as they learn new knowledge about maps as well as **cooperation** as they work together in pairs.

Guide the learner into learning correct information by giving summarised explanation as per the expected learning outcomes.

Teaching and learning methods

- Guided discovery
- Discussion
- Observation
- Question and answer

Extension/Remedial Activities

Learners should find out the renewable and non renewable sources of energy used in Rwanda.

19.4 & 19.5 PROBLEMS AND FUTURE PROSPECTS OF ENERGY IN RWANDA

Learning outcomes

By the end of this section, the learners should be able to:

- Describe problems facing energy production in Rwanda
- Outline future prospects for power

and energy production in Rwanda.

Additional information for the teacher

Introduce this lesson by reviewing the forms of energy available in Rwanda. Assign learners **Activity 19.4**. This activity will serve as an eye opener into the costs of energy in Rwanda. Explain to learners the cost implications of energy to the economy of Rwanda.

This activity will help learners to understand the problems facing energy production in Rwanda. These problems include:

- *Insufficient capital*: Production of power requires heavy capital outlay. Rwanda has limited capital to invest in power generation.
- *Shortage of skills*: Rwanda has few engineers for the Energy Sector.
- *High cost of power*: Many Rwandans cannot afford to buy power which limits power production.

Brainstorm with learners on the possible solutions to the problems facing energy production. These solutions offer a leeway into the future prospects for energy production in Rwanda.

Using **Activity 19.5**, let learners discuss the measures that the Government of Rwanda has put in place in order to ensure that production of energy improves.

The Government of Rwanda has put in place plans for improving the future of power and energy. The measures taken include:

- a) Increasing households access to electricity services with particular

- a) emphasis on remote and rural areas
- b) Intensifying regional cooperation in Eastern Africa to expand the shared hydropower projects.
- c) Working with Banks and Private agencies to supplement funds for diversifying energy sources.
- d) Strengthening education and training to gradually get more skilled personnel required in the energy sector.
- e) Lowering the energy pricing to levels that are affordable by most people.
- f) Giving subsidies to those wishing to produce energy.
- g) Diversifying sources of alternative energy such as wind, methane gas and solar so that most people can afford and reduce the reliance on wood fuel.
- h) Expanding and setting up isolated micro-hydro power stations to remote rural areas.

Preparation for teaching

Make comprehensive notes on problems facing energy production as well as future prospects of energy production in Rwanda. The notes should be simplified.

Teaching and learning resources

- a) Learner's Book
- b) Chalkboard
- c) Ensure use of appropriate materials for learners with special needs
- d) Charts

Interactive and multi-ability learning

As they discuss the problems facing

energy production, ensure that both slow and fast learners are actively involved. Ensure that learners with special needs are always catered for.

Teaching and learning methods

- a) Teacher exposition
- b) Discussion
- c) Demonstration
- d) Question and answer

Attitudes and values to be attained at the end of the lesson

The learner should thoroughly explain problems facing energy production as well as future prospects of energy production in Rwanda.

Extension/Remedial Activities

Let the learners draw the map of Rwanda showing location of hydro-electric power station in the country.

Organise a field trip to one of the hydro electric power stations within your Province, if any.

19.6 EFFICIENT UTILISATION OF POWER AND ENERGY RESOURCES IN RWANDA

Learning outcome

By the end of this section, the learner should be able to explain ways of efficient utilisation of power and energy.

Additional information for the teacher

Introduce learners to the concept of

saving energy. Let them identify ways in which energy is saved at their homes and in their school. Let them work on **Activity 19.6** in groups.

Let learners tackle **Activity 19.7** on the concept of “green energy”. This will help learners come up with a list of ways of saving energy. These include:

- a) Introduction of motivations such as 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.

Preparation for teaching

As you prepare, take into account learners with special needs. Read exhaustively about methods of conserving energy and make

summarised notes for easier content delivery.

Teaching and learning resources

- a) Photographs
- b) Chalk board
- c) charts

Interactive or multi-ability learning

Ensure the groups are made of fast and slow learners. Guide and supervise learners during group discussions. Let all learners be part of a group which has all the materials necessary for the activity.

Teaching and learning methods

- a) Guided discovery
- b) Guided discussions
- c) Question and answer
- d) Demonstration

Extension/Remedial Activities

Let learners give a step by step account about the production of biogas.

Answers to End of unit assessment

1. a) Why water is a renewable source of energy

Water can be used without reducing the quantity available for the future

b) Examples of non-renewable energy sources

Petroleum, coal, natural gas and uranium

2. Reasons why most people in Rwanda mainly use wood fuel

- i) Wood fuel is cheap.
- ii) It is readily available.
- iii) The by-products from burning wood fuel (such as ash) has numerous other uses such as being used as a preservative
- iv) Wood fuel can be found and used in many forms, including firewood, charcoal and sawdust.

3. Communities can use wood fuel effectively by investing in energy saving cooking stoves.

4. Problems that Rwanda experiences in the production of hydro-electric power:

- *Insufficient capital:* Production of power requires heavy capital outlay. Rwanda has limited capital to invest in power generation.
- *Shortage of skills:* Rwanda has few engineers for the Energy Sector.
- *High cost of power:* Many Rwandans cannot afford to buy power which limits power production.
- *Weather changes:* Changes in climatic conditions may cause flooding or reduction in water supply during dry seasons. This affects hydro-electric power production.

Key unit competence

At the end of the four lessons, the learner should be able to investigate the impact of industrial growth on sustainable development of Rwanda.

Introduction

In this unit, the following key areas of population in Rwanda will be covered:

- (i) Classification of industries
- (ii) Factors for location growth and development of industries in Rwanda
- (iii) Importance of industries in Rwanda
- (iv) Problems and effects of industrial development in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Outline the major types of industries in Rwanda. • Identify factors for location, growth and development of industries in Rwanda. • State the importance of industries to the economy of Rwanda. • Identify the problems and effects of industrial growth and development in Rwanda. 	<ul style="list-style-type: none"> • Examine factors influencing the location, growth and development of industry in Rwanda. • Describe the importance of industrial development to the economy of Rwanda. • Research on the effects of Industrial development in Rwanda. 	<ul style="list-style-type: none"> • Advocate for increased industrial location and development with special focus on environmental protection • Appreciate the importance of industrial growth in Rwanda. • Show concern for other perspectives related to industrialisation in comparison to development of other economic activities in an area

Information for the teacher

Mining, agriculture, fishing and forestry make up the **primary industries**. These activities involve extracting raw materials at the initial or primary stage. The value of primary goods is normally so low that those who depend on them in most cases do not make much income. The value of these products is increased when they are processed. At this stage we have the **secondary industries** also known as manufacturing industries. The two types of industries are supported by **service industries** such as transport, communication, trade banking and insurance.

In this unit we are concerned with the secondary industries. This is an important sector of the economy in that it provides market for primary raw materials, employment opportunities, goods for consumption and for trading with among other contributions to the economy.

Rwanda is a developing country. This implies that the country is not highly industrialised like the developing countries. However, the industrial sector is important in that it contributes significantly to the economy of the country. Most of the industries in Rwanda are agricultural based. This means that they use agricultural raw materials such as sugarcane, cotton, milk, tea and coffee. These are classified as light industries. Rwanda does not have heavy industries and has to import goods produced in heavy industries. Such goods as the machinery and vehicles found in Rwanda are imported

from countries such as Germany United Kingdom and Japan.

Generic competences

- Co-operation
- Problem solving
- Research skills
- Critical thinking
- Lifelong learning

Crosscutting issues

Industrial development if not well planned can bring about water, air and general environmental pollution. For this reason, as the learners are taken through this unit, they will appreciate the measures that are taken to ensure *environmental conservation* as industries are developed.

Pollution of air by industries that emit fumes into the atmosphere is a major cause of *global warming* and ultimately *climate change*. This is an important aspect of industrial development that investors have to put into consideration to ensure they avoid as they run their industries. The main aim of setting up an industries is to make profits. Thus the knowledge of *financial education* is one of the areas to mention in this unit.

20.1 CLASSIFICATION OF INDUSTRIES

Learning outcome

By the end of this section the learner should be able to outline the major types of industries in Rwanda.

Additional information for the teacher

Rwanda's economy is agricultural based. The level of industrialization is at a basic stage with most of the industries being those that use agricultural raw material. The industrial products are mainly for local consumption. This places the country in disadvantageous situation as far as completion in the regional or world market is concerned.

However, with limited resources, the country is making some positive strides in the development of industries. The sector is a key player in the generation of revenue for the government and in creation of employment opportunities.

At this level in school, learners have knowledge about industries and industrial products. Introduce this unit by asking them to name some of the industries that they know while also naming the products that are made in each. They can give examples from Rwanda and from other parts of the world. You may also ask them to give reasons for absence of some industries in Rwanda. In pairs, ask learners to work on **Activity 20.1**.

Preparation for the teacher

Ensure to prepare comprehensive notes and guiding questions to enable logical flow of the lesson. In addition, you need to prepare a map showing the location of the major industries so that as each type is being discussed, the specific location where it is found is identified.

Teaching/learning resources

- Recommended text books
- A map showing location of industries
- Photographs of certain industries

Interactive and multi-ability learning

Use question and answer to introduce class discussion and ensure all learners are actively involved. Ensure that slow learners are not left out. Let learners work on **Activity 20.2**.

Teaching/learning methods

- Guided discovery
- Discussion
- Question and answer

Teaching and learning activities

- Locating industrial sites on a map
- Studying photographs
- Taking notes

Extension/Remedial Activities

Ask the learners to draw a map of Rwanda showing the location of the major industries. Ask learners to work on **Activity 20.3** and present their findings before the next lesson.

20.2 FACTORS FOR LOCATION, GROWTH AND DEVELOPMENT OF INDUSTRIES IN RWANDA

Learning outcome

By the end of this section the learner should be able to explain the factors influencing the location, growth and development of industry in Rwanda.

Additional information for the teacher

This section has three terms to be considered as you take the learners through. These are *location*, *growth* and *development* of industries. Ensure you distinguish each term from the rest so that learners are able to relate each to industries in Rwanda.

Many factors come into play in determining the best place to locate an industry and whether the industry will grow or develop with time. Certain locations are determined by demands or market for a given product while others may be due to availability of raw materials. However, the level of profitability of an industry plays a key role to justify the location growth and development. For instance, a milk processing factory may start as a small factory buying milk from a few farmers. As time goes, more farmers ask to deliver milk for processing. The investor will be forced to buy more equipment and employ more people to meet the demand.

Let the learners name the industries they are familiar with and then give reasons why they think each was located where it is found. Ensure each factor given is discussed to form part of the notes to be taken. Ensure capital, market, raw material and all other relevant factors are included. Ask learners to work on **Activity 20.4**.

Preparation for teaching

Plan to divide the class into groups to work on the activity in the section.

Prepare comprehensive notes and questions to guide class discussion. Ensure you have read through the section and are familiar with the factors outlined. Ensure in your notes you not only have the general factors that influence location of industries but also specific factors for given industries in Rwanda.

Teaching/learning resources

Recommended text books, a map showing location of industries, photographs of certain industries and also photographs of some raw materials and finished products.

Interactive and multi-ability learning

Use question and answer to introduce class discussion and ensure all learners are actively involved. Ensure that slow learners are actively participating.

Teaching/learning methods

- (i) Guided discovery
- (ii) Discussion
- (iii) Question and answer

Teaching and learning activities

- Locating industrial sites on a map
- Studying photographs
- Taking notes

Extension/Remedial Activities

Ask the learners to complete the activity in the section in groups for discussion. Ask learners to work on

Activity 20.5.

20.3 IMPORTANCE OF INDUSTRIES IN RWANDA

Learning outcome

By the end of this section, the learner should be able to describe the importance of industrial development to the economy of Rwanda.

Additional information for the teacher

Begin by engaging the learners in discussing the role that industries play in Rwanda. How do individuals, the government and the society as a whole benefit from industries in Rwanda? As they answer the questions, all the points raised are put down to be used to compile notes. Let learners work on **Activity 20.6**.

When a country has many industries, it is a sign of a high level of development. Industries play a great role in creating wealth for a country through taxation and sale of the finished products. Individuals also benefit by getting employment thus improving their living standards. Other benefits are indirect. They include attracting developments like infrastructure such as roads water and electricity supplies. They also are a way of diversifying the economy so that a country is not dependant only on primary activities.

For agricultural based industries, farmers benefit in that they get market for their produce which serve as raw materials as well as benefiting if they supply foodstuff to the factory employees. Industries are a training

ground for the employees who benefit by learning new skills. There are many other reasons that industries are important to a country.

Preparation for teaching

Plan to divide the class into groups to work on the research activity on the Bralirwa breweries. Prepare comprehensive notes and questions to guide class discussion. Ensure you have read through the section and are familiar with the benefits of industries to a country. Ensure you have worked notes on specific industries to avoid generalising the benefits since some are very specific to a given industry. Organise a field trip as indicated on **Activity 20.6**.

Teaching/learning resources

Recommended text books, a map showing location of industries, photographs of certain industries and also photographs of some raw materials and finished products.

Interactive and multi-ability learning

Use question and answer to introduce class discussion and encourage the learners to have group discussions. Ensure all learners are actively involved.

Teaching/learning methods

- Guided discovery
- Discussion
- Question and answer

Teaching and learning activities

- Locating industries on a map
- Studying photographs
- Taking notes

Extension/Remedial Activities

Ask the learners to complete the research activity in the section in groups for discussion.

20.4 PROBLEMS AND EFFECTS OF INDUSTRIAL DEVELOPMENT IN RWANDA

Learning outcome

By the end of this section the learner should be able to carry out a Research on the effects of industrial development in Rwanda.

Additional information for the teacher

Begin by asking learners to work on **Activity 20.7**. Engage learners in discussing the problems and effects that industries have on the local environment and on the local communities. Although industries form an important sector of the economy, the problems resulting from their development cannot be ignored because they affect the environment, individuals and a country in general. Thus the problems can be classified as environmental, social and economic. Industries can also lead to political problems if in one way or another they are set under political influence.

Although the level of industrial development in Rwanda is still low, the few industries that exist have a role to play in problems such as environmental pollution, overexploitation of natural resources and displacement of people

as they are set up or as they expand.

Preparation for teaching

Ensure you have possible answers to the research question to be able to guide the class as the activity is discussed. Prepare comprehensive notes and questions to guide class discussion. In addition, read widely on the problems so that you exhaust all the possible problems and effects of industries. Ensure you have worked notes on specific industries to avoid generalizing on some of the problems since some are very specific to a given industry.

Teaching/learning resources

Recommended text books, photographs of certain industries and associated problems. Materials for learners with special needs.

Interactive and multi-ability learning

Use question and answer and class discussion and encourage the learners to have group discussions. Ensure all learners participate in the discussions.

Teaching/learning methods

- (i) Guided discovery
- (ii) Discussion
- (iii) Question and answer

Teaching and learning activities

- Locating industries on a map
- Studying photographs
- Taking notes

Extension/Remedial Activities

Learners to research further on the topic and complete the activity in the section.

Key unit competence

At the end of the four periods, the learner should be able to investigate the impact of transport, communication and trade on sustainable development of Rwanda.

Introduction

In this unit the main sections, to be covered are:

A. Transport and communications

- (i) Types of transport and communication in Rwanda
- (ii) Advantages and disadvantages of transport and communication systems in Rwanda
- (iii) Problems and solutions of transport and communication in Rwanda

B. Trade in Rwanda

- (i) Types of trade
- (ii) Importance of trade in Rwanda
- (iii) Problems affecting trade and possible solutions in Rwanda
- (iv) Regional and international trade partners in Rwanda

Learning objectives

As you teach this unit, you should ensure that learners acquire the knowledge, skills and attitudes outlined in the following table:

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Name types of transport and communication. • State the importance of the various types of transport and communication in Rwanda. • State the problems and solutions of transport and communication. • Identify the types and importance of trade in Rwanda. 	<ul style="list-style-type: none"> • Describe the different types of transport and communication systems in Rwanda. • Explain the advantages and disadvantages of various types of transport and communication in Rwanda. • Examine the problems resulting from land lockedness and suggest possible solutions. 	<ul style="list-style-type: none"> • Appreciate the importance of transport and communication in the development of trade. • Show concern of the land lockedness of Rwanda and a desire to develop transport and communication networks. • Appreciate the importance of trade to the economic development of Rwanda.

<ul style="list-style-type: none"> • State the problems associated with trade in Rwanda and possible solutions. • Identify regional and international trade partners of Rwanda. 	<ul style="list-style-type: none"> • Describe the trade structure in Rwanda. • Analyse the problems of trade and possible solutions to trade. 	<ul style="list-style-type: none"> • Appreciate the role played by regional and international trade partners in development of trade in Rwanda.
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Information for the teacher

Transport, communication and trade are three interrelated service industries. Together they contribute greatly to economic development of a country. If they are underdeveloped, they slow down the development processes of a country.

Transport is the physical process of carrying goods and passengers from one place to another. **Communication** is passing information from one person to another. These two are greatly needed for any country to develop. **Trade** is the buying and selling of goods and services.

For all sections of this unit, read more geographical materials concerning transport and communication in Rwanda and any other sources you can access such as TV shows, radio information, articles or even approach resourceful persons. This will equip you with sufficient information needed to tackle this unit and respond to learners' questions easily.

Go ahead to explain types of transport. Here, the Learner's Book will be found very useful. You can start by noting that they require knowledge gained in unit 3 about photograph interpretation

to comfortable handle **Activity 21.1**. Pick learner responses at random who will tell you what they see from the photograph provided in this activity.

For **activities 21.2** and **21.3**, make enough research ahead of learners for you to understand broadly about communication systems in Rwanda. to be so sure on how to guide them with their research. You have to group learners for **Activity 21.4** and appoint a group representative who will present the group work.

Activity 21.5 is meant to weigh the advantages against disadvantages of transport and communication systems in Rwanda. Make explanation for communication systems in Rwanda as you ensure that learners are actively involved.

This activity is meant to invoke imaginative thinking of the learners as each will need to assume being the Minister of infrastructure. As the minister, they will have to make a list of types of transport they would wish to develop in different parts of the country. For each type, one is supposed to advocate for or against its development in particular areas.

Activity 21.6 is about problems and solutions of transport and

communication in Rwanda. One of the major hindrances to transport between Rwanda and her neighbours is because it is landlocked. A discussion about landlockedness was initiated in Unit 6 under the general presentation. Therefore, use this background to advance the discussion on how landlockedness poses a disadvantage to doing of business in Rwanda.

Explain satisfactorily the table showing types of transport/communication, advantages and disadvantages. From here proceed to problems and solutions of transport and communication in Rwanda. You may start this section with description of Rwandan relief since it is linked to these problems. Ensure that learners have access to atlases which are a necessity in this work. With the help of **Activity 21.7**, explore the possible solutions to the problems of transport and communication.

Guide learners on **Activity 21.8**. For their research you can refer them to internet, library or resourceful people like other teachers, parents or learners in upper classes. Explain possible solutions to the problems and then tackle trade. Explain the way trade may be on a small scale (done between few people) regional or even international. This Activity requires that you help learners prepare for the field study, because it is a form of study not yet taught. Each then the basics required for field study. These skills are still necessary for **Activity 21.9**. Note that it may be necessary for you to first carry out the pilot study in a market to see

if learners will acquire skill you want them to obtain. Thereafter, you can take them out for field study. Advise them on how to politely acquire information they want from market dwellers.

Organise learners into groups for **activity 21.10**. Ensure gender sensitivity for the groups formed is respected. Explain why international trade is important in Rwandan economy. Introduce problems affecting trade and possible solutions in Rwanda. Avail learners with any material they may need for this activity. Complete your explanation for the trade problems and likely solutions.

In **Activity 21.12**, provide relevant reference materials if access to the Internet is not available. Alternatively, you can search for the materials on the Internet and discuss them with the learners. Conclude the unit by explaining other country partners Rwanda trades with. These include members of the East African Community, COMESA member countries and others such as China, Thailand, USA, Japan, Britain among others.

Links to other subjects

While teaching this unit, ensure to draw a link to Economics as far as trade is concerned and Entrepreneurship education.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) **Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) **Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) **Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.
- e) **Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) **Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of

existing information and concepts and sound judgment in developing viable solutions.

- g) **Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross cutting issues

This unit will touch on *financial education* because transport, communication and trade have everything to do with finance. Developing the three sectors requires financial planning and involves large sums of money. In trade, goods and services are exchanged mainly for money.

The unit also mentions *Genocide studies* in that transport, communication and trade came to a halt during the war. This was because the country was insecure and production of goods had stopped. Through the study of this unit, learners 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 waste products. This is causing concern worldwide.

As you teach this unit, you are not limited to the above cross cutting issues alone. It is therefore important to keep in mind other cross cutting issues that you may bring out in your diverse teaching methods and techniques as opportunity may arise and tackle cross cutting issues such as:

- (i) Comprehensive sexuality education, reproductive health, family planning, HIV and AIDS and STIs.
- (ii) Peace and values education
- (iii) Standardisation culture
- (iv) Inclusive education

21.1 TYPES OF TRANSPORT AND COMMUNICATION IN RWANDA

Learning outcomes

By the end of this section, the learners should be able to:

- a) Name types of transport and communication
- b) Describe different types of transport and communication systems in Rwanda
- c) Appreciate the importance of transport and communication in development of trade

Additional information for the teacher

Give the learners the task to define transport and communication and even to brainstorm types of transport they know. They can use a dictionary or other sources of information.

a) Types of transport in Rwanda

Referring to the map of Rwanda in Learner's Book, let them identify the major transport lines in the country. Ask them to identify the towns linked by various major roads. They should also identify towns that have airports and lake ports. You could compare the Rwandan transport lines with one of the countries of Eastern African.

As the learners work in groups on questions 1 and 3 of **Activity 21.1**. Ensure that they as much as possible share their findings with others after discussions in a class presentation. The second question of this activity should be given as further activity.

Remember, group work and discussion promotes **cooperation** while presentation develops **communication skills**.

b) Types of communication in Rwanda

Before teaching this section, first mention different forms of communication in Rwanda: first the traditional forms then the modern forms.

Working in groups, let learners explore the different systems of communication as required in **Activity 21.2**.

Divide the class into two. The first group should discuss **Activity 21.3** and the second group to discuss **Activity 21.4**. Each group should pick their team leader.

The task of each group leader will be to coordinate research on the items of study in each activity. Allow them time to discuss their findings.

However, before they present their findings, access their research findings, guide them before the lesson commences. This will only allow correct responses to be communicated. As presentations will be going on, other learners should be taking notes. Encourage questions from the rest of the class, which should be correctly be answered.

Remember, research promotes research skills while discussions promote tolerance, peaceful coexistence and cooperation.

Preparation for teaching

Ensure that you have an appropriate map of country that you wish to use to compare with Rwanda in terms of distribution of transport lines found. You also need to have comprehensive notes and questions to use as you introduce the topic to the class. Prepare a sketch map of Rwanda similar to the one that you will ask the learners to draw to show the network of major roads in the country. Acquaint yourself with the activities within this section in the Learner's Book.

Teaching and learning resources

- a) Learner's Book
- b) Wall maps
- c) Sketch map of Rwanda
- d) Photographs and Atlases

Interactive and multi-ability learning

Ensure that each learner has worked on the activities. At this point, involve the class in discussions ensuring that all members participate. You could appoint one student to lead the discussion for the activity and ensure that slow learners and those with other challenges may be appointed to lead.

Teaching and learning methods

- Guided discovery
- Group discussion
- Photograph and map analysis
- Question and answer

Teaching and learning activities

- Drawing maps
- Using the atlas locate major roads
- Studying photographs
- Question and answer
- Class presentations
- Discussion
- Taking notes

Extension/Remedial Activities

Learners should work on question 2 of **Activity 21.3** in groups and present their findings in the next lesson. However, check their books before the lesson, picking out those with correct responses. Identify at least two of them to present their answers before the class.

21.2 ADVANTAGES AND DISADVANTAGES OF TRANSPORT AND COMMUNICATION SYSTEMS IN RWANDA

Learning outcome

By the end of this section, the learners should be able to explain the advantages and disadvantages of various types of transport and communication in Rwanda.

Additional information for the teacher

Engage the learners in reviewing what has been learnt so far by asking them guiding questions. This should include the review of **Activities 21.3** and **21.4**.

In groups, let them quickly come up with their responses to **Activity 21.5**. Remember, a class presentation here after will be favourable. During the presentation, ensure you reinforce the attainment of communication skills.

Each type of transport and communication system has advantages and disadvantages and each plays a major role in development. Learners have to take each type of transport and discuss its advantages and disadvantages giving comparisons among them.

Comparing their findings develops their critical thinking. Comparison of communication systems should be done by the learners in an out of class assignment - for example, a library research assignment. However, take them through the guiding notes given in a table format in the Learner's Book.

Preparation teaching

Ensure that you have made notes by reading from different sources of information. Prepare questions to ask learners at the beginning of the lesson. Ensure you have the answers to the activities in the section. Collect relevant photographs for the lesson. Have the answers to the activity questions.

Teaching and learning resources

- (i) Learner's Book
- (ii) Sketch map of Rwanda
- (iii) Photographs of different forms of transport
- (iv) Other relevant resource materials
- (v) Atlases

Interactive and multi-ability learning

Use guiding question to initiate a class discussion. Involve the class in discussions ensuring that all members participate. Let the learners discuss the activities in groups and make presentations in class for further discussion. Ensure that slow learners and those with special needs participate in answering questions and in the discussions.

Teaching and learning methods

- a) Guided discovery
- b) Class discussion
- c) Group work
- d) Photograph analysis and interpretations
- e) Map analysis
- f) Question and answer

Teaching and learning activities

- Analysing photographs
- Question and answer
- Class presentations
- Discussions
- Taking notes

Extension/Remedial Activities

Ask learners to summarise the advantages and disadvantages of:

1. Transport systems in Rwanda
2. Communication systems in Rwanda

Let them compare the results for better understanding.

21.3 PROBLEMS AND SOLUTIONS OF TRANSPORT AND COMMUNICATION IN RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

- State the problems and solutions of transport and communication in Rwanda.
- Examine the problems resulting from land lockedness and suggest possible solutions.
- Show concern for land lockedness of Rwanda and desire to develop transport and communication networks.

Additional information for the teacher

a) Problems of transport and communication in Rwanda

Review the previous lesson briefly brainstorming with the learners about the advantages and disadvantages of transport and communication.

Remember that some people in Rwanda cannot afford to buy items such as televisions and computers due to poverty. Thus, there is a proportion of the population that has access to modern communication equipment. However some of the gadgets such as mobile phones are currently affordable and are now widespread in the country.

Engage the learners in reviewing what has been learnt so far by asking them guiding questions. Each type of

communication has disadvantages and each plays a major role in development.

Learners have to take each mode and discuss the problems and giving comparisons among each of them.

On the other hand, different forms of transport are affected by different challenges in development, maintenance and in use. Countries have different ways of dealing with challenges. In Rwanda, development of road transport is very expensive because of rugged relief. Capital required to construct roads, pipelines and airports is limited. In addition, Rwanda is landlocked and sea ports are very far. This affects transportation of imports and exports by sea. These are just a few of the problems that Rwanda faces. It is important to discuss all the problems exhaustively.

Summarise the lesson with **Activity 21.6**. Guide the learners on the responses expected from them and allow them to work in groups to come up with the answers. This activity will be found helpful as it will provoke imaginative thinking in the learners and cooperation when working together in groups.

You could get some information from the ministry of transport regarding transport in Rwanda. Read widely from different resources so that you make comprehensive notes on the problems that affect transport in Rwanda and in other countries so that you will make comparisons. Prepare questions that you will be able to guide the learners to be able to compare Rwanda and other countries. For instance: What practice

can Rwanda borrow from the other East African countries? Ensure you have the answers to the activities in the section.

b) Possible solutions of transport and communication in Rwanda

One of the solutions to transport problems is getting loans to finance construction of roads and other forms of transport. Borrowing loans has its own challenges like a country having too much debt to pay. For every solution to the problems, there is a negative side. These should be explored so that the appropriate future prospects are suggested.

Ensure that you have made notes by reading from different sources of information. Prepare questions that the learners can answer at the beginning of the lesson. Prepare the answers to the activities. In your notes, you should have a list of all possible solutions and future prospects for transport in Rwanda. Where possible acquire some government documents to get the plans that the government has put in place regarding transport in Rwanda

Use **Activity 21.7** to test the understanding of the learners. Ensure you look at the way they will have handled the research and correct wrong approaches even as you reinforce correct answers.

Teaching and learning resources

- Learner's Book
- Sketch maps
- Photographs
- Government documented laws

- Local environment
- Other relevant resource materials
- Atlases

Interactive and multi-ability learning

Begin the lesson by asking guiding questions that will motivate a discussion on solutions and prospects for transport in Rwanda. Use the guiding question to introduce a class discussion.

Ensure that all members participate while ensuring that slow learners and those with special needs participate in answering questions and in the discussions. Do not let the slow learners be overshadowed by the fast learners.

Interactive and multi-ability learning

Let the learners discuss the questions in the activities. Use guiding question to introduce class discussion. Ensure that all members participate. Ensure that slow learners and those with special needs participate in answering questions and in the discussions.

Teaching and learning methods

- Guided discovery
- Class discussion
- Question and answer

Teaching and learning activities

- a) Question and answer
- b) Class presentations
- c) Discussions and taking notes

Extension/Remedial Activities

All learners to draw two tables, one for transport and the other for communication. Each table should have two columns: one showing the problem facing either transport or communication and the other showing the possible solution to each.

Fast learners can identify problems with short-time solutions and those that require long term strategies to resolve. Ensure you check the work before the next lesson.

21.4 TRADE AND TYPES OF TRADE IN RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

1. Identify the types of trade in Rwanda
2. Describe the trade structure in Rwanda

Additional information for the teacher

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 with all its needs. Developing countries like Rwanda export mainly raw materials and imports mainly manufactured goods.

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. Give the learners the task to define trade and discuss how transport and communication facilitates trade. They can use a dictionary or other sources of information.

Research beforehand and help learners list the countries that trade with Rwanda. Let them make a list of different items exported and imported from these countries.

Preparation for teaching

Ensure that you have appropriate comprehensive notes and questions to use as you introduce the topic to the class. Your notes should include categories of trade, which are:

- Domestic (or internal) trade
- International trade

Explain the meaning of each, then ask learners to give examples of trade in each category. If time does not allow, you can give them this task as an assignment.

When discussing international trade, mention the **exports** and **imports** for Rwanda and the trading partners for the country. You should also have notes on **internal trade goods**. Ensure you have definitions of terms such as **bilateral** and **multilateral trade**.

Acquaint yourself with **Activity 21.8** in this section so that you allocate appropriate time for the **field study**.

Teaching and learning resources

- Learner's Book
- Photographs of items of trade
- Atlas maps
- Data collection tools

Interactive and multi-ability learning

Ensure that learners discuss all the types of trade in this section. Involve the class in discussions ensuring that all members participate. Ensure that slow learners and those with other challenges participate in the discussion. During the field study, ensure all learners are catered for to ensure that active participation and learning takes place.

Teaching and learning methods

- Guided discovery
- Discussion
- Photographs and real object displays and analysis
- Question and answer

Teaching and learning activities

- a) Carrying out a field study
- b) Studying photographs
- c) Observing real objects
- d) Asking/answering questions
- e) Discussions and taking notes

Extension/Remedial Activities

To encourage learners to read ahead of normal class learning, ask them to work on **Activity 21.9** in groups and write a report.

21.5 IMPORTANCE OF TRADE IN RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

- a) State the importance of trade in Rwanda.
- b) Appreciate the importance of trade to the economic development of Rwanda

Additional information for the teacher

Start by class presentations on **Activity 21.9**. In groups, let learners discuss the importance of trade in Rwanda from their findings and make class presentations.

Remember that trade promotes local production. Internal trade is important in that it encourages the producers to increase production since they are assured of market. People who are engaged in agriculture are encouraged to improve their methods of production to increase their yields so as to earn more when they sell their produce.

Trade generates income for individuals and for the country. Internal trade has an impact in generating income and improving the standards of living of individuals in a country.

Involve the learners to discuss the importance of both internal and external trade in the development of the country.

Explain the points given in the Learner's Book, by asking different learners to read out the points as you explain.

Preparation for teaching

Acquaint yourself with as much information as possible by reading from other sources of information. Ensure that you have appropriate questions to use to arouse the learners' interest in the lesson at the start. Prepare summarised points from those in the Learner's Book and from other reference materials for class discussion.

Teaching and learning resources

- Learner's Book
- Reference materials from Entrepreneurship and Economics
- Photographs
- Maps

Interactive and multi-ability learning

Use guiding question to initiate a class discussion. At this point, involve the class in discussions ensuring that all members participate. Let the learners discuss the guiding questions you will give them and make presentations. Ensure that slow learners and those with special needs participate in the discussions and in answering questions.

Teaching and learning methods

- a) Guided discovery
- b) Class discussion
- c) Group work
- d) Question and answer

Teaching and learning activities

- (i) Question and answer
- (ii) Class presentations
- (iii) Discussions
- (iv) Taking notes

Values and attitudes to be attained

The learner should appreciate the importance of trade in Rwanda.

Extension/Remedial Activities

In groups, let learners discuss how as individuals they benefit from external trade. **Group work promotes cooperation while presenting their findings enhances their communication skills.** They should research more using other sources of information.

21.6 PROBLEMS AFFECTING TRADE IN RWANDA AND THEIR POSSIBLE SOLUTIONS

Learning outcomes

By the end of this lesson, the learners should be able to:

- a) State the problems associated with trade in Rwanda and their possible solutions
- b) Analyse the problems of trade and possible solutions to trade

Additional information for the teacher

Briefly review the previous lesson. Let learners form groups of four and

discuss the problems affecting trade and their possible solutions. Allow learners to present their findings and compare them.

Discussion and group work promotes cooperation, presentation develops their communication skills and comparing their findings enhance their critical thinking.

Trade is affected by many factors. In developing countries, factors such as inadequate capital, poverty and production of primary goods are some of the factors. In Rwanda, being land locked is a major factor affecting external trade. Transport and communication are vital in promoting trade.

Remember Rwanda as a developing country faces many challenges in the sector of trade. A major challenge as discussed earlier in this unit is land locked position that makes external trade with overseas nations very expensive.

Other problems include poor transport network especially in the rural areas, produces almost similar goods with her trading partners within the East African region and lack of a common currency between Rwanda and her trading partners which forces the country to use expensive international currencies. From the information above it is clear that Rwanda has numerous challenges in trade regardless of which she is still able to participate in trade.

Engage the learners in reviewing what has been learnt so far by asking them guiding questions. Let them discuss the problems of trade in Rwanda and for each, suggest possible solution.

Preparation for teaching

Ensure that you have read on problem of trade from different reference books ensuring that you have done comparisons between Rwanda and other countries and you have comprehensive notes. Make a table showing problems and possible solutions. Ensure you have the answers to the activities in the section. Remember that Rwanda is currently a member of the East African Community. How will this help in her trade?

Also ensure that you have appropriate notes on factors affecting trade in Rwanda. Prepare guiding questions to use at the start of the lesson to bring the learners to the attention of the lesson.

Prepare a list of factors that you intend to discuss ensuring that you include specific examples in relation to trade in Rwanda. It is important to give comparisons with other countries for learners to appreciate whether the factors are specific or general.

Teaching and learning resources

- a) Learner's Book
- b) Atlas maps
- c) Other sources of information

Interactive and multi-ability learning

Learners should discuss the answers to **Activity 21.10** for *the problems affecting trade and in Rwanda*. Use guiding question to introduce class discussion. At this point, involve the class in discussions ensuring that all members participate. Ensure that slow learners and those with other

challenges participate in the discussion and in answering questions. Reinforce the knowledge gained by taking learners through the notes given in the Learner's Book. Explain the points that may seem difficult to be understood.

Assign them an activity of finding solutions to each of *the problems affecting trade in Rwanda* as discussed above. Worth noting is the need to give them background information that will form the basis of their thinking and knowledge and make this activity easier and enjoyable. Refer them to different sources of geographical information as well as the Internet where possible.

Teaching and learning methods

- (i) Guided discovery
- (ii) Class discussion
- (iii) Map analysis
- (iv) Question and answer

Teaching and learning activities

- Studying maps
- Question and answer
- Class discussions
- Taking notes

Extension/Remedial Activities

Learners should be asked to read through the sections of the topic so far. They should complete answering the questions in the activities and make notes.

21.7 REGIONAL AND INTERNATIONAL TRADE PARTNERS WITH RWANDA

Learning outcomes

By the end of this lesson, the learners should be able to:

1. Identify regional and international trade partners in Rwanda
2. Appreciate the role played by regional and international trade partners in development of trade in Rwanda

Additional information for the teacher

Let learners work on **Activity 21.11** and present their findings.

Rwanda's exports are mainly agricultural products such as tea and coffee. The others are minerals mainly tin, wolfram and cassiterite which are produced in small quantities compared to other producing countries. Some of the developed countries where Rwanda exports the goods to are Germany, China, and United States of America. The country then imports items such as machinery, construction equipment, petroleum products, fertiliser and foodstuff among others. Rwanda buys her imports mainly from Germany, Belgium, Uganda and Kenya. From the information above it is clear that Rwanda spends more money importing goods than she earns from her exports.

Engage the learners in reviewing what has been learnt so far by asking them guiding questions. Let them discuss the

items of trade both imports and exports and the earnings for Rwanda

Preparation for teaching

Ensure that you have read on balance of trade from different reference books and made notes. Make a table with types of exports and imports for Rwanda for comparison. Ensure you have the answers to the activities in the section. Collect relevant photographs for the lesson. Have the answers to the activity questions.

Teaching and learning resources

- Learner's Book
 - Photographs of items of trade
- Other relevant resource materials

Interactive and multi-ability learning

Use guiding question (such as 'What is balance of trade?') to introduce a class discussion. Involve the class in discussions ensuring that all members participate. Let the learners discuss the activities and make presentations in class for further discussion. Ensure that slow learners and those with special needs participate in answering questions and in the discussions.

Teaching and learning methods

- (i) Guided discovery
- (ii) Class discussion
- (iii) Photograph analysis
- (iv) Question and answer

Teaching and learning activities

- a) Analysing photographs
- b) Question and answer
- c) Class presentations
- d) Discussions and taking notes

Values and attitudes to be attained

The learner should show continual desire to acquire entrepreneurial skills in trade for the development of Rwanda.

Extension/Remedial Activities

Let learners work on the **End of Unit Revision Exercise**. Encourage learners to read further on this topic area. Guide them to the relevant reference books for further reading and making notes.

Key unit competence

To be able to investigate the impact of tourism on sustainable development of Rwanda.

Introduction

In this unit the main sections to be covered are:

- (i) Definition of tourism
- (ii) Tourist sites in Rwanda (historical and natural sites)
- (iii) Factors for tourism development in Rwanda
- (iv) Importance of tourism industry to the economy of Rwanda
- (v) Problems affecting tourism and possible solutions in Rwanda
- (vi) Relationship between tourism in Rwanda and regional countries: Kenya, Uganda and Tanzania

Learning objectives: As you teach this unit, you should ensure that learners acquire the following skills, values and attitudes.

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> • Identify the different tourist attractions in Rwanda. Identify the importance of tourism to the economy of Rwanda. • Explain the problems and future prospects of tourism in Rwanda. • Identify the relationship between tourism in Rwanda with regional countries: Kenya, Uganda, Tanzania. 	<ul style="list-style-type: none"> • Compare the various tourist potentials in Rwanda with those other countries. • Evaluate the importance of tourism in Rwanda. • Analyse the problems affecting tourism and suggest possible solutions. • Analyse the relationship between tourism in Rwanda with regional countries. 	<ul style="list-style-type: none"> • Appreciate the importance of tourism to the economic development of Rwanda. • Appreciate the reasons advanced in favour of conservation of tourism potentials in Rwanda. • Propose the solutions to problem of tourism in Rwanda. • Relate development of tourism in Rwanda with regional countries.

Information for the teacher

Tourism is one of the many economic activities carried out in Rwanda. It involves people travelling within a country or visiting other countries simply for relaxation or adventure. It is an important economic activity in that foreign tourists are a source of foreign exchange for the country visited. These tourists come with their money to buy goods and pay for services in the country they visit. Without foreign exchange a country would not be able to buy imports since they are not paid for using local currency. Local tourists are charged fees as they visit tourist sites and the government gets part of the money through taxes.

Links to other subjects

While you teach this unit, ensure you draw a link to trade in Economics and Entrepreneurship.

Generic competences

In this unit, ensure that you achieve one or a combination of the following generic competences:

- a) **Critical thinking:** This is the ability of the learner to think imaginatively and evaluate ideas in a meaningful way before arriving at a conclusion. It is also the ability to make appropriate decisions based on experience and relevant learning.
- b) **Creativity and innovation:** This is thinking beyond what is provided in order to generate new ideas to enrich learning. It also includes generating new ideas and applying them in learning situations.
- c) **Problem solving:** In some cases, the learner will be required to be resourceful by finding answers to questions and solutions to problems. This competence is also achieved when a learner is able to explain phenomena based on findings from information gathered or provided.
- d) **Communication skills:** This involves comprehending language through listening and reading, using oral and written language to discuss, argue and debate a variety of themes in a logical manner and exchanging ideas confidently and effectively.
- e) **Lifelong skills:** This is described as coping with evolution of knowledge and technology advances for personal fulfillment. It is also exploiting all opportunities available to improve on knowledge and skills.
- f) **Research skills:** This is being resourceful in finding answers to questions and solutions to problems as well as producing new knowledge based on research of existing information and concepts and sound judgment in developing viable solutions.
- g) **Cooperation:** Adapting to different situations including the world of work and practicing respect for rights, views and feelings of others.

Cross cutting issues

The study of tourism is basically a study of a major environmental component.

If we misuse our forests, wild animals and beautiful tourist attractions life on earth will cease to exist. As such, this study will to a large extent include *environment conservation and sustainability* in general and *conservation of tourist attraction sites* in particular. In addition, learners will appreciate this unit as preparation for career in the field of Tourism. 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 conservation of tourist attraction sites and importance of tourism to the economy of Rwanda all which have financial implications.

As you teach this unit, you are not limited to the above cross cutting issues alone. It is therefore important to keep in mind other cross cutting issues that you may bring out in your diverse teaching methods and techniques as opportunity may arise:

- a) Genocide studies
- b) Comprehensive sexuality education, reproductive health, family planning, HIV and AIDS and STIs.
- c) Peace and values education
- d) Standardisation culture
- e) Inclusive education

Assessment criteria

By the end of this unit, the learner should be able investigate the impact of tourism on sustainable development of Rwanda.

End of unit notes

Emphasise key skills, values and attitudes to be attained at the end of each section. Also, sensitise the learners on the cross cutting issues that can be linked to this unit.

22.1 DEFINITION OF TOURISM

Learning outcomes

By the end of this sub-topic the learner should be able to:

- Define tourism
- Identify tourist attractions in Rwanda

Additional information for the teacher

This is an area that requires use of the local environment for learners to identify different tourist sites. This is the starting point on reference which will be made when teaching the rest of the unit. Thus, using the principle of teaching/learning from known to unknown.

Ask learners to work on **Activity 22.1** and ask them to make class presentation on the same. Ensure as many of them as possible have given their presentations and all class members have participated in the discussions on each presentation.

Tourism is travelling to visit a place for relaxation, recreation and leisure usually for a short period of time. When people travel as tourists within their own country, this is referred to as *domestic tourism*. Travelling to another country as tourists is referred to as *international tourism*. Rwanda's tourist sites are visited by both domestic and international tourists.

Preparation for teaching

Ensure that you have appropriate maps of the countries that you wish to use to compare with Rwanda in terms of tourism. You also need to have comprehensive notes and questions to use as you introduce the topic to the class. Prepare a sketch map of Rwanda similar to the one that you will ask the learners to draw to show the major tourist attractions sites in the country.

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.

Safety

In case you need to use the local environment to for the class to see the resources in their natural state it is important to ensure that care is taken as the learners walk to areas away from the school compound. Steep slopes should be avoided.

Teaching/learning resources

Maps showing locations of tourist attraction sites, text books, photographs and teachers' guide.

Interactive learning

Ensure you pair learners of different abilities as they work on the activities. During class presentations, all learners should make contributions.

Teaching/learning methods

- Guided discovery
- Question and answer
- Researching
- Class presentations

- Discussions

Extension/Remedial Activities

Learners should be asked draw a map of Rwanda showing major tourist attraction sites in Rwanda. Ask learners to read further from available documents and researching from the Internet.

22.2 TOURIST SITES IN RWANDA (HISTORICAL AND NATURAL SITES)

Learning outcome

By the end of this sub-topic the learner should be able to identify the different tourist attraction sites in Rwanda.

Additional information for the teacher

Review the previous lesson by asking learners to define tourism. Let them brainstorm on major tourist attraction sites in Rwanda.

Rwanda has different types of tourist attractions which attract both local and foreign tourists. Some of the sites are historical in that they were developed way in the past and have been in existence for many years. Others are natural features which include landforms and wildlife.

Let learners use their atlases to locate these sites.

Preparation for teaching

Ensure that you have appropriate maps of the countries that you wish to use to compare with Rwanda in terms

of tourism. You also need to have comprehensive notes and questions to use as you introduce the lesson to the class. Prepare a sketch map of Rwanda similar to the one that you will ask the learners to draw to show the major tourist attractions sites in the country.

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.

Safety

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.

Teaching/learning resources

- (i) Local environment
- (ii) Atlas maps
- (iii) Photographs
- (iv) Local environment
- (v) Text books

Interactive and multi-ability learning

Ensure you pair learners of different abilities as they work on the activities. During class presentations, all learners should make contributions.

Teaching/learning methods

- Guided discovery
- Question and answer
- Researching
- Class discussions
- Presentations

Extension/Remedial Activities

Ask learners to work on **Activity 22.2**.

Reading further from available documents and researching from internet and other available relevant materials.

22.3 FACTORS FOR TOURISM DEVELOPMENT IN RWANDA

Learning outcome

By the end of this lesson, the learners should be able to explain factors for tourism development in Rwanda.

Additional information for the teacher

Review the previous lesson by asking learners to name the tourist attraction sites in Rwanda.

Ask learners to work on **Activity 22.3**. Allow them to present their findings.

Preparation for teaching

Ensure you identify appropriate areas within the local environment where learners can visit to learn practically. Make appropriate notes to guide the learners during class discussions.

Safety

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.

Teaching/learning resources

- Local environment
- Atlases
- Maps
- Photographs of the various tourist attraction sites
- Learner's Book

Interactive learning

Ensure all the learners of different abilities take part during class presentations, all learners should make contributions while at sites outside the classroom.

Suggested teaching/learning methods

- Teacher exposition
- Question and answer
- Researching from local environment
- Class discussions and presentations
- Note taking

Extension/Remedial Activities

Let learners engage in further reading from available relevant documents and researching from internet and other available relevant materials.

22.4 IMPORTANCE OF TOURISM INDUSTRY TO THE ECONOMY OF RWANDA

Learning outcome

By the end of this lesson, the learners should be able to explain the importance of tourism to the economy of Rwanda.

Additional information for the teacher

Organise a field trip to the nearest museum to study the role of tourism in the economy of Rwanda. Ask learners to work on **Activity 22.5**.

Preparation for teaching

Ensure you make preparations for a visit to the nearest museum. Put in place the necessary logistics with your school's administration as well as the museum's management.

Safety

Ensure learners are well guarded during any outdoor learning session. Avoid steep areas and any other areas where accidents could easily occur.

Teaching/learning resources

- Local environment
- Atlas maps
- Photographs
- Text books

Interactive learning

Ensure all the learners of different abilities take part during class presentations, all learners should make contributions while at sites outside the classroom and during class presentations.

Teaching/learning methods

- Teacher exposition
- Question and answer
- Researching from local environment
- Class discussions and presentations
- Note taking

Extension/Remedial Activities

Let learners engage in further reading from available relevant documents and researching from internet and other available relevant materials.

22.5 PROBLEMS AFFECTING TOURISM AND POSSIBLE SOLUTIONS IN RWANDA

Learning outcome

By the end of this lesson, the learners should be able to explain the problems and future prospects of tourism in Rwanda.

Additional information for the teacher

Review the previous lesson by asking learners to explain the importance of tourism in Rwanda. Ask learners to discuss in groups the problems affecting tourism in Rwanda and their possible solutions.

Preparation for teaching

Ensure that you have appropriate maps. You also need to have comprehensive notes and questions to use as you introduce the lesson to the class.

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.

Safety

Ensure learners are well guarded during any outdoor learning session. Avoid steep areas and any other areas where accidents could easily occur.

Teaching/learning resources

- Local environment
- Atlas
- Maps
- Photographs
- Text books

Interactive learning

Ensure all the learners of different abilities take part during class presentations, all learners should make contributions while at sites outside the classroom.

Teaching/learning methods

- a) Guided discovery
- b) Question and answer
- c) Researching from local environment
- d) Class discussions and presentations
- e) Note taking

Extension/Remedial Activities

Let learners engage in further reading from available relevant documents and researching from internet and other available relevant materials.

22.6 RELATIONSHIP BETWEEN TOURISM IN RWANDA AND REGIONAL COUNTRIES (KENYA, UGANDA AND TANZANIA)

Learning outcome

By the end of this lesson, the learners should be able to evaluate the relationship between tourism in Rwanda with regional countries: Kenya, Uganda and Tanzania.

Additional information for the teacher

Use **Activity 22.7** to teach this lesson. Ask learners to work in groups and guide them. Allow learners to present their work.

Preparation for teaching

Make appropriate notes to guide the learners during class discussions. Apart from the suggested activity, you are advised to come up with any other relevant practical activities that you can engage learners in.

Safety

Ensure learners are well guarded during any outdoor learning sessions. Avoid steep areas and any other areas where accidents could easily occur.

Teaching/learning resources

- Local environment including areas where forests are planted or farms that have proper soil care
- Atlas maps
- Photographs of the various aquatic living organisms
- Text books

Interactive and multi-ability learning

Ensure all the learners of different abilities take part during class presentations on **Activity 22.7** and any other activity, all learners should make contributions while at sites outside the classroom.

Teaching/learning methods

- Guided discovery
- Question and answer

- Map drawing
- Researching from local environment
- Class discussions and presentations
- Note taking

Extension/Remedial Activities

Let learners engage in further reading from available relevant documents and researching from internet and other available relevant materials

Ask learners to work on the End of unit exercise.

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