SCIENCE AND ELEMENTARY TECHNOLOGY (SET)

PRIMARY FIVE

(P5)

TEACHER'S GUIDE

Adapted Edition

Kigali, 2022

FOREWORD

Dear teacher,

Rwanda Basic Education Board is honoured to present to you the Primary 5 Science and Elementary Technology Teacher's Guide which serves as a guide to competence-based teaching and learning to ensure consistency and coherence in the learning of Science and Elementary Technology 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 teacher's 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 teacher, 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 tothe nation.

This is in contrast to traditional learning theories which view learning mainly as a process of acquiring knowledge from the more knowledgeable person 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 learners whereconcepts are mainly introduced by an activity or situation that helpsthe learners 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. Inview of this, your role is to:

- Plan your lessons and prepare appropriate teaching and learning materials.
- Organize group discussions for learners considering the importance of social constructivism suggesting that learning occurs more effectively when the

learners work collaboratively with more knowledgeable and experienced people.

- Engage learners through active learning methods such as inquirymethods, 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. It is divided in 3 parts:
The part 1: Explains the structure of this Teacher's guide and gives you the methodological guidance;
The part 2: Gives the sample lesson plans as reference for your lesson planning process;
The part 3: Provides the teaching guidance for each concept given in the Pupil's book.
Even though this teacher's guide contains the answers to all activities given in the student's book, you are requested to work through each question and activity before judging learner's findings.
I wish to sincerely appreciate all people who contributed towards the development, translation and adaptation of this teacher's guide, particularly REB staff who organized the whole process from its inception. Special gratitude goes to translators, illustrators and designers who diligently worked to successful completion of this teacher's guide. Any comment or contribution would be welcome for the improvement of this teacher's guide for the next edition.

Dr. MBARUSHIMANA Nelson
Director General, REB

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Joan MURUNGI

Head of Curriculum, Teaching and Learning Resources Department/ REB

PART I: GENERAL INTRODUCTION

1.0. About the Teacher's guide

This book is a teacher's guide for Primary Three Science and Elementary Technology subject. It is designed to accompany Pupil's book and intends to help teachers in the implementation of competence-based curriculum specifically Science and Elementary Technology syllabus.

As the name says, it is a guide that teachers can refer to when preparing their lessons. Teachers may prefer to adopt the guidance provided but they are also expected to be more creative and considertheir specific classes' contexts and prepare accordingly.

1.1. The structure of the guide

This section presents the overall structure, the unit and sub-headingstructure to help teachers to understand the different sections of thisguide and what they will find in each section.

Overall structure

The whole guide has three main parts as follows:

Part I: General Introduction

This part provides general guidance on how to develop the generic competences, how to integrate cross cutting issues, how to cater for studentswith special educational needs, active methods and techniques of teaching Science and Elementary Technology and guidance on assessment.

Part II: Sample lesson plan

This part provides a sample lesson plan, developed and designed to help the teacher develop their own lesson plans.

Part III: Unit development

This is the core part of the guide. Each unit is developed following thestructure below:

Each unit is made of the following sections:

- **Unit title:** from the syllabus

- Key unit competence: from the syllabus

- Prerequisites (knowledge, skills, attitudes and values)

This section indicates knowledge, skills and attitudes required for the success of the unit. The competence-based approach calls for connections between units/topics within a subject and interconnections between different subjects. The teacher will find an indication of those prerequisites and guidance on how to establish connections.

- Cross-cutting issues to be addressed

This section suggests cross cutting issues that can be integrated depending on the unit content. It provides guidance on how to comeup with the integration of the issue. Note that the issue indicated is a suggestion; teachers are free to take or add another cross-cutting issuetaking into consideration the learning environment.

- List of lessons

This section presents in a table the list of suggested lessons, lesson objectives copied or adapted from the syllabus and duration for each lesson.

- Teaching approach for each lesson

In this section, each lesson is developed by describing how it will be conducted in classroom. Note that it is a proposal which leaves the room to the teacher of adapting the lesson to the context of the class and school environment. Each lesson development shows the lesson objectives, teaching and learningmaterials, teaching and learning activities, conclusion of the lesson and assessment of the lesson.

- Additional information for the teacher

This part gives the teacher additional content and advanced knowledge onthe unit to be taught. Remember that the teacher must have more knowledge and understanding beyond the content or topic in the syllabus and Pupil's book.

- Answers to End of unit assessment

This part provides answers or guidance to questions of the end of unit assessment in the Pupil's book and suggests additional questions and related answers to assess the key unit competence.

- Additional activities (remedial, consolidation and extended activities)

The purpose of these activities is to accommodate each learner (slow, average and gifted) based on end of unit assessment results.

Structure of each lesson

Each lesson is made of the following sections:

Lesson title 1: ……

- Lesson objectives

- Teaching and learning resources

This section suggests the teaching aids or other resources needed in line with the activities to achieve the learning objectives. Teachers are encouraged to replace the suggested teaching aids by the available ones in their respective schools and based on learning environment.

- Teaching and Learning activities

This section provides a short description of the methodology and any important aspect to consider. It provides also answers to learning activities with cross reference to Pupil's book.

- Assessment and Conclusion

This provides guidance on how to conduct assessment and support learners to make a conclusion or summary of what they learned.

Note: The guide ends with references.

1.2. Methodological guidance

1.2.1. Developing competences

Since 2015, Rwanda shifted from a knowledge based to a competence-based curriculum for pre-primary, primary and general secondary education. For TTCs, it is in 2019 that the competence-based curriculum was embraced. Thiscalled for changing the way of learning by shifting from teacher centered to a learner centered approach. Teachers are not only responsible for knowledge transfer but also for fostering pupil's learning achievement, and creating safe and supportive learning environment. It implies also that a learner has to demonstrate what he/she is able to

do using the knowledge, skills, values and attitudes acquired in a given situation.

The competence-based curriculum employs an approach of teaching and learning based on discrete skills rather than dwelling on only knowledge or the cognitive domain of learning. It focuses on what learners can do rather than what they know. Learners develop basic competences through specific subject unit competences with specific learning objectives broken down into knowledge, skills and attitudes. These competences are developed through learning activities disseminated in learner-centered rather than the traditional instructive approach. The learner is evaluated against set standards to achieve before moving on.

In addition to specific subject competences, learners also develop generic competences which are transferable throughout a range of learning areas and situations in life.

Below are examples of how generic competences can be developed in Scienceand Elementary Technology:

Generic competence	**Examples of activities that develop genericcompetences**
Critical thinking	These activities require learners to think critically about subject content. These may include: Work in groups in different ways e.g. taking turns,listening, taking decisions, Observe and analyse. Example: mark out areas in the school and get different groups to record livingthings like insects, people, animals, birds Discuss and give scientific reasons of phenomenon commonly known like sun shining, raining, changing colours for plants, e.t.c. Observe, record, interpret data recorded during experiments Identify and use the applications of Science and Elementary Technology concepts to solve problems of life and society

Research and Problem solving	Research using internet or books from the library Design a project for making toys and materials
Innovation and creativity	Create an experiment procedure to prove a point Making practice in different units - Conduct experiments with objectives, methodology,observations, results, conclusions - Identify local problems and ways to resolve them
Cooperation, Personal and Interpersonal management and life skills	Work in Pairs Small group work Large group work
Communication	Telling a story related to the lesson of SET needed to be studied Presenting ideas verbally or in writing Reading a text related to SET
Lifelong learning	Take initiative to update knowledge and skills with minimum external support Cope with the evolution of knowledge and technology advances for personal fulfilment Seek out acquaintances more knowledgeable in areas that need personal improvement and development Exploit all opportunities available to improve knowledge and skills in SET.

1.2.2. Addressing cross cutting issues

Among the changes in the competence-based curriculum is the integration of cross cutting issues as an integral part of the teaching/learning process as they relate to and must be considered within all subjects to be appropriately addressed. The eight cross cutting issues identified inthe national curriculum

framework are: genocide studies, environment and sustainability, gender, Comprehensive Sexuality Education (CSE), Peace and Values Education, Financial Education, standardization Culture and Inclusive Education.

Some cross cutting issues may seem specific to particular learning areas or subjects but the teacher needs to address all of them whenever an opportunity arises. In addition, student should always be given an opportunity during the learning process to address these cross cutting issues both within and out of the classroom so as to progressively develop related attitudes and values.

Below are examples on how crosscutting issues can be addressed in Science and Elementary Technology:

Cross-cutting issues	**Examples on how to integrate the cross-cutting issues**
Inclusive education	Involve all learners in all activities without any bias. Eg: Allow a learner with physical disability (using wheelchair) to take notes or lead the team during a task or an experiment.
Gender	Involve both girls and boys in all activities: No activity is reserved only to girls or boys. Teacher should ensure equal participation of both girls and boys during activities as well as during cleaning activities after practical tasks.
Peace and Values Education	During group activities, the teacher will encourage learners to help each other. During all teaching and learning activities, texts and examples used by the teacher should reflect promotion of peace and values among them at school and with others in society.
Standardizationculture	- Some lessons involve carrying out practical tasks. Instructions should be clear for learners to always check if they are using appropriate materials. - Through making quality work/objects which areattractive to the community.

Environment and sustainability	In order to avoid the environment pollution, before, during or after practical tasks, learners should avoid throwing wastes anywhere; special places or appropriate containers should be used. During field visits, learners should be reminded of not damaging or destroying environment components or of not throwing wastes in environment.
Financial Education	When making toys and objects for example, learners are encouraged to use well the resources by using the quantities that are just required. Using materials, tools and materials in proper way for safe guarding their durability Making different objects that can be sold.

1.2.3. Attention to special educational needs specific to teaching and learning SET subject

In the classroom, pupils learn in different way depending to their learning pace,needs or any other special problem they might have. However, the teacher has the responsibility to know how to adopt his/her methodologies and approaches inorder to meet the learning needs of each pupil in the classroom. Also, teacher must understand that learners with special needs need to be taught differently or need some accommodations to enhance the learning environment. This will be done depending on the unit and the nature of the lesson.

In order to create a well-rounded learning atmosphere, teacher needs to:

- Remember that pupils learn in different ways so they have to offer a variety of activities (e.g. role-play, music and singing, word games and quizzes, and outdoor activities).
- Maintain an organized classroom and limits distraction. This will help learners with special needs to stay on track during lesson and follow instructions easily.
- Vary the pace of teaching to meet the needs of each learner. Some learners

process information and learn more slowly than others.

- Break down instructions into smaller, manageable tasks. Learners with special needs often have difficulty understanding wordy or several instructions at once. It is better to use simple, concrete sentences in order to facilitate them understand what you are asking.
- Use clear consistent language to explain the meaning (and demonstrate or show pictures) if you introduce new words or concepts.
- Make full use of facial expressions, gestures and body language.
- Pair a learner who has a disability with a friend. Let them do things together and learn from each other. Make sure the friend is not over protective and does not do everything for the learner. Both learners will benefit from this strategy.
- Use multi-sensory strategies. As all pupils learn in different ways, it is important to make every lesson as multi-sensory as possible. Pupils with learning disabilities might have difficulty in one area, while they might excel in another. For example, use both visual and auditory cues.

Below are general strategies related to each main category of disabilities and how to deal with every situation that may arise in the classroom. However, the list is not exhaustive because each learner is unique with different needs and that should be handled differently.

Strategy to help learners with developmental impairment

The teacher should:

- Use simple words and sentences when giving instructions.
- Use real objects that the learner can feel and handle, rather than just working abstractly with pen and paper.
- Break a task down into small steps or learning objectives. The learner should start with an activity that s/he can do already before moving on to something that is more difficult.

- Gradually give the learner less help.
- Let the learner work in the same group with those without disability.

Strategy to help learners with visual impairment

The teacher should:

- Help learners to use their other senses (hearing, touch, smell andtaste) to play and carry out activities that will promote their learning and development.
- Use simple, clear and consistent language.
- Use tactile objects to help explain a concept.
- If the learner has some sight problem, ask him/her what they can see. Get information from parents/caregivers on how the learner manages their remaining sight at home.
- Make sure the learner has a group of friends who are helpful and who allow them to be as independent as possible.
- Plan activities so that learners work in pairs or groups whenever possible.

Strategy to help learners with hearing impairment

The teacher should:

- Set strategies to help learners with hearing disabilities or communication
- difficulties
- Always get the learners' attention before you begin to speak.
- Encourage the learners to look at your face.
- Use gestures, body language and facial expressions.
- Use pictures and objects as much as possible.
- Ask the parents/caregivers to show you the signs they use at home for communication. Use the same signs and encourage other learners to also use them.
- Keep background noise to a minimum.

Strategies to help children with physical disabilities or mobility difficulties

The teacher should:

- Adapt activities so that learners who use wheelchairs or other mobility
- aids, or other learners who have difficulty moving, can participate.
- Ask parents/caregivers to assist with adapting furniture e.g. The height of a table may need to be changed to make it easier for a learner to reach it or fit their legs or wheelchair under.
- Encourage peer support. Friends can help friends.
- Get advice from parents or a health professional about assistive devices.

1.2.4. Guidance on assessment

Each unit in the Teacher's guide provides additional activities to help learners achieve the key unit competence. Results from assessment inform the teacher which learner needs remedial, consolidation or extension activities. These activities are designed to cater for the needs of all categories of learners; slow, average and gifted respectively.

Assessment is an integral part of teaching and learning process. The main purpose of assessment is for improvement. Assessment for learning/ Continuous/ formative assessment intends to improve learners' learning and Teacher's teaching whereas assessment of learning/summative assessment intends to improve the entire school's performance and education system in general.

Continuous/ formative assessment

It is an ongoing process that arises out of interaction during teaching and learning process. It includes lesson evaluation and end of sub unit assessment. This formative assessment plays a big role in teaching and learning process. The teacher should encourage individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.

In Primary Three, formative assessment principle is applied through application

activities that are planned in each lesson to ensure that lesson objectives are achieved before moving on. At the end of each unit, the end of unit assessmentis formative when it is done to give information on the progress of learners and from there decide what adjustments need to be done. Assessment standards are taken into consideration when setting tasks.

Summative assessment

The assessment done at the end of the term, end of year, is considered as summative. The teacher, school and parents are informed on the achievementof educational objectives and think of improvement strategies. There is also end of level/ cycle assessment in form of national examinations.

1.2.5. Pupils' learning styles and strategies to conduct teaching and learning process

There are different teaching styles and techniques that should be catered for. The selection of teaching method should be done with the greatest care and some of the factors to be considered are: the uniqueness of subjects, the type of lessons, the particular learning objectives to be achieved, the allocated time to achieve the objective, available instructional materials, the physical/sitting arrangement of the classroom, individual learner's needs, abilities and learning style.

There are mainly four different learning styles as explained below:

a) Active and reflective learners

Active learners tend to retain and understand information best by doing something active with it, discussing or applying it or explaining it to others. Reflective learners prefer to think about it quietly first.

b) Sensing and intuitive learners

Sensing learners tend to like learning facts while intuitive learners often prefer discovering possibilities and relationships. Sensors often like solving problems by well-established methods and dislike complications and surprises; intuitive learners

like innovation and dislike repetition.

c) Visual and verbal learners

Visual learners remember best what they see (pictures, diagrams, flow charts, time lines, films, demonstrations, etc.); verbal learners get more out of words (written and spoken explanations).

d) Sequential and global learners

Sequential learners tend to gain understanding in linear steps, with each step following logically from the previous one. Global learners tend to learn in large jumps, absorbing material almost randomly without seeing connections, and then suddenly "getting it."

1.2.6. Teaching methods and techniques that promote theactive learning

The different learning styles mentioned above can be catered for, if the teacher uses active learning whereby learners are really engaged in the learning process.

What is Active learning?

Active learning is a pedagogical approach that engages students in doing things and thinking about the things they are doing. In active learning, learners are encouraged to bring their own experience and knowledge into the learning process.

The role of the teacher in active learning

- The teacher engages learners through active learning methods such as inquiry methods, group discussions, research, investigative activities and group and individual work activities.
- He/she encourages individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.
- He provides supervised opportunities for learners to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation.
- Teacher supports and facilitates the learning process by valuing learners'

contributions in the class activities.

The role of learners in active learning

Learners are key in the active learning process. They are not empty vessels to fill but people with ideas, capacity and skills to build on for effective learning.

A learner engaged in active learning:

- Communicates and shares relevant information with other learners through presentations, discussions, group work and other learner- centred activities (role play, case studies, project work, research and investigation).
- Actively participates and takes responsibility for their own learning.
- Develops knowledge and skills in active ways.
- Carries out research/investigation by consulting print/online documents and resourceful people, and presents their findings.
- Ensures the effective contribution of each group member in assigned tasks through clear explanation and arguments, critical thinking, responsibility and confidence in public speaking.
- Draws conclusions based on the findings from the learning activities.

Some active techniques that can be used in Science and Elementary Technology

The teaching methods strongly emphasised in the competence Based Curriculum (CBC) are active methods. Below are some active techniques that apply in sciences:

A. Practical work/ experiments:

Many of the activities suggested in the Science and Elementary Technology curriculum as well as in the Pupil's book are practical work or experiments.

Practical work is vital in learning Science and Elementary Technology;this method gives the learner the opportunity to implement a series of activities and leads to the development of both cognitive and hands-on skills. The experiments and questions given should target the developmentof the following skills in learners:

observation, recording and report writing,manipulation, measuring, planning and designing. Most of experiments or practical activities suggested in the syllabus of SET are developed in step-by-step guidance in a booklet called **"SET Practical activities user guide"** to be used while facilitating such practical activities.

A practical lesson/Experiment is done in three main stages:

- **Preparation of practical lesson/ experiment:** Checking materials to ensure they are available and in a good state; try the task before the lesson; think of safety rules and give clear instructions.
- **Performance of practical lesson/ experiment:** Sitting or standing arrangement of learners; introduction of the experiment: aims and objectives; setting up the materials; performing the experiment; write and record the data.
- **Discussion:** Observations and interpreting data; make generalisations and assignment: writing out the experiment report and further practice and research.

In some cases, demonstration by the teacher is recommended when for examplethe experiment requires the use of sophisticated materials or very expensive materials or when safety is a major factor like dangerous experiments and it needs specific skills to be learnt first.

In case your school does not have enough science kit materials, experiments can be done in groups but make sure every learner participates.

B. Project work

Science and Elementary Technology teachers are encouraged to sample and prepare project works and engage their learners in, as many as possible. Learners in groups or individually, are engaged in a self-directed work for an extended period of time to investigate and respond to a complex question, problem, or challenge. Projects are based on real-world problems that capture learners' interest. This technique develops higher order thinking as the learners acquire and apply new knowledge in a problem-solving context.

C. Field trip

One of the main aims of teaching Science and Elementary Technology inRwanda is to

apply its knowledge for development. To achieve this aim, we need to show to learners the relationship between classroom science lessons and applied sciences. This helps them see the link between science principles and technological applications.

To be successful, the field visit should be well prepared and well exploited after the visit:

Before the visit, the teacher and learners:

- agree on aims and objectives
- gather relevant information prior to the visit
- brainstorm on key questions and share responsibilities
- discuss materials needed and other logistical and administrative issues
- discuss and agree on accepted behaviours during the visit
- Visit the area before the trip, if possible, to get familiar with the place

After the visit

When learners come back from trip, the teacher should plan for follow-up. The follow-up should allow learners to share experiences and relate them to the prior science knowledge.

Alternate Teaching Approach

The 5Es

This "5Es" is a constructivist approach based on the idea that learners learn best when they participate in activities that give them opportunities to work things out for themselves. As the names suggests, there are five phases: engage, explore,explain, elaborate and evaluate.

1. Engage

In this phase:

- Teachers engage learners in activities that capture their interests and

- stimulate curiosity,
- Learners raise questions,
- Teachers verify learners' prior understandings of the topic,
- Learners compare ideas.

2. Explore

In this phase learners undertake hands-on activities where they:

- Experience the phenomenon or concept,
- Explore the questions they have raised, test their ideas and solve problems.

3. Explain

Only after learners have had opportunities to explore, they have opportunities to:

- Compare their ideas with scientific explanations,
- Use scientific terminology,
- Construct explanations that can be justified using information collected.

4. Elaborate

In this phase learners have opportunities to:

- Apply what they have learnt to new contexts,
- Develop a deeper understanding of the problem or phenomenon as they discuss and compare ideas.

5. Evaluate

In this phase learners and the teacher:

- Look for evidence of changes in learners' ideas, beliefs and skills,
- Evaluate what learners know and can do.

Example of the 5Es teaching and learning approach

Phase of teaching and learning approach	Examples of teaching and learning activities	Sample Questions

1. Engage Create interest Reveal personal ideasand beliefs	Brainstorming, concept mapping, developing questions, demonstra- tions, asking open-end- ed questions.	What do you mean by . . .?Tell me more about . . .? I find that hard to understand: tell me.....? What makes you think . . .?How do you know . . .? How did you find out about that idea?
2. Explore Explore questions and test learner's ideas	Prioritise class ques- tions, group tasks, investigations, test ideas,research.	How are you going to . . .? How will you be able to tell . . .? Is that the question you really want toask . . .? What will you do when. . .? It might be a good idea to think about..... ? How will you know it ..... ? What do you need to find out moreabout ? Why are you doing it that way? How will you be sure it is a fair test....? How did you arrive at that idea?
3. Explain Compare ideas Construct explana- tions and justify them in terms of observa- tions and data	Reporting, group discus- sion, gathering information.	What do you think others might thinkabout this . . .? How is that idea different to . . .? Some people say . . . Does that fit with your idea . . .? How did you arrive at that idea . . .?How will you be able to tell . . .?

4. Elaborate Apply concepts and explanations in new contexts	Further practical work, videos, debates, research.	Same as the *explore* phase. How could you verify that . . .? What will happen if . . .?
5. Evaluate Gather evidence of changes in learners' ideas, beliefs and skills	Refining concept maps, responding to open-ended questions, reflection.	How have your ideas changed . . .? How is that different to . . .? It seems you are not sure about . . . Do you have any questions about . . .? What have you found out? What else do we need to know . . .? What else might you do to be reallysure of that. . .?

Main steps for a lesson in active learning approach

All the principles and characteristics of the active learning process highlighted above are reflected in steps of a lesson as displayed below. Generally, the lesson is divided into three main parts whereby each one is divided into smaller steps to make sure that learners are involved in the learning process. Below are those main parts and their small steps:

1) Introduction

Introduction is a part where the teacher makes connection between the current and previous lesson through appropriate technique. The teacher opens short discussions to encourage learners to think about the previous learning experience and connect it with the current instructional objective. The teacher reviews the prior knowledge,

skills and attitudes which have a link with the new concepts to create good foundation and logical sequencing.

2) Development of the new lesson

The development of a lesson that introduces a new concept will go through the following small steps: discovery activities, presentation of learners' findings, exploitation, synthesis/summary and exercises/application activities, explained below:

- **Discovery activity**

Step 1

- The teacher discusses convincingly with learners to take responsibility of their learning
- He/she distributes the task/activity and gives instructions related to the task (working in groups, pairs, or individual to instigate collaborative learning, to discover what is to be learnt.)

Step 2

- The teacher allows the learners to work collaboratively on the task.
- During this period the teacher refrains to intervene directly on the task.
- He/she then monitors how the learners are progressing towards thetask to be done and boost those who are still behind (but without communicating to them)

- **Presentation of learners' findings**

- In this section, the teacher invites representatives of groups to present the learners' productions/findings.
- After three/four or an acceptable number of presentations, the teacher decides to engage the class into discussion about the learners' findings.
- **Discussion on the learners' findings.** The teacher asks the learners to evaluate the findings citing the ones that are correct, incomplete or false.
- Then the teacher judges the logic of the learners' findings, corrects those which are false, completes those which are incomplete, and confirms those

which are correct.

❖ **Institutionalization (summary/conclusion/ and examples)**

The teacher summarises the learnt content and gives examples which illustrate the learnt content.

❖ **Exercises/Application activities**

- Exercises of applying processes and products/objects related to covered unit/sub-unit
- Exercises in real life contexts
- Teacher guides learners to make the connection of what they learntto real life situations. At this level, the role of teacher is to monitor the fixation of process and product/object being learnt.

3) Assessment

In this step the teacher asks some questions to assess achievement of instructional objective. During assessment activity, learners work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class andindividuals. In some cases, the teacher can end with a homework assignment.

PART II. SAMPLE LESSON PLAN

Sample Competence-based Lesson Plan

Name of the School: Nyakabanda Primary School Teacher's Name: Marie Muhoza

Term	Date	Subject	Class	Unit No	Lesson No	Duration	Class size
I	22/01/2017	Science and Elementary Technology	P5	1	1 out of 8	40 min	40
Type of special education needs to be catered for in this lesson and number of learners in each category		• Partial hearing impairment 3 • Low vision 1					

Unit title	Carpentry tools
Key unit competence	By the end of this lesson, each learner should be able to use and maintain carpentrytools.
Title of the lesson	Identification of carpentry tools.
Instructional objectives	Using charts, pictures and real carpentry tools, the learner should be able to nameand draw at least 10 carpentry tools correctly.
Plan for this lesson location (in or outside theclassroom)	Inside the classroom: All learners should be seated in a semicircle (where possible). **Arrangement for learners with special needs** • ***Low vision:*** Assign them sitting positions at the front where they can see easily. • ***Partial hearing impairment:*** The learners should sit at the front near where theycan see the learning materials, hear the teacher and lip read. • ***Arrangement for learners without disabilities:*** To be seated in semi-circle clusters.This encourages cooperative learning at both group and class level.

Learning materials for alllearners	• Real carpentry tools, pictures and charts. • Books showing carpentry tools. • Notebooks, pencils and pens.
References	Science and Elementary Technology Pupil's Book page 2, Teacher's Guide page 10 andany other relevant carpentry books.

Timing of each step	**Description of teaching and learning activity** The teacher to display charts, pictures and real tools forlearners to observe, draw and identify carpentry tools.		**Generic competencies and cross- cutting issues to be addressed andshort explanation**
	Teacher activities	**Learner activities**	
Introduction 7 min	• Ask learners in pairs todescribe briefly what carpentry tools are. • Ask learners to observe figures (a) to (g) on page 2 of the Pupil's Book. Allow them to discuss the pictures in groups.	• A few learners describe brieflywhat carpentry tools are. ***Possible answer:*** Are hand held tools that a carpenteruses to do his or her work. • Observe introductory pictures on carpentry tools in groups. • Discuss and answer questions orally. ***Possible answers:*** (a) A brace (b) A chisel	**(a) Generic Competencies** ***(i) Co-operation and Teamwork*** Learners assist each other and co- operate to describe what carpentry tools are and to identify and describeintroductory carpentry tools. ***(ii) Life Long Skills*** Learners will relate carpentry tools tocarpentry products. ***(iii) Critical Thinking*** Learners will predict what they are going to learn.They will also be able to talk about tools using their correctnames.

		(c) A desk (d) A tape measures (e) A carpenter and a boy working.	
	•	•	

Timing of each step	Teacher activities	Learner activities	Generic competencies and cross- cutting issues to be addressed andshort explanation
	• Ask learners from different groups to describe what they aregoing to learn in the unit. • Show a few tools to the learners for themto observe. • Let the learners mention names of toolsshown. • Listen to learners' responses. • Complements learners' responses or corrects them.	(f) A chair (g)A man/carpenter cutting wood using a saw. • Predict what they are going tolearn in the unit. • Identify carpentry tools brought in class and give their names.	***(iv) Communication*** You will ask learners questions and they will answer you.They will discuss in pairs or groups (talk to each other).All these activities entailcommunication. **(b) Crosscutting Issues** ***(i) Peace and Values Education*** As learners communicate, share ideasand provide answers they learn to work in peace. ***(ii) Gender Education*** All learners will participate in discussions regardless of their gender.The teacher will give equal chances toboth boys and girls to participate in class activities.

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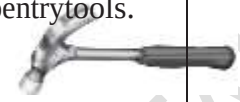
Timing of each step	Teacher activities	Learner activities	Generic competencies and cross- cutting issues to be addressed and short explanation

Developm entof the lesson 25 min	• Ask the learners to draw all carpentry tools in Activity 1.1 (Pupil's Book pages 3 in their notebooks). (12min).	• Draw all carpentry tools; Activity 1.1 (Pupil's Book page 3) in theirnotebooks. ***Examples of tools drawn:*** (a)  (b) (c) (d) (e) (f)	**(a) Generic Competencies** ***(i) Research and Problem-Solving*** Learners research from books and Internet to discover the identity of toolsthat they do not know. ***(ii) Co-operation and Teamwork*** Learners co-operate in searching for information concerning carpentry toolsthey do not know. ***(iii) Communication Skills*** Learners talk and share information inorder to identify tools. **(b) Crosscutting Issues** ***(i) Peace and Values Education*** As learners communicate, share ideasand provide answers, they learn to work in peace.

Timing of each step	Teacher activities	Learner activities	Generic competencies and cross- cutting issues to be addressed and short explanation
	• Ask learners in pairs todiscuss and identify the tools drawn. (5 min). *(For names of tools (g) - (s), refer from Teacher's Guide page 11;* ***Teacher's Notes***)	• In pairs, learners discuss and give names of carpentry tools shown in Activity 1.1. • ***Possible answers:*** (a) Claw ham mer (b) Workbench (c) Mallet (d) Plane (e) Axe (f) Wood chisel	***(ii) Gender Education*** All learners will participate in discussions regardless of their gender.The teacher will give equal chances toboth boys and girls to participate in class activities. ***(iii) Financial Education*** Learners identify carpentry tools and attach value to their usage.They also appreciate that carpentry tools are bought hence need to be taken care of.
	• Allow them to hold some of the tools. Askthem to identify all the carpentry tools you have displayed in class (if any). (5 min) • Respond to learners' questions concerning identification of carpentry tools. (3 min)	• Hold and identify displayed carpentry tools with the help of theteacher. • Asking and answering questions oncarpentry tools.	

Timing ofeach step	Description of teaching and learning activity		Generic competencies and cross-cutting issues to be addressed andshort explanation
	Teacher activities	**Learner activities**	
Conclusion, summary and assessment 8 min	• Give assessment questions to individual learners on identificationof carpentry tools. • ***Possible questions:*** 1. Name 10 carpentrytools. 2.  This is a **(a)** it is _____ used for **(b)** 3. Name 2 cutting tools used in	• Write answers in their notebooks. • ***Possible answers:*** 1. Wood saw, T-square, plane, axe,wood chisel, screw driver, bow saw, brace, mallet etc. 2.(a) hammer (b) driving nails in wood and removing nails from wood. 3. Hand saw, bow saw, table saw,axe. 4. Learners' drawings.	**(a) Generic Competencies** ***(i) Critical Thinking*** Learners recall responses they had given earlier in order to respond to individual assessment questions. ***(ii) Problem Solving*** Learners provide answers to given assessment questions. **(b) Crosscutting Issues** ***(i) Gender Education*** All learners will be given equal chances to respond to questions. ***(ii) Inclusive Education*** Assessment

	carpentry. 4. Draw a brace, hand saw, wood chisel, mallet and spirit level. • Mark learners' work.		questions should be suited for all levels of learners (both slow and fast).

PART III. UNITS DEVELOPMENT

Unit 1: Carpentry tools

1.1 Key Unit Competence

To use and maintain carpentry tools

1.2 Prerequisites

In P4, pupils learnt about agricultural tools. Carpentry tools are used by carpenters to make furniture. In our homes we have different pieces of furniture.

1.3 Introductory activity

Guidance:

Ask learners to observe each one of the pictures in p5 science and elementary technology textbook, on page 2, and request everyone to try identification and usage of each object displayed in picture. By brainstorming learners give name, usage and importance for some of the displayed objects in daily life. Ask learners finally to predict what they are going to learn in the unit

Answer to questions of introductory activity

1.4. List of Lessons

#	Lesson title	Learning objectives	Number of periods
	Identification of carpentry tool	• Identify and name carpentry tools • Observe and identify carpentry tools. • Show concern to the importance of carpentry tools	2

	Usage and maintenance of measuring carpentry tool	• Explain use and maintenance of measuring carpentry tools. • Use measuring carpentry tools correctly. • Maintain measuring carpentry tools. • Show concern to replacing the worn-out parts of measuring carpentry tools	2
	Usage and maintenance of hand carpentry tools	• Explain use and maintenance of hand carpentry tools. • Use hand carpentry tools correctly. • Maintain hand carpentry tools. • Show concern to replacing the worn-out parts of hand carpentry tools	2
	Dangers of carpentry tools	• Outline dangers of carpentry tools	1
	Security measures against dangers of carpentry tools	• Outline precautions against dangers of carpentry tools • Take precautions when using carpentry tools. • Show familiarity in using carpentry tools.	1

	Assessment and remediation		1

Teaching approach for each lesson

1.4.1 Identification of carpentry tool

a) Learning objectives

- Identify and name carpentry tools
- Observe and identify carpentry tools.
- Show concern to the importance of carpentry tools

b) Teaching resources

- Real tools
- Charts
- Flask cards
- XO laptops

c) Learning activities

- Find out from learners the carpentry tools available in learners' homes beforethe lesson.
- Collect commodity available carpentry tools and take them to the classroom before
- Identify cutting tools such as an axe, hand saw, bow saw and table saw.
- Familiarize yourself with tools such as jointer, spokes shave and spirit level Ask learners to mention the carpentry tools they have in their homes.
- Ask learners to observe the pictures in the introduction of their Pupil's Book page 2.
- Allow them to discuss and describe the pictures. From their description let them predict what they are going to learn in the unit.
- Display available tools for the learners to observe and identify.
- Observe charts and flash cards with pictures of tools that are not available in class.
- Let them name tools displayed.

- Ask learners to observe tools in Activity 1.1. Allow them to draw and identify all the carpentry tools.
- Let learners research more about carpentry tools in their XO laptops.

Answer for learning activities

The carpentry tools in Activity 1.1 are as follows:

(a) Hammer	(b) Workbench	(c) Mallet	(d) Plane
(e) Axe	(f) Wood chisel	(g) Brace	(h) Screw driver
(i) Spirit level	(j) Bow saw	(k) Jointer	(l) Metre ruler
(m) Hand saw	(n) T-square	(o) Table saw	(p) Auger bit
(q) Spokes shave	(r) Tape measure	(s) Shaper	

1.4.2 Usage and maintenance of measuring carpentry tools

a) Learning objectives

- Explain use and maintenance of measuring carpentry tools.
- Use measuring carpentry tools correctly.
- Maintain measuring carpentry tools.

d) Teaching resources

- Real carpentry tools
- Charts
- Flash cards
- XO laptops

c) Learning activities

i. Visit a local workshop. Organize with the carpenter to help you teach learners on how to use and maintain carpentry tools.

ii. Take learners to a nearby carpentry workshop.

iii. Ask learners to name the various carpentry tools available in the workshop.

iv. Let the carpenter demonstrate to learners how each tool is used and maintained. Let him/her also point out safety measures to be taken when using them.

v. Allow learners to use and maintain the tools as outlined in the Pupil's Book

pages 4 – 10.

vi. Let the learners take short notes on use and maintenance of the tools.

vii. Display flash cards and charts showing tools being maintained.

1.4.3 Usage and maintenance of hand carpentry tools

a) Learning objectives

- Explain use and maintenance of hand carpentry tools.
- Use hand carpentry tools correctly.
- Maintain hand carpentry tools.

b) Teaching resources

- Real hand carpentry tools
- Charts
- Flash cards
- XO laptops

c) Learning activities

(i) Visit a local workshop. Organize with the carpenter to help you teach learners on how to use and maintain carpentry tools.

(ii) Take learners to a nearby carpentry workshop.

(iii) Ask learners to name the various carpentry tools available in the workshop.

(iv) Let the carpenter demonstrate to learners how each tool is used and maintained.Let him/her also point out safety measures to be taken when using them.

(v) Allow learners to use and maintain the tools as outlined in the Pupil's Bookpages 4 – 10.

(vi) Let the learners take short notes on use and maintenance of the tools.

(vii) Display flash cards and charts showing tools being maintained.

1.4.4 Dangers of carpentry tools

a) Learning objectives

- Outline dangers of carpentry tools and precautions they should take.
- Take precautions when using carpentry tools.
- Show familiarity in using carpentry tools.

b) Teaching resources

- Charts
- Pictures in Pupil's books

c) Learning activities

(i) Find out through questions and answers the dangers and safety measures whenusing carpentry tools.

(ii) Obtain charts showing dangers when using carpentry tools

(iii) Learners find out from their parents the dangers of using carpentry tools.

(iv) Display charts showing dangers of some carpentry tools. Let leaners also readcontent in their textbooks page 11.

(v) Lead learners into discussion on the dangers of all carpentry tools for exampleask them:

a. Have you ever seen a person who has been injured by a carpentry tool?

b. Which tool was it?

c. What could have led to the injury?

(vi) Ask learners to describe ways by which they avoid being injured while usingcarpentry tools.

(vii) Allow them to discuss most dangerous carpentry tools and how to avoid them.

(viii) Let learners write other dangers posed by use of carpentry tools.

1.4.5 Security measures against dangers of carpentry tools

a) Learning objectives

- Explain how to-prevent danger of carpentry tools
- Use and maintain carpenter protective equipment

b) Teaching resources

- Carpenter protective equipment
- Chart/ pictures

c) Learning activities

a. Ask learners to describe ways by which they avoid being injured while usingcarpentry tools.

b. Allow them to discuss most dangerous carpentry tools and how to avoid them.

c. Let learners write other dangers posed by use of carpentry tools.

1.5. Additional content/information for student and teacher

Carpentry Tools Buying Guide

Here are few general guidelines for buying the right product:

- **Know your Requirements well**: Before purchasing any product, one must be thorough with ones requirements. You must know what size of work piece you will be working upon and so buy the product as per your specifications such as blade size, workbench shape etc.
- **Read the Guidelines carefully:** Read the guidelines mentioned on the toolbox carefully**.** These guidelines will help you choose the product for your requirement.
- **Check for damaged articles:** Check whether the tool you are about to purchase in good condition and is not out of order. This can seriously harm your safety, if not verified beforehand.
- **Buy a Quality Product**: Many products of the same kind are available in the market but make sure you buy a quality product without compromising with your budget. Check the specifications of the product well before purchasing. Also check if there is any warranty available in order to ensure the durability of the tool.

- **Review the Tool:** Before purchasing review the tool for its cost, specifications and utility well before hand

1.6 End unit Assessment

- Ask learners questions to know if they can describe dangers of carpentry tools and ways of avoiding them. Give remedial questions to weak learners.
- Listen to learners as they make presentations on the dangers of carpentry tools. Pay attention to ways by which they avoid being injured while using carpentry tools.

1.7 Additional activities

a) Remedial Activity

These are given to learners who have difficulties in naming carpentry tools. Using carpentry tools and identifying dangers of carpentry tools.

To assist these learners:

1) Give them multiple choice questions on identification of tools.
2) Allow them to carefully use and maintain carpentry tools longer than other learners.

In addition, give them matching questions e.g. match a tool to its uses.

Example of questions

(i) Observe pictures on page 2 and 3 and draw (a) bow saw (b) hand saw (b) axe.

(ii) Demonstrate how to use the following tools:

(a) T-square (b) Wood saw (c) Spirit level

(iii) Match the following tools with their possible dangers

Tool	Danger
(a) Chisel	(i) Can chop off your hand or fingers.
(b) Clamp	(ii) Can bore into your hand.
(c) Shaper	(iii) Can trap your fingers or hand.

b) Consolidated Activities

Give multiple choice questions and structured questions on identification, safe use and maintenance of carpentry tools. These questions should include safety measures during use of tools, dangers of mostdangerous carpentry tools and how to avoid these dangers.

Example of questions

(i) Identify 4 cutting and 2 drilling carpentry tools.

(ii) Write down the maintenance Practices of the following tools:

(a) Plane (b) Axe (c) screw driver

(iii) Explain the dangers of the following carpentry tools:

(a) Table saw (b) clamp/jointer

(c) Chisel (d) Shaper

(iv) Outline 2 safety measures that one can apply to prevent dangers on carpentry tools.

c) Extension Activity

Give questions that will give learners more practice. These questions should be additional to what the learners are currently doing.

During identification of tools let fast learners propose possible uses of tools as well:

Tool	Uses
 Name _____	(i) _____ (ii) _____

During use of tools, allow fast learners to use other tools other than those mentioned

e.g. use of mallet, wood chisel.

Give questions requiring learners to identify several ways of maintaining tools as well as avoiding dangers of the tools.

Example of questions

(i) Group carpentry tools as: (a) Cutting tools (b) Smoothening tools (c) Griping tools (d) Boring/drilling tools

(ii) A girl wanted to make a chair. Suggest at least 3 carpentry tools she must have.

(iii) Identify the uses of tools in (b) above.

Answers to Practice Activity 1.1

(Reference: Textbook page 10)

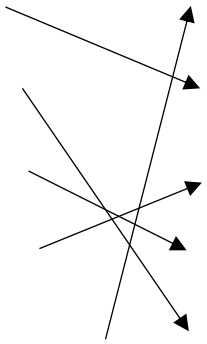
1. (a) Screw driver (b) T-square (c) Hand saw
2. (a) Jack plane (b) Claw hammer (c) Brace (d) Bow saw
3. • Sharpen blunt cutting edges.
   • Replace broken handles.
   • Clean the blade after use.
4. To prevent rusting.
5. A T-square

Possible Answers for Revision Activity 1

(Reference: Pupil's Book page 13)

1. Blade
2. • Wood saw. • Axe. • Bow saw. • Table saw
3.

(a) Saw	Driving screws into wood
(b) Plane	Cutting wood
(c) Meter	Holding pieces of wood together



4. Observe learners' activities. Ensure they hold the tools correctly. They use the tools correctly. They use the tools for the right purpose and avoid getting hurt/ injured while using the tools.

5. (a) (ii) (b) (i)

(c) • Sharpen the cutting edge.

• Fix a loss or broken handle.

• Clean the saw after use and store it safely.

6. (a) Spirit level

(b) It is used to check if the surface is vertical or horizontal.

(c) Clean it with a damp piece of cloth to remove dirt. Avoid dropping it as it can break easily.

7. (a) A jack plane is used to smoothen wood.

(b) A sand paper, scrub plane or smoothing plane.

(c) • Clean the parts to remove dust.

• Apply oil on the lower metallic surface to prevent rusting.

• Sharpen the smoothing edge.

8. (a) A wood bench – This is a strong table on which a carpenter works.

(b) Smoothing wood, cutting wood, making joints.

(c) • The workbench should be firm and strong to avoid shaking.

• Remove tools not in use from the workbench.

• Wipe the workbench regularly. Use a brush to clean the workbench but not your bare hands.

9. (a) • Circular blade • Wooden frame

• Electric motor

(b) • It can cut parts of the body such as fingers or hands.

• It can throw back pieces of wood that hit the user.

(c) • Observe maximum caution while using a bench saw.

• Place a narrow piece of metal around the cutting blade.

• Always wear protective gear such as helmet, goggles and gloves.

• The piece of wood being cut should be held firmly and securely.

10. (a) A table saw is made up of circular saw moved by electric motor. A hand saw has a wide blade and handle that the user moves it along wood.

(b) A bow saw is made up of a frame and a narrow cutting blade. A wood saw has a wide blade and handle.

11. (a) They include a workbench shaper, clamp/jointer, table saw, spokeshave, plane, auger bit.

(b)

Tools	Maintenance Practises
Shaper Clamp Table saw Workbench Spokeshave	• Sharpening, oiling, fastening loose parts • Remove dirt, oil movable parts • Sharpening and oiling the blade • Fasten loose nuts at the handle • Remove all tools not in use and wipe it • Sharpening and proper storage

(c) General safety measures to observe when using carpentry tools:

- Tools should be used for their right purpose.
- Repair all broken parts.
- Avoid placing tools where they cannot be seen. Put the tools in the tool rack after use.
- Avoid running in the workshop.
- Always wear the necessary protective clothing when working

Answers to Remedial, Consolidation and Extension activities

a. Remedial Activity

(i) (a) (b) (c)

(ii) Observe learners' activities, award marks for correct demonstration.

(iii) a – (ii)

b – (iii)

c – (i)

b. Consolidation Activity

(i)
- Cutting tools – Bow saw, hand saw, axe, table saw, shaper
- Drilling tools – Chisel, brace

(ii)

(a) Plane	(b) Axe	(c) Screw driver
• Oil metallic parts. • Sharpen the blade. • Replace broken blades. • Replace broken handles.	• Sharpen blunt cutting edges. • Replace broken handles. • Clean the blade after use.	• Replace broken or worn-out handles.

(iii) (a) Table saw

- The rotating blade can slice off the user's hand or fingers.
- The table saw might throw back pieces of wood and hit the user (kickback).

(b) Clamp / Jointer

- The user can accidentally press his/her fingers or arms.
- Loosely cramped parts can break and fall or drop out on user's hands or legs.

(c) Chisel

- The sharp cutting edge of the chisel can bore into your hands if carelessly handled.
- The mallet can injure your art or finders while hitting the chisel head if carelessly handled.

(d) Sharper

- The blades of the sharper can cause serious injuries to the user's arm if carelessly handled.

(iv)
- Do not put your arm or fingers close to the cutting blade of tools.
- Always wear appropriate protective clothing where necessary before using tools e.g. helmets, goggles, gloves etc.

b. Extension Activity

Tool	Uses
(i)  Name: Claw Hammer	• Drive in Nails • Remove nails from wood.

- Assess how the learners are using the tools and award marks accordingly.

Examples of questions

(i) (a) Cutting tools: Bow saw, table saw, wood saw, axe

(e) Smoothening tools: Plane

(f) Griping tools: clamp / jointer

(g) Boring/drilling tools: Chisel, brace

(ii) Carpentry tools used to make a chair: Place, hammer, hand saw, T-square, chisel.

(iii) Used for smoothening wood so as to give smooth and shiny surface.

UNIT 2: MASONRY TOOLS

2.1 Key Unit Competence: To use and maintain masonry tools

2.2 Prerequisites:

You learnt about agricultural tools (in P4), and recently carpentry tools. Masonry tools are tools used in the construction of farm structures and building. These tools need to be taken care of to last longer. The teacher should encourage learners to use and maintain common masonry tools.

2.3 Introductory activity

Guidance

Ask learners to observe each one of the pictures in p5 science and elementary technology textbook, on page 16, and request everyone to think about naming and usage of each object displayed in picture. By brainstorming learners give name, usage and importance for some of the displayed objects in daily life. Learners finally predict what they are going to learn in the unit

2.4 List of lessons

#	Lesson title	Learning objectives	Number of periods
1	Identification of masonry tool	• Identify the commonly used masonry tools • Draw masonry tools	1

		• Appreciate the need to have the masonry tools	
3	Usage and maintenance of measuring masonry tools	• Explain the use of measuring masonry tools • Use and maintain measuring masonry tools	2
4	Usage and maintenance of other masonry tools	•Explain the use of other masonry tools •Use and maintain other masonry tools	2
5	Dangers of masonry tools	•Describe the dangers of masonry tools •Explain how to prevent danger of masonry tools •Handle masonry tools properly •Apply techniques of maintaining masonry tools.	1
6	**Assessment and remediation**		1

Teaching approach for each lesson

2.4.1 Identification of masonry tool

a) Learning objectives

- Identify the commonly used masonry tools
- Draw masonry tools
- Appreciate the need to have the masonry tools

b) Teaching resources

- Real masonry tools such as spirit level, trowel, plumb line, float, meter ruler, tape measure, jointer, among others.
- Charts showing masonry tools, pictures in books, flash cards and boards.

c) Learning activities

i. Ask learners to find out names of various tools that a mason uses.

ii. Collect the required learning resources and taking take them to class.

iii. Ask learners to observe introduction pictures.

iv. Allow them to talk about the pictures in order for them to predict what they aregoing to learn in the unit.

v. Display masonry tools such as spirit level, trowel, plumb line, float, tape measure, meter ruler, T-square, and shovel. Ask the learners to write the names of the tools they know in their notebooks. If you do not have real tools, show them charts and books with pictures of masonry tools.

vi. Let learners copy and fill names of tools in Activity 2.1.

vii. Let the learners exchange their books to see each others responses.

viii. Allow them to present in groups in order for them to identify all the tools displayed and those in their textbook page 17.

ix. Ask the learners to draw three tools they have seen or used.

Answer for learning activity 2.1

(a) Spirit level	(b) Trowel	(c) Plumbline
(d) Meter ruler	(e) Tape measure	(f) Jointer
(g) Wheel barrow	(h) T-square	(i) Shovel
(j) Masonry hammer	(k) Brick frame	(l) Chisel
(m) Steel float	(n) Hoe	(o) Mortar mixer

2.4.2 Usage and maintenance of measuring tools in masonry

a) Learning objectives

•Explain the use of measuring masonry tools

•Use and maintain measuring masonry tools

b) Teaching resources

- •A construction site
- Paper
- •Pen
- Textbook
- •Real measuring tools in masonry (Spirit level, Plumb line, Meter ruler, Tape measure, T-square)

c) Learning activities

i. Help learners to prepare materials for recording information.

ii. Obtain permission from the school and construction site you are to visit.

iii. Visit the construction site to ensure they have necessary tools.

iv. Organise the learners into manageable groups and visit a nearby construction site.

v. Let learners observe how various masonry tools are being used.

vi. Let learners use and maintain some of the masonry tools. Remind them to be careful in order to avoid dangers of masonry tools.

vii. When you go back to school, ask learners to discuss write a report about:

a. The tools they saw.

b. How the tools were being used.

c. How the tools were being maintained.

2.4.3 Usage and maintenance of other masonry tools

a) Learning objectives

•Explain the use of other masonry tools

•Use and maintain other masonry tools

b) Teaching resources

- A construction site
- Paper
- Pen
- Textbook

c) Learning activities

i. Help learners to prepare materials for recording information.
ii. Obtain permission from the school and construction site you are to visit.
iii. Visit the construction site to ensure they have necessary tools.
iv. Organise the learners into manageable groups and visit a nearby construction site.
v. Let learners observe how various masonry tools are being used.
vi. Let learners use and maintain some of the masonry tools. Remind them to be careful in order to avoid dangers of masonry tools.
vii. When you go back to school, ask learners to discuss write a report about:
    a. The tools they saw.
    b. How the tools were being used.
    c. How the tools were being maintained.

2.4.4 Dangers of masonry tools

a) Learning objectives

- Describe the dangers of masonry tools
- Explain how to prevent danger of masonry tools
- Handle masonry tools properly
- Apply techniques of maintaining masonry tools.

b) Teaching resources

- Real masonry tools including protective equipment
- Pupil's Book.

c) Learning activities

i. Ask learners to research safety measures whilst using masonry tools.

ii. Ask learners to describe how they used masonry tools when they visited the construction site. Let the learners tell you if they have ever misused tools and got injured.

iii. Guide the learners into a discussion on dangers of masonry tools by asking questions. For example:

a. Have you ever hurt yourself while using a masonry tool?

b. Have you ever hurt another person while using a masonry tool?

c. Have you ever damaged a masonry tool by using it in the wrong way?

iv. Ask the learners to suggest and demonstrate several ways of using tools safely.

2.5 Additional content/information for student and teacher

Masonry tools and equipment are used to cut, prepare, set and finish structures, floors, and substrates made with brick, concrete, cement, or stone block.

2.6 End unit assessment

Encourage all the learners to participate.

Listen to the Pupil's presentations and assess whether:

- They can use masonry tools safely.
- They can describe dangers of masonry tools and how to prevent them.

2.7 Additional activities

a. Remedial Activity

- Design activities that help learners associate or match pictures of tools with their correct names.
- Allow learners to use masonry tools for a longer period ask them to say the

uses aloud.

- Let learners practise safe use of the tools. Allow them to mention possible dangers of masonry tools and how to avoid them.

Example of questions

(i) Match the tools shown below to their correct names.

Tool	Name
a) 	(i) Float
b) 	(ii) Metre ruler
c) 	(iii) T-square
d) 	(iv) Spirit level

(ii) Describe briefly how the following tools are used:

(a) Tape measure (b) Trowel (c) Plumb line (d) T-square

(iii) You can get _____ if you use masonry tools carelessly. (Injured, healthy)

(iv) We can prevent dangers of masonry tools by

(a) _____ (b) _____ (c)

_____

b. Consolidation Activity

- Give activities that help learners to identify commonly used masonry tools. Allow them to draw and name at least 10 tools.
- Ask learners to use all recommended masonry tools. Allocate them normal time let them discuss in groups after using the tools for them to create theirown notes.

Tool	Uses

- Let learners highlight dangers of masonry tools and ways of avoiding them.

Example of questions

(i) Learners to sit in their working groups and draw 4 masonry tools that you have learnt.

(ii) What will happen if we don't clean and oil metallic frames of a brick frame?

(iii) Describe briefly how to maintain a jointer.

(iv) Outline dangers of masonry tools:

(v) What will happen if we don't store masonry tools properly?

c. Extension Activity

- Allow learners to draw, name and give possible uses of identified tools. Let them give uses and maintenance of other not covered.

Example of questions

(i) A farmer wants to build a poultry house. Which tools is he/she likely to use?

(ii) Write a short comprehension describing *dangers of masonry tools* and how to prevent them.

Possible Answers for Revision Activity 2

(Reference: Pupil's Book page 23)

1. (a) Trowel (b) Claw hammer (c) Plumb line

(b) Spirit level (e) Metre ruler (f) T-square

2. (a) It is used for mixing, scooping and applying mortar.

(b) (i) Steel float is used for plastering walls and floors.

(ii) Wooden float is used for spreading concrete over floors and walls.

(c) It is used to measure the heights of locations that are far apart on a surface.

(d) It is used to determine whether walls of a building under construction are vertical.

3. (a) Wheelbarrow

(b) and (c) Observe learner's activities. Award marks for proper use and maintenance of tools.

4. (a) Tighten the belts and pulleys

- Oil the metallic parts
- Clean it after use and store in a dry place.

(b) Clean after use. Dry it using a rag. Store in a dry place.

5. Observe learners' activities and award marks appropriately.

6. • Some masonry tools can hurt if handled carelessly.
- If not stored properly, one can trip on them and fall.
- They can pierce the skin if stepped on.
- Some tools can bruise when you rub against them.

7. They are important because they make construction of farm structures and buildings easier. For example, wheelbarrows help to carry sand, gravel and stones instead of carrying them by hands. Mortar mixers help in mixing cement, sand and gravel.

8 (a) It is used to mix cement, sand, gravel and water to form concrete.

(b) (i) Trowel

(ii) Used for mixing, scooping and applying mortar.

(c) Tightening belts and pulleys, oiling the moving parts and cleaning after use.

9. (a) • Trowel • Wheelbarrow • Shovel

(b) Mortar mixer

10. (a) Replace worn out parts and store the hammer in a dry and safe place after use.

(b) It will rot due to presence of moisture.

11. (a) It is used to determine whether walls of a building under construction are vertical.

(b) Tape measure

(c) Used to measure the heights of locations that are far apart on a surface.

Answers to Remedial, Consolidation and Extension Activities

a) Remedial Activity

(i) Matching

(a) – (iii) (b) – (iv)

(c) – (i) (d) – (ii)

(ii) (a) Tape measure – used for measuring distances, both vertically and horizontally.

(a) Trowel – Used for mixing, scooping and applying mortar.

(b) Plumb line – to determine whether walls of buildings under construction are vertical.

(c) T-square – Used for measuring the right angle.

(iii) Injured

(iv) (a) Using the tools carefully.

(b) Storing the tools in a tool rack.

(c) Using the right tool for the right work.

b) Consolidation Activity

(i)

 Float	 Meter ruler
 T-square	 Plumb line

(ii) It will rust.

(iii) Ensure the nuts of a jointer are tight.Clean, dry and store in a dry place.

(iv)
- They can bruise you
- You can trip on them and fall
- Can cut you
- Can pierce the skin.

(v) One can trip on them and fall.

c) Extension Activities

(i) • Wheelbarrow • Tape measure • Plumb line • Spirit level

(ii) They can cut we should handle them carefully. Masonry tools can bruise. We should avoid rubbing against them. They can pierce the skin. We should avoid stepping on them. If not stored properly we can trip on them and fall.

Unit 3: Objects production

3.1 Key unit competence

To make simple utility objects, toys and learning materials

3.2 Prerequisite

Creativity is an important aspect in promoting innovations. Objects creatively made can be sold for use in homes or schools. Object making can therefore be a source of livelihood for citizens.

3.3 Introductory activity and guidance

Guidance:

Ask learners to observe each one of the pictures in p5 science and elementary technology textbook, on page 26, and request everyone to think about naming, making and material of each object in picture displayed. By brainstorming learners give usage and importance of displayed objects in daily life. Learners finally predict what they are going to learn in the unit

3.4 List of lessons

#	Lesson title	Learning objectives	Number of periods
1	Making a toy bicycle in sorghum straws and sticks	•Select the sorghum straws and sticks in the locality to make toy bicycle. •Explain how to make a toy bicycle in sorghum straws and sticks •Make a toy bicycle using sorghum sticks and straws. •Beware of learning from their mistakes. •Appreciate well-made bicycle in sorghum straws and sticks.	2
2	Making a toy house in	• Select the sorghum straws and sticks in the locality to make toy house.	2

	sorghum straws and sticks	•Explain how to make a toy house in sorghum straws and sticks •Make a toy house using sorghum sticks and straws. •Beware of learning from their mistakes. •Appreciate well-made house in sorghum straws and sticks.	
3	Making Wooden spoon	•Select the wood in the locality to make wooden spoon •Explain how to make a wooden spoon in wood •Make wooden spoon using wood •Beware of learning from their mistakes. •Appreciate well-made wooden spoon.	2
4	Making Hoe-handle	•Select the wood in the locality to make hoe-handle •Explain how to make a hoe-handle in wood •Make hoe-handle using wood •Beware of learning from their mistakes •Appreciate well-made hoe-handle	2
5	Making a trapezium in paper and manilla paper	•Select the paper and manilla paper to make a trapezium •Explain how to make a trapezium in paper and manilla paper •Make trapezium using paper and manilla paper •Beware of learning from their mistakes •Appreciate well-made trapezium	2

6	Making a rhombus in paper and manilla paper	• Select the paper and manilla paper to make a rhombus • Explain how to make a rhombus in paper and manilla paper • Make rhombus using paper and manilla paper • Beware of learning from their mistakes • Appreciate well-made rhombus	2
7	Making a parallelogram in paper and manilla paper	• Select the paper and manilla paper to make a parallelogram • Explain how to make a parallelogram in paper and manilla paper • Make parallelogram using paper and manilla paper • Beware of learning from their mistakes • Appreciate well-made parallelogram	2
8	Maintenance of utility and learning objects	• Identify the ways of maintaining utility and learning objects produced. • Maintain produced utility and learning objects efficiently • Keep produced utility and learning objects safely	1
9	**Assessment and remediation**		2

Teaching approach for each lesson

3.4.1 Making a bicycle in sorghum straws and sticks

a) Learning objectives

- Select the sorghum straws and sticks in the locality to make toy bicycle.
- Explain how to make a toy bicycle in sorghum straws and sticks
- Make a toy bicycle using sorghum sticks and straws.
- Beware of learning from their mistakes.
- Appreciate well-made bicycle in sorghum straws and sticks.

b) Teaching resources

Sorghum straws and sticks, Pictures showing a toy bicycle made using straws and sticks and bicycle charts.

c) Learning activities

i. Ask learner to collect sorghum straws, sticks and strings and bring them to school.
ii. Collect charts and pictures showing how to make toy bicycles in sticks and straws
iii. Show learners pictures of toy bicycles made in sticks and straws
iv. Demonstrate how to make a toy bicycle as outlined in Pupil's Book page 28.
v. Let learners practise making a toy bicycle.
vi. Observe learners as they work. Assist learners with difficulties.
vii. Give them time to finish making the toy bicycles.

3.4.2Making a toy house in sorghum straws sticks

a) Learning objectives

- Select the sorghum straws and sticks in the locality to make toy house.

- Explain how to make a house in sorghum straws and sticks
- Make a toy house using sorghum sticks and straws.
- Beware of learning from their mistakes.
- Appreciate well-made house in sorghum straws and sticks.

b) Teaching resources

Straws, sticks, Pictures showing a toy house made using straws and sticks and Charts.

c) Learning activities

i. Ask learner to collect straws, sticks and strings and bring them to school.

ii. Collect charts and pictures showing how to make toy house in sticks and straws.

iii. Show learners pictures of toy house made in straws and sticks.

iv. Demonstrate how to make a toy house as outlined in Pupil's Book page 28.

v. Let learners practise making a toy bicycle.

vi. Observe learners as they work. Assist learners with difficulties.

vii. Give them time to finish making the toy bicycles.

3.4.3Making Wooden spoon

a) Learning objectives

- Select the wood in the locality to make wooden spoon
- Explain how to make a wooden spoon in wood
- Make wooden spoon using wood
- Beware of learning from their mistakes.
- Appreciate well-made wooden spoon.

b) Teaching resources

- A suitable piece of wood
- A machete
- Spokes shave
- A chisel
- Hand saw
- Sand paper

c) Learning activities

i. Ask learners to read instructions given in the Pupil's Book pages 29

ii. Let the learners bring the outlined materials and tools.

iii. Display pictures showing different shapes of wooden spoons. You can also display real wooden spoon.

iv. Ask learners to read through steps of making a wooden spoon as outlined in pupil's Book page 29.

v. Demonstrate to learners how to make a wooden spoon using collected materials.

vi. Allow learners to make wooden spoons individually. Go round checking theiractivities.

3.4.4Making Hoe-handle

a) Learning objectives

- Select the wood in the locality to make hoe-handle
- Explain how to make a hoe-handle in wood
- Make hoe-handle using wood
- Beware of learning from their mistakes
- Appreciate well-made hoe-handle

b) Teaching resources

- A suitable piece of wood
- A machete
- Spokes shave
- A chisel
- Hand saw
- Sand paper

c) Learning activities

i. Ask one learner to draw a hoe handle on the board.

ii. Ask learners to describe how hoe handles are made in their homes.

iii. Take them through the steps of making a hoe handle as outline in Pupil's Bookpage 30.

iv. Allow learners to make hoe handle following these steps.

v. Observe and assist learners when making the hoe handle.

vi. Give precautions of handling cutting or sharp tools.

3.4.5Making a trapezium in paper and manilla paper

a) Learning objectives

- Select the paper and manilla paper to make a trapezium
- Explain how to make a trapezium in paper and manilla paper
- Make trapezium using paper and manilla paper
- Beware of learning from their mistakes
- Appreciate well-made trapezium

b) Teaching resources

- Colored manila papers
- Ruler
- Protractor
- Crayons
- Pair of scissors and razor blade
- Compass
- Glue/cello tape
- Paint and brush

c) Learning activities

i. Collect manila paper and scissors.

ii. Learners to read the content in the Pupil's Book pages 33.

iii. Ask learners to draw a trapezium in their notebooks.

iv. Demonstrate to the learners how to draw trapezium.

v. Ask learners to draw this shape on manila papers.

vi. Let them follow the procedures outlined in Pupil's Book pages 33. If colored manila paper is not readily available use ordinary paper.

vii. Caution learners on dangers of using sharp objects.

viii. Go round inspecting the learners' work.

ix. Let learners paint or colour this shape using crayons or paint to make it attractive.

3.4.6Making a rhombus in paper and manilla paper

a) Learning objectives

- Select the paper and manilla paper to make a rhombus
- Explain how to make a rhombus in paper and manilla paper
- Make rhombus using paper and manilla paper
- Beware of learning from their mistakes
- Appreciate well-made rhombus

b) Teaching resources

- Colored manila papers
- Pair of scissors and razor blade
- Ruler
- Compass
- Protractor
- Glue/cellotape
- Crayons
- Paint and brush

c) Learning activities

i. Collect manila paper and scissors.

ii. Learners to read the content in the Pupil's Book pages 31

iii. Ask learners to draw a rhombus, in their notebook

iv. Demonstrate to the learners how to draw rhombus

v. Ask learners to draw this shape on manila papers.

vi. Let them follow the procedures outlined in Pupil's Book pages 31. If colored manilla paper is not readily available use ordinary paper.

vii. Caution learners on dangers of using sharp objects.

viii. Go round inspecting the learners' work.

ix. Let learners paint or colour this shape using crayons or paint to make it attractive.

3.4.7Making a parallelogram in paper and manilla paper

a) Learning objectives

- Select the paper and manilla paper to make a parallelogram
- Explain how to make a parallelogram in paper and manilla paper
- Make parallelogram using paper and manilla paper
- Beware of learning from their mistakes
- Appreciate well-made parallelogram

b) Teaching resources

- Colored manila papers
- Pair of scissors and razor blade
- Ruler
- Compass
- Protractor
- Glue/cellotape
- Crayons
- Paint and brush

c) Learning activities

i. Collect manila paper and scissors.

ii. Learners to read the content in the Pupil's Book pages 32.

iii. Ask learners to draw a parallelogram in their notebooks.

iv. Demonstrate to the learners how to draw parallelogram.

v. Ask learners to draw these shapes on manila papers.

vi. Let them follow the procedures outlined in Pupil's Book pages 32. If colored manila paper is not readily available use ordinary paper.

vii. Caution learners on dangers of using sharp objects.

viii. Go round inspecting the learners' work.

ix. Let learners paint or colour the shape using crayons or paint to make it attractive.

x. Identify the ways of maintaining utility and learning objects produced.

xi. Maintain efficiently utility and learningobjects

Understand the need to keep utility and learning objects safely

3.4.8Maintenance of utility and learning objects

a) Learning objectives

- Identify the ways of maintaining utility and learning objects produced.
- Maintain produced utility and learning objects efficiently
- Keep produced utility and learning objects safely

b) Teaching resources

- Charts
- Bags
- Shelves
- Made objects
- Clipboards
- Cartons

c) Learning activities

i. Ask the learners to write down ways of keeping objects safely at home.

ii. Collect the appropriate storage materials such as cartons and bags.

iii. Collect all required learning materials.

iv. Group learners into manageable groups.

v. Ask learners to discuss various ways materials are kept at home.

vi. Let learners practise various ways of maintaining objects they have made in storage places available.

vii. Ask learners to discuss other ways of maintaining utility and

learning objects.

viii. Ask the learners to write in their notebooks reasons for maintainingtoys and other objects made.

3.5. Additional content/information for student and teacher

Additional Information for the teacher

3.6End unit assessment

- This part provides the answers of end unit assessment with cross reference to the textbook
- The teacher's guide suggests additional questions and answers to assess the key unit competence.
- Assessment activities are designed in integrative approach to assess the key unit competence with cross reference to the textbook.

3.7Additional activities

a) Remedial Activity

- Allow learners to select suitable materials for making toys.
- Give them an activity to make simple toys, utility objects or learning materialsat their own pace e.g. toy bicycle, hoe handle and rhombus.
- Assign them more faster grasping peers to collaborate in Activities. For theory, give simple multiple-choice questions.

Examples of Questions

(i) _____ and _____are made from wood.

(Cooking stick and spade), (Cooking stick and hoe handle)

(ii) Make a simple wooden spoon from wood.

b) Consolidation Activity

- Ask learners to make a toy house in sticks and straws. Let them use other designs.
- Allow them to make hoe handles of various size on their own.
- Let them make rhombus and trapeziums using waste papers and manila papers.
- Allow them to store made objects appropriately.

Examples of Questions

d. Make a wooden spoon.

e. Store made objects in racks and sacks.

f. Name 3 other places where made objects can be stored.

c) Extension Activity

- Ask the learners to make toy bicycle with rotating wheels. Let them use coloured straws and sticks.
- Ask learners to make wooden spoons of various shapes. Let them make attractive patterns on their handles.
- Ask learner to make various shapes and colour them using crayons or paint.

Examples of Questions

Make a wooden spoon. Colour the spoon using locally made paint (from plant leavesor flowers).

Possible Answers for Revision Activity 3

(Pupil's Book page 34 – 35)

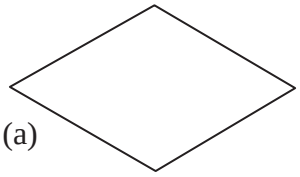
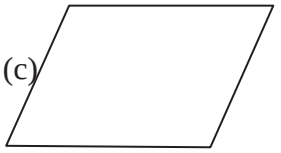
1. Observe learners' activities. Award marks for creativity, good quality work and ability to finish the given task on time.

2. (a) • Observe learners as they make basic wooden hoe handles.
   • Award marks for creativity and safe use of cutting tools.
   • Supervise learners' activities to minimise injuries and cheating.

3. (a) • Observe learners as they make, colour and store the trapezium made.
   • Award marks for well-made trapeziums, creatively coloured trapeziums and correct storage.

   (b) • Machete • Saw • Spokeshave • Sandpaper

4. • A wooden spoon should be washed, dried and hung on the rack.
   • A wooden hoe handle should be kept in the store.
   • Learning materials such as trapezium, rhombus and parallelogram should be mounted on manila paper and placed on a soft board.

5. (a)  (b)  (c) 

   Rhombus Trapezium

   Parallelogram

6. (a) • Hammer • Saw

   (b) • She used the saw to cut the wood.
   • She used the hammer to drive nails in wood.

7. (a) • wood • Sticks • Strings or wires

   (b) From the local environment

8. (a) Should be careful when using a machete to avoid causing injuries.

   (b) Should be careful when using a hammer.

   (c) Sticks should be handled carefully to avoid poking to the eyes.

9. The toy house can be covered using packing paper, grass and leaves. She can also keep her toy house on a rack or in a box.

10. (a) Used for cooking.

(b) Fitted to the hoe for digging

(c) Serving food.

Answers to Remedial, Consolidation and ExtensionActivities

a) Remedial Activity

(i) Cooking stick and hoe handle.

(ii) For this question assess whether the cooking stick is correctly made and award marks accordingly.

b) Consolidation Activity

For question (i) and (ii) observe whether the wooden spoon is correctly made and stored/displayed appropriately. Award marks accordingly.

c) Extension Activity

Observe whether the wooden spoon has been correctly made and painted thenaward the appropriate marks.

UNIT 4: COMPUTER MY FRIEND

4.1. Key unit competence

To use data storage devices and data sharing

4.2. Prerequisites

The computer system is made up of hardware components that work together for the computer to complete tasks. Learners have learned basic storages devices including the flash card, CD card and Memory card.

Learners need to be taught the basic hardware components such as computer memory, hard drive and their roles in ensuring the effective performance of a computer system.

Before starting this new unit, ask them some probing questions to check if they remember what they learned in primary four related to storage devices.

4.3. Introductory activity

Guidance on the introductory activity

- Ask learners to observe each one of the pictures in student's books page 37 and request each students to think about naming and usages of each device displayed in picture.
- By brainstorming learners give name, usage and importance for some picture in daily life. Finally, learners predict what they are going to learn in the unit.

Answers to introductory activity

a) RAM b) hard disk c) Memory card d) flash disk e) CD (compact disk) f) CD and DVD

4.4. List of lessons

#	Lesson title	Learning objectives	Number of periods:12

1	aning of data	-Explain the concept of data and memory. -Describe and define data, memory and storage.	1
2	aning and roles of memory	-Describe and define data, memory and storage. -Differentiate and use the different types of storage and memory devices. -Appreciate the use and flexibility of external storage in a computer.	2
3	ng internal memories	-Practise typing, saving and opening a document from the internal storage. -Be excited about how data can be kept on storage -Appreciate the importance of saving on storage devices. -Identify types of internal storage. -Differentiate internal memory. -Understand the functionality of internal memory.	2

		-Appreciate the use and flexibility of external storage in a computer.	
4	ng flash disc	-Differentiate and use the different types of storage and memory devices. - Practise inserting and removing a flash disk/memory stick from thecomputer. -Appreciate the use and flexibility of external storage in a computer. -Appreciate the importance of saving on storage devices.	2
5	Using DVD/CD	-Differentiate and use the different types of storage and memory devices. -Be excited about how data can be kept on storage media. -Appreciate the importance of saving on storage devices.	1
6	ng external hard disc and memory card	- Differentiate and use the different types of storage and memory devices.	1

		-Practise inserting and removing a flash disk/memory stick from thecomputer. -Be excited about how data can be kept on storage media. -Appreciate the importance of saving on storage devices.	
7	aring and sending a document (e.g: Invitation)	-Explain the concept of data sharing. -Copy a document from a flash disk to a Journal/computer and vice versa. -Communicate with others in sharing files and documents.	2
8	**sessment and remediation**		1

Teaching approach for each lesson

4.4.1. Meaning of data

a) Learning objectives

-Explain the concept of data.

-Describe and define data.

b) Teaching resources

- Charts, Board, Projector, XO laptops, Desktop computers or laptops, CDs or flash disks with sugar software

c) Learning activities

- As teacher, research and read before the meaning of data.
- Avail chats and images showing examples of data, storage devices.
- Instruct learners to open their Pupil's Book page 37.
- Allow them time to look at the illustrations on that page.
- Let them write what they have seen in their notebooks.
- Instruct them to exchange their exercise notebooks to see what they havewritten.
- Introduce the topic by explaining to learners the data and function of data
- Engage learners by questioning about specific things such as:

✓ Who has ever heard of data?

✓ What is data?

- Provide examples of data

d. **Lesson assessment and conclusion**

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarise the content.

4.4.2. Meaning and roles of memory

a) Learning objectives

-Describe and define data, memory and storage.

-Differentiate and use the different types of storage and memory devices.

-Appreciate the use and flexibility of external storage in a computer.

b) Teaching resources

- Charts, Board, Projector, XO laptops, Desktop computers or laptops, CDs or flash disks with sugar software

C) Learning activities

- As teacher, research and read before the meaning of memory.
- Avail chats and images showing examples of memory, storage devices.
- Instruct learners to open their Pupil's Book page 38.
- Allow them time to look at the illustrations on that page.
- Let them write what they have seen in their notebooks.
- Instruct them to exchange their exercise notebooks to see what they havewritten.
- Introduce the topic by explaining to learners that definition of memory and roles of memory.
- Demonstrate how memory works using XO laptop Journal.
- Ask learners to discuss in pairs why memory is important in a computer.
- Instruct learners to open any activity such as Write Activity. This will take sometime to open.
- Explain to learners that the computer is loading the requested activity intocomputer memory. That is why it has to take few seconds.
- **Lesson assessment and Conclusion**

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

4.4.3. Using internal memories

a) Learning objectives

-Practise typing, saving and opening a document from the internal storage.

-Appreciate the use and flexibility of external storage in a computer.

-Be excited about how data can be kept on storage

-Appreciate the importance of saving on storage devices.

-Identify types of internal storage.

-Differentiate internal memory.

-Understand the functionality of internal memory.

b) Teaching resources

- Charts, Desktop computers, XO laptops, Charts and pictures showing RAM and ROM

c) Learning activities

- Learners to identify internal storage devices (RAM, ROM and Hard disk)
- Instruct learners to start Write activity then type the title for the activity.
- Let learners open the Journal and check the saved activities.
- Display pictures showing RAM, ROM and Hard disk on the board.
- Ask learners to identify these images.
- Explain the meaning of ROM and RAM to the learners.
- Allow learners to discuss the roles of memory in pairs.
- Engage learners by questioning on specific things such as:
    - ✓ How does RAM help in saving sugar activities?
    - ✓ What is the Journal?
- Provide examples of scenarios where RAM is used for the learners to be familiarwith.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

4.4.4. Using flash disc

a) Learning objectives

-Appreciate the use and flexibility of external storage in a computer.

-Differentiate and use the different types of storage and memory devices.

- Practise inserting and removing a flash disk/memory stick from the computer.

-Appreciate the importance of saving on storage devices.

b) Teaching resources

- Charts, Desktop computers, XO laptops, External Hard disk, Flash disks , Micro SD cards

C) **Learning activities**

- Create a document.
- Save the created document from the Journal to the flash disk.
- Instruct learners to open the Journal then copy any saved activity to flash disk.
- Navigate to the flash disk and confirm if the saved file is available.
- Eject the flash disk device using the right procedure.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

4.4.5. Using DVD/CD

a) Learning objectives

-Differentiate and use the different types of storage and memory devices.

-Be excited about how data can be kept on storage media.

-Appreciate the importance of saving on storage devices.

b) Teaching resource

- Charts, Desktop computers, XO laptops, External Hard disk, Flash disks

, Micro SD cards, CD/DVD

C) Learning activities

- Create a document.
- Save the created document from the Journal to the CD/DVD.
- Instruct learners to open the Journal then copy any saved activity to CD/DVD.
- Navigate to the CD/DVD and confirm if the saved file is available.
- Eject the CD/DVD device using the right procedure.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

4.4.6. Using external hard disc and memory card

a) Learning objectives

-Be excited about how data can be kept on storage media.

- Differentiate and use the different types of storage and memory devices.

-Practise inserting and removing a flash disk/memory stick from the computer.

-Appreciate the importance of saving on storage devices.

b) Teaching resource

- Charts, Desktop computers, XO laptops, External Hard disk, Flash disks , Micro SD cards, CD/DVD.

c)Learning activities

- Create a document.
- Save the created document from the Journal to an external device.
- Instruct learners to open the Journal then copy any saved activity to external storage
- Navigate to the external storage and confirm if the saved file is available.

- Eject the external storage device using the right procedure.
- Display charts showing memory card, flash disk, DVD and external hard disk on the chalk board, chart or on a projector screen.
- Ask learners to identify these external storage devices.
- Engage learners by questioning on specific things such as:
    - How do external storage devices look like?
    - What is their importance?
- Provide different examples of storage devices for the learners to observe and hold. Allow learners to refer to their Pupil's Book pages 42 – 43.
- Demonstrate how to save files on external storage devices.
    - Start Write Activity from the Home View (The Write icon looks like a piece of paper and a pencil). Type something in the work area.
    - On the tool bar in the activity text box, type your file name.
    - This saves the document using the specified name.
    - Click on the Journal icon (it looks like a folder) to open it.
    - Point on a file you wish to save in an external drive then copy to the device to save.
    - Instruct learners to complete Activity 4.7, 4.8 and 4.9 on Pupil's Book. Go roundchecking guiding them as they complete the activity.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

4.4.7. Sharing and sending a document (e.g. Invitation)

a) Learning objectives

-Explain the concept of data sharing.

-Copy a document from a flash disk to a Journal/computer and vice versa.

-Communicate with others in sharing files and documents.

b) Teaching resources

- Chart, Desktop computers, XO laptops , Hard Disk, Wi-Fi

c) Learning activities

- Saving and opening documents.
- Sharing a document by sending an invitation.
- Sharing a document with the neighbourhood.
- Start the lesson by writing the topic "sharing a document" on the chalk board.
- Challenge learners to explain how they normally share their personal effects.
- Engage learners through questioning on specific things such as:
    - ✓ What do you need in order to collaborate effectively?
    - ✓ What are the steps you take when sending an invite?
    - ✓ What do you see when you access the neighbourhood View of XO laptop?
    - ✓ Allow learners time to read instruction showing how to send invitation andaccessing the neighbourhood view.
- Apart from using the XO laptop provide examples of scenarios on how files sharing can be done.
- Demonstrate on how to share activities with the neighbourhood. Then let learners practise sharing of documents individually.
- Ask learners to complete activity 4.10 and 4.11 in their Pupil's Book. Go round checking and encouraging learners to follow the procedure.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning

and summarize the content.

4.5. Additional content of student and teacher

4.5.1. Additional Information for the student

4.5.2. Additional content for the teacher

The term external storage simply means an off-site storage that is not inside the computer. Different forms of external storage exist in the market today with vast storage capacity ranging from gigabytes to multi-terabytes of storage space. If possible, display example of external storage devices to the learners. If not available,use pictures and videos downloaded from the internet. Also use Pupil's Book as reference if you don't have additional pictures.

Emphasize on the importance of learning how to use external storage devices. Advantages of external storage includes portability and data sharing.

4.6. End unit assessment

a. Guidance on End unit assessment

- **The end unit assessment is called "Revision activity" in the student book, at Page 46-47.**

- Request learners to answer all questions of the "**Revision activity"** during the time reserved to lesson of end unit assessment. If all questions cannot be completed in that time, request them to answer them during their self-study time or as homework.
- Mark their answers and keep records of every student's achievements.
- Provide the remedial, consolidation and extended activities when necessary.

b. Answers for End unit assessment

1. (a) (i) External hard disk (ii) Internal hard disk
   (iii) ROM chip (iv) Memory card

(b) • Internal memories - (ii) and (iii)

• External memories - (i) and (iv)

(c) RAM - It is a temporary memory. It loses data when power goes off suddenly.

ROM - It is a permanent memory. It does not loose data when power goes off suddenly.

2. RAM is the same as hard disk
3. The ROM loads the operating system
4. Navigate to the tool bar
5. Examples of data:
   - Numeric values such as 1,2,3 etc.
   - Letters of alphabets such as A, B, C, D etc
   - Symbols such as #, @, / etc.
6. It loads stored programs.
7. It stores a large amount of data.
8. Functions of ROM:
   (a) Starting the computer
   (b) Loading the operating system
   (c) Saving data permanently
9. RAM
   - Since RAM is a working memory, open programs are held temporarily.
   - RAM is volatile
10. How to save in a flash disk: (a, b, c)
    - Observe how learners insert the flash disk in the USB port.
    - Award marks for correct copying of information from the Journal to the flash disk.
11. How to share:
    - Check learner's composition.
    - Assess their ability to share documents with the neighbourhood.

- Go to the Neighbourhood then click a friend's XO icon to send an invite request.
- Once you have invited your friend, tell him or her to click the Write icon in the Frame of his or her XO laptop.
- Click on Join option from the drop down menu that appears.

4.7. Additional activities

a. Remedial Activities

Questions

1. Which type of memory is data saved temporarily (RAM, ROM)?
2. DVD stand for_____
3. Match the following types of memory to the correct description.

Memory type	Description
RAM	(a) It is non-volatile
ROM	(b) Data is saved permanently
	(c) It is volatile
	(d) Data is saved temporarily

Answers

1. Random Access Memory (RAM).
2. Digital Versatile Disk.
3. RAM – • It is volatile. • Data is saved temporarily.

ROM – • It is non-volatile. • Data is saved permanently.

b. Consolidation activities

QUESTIONS

1. Explain briefly the meaning of collaboration.

2.In your own words explain the roles of the following types of memory:

(a) RAM

(b) ROM

3.Start write activity

a) Create a birthday message.

b) Navigate to the Journal and copy this file to a flash disk.

c) When you copy the original file remains in the Journal:

i) Why do you think the original file remained in the Journal?

ii) Explain the role of memory.

Answers

1. Collaboration is sharing what you have with others. You can collaborate by sending or sharing with neighbourhood.
2. (a) RAM holds instructions and data needed to complete tasks temporarily.

   (b) ROM holds instructions and data needed to start the computer.
3. Supervise how learners create simple table and copy the same table file to flash disk.

   (i) The original file remained in the Journal because it is a permanent storage.

   (ii) Memory is used to save data and instructions either permanently or semi-permanently.

c. Extended activities

Questions

1. Write short notes on the following:

   a) Types of computer memory

   b) Types of internal storage devices

   c) Types of external storage devices

d) Roles of memory and storage devices

2. Give a description of storage devices shown in the table below.

Storage devices	Description
Hard drive	
External hard drive	
Micro SD-Card	

Answers

1. (a) There are two types of computer memory namely RAM and ROM.

-ROM stands for Read Only Memory. This type of memory only allows reading of its content. It is also a permanent storage or non-volatile. ROM contains data that is used when starting computer, checking the RAM and loading others computer programs.

-RAM stands for Random Access Memory. It is temporary memory. Most computers do not store what you have worked on automatically. When power goes off suddenly, what you have been working on disappears. This is said to be volatile.

(b) Internal storage is any storage type found inside the computer system. This will include ROM, RAM and the Hard disk.

(c) External storage refers to devices that are not permanently fixed on or in a computer. This device is used to store information permanently. These devices include memory cards, flash disks, CDs, DVDs and external hard drives.

d) Computer memory is important for storing information. Memory holds instructions and data needed to complete task. The Journal is the internal storage of the XO laptop. These are storage/memory found inside the computer. They include ROM, RAM and hard disk. The external storage devices are found outside the computer. They include memory cards, flash

disks, CDs, DVDs and external hard drives.

2. Hard drive – A permanent storage device found inside the computer such as the Journal.

External hard drive – A permanent storage device that is used externally. It is also portable.

Micro-SD card – It is also called memory card. It is an electronic devices used for storing digital information.

UNIT 5: WRITING SKILLS

5.1. Key Unit Competence

To perform write activity

5.2. Prerequisites

Learners have learned basic writing skills in primary four units 4 including text editing, text formatting, text selection. Before starting this new unit, ask them some probing questions to check if they remember what they learned in primary four on writing skills.

5.3. Introductory activity

Guidance on the introductory activity

- Ask learners to observe each one of the screenshot in student's book page 49 and request each student to think on arrangement of the screenshot displayed in picture.
- By brainstorming learners give answers for picture arrangement. Finally, learners predict what they are going to learn in the unit.

5.4. List of lessons

#	Lesson title	Learning objectives	Number of periods:9
1	ating, Inserting and labelling of table	. Distinguish between rows and columns. • Insert a table in Write Activity • Create a table by labelling rows and columns. • Insert data in cells. • Delete rows and column.	1

		• Appreciate the way tables keep data. • Care for the number of rows and columns that make up a table.	
2	Manipulation of a table: Adding/removing columns or rows, typing	• Insert a table in Write Activity • Create a table by labelling rows and columns. • Adjust rows and columns. • Appreciate the way tables keep data. • Care for the number of rows and columns that make up a table.	2
3	erting and labelling of image/picture	• Discover how to insert pictures and images. • Learn how to resize pictures and images. • Effectively move and delete pictures and images.	2
4	nipulation of image /picture	• Insert pictures and images from internal and external storage.	1

		• Manipulate pictures and images by resizing. • Show concern and care when resizing pictures and images. • Delete unwanted images.	
5	viding text relating to imploded image	• Learn how to type comments on images. • Appreciate the use of pictures and images in the Write Activity.	2
6	**sessment and remediation**		1

Teaching approach for each lesson

5.4.1. Creating, Inserting and labelling of table

a) Learning objectives

. Distinguish between rows and columns.

- Insert a table in Write Activity
- Create a table by labelling rows and columns.
- Insert data in cells.
- Delete rows and column.
- Appreciate the way tables keep data.
- Care for the number of rows and columns that make up a table.

b) Teaching resource

- XO laptop, Desktops, Laptops, Sugar on a disk, Projector

c) Learning activities

(a) Creating tables (Columns and Rows)

(i) Drawing tables in the Write Activity.

(ii) Typing text in tables.

(iii) Give a brief overview of the topic relating it with Computer My Friend.

(iv) Display charts showing different table templates for learners to be familiar with tables.

(v) Engage learners through questioning:

- What are rows and columns in a table?
- What kind of information can be inserted in a table?

(vi) Demonstrate how to insert a table in the Write Activity

(vii) Demonstrate how to type text in a cell.

(viii) Ask learners to complete Activity 5.1 found in their Pupil's Book. Go round checking to ensure the right procedure is used.

b. Inserting Columns and Rows

i. Using the table tool to insert columns and rows.

ii. Start the lesson with a recap of previous lesson.

iii. Ask learners to start Write Activity and access the table tools. Let them insert a table with two columns and two rows.

iv. Engage learners in the lesson by them to practise inserting more rows and columns in the table they had created earlier.

v. Demonstrate how to insert columns and rows in an existing table.

vii. Ask learners to complete exercise 5.2 found in their Pupil's Book. Go round checking to ensure they are doing the correct thing.

c. Resizing Rows and Columns

i. Adjusting columns and rows.

ii. Start with a recap of previous lesson. Explain to the learners that in this lesson they will learn how to resize rows and columns.

iii. Engage learners through questioning:

(a) What do you do if a typed word does not fit in a cell?

(b) What does resize mean?

(c) How do we resize columns and rows?

iv. Demonstrate how to resize columns and rows.

v. Allow learners to practise resizing rows and columns in their tables.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

5.4.2. Manipulation of a table: Adding/removing columns or rows, typing

a) Learning objectives

- Insert a table in Write Activity
- Create a table by labelling rows and columns.
- Adjust rows and columns.
- Appreciate the way tables keep data.
- Care for the number of rows and columns that make up a table.

b) Teaching resources

- XO laptop, Desktops, Laptops, Sugar on a disk, Projector

c) Learning activities

i. Deleting columns and rows from tables.

ii. Engage learners through questioning:

(a) What does delete mean?

(b) How do you delete a column?

iii. Demonstrate on how to delete columns and rows.

iii. Let learners practise how to delete rows and columns.

iv. Demonstrate how to delete a table. Allow learners to practise inserting and deleting tables.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

5.4.3. Inserting and labelling of image/picture

a. Learning objectives

- Discover how to insert pictures and images.
- Learn how to resize pictures and images.
- Effectively move and delete pictures and images.

b. Teaching resources

- XO laptop, Desktops, Laptops, Sugar on a disk, Projector

c. Learning activities

(i) Taking photographs using the XO laptop.

(ii) Drawing pictures in the Paint Activity.

(iii) Use guided discovery to help learners know how images are inserted in Write Activity. Observe closely to see how they try to discover on their own.

(iv) Encourage learners to speak about the task and compare what they have done with others.

(v) Now demonstrate how images/pictures are inserted in Write Activity. Give them time to observe closely and follow the procedure to insert images/ pictures.

(vi) Ask learners to complete Activity 5.4 in their Pupil's Book.

(vii) Go round ensuring each learner is doing the right thing.

(viii) Allow learners to explore and insert pictures from storage devices.

(ix) Help learners understand the concepts by asking them questions on the tasks learnt.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

5.4.4. Manipulation of image /picture

a. Learning objectives

- Insert pictures and images from internal and external storage.
- Manipulate pictures and images by resizing.
- Show concern and care when resizing pictures and images.
- Delete unwanted images.

b. Teaching resources

- XO laptop, Desktops, Laptops, Sugar on a disk, Projector

c. Learning activities

(i) Learners to practise in pairs then individually on how to resize pictures and images

(ii)Practise on inserting comments on a picture.

(iii) Ask learner to resize images and pictures the same way they resized rows and columns. Observe closely to see how they carry out the task.

(Iv) Encourage learners to speak about the task and compare what they have done with others.

(v)Now demonstrate how images/ pictures are resized in Write Activity. Give them time to observe closely and follow the procedure to resize images/pictures.Allow them to refer from Pupil's Book page 54.

(vi) Go round ensuring each learner is doing the right thing.

(vii)Allow learners to explore and insert pictures from storage devices.

(viii) Help learners understand the concepts by asking them questions on the tasks learnt.

(ix) Go round helping learners with difficulties to do this task.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

5.4.5. Providing text relating to imploded image

a) Learning objectives

- Learn how to type comments on images.
- Appreciate the use of pictures and images in the Write Activity.

b) Teaching resources

- XO laptop, Desktops, Laptops, Sugar on a disk, Projector

c) Learning activities

(i) Learners to practise in pairs then individually on how to resize pictures and images.

(ii) Practise on inserting comments on a picture.

(iii) Ask them to type simple comments around the inserted pictures and images.

(iv) Go round helping learners with difficulties to do this task.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

5.5. Additional content of student and teacher

5.5.1. Additional Information for the student

5.5.2. Additional content for the teacher

It is important for the leaner to know that if they have pictures saved in the Journal or storage device, they can insert them into the document they are working on and resize to desired size. This can be useful when they want to place a picture at a certain point in the document. Pictures and images generally beautify documents making them more appealing.

To delete select row or column then on the table tools menu choose the right option to delete. You can also place the cursor in the row or column you want to delete then select appropriate command to delete. Ensure learners use the right procedure to delete columns and rows. Keep on demonstrating on how they can delete multiple columns or rows to save time.

5.6. End unit assessment

a. Guidance on End unit assessment

- **The end unit assessment is called "Revision activity" in the student book, at Page 56-57.**

- Request learners to answer all questions of the "**Revision activity"** during the time reserved to lesson of end unit assessment. If all questions cannot be completed in that time, request them to answer them during their self-study time or as homework.
- Mark their answers and keep records of every student's achievements.
- Provide the remedial, consolidation and extended activities when necessary.

b. Answers for End unit assessment

1. Sheets
2. (a) Table tool

   (b) The pictures of the tortoise have been resized.
3. Select
4. Create table
5. Observe learners' activities. Award them marks for ability to draw shapes in

Paint Activity and the ability to insert the shape in a Write Activity.

6. (a) Observe if learner is able to type in the table.

   (b) The typed word is erased.

   (c) The word erased in (b) above reappears.

7. The table tool

8. To activate the cell and enable the cursor to be active for typing.

9. (a), (b) and (c) Observe and award learners for ability to carry out stated tasks.

10. Assess ability of learner to do required task.

11. Observe learner's activities and award marks for execution of tasks correctly.

5.7. Additional activities

A. Remedial Activities

Questions

Read the following statements. Indicate if **True** / **False**.

1. A table is a grid of cells arranged in rows and columns. **True** / **False**
2. A column is a set of data values appearing vertically in a table. **True** / **False**
3. The intersection of rows and columns form a cell. **True** / **False**
4. Match the following table features to the correct description.

Table feature	Description
(a) Column	(a) Defined by horizontal lines
(b) Row	(b) Where rows and columns intersect
(c) Resize	(c) Defined by vertical lines
(d) Cell	(d) Adjust row heights and column width

Answers

1. True
2. True
3. True
4. Column – Defined by vertical lines.

(a) Row – Defined by horizontal lines.

(b) Resize – Adjust row heights and column width.

(c) Cell – Where rows and columns intersect.

B. Consolidation Activity

Questions

1. Start Write Activity.
   (a) Insert a table with 5 columns and 5 rows.
   (b) Delete 1 column such that the table remains with 4 columns.
   (c) Delete 1 row such that the table remains with 4 rows.
   (d) Insert 2 columns and 2 rows in your table.
2. Explain the meaning of the following words as used in tables:
   (a) Column (b) Row
   (c) Cell (d) Resize

Answers

1. (a) Observe how learners insert a table with 5 columns and 5 rows.
   (b) Supervise to ensure learners use the right procedure to delete column.
   (c) Supervise to ensure learners use the right procedure to delete 1 row.
2. (a) Column is defined by the vertical lines.
   (b) Row is defined by the horizontal lines.
   (c) Resize is to adjust row heights and column width.
   (d) Cell is where rows and columns intersect.

C) Extension activity

Questions

1. Using Write Activity, write short notes on how to create a table.
2. Start write activity.
   (a) Use table tools to create your performance record table.

(b) Insert a column showing the subjects that you do.

(c) Insert two rows that will contain your target minimum and maximum scores in all subjects.

3. Create a table with 6 rows and 5 columns perform the following activities.

(a) Resize row 3 (b) Resize column 2

(c) Delete column 4 (d) Delete row 2

(e) Delete the whole table

Answers

1. • Start Write Activity then click the table drop-down arrow to assess table tools.

• Click the table tool to insert a table. The table grid is displayed where you can choose the number of columns and rows using the mouse pointer.

2. Supervise and observe how learners created their performance record using table tools.

Award marks based on right steps being followed and completing in time.

3. Observe how learners resize rows, columns and delete rows, columns and table.

Award marks if the right steps are followed for this activity.

UNIT 6: COMPUTER RESEARCH

6.1. Key unit Competence

To explore and use the Browse Activity and the use of E-mails (Sugar Interface)

6.2. Prerequisites

Learners have learned basic internet skills in primary four, unit 4 including browser, roles of internet, WWW, sharing and collaboration. Before starting this new unit, ask them some probing questions to check if they remember what they learned in previous lessons.

6.3. Introductory activity

Guidance on the introductory activity

-Starting by showing the pictures to the learners.

-Ask them fist question and allow them to think and suggest the answers.

-Continue to ask all questions and other possible probing questions to learners until they discover and predict what they are going to study.

6.4. List of lessons

#	Lesson title	Learning objectives	Number of periods:10
1	aning of browse and the uses of emails	• Explain the role of using e-mails in real life. • Create, write, send and read e-mails. • Feel happy to have an e-mail account. • Show respect when sending and receiving e-mails.	1

2	ation of email account	• State steps involved in creating, writing and sending e-mails. • Create, write, send and read e-mails. • Show respect when sending and receiving e-mails.	2
3	mmunication by email	• Show respect when sending and receiving e-mails. • Create, write, send and read e-mails.	1
4	Access world map, the dictionary, the textbook and storybooks through browse	• Explain the process of accessing the dictionary, world map and storybooks from the Browse Activity. • Outline the process of taking a screenshot. • Find/access (a) a world map (b) Dictionary (c) Textbooks and storybooks.	2

		• Take screenshots.	
5	aring the content from browse	• Share a snapshot and bookmarks with friends. • Appreciate the content found using the Browse Activity.	2
6	**sessment and remediation**		2

Teaching approach for each lesson

6.4.1. Meaning of browse and the uses of emails

a) Learning objectives

- Explain the role of using e-mails in real life.
- Create, write, send and read e-mails.
- Feel happy to have an e-mail account.
- Show respect when sending and receiving e-mails.

b) Teaching resources

- XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet, Charts

c) Learning activities

(i) Ask learners to have a look at the activity in their Pupil's Book page 58.Allow them time to describe these activities.

(ii) Start the lesson by writing words concerning meaning and uses of email on the board. Ask learners to try and define e-mail terminologies.

(iii) Now show the definition of email and uses of email in daily life. Learners make a research on the internet the uses of internet.

(iv) Go round ensuring each learner is doing the right thing.

(v) Help learners understand the concepts by asking them questions on the tasks being done. Be keen to observe that Pupil's follow and apply the right procedure.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

6.4.2. **Creation of email account**

a) Learning objectives

- State steps involved in creating, writing and sending e-mails.
- Create, write, send and read e-mails.
- Show respect when sending and receiving e-mails.

b) **Teaching resources**

- XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet, Charts

c) **Learning activities**

(i) Ask learners to have a look at the illustrations in their Pupil's Book page 59. Allow them time to describe these illustrations.

(ii) Start the lesson by writing words concerning e-mail account on the board. Ask learners to try and define e-mail terminologies.

(iii) Guide learners through the process of creating an e-mail account as outlined inthe Pupil's Book page 59.

(iv) Now demonstrate how e-mail account is created. Give them time to observe Cleary and follow the procedure to create their own e-mail accounts.

(v) Go round ensuring each learner is doing the right thing.

(vi) Help learners understand the concepts by asking them questions on the tasks being done. Be keen to observe that Pupil's follow and apply the right procedure.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

6.4.3. Communication by email

a) Learning objectives

- Show respect when sending and receiving e-mails.
- Create, write, send and read e-mails.

b) Learning resources

- XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet, Charts

c) Learning activities

(a) Write and send an e-mail

i. Exercises on writing, sending and reading e-mails.

ii. Compose and send e-mail to wish your friend happy birthday.

iii. Ask learners to discuss reasons for sending or receiving letters.

iv. Let them know that e-mails are just like letters, only that they are send or received online (electronically).

Write some terms associated with e-mails on the board for learners to define.

v. Allow them time to refer on the available charts showing how to compose, send forward and reply to e-mail messages.

vi. Guide learners on how to compose new e-mail, reply to mail, attach files and send e-mail messages as outlined in the Pupil's Book page 60.

vii. Go round ensuring each learner is doing the right thing. Let learners write and send e-mails to each other's e-mail accounts.

viii. Ask learners to complete Activity 6.4. To write and send an e-mail available in their Pupil's book. (Page 60)

ix. Help learners understand the concepts by assisting them to carry out tasks being done.

(b) Read inbox e-mails

i. Start the lesson by writing a few terms used in managing inbox messages on theboard for learners to define. Ask learners to explain the meaning of this terms.

- Sent message (b) Marked as important (c) Inbox messages.Allow learners time to discuss in pairs.

ii. Guide learners on how to open and read e-mail messages as outlined in thePupil's Book page 60.

iii. Go round ensuring each learner is doing the right thing.

iv. Help learners understand the concepts by encouraging them to practise more.

v. Ask learners to complete Activity 6.5; Reading inbox e-mails.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

6.4.4. Access world map, the dictionary, the textbook and storybooks through browse

a) Learning objectives

- Explain the process of accessing the dictionary, world map and story books from the Browse Activity.
- Outline the process of taking a screenshot.
- Find/access (a) a world map (b) Dictionary (c) Textbooks and storybooks.
- Take screenshots.

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet.

c) Learning activities

a) Access world map

i. Navigating and using the Browse Activity.

ii. Accessing the map of Africa, Science notes and a storybook on animals.

iii. Accessing maps and making screenshots.

iv. Start the lesson by asking learners a few questions on Browse Activity.

v. Display images and illustrations showing how to navigate the Browse Activity.

vi. Guide learners on how to navigate and use the Browse Activity as indicated in the Pupil's Book page 62.

vii. Ask learners to complete Activity 6.8; Navigating using Browse Activity.

viii. Go round ensuring each learner is doing the right thing.

ix. Help learners understand the concepts to use the Browse Activity to locate the world map.

b) Access the Dictionary

(i) Ask learners a few questions about the dictionary.

(a) What is an online dictionary?

(b) What other examples of online dictionaries do you know?

(ii) Demonstrate to learners how to navigate and access the dictionary as indicated in the Pupil's Book page 62.

(iii) If possible avail images and illustrations showing steps for accessing the dictionary.

(iv) Go round ensuring each learner is doing the correct thing.

(v) Help learners understand the concepts by giving them words to search for from the dictionary.

c) Access Textbooks and Storybooks

(i) Start the lesson by asking learners a few questions about textbooks, storybooks.

(a) What is an online textbook?

(b) Who has ever read an online textbook or storybook?

(ii) Guide learners on how to navigate and access online textbooks and storybooks as indicated in the Pupil's Book page 62.

(iii) Go round ensuring learners are doing the correct thing. Allow them to read some of the browsed stories.

(iv) Give them more practise activities.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

6.4.5. Sharing the content from browse

a) Learning objectives

- Share a snapshot and bookmarks with friends.
- Appreciate the content found using the Browse Activity.

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet.

c) Learning activities

i. Share visited websites using bookmark.

ii. Writing and commenting on the screenshots

iii. Ask learners to explain briefly how they shared stories and other materials in the Write Activity. Ask them to explain how you will share the visited websites with someone else?

iv. Display illustrations showing steps for sharing content from Browse.

v. Allow learners time to refer from the available charts. Demonstrate how to share content as indicated in the Pupil's Book page 63.

vi. Go round ensuring each learner are sharing the browsed information.

vii. Help learners understand the concepts by asking them questions on the tasks being done. Be keen to observe that Pupil's follow and apply the right procedure.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

6.5. Additional content of student and teacher

6.5.1. Additional Information for the student

6.5.2. Additional content for the teacher

Different dictionaries are available in the internet, examples are Word Press and Oxford dictionaries. To search for any dictionary of your choice you need to start by opening a search engine such as Google then on the search box type the preferred search word. Search words should be short and to the point.

To browse web pages, you need to search or type the exact web address in the address bar to view its contents. Once you have access to the home page of that website you can use the available hyperlinks or buttons to navigate the web. If you want to search for a specific topic let's say world map you need to open a search engine website such as Google, Wikipedia and so on.

6.6. End unit assessment

a. Guidance on End unit assessment

- **The end unit assessment is called "Revision activity" in the student book, at Page 64-66.**
- Request learners to answer all questions of the "**Revision activity"** during the time reserved to lesson of end unit assessment. If all questions cannot be completed in that time, request them to answer them during their self-study time or as homework.
- Mark their answers and keep records of every student's achievements.
- Provide the remedial, consolidation and extended activities when

necessary.

Answers to Practice Activity 6.1

Reference: Pupil's book 63

1. http://www.google.com
2. Storybooks for kids.
3. (a) Children English Storybooks.

   (b) Free kids Books online.

   (c) Tell your Story Today.

b. Answers for End unit assessment

1. (a) It is used for research.

   (b) (i) • K – Search box. • J – Bookmarks.

   (ii) Click on one bookmark. Hover your pointer on the private icon on top of your screen. Click on my neighborhood icon and allow your friends to view your bookmarks.

   (c) • Wikipedia • Ask.com • MSN • Bing • Yahoo search.
2. • Observe learners work. Award marks for ability to access the world map.
   - Ability to zoom the map accessed.
   - Ability to take and share a screenshot with friends.
3. A - Messages that is sent electronically.
4. B - Signup
5. (i) Is where you type the recipients e-mail address.

   (ii) Helps you type the title of your message.

   (iii) The button that allow you to attach files.

   (iv) A place where you can type your e-mail message.
6. D- School
7. Assess ability of learners to recall procedure of creating an e-mail and typing

the information.

Steps:

(a) Type www.gmail.com on the address bar.

(b) Click on Create to open the sign up form.

(c) Fill in the form to create an account.

8. Read learners e-mail messages to know if correct content has been written. Observe if they can send e-mails.

9. • Sign into your account.

• On the screen menu click compose followed by new mail.

• Type text in the available text area.

10. (a) The person receiving the e-mail.

(b), (c) and (d) – Observe learner's activities and award marks appropriately.

11. (a) Yes

(b) (i) It is a file that has been added to an e-mail.

(ii) Pictures, documents

6.7. Additional activities

a. Remedial Activities

Questions

1. A place where web addresses are typed …… (address box, address bar).
2. An e-mail is…… (an electronic message, a written message)
3. Display the image of e-mail account and ask learners to identify features of e-mail account such as search box, compose, inbox and logout.
4. Match the following e-mail and search engine terminologies to their correct descriptions.

Terminology	Description
(a) Browser	(a) Takes you to a new page within the website
(b) Home Page	(b) To fill in personal details
(c) Address bar	(c) Where search terms are entered
(d) Sign up	(d) The first page of a website
(e) Hyper-link	(e) Application for accessing web-pages
(f) Search box	(f) Where web addresses are entered

Answers

1. Address bar
2. An electronic message
3. Point at different features of e-mail account and let learners give answers.
4. (a) Browser – Application for accessing web pages.

(b) Home page – The first page of a website.

(c) Address bar – Where web addresses are typed.

(d) Sign up – To fill in personal details.

(e) Hyper-link – Takes you to a new page with the website.

(f) Search box – Where search terms are entered.

(b) Consolidation Activity

Questions

1. Create an e-mail account and compose a new e-mail message.
2. Explain steps you will follow to read incoming messages.
3. In your groups, discuss the following e-mail terminologies.
   (a) Browser
   (b) Home page
   (c) Address bar
   (d) Webmail account
   (e) Sign up
   (f) Sign in
   (g) Hyper-Link
   (h) Form

Answers

1. Observe learners closely as they create e-mail accounts and compose new e-mail messages. Award them marks basing on their speed and use of the right steps.
2. Login to your e-mail account using your username and password. Locate the inbox button and click on it. The new messages appear in bold.
3. (a) Application used to access web pages.
   (b) The first page of a website.
   (c) The bar where web addresses are entered.
   (d) E-mail account created using e-mail provider website such as yahoo, Gmail, Hotmail etc.
   (e) Filling a form for e-mail account.
   (f) Opening your e-mail account to read mail.
   (g) A link that takes you to a new page within the website.

(h) A place where you enter personal details.

(c) Extension Activity

Questions

1. Write short notes on the following topics:
   (a) Sing up (b) Sing in
   (c) Reading new messages (d) Replying messages
2. Ask learners to access 2 online storybooks, bookmark them and share the bookmarks.
3. Start Browse Activity.
   (a) On the address bar type www.wikipedia.org.
   (b) Locate the search box then type world map.
   (c) Write short notes about what you discover on this map.

Answers

1. (a) When signing up for a new e-mail account, you will access a form where your details will be captured. Once a sign up form opens, you start filling in your personal details. Click submit when you finish entering your correct details.

   (b) For you to sign in to your e-mail account you need to type your username and password then click login button.

   (c) Sign in the click the inbox button to access the new e-mail messages.

   (d) To reply to a message, click the compose button then type your message. Remember to type the e-mail address for the recipient plus the subject of your message.

2,3 Observe the learner's work and award them marks.

UNIT 7: PROGRAMMING FOR CHILDREN

7.1. Key unit competence

To perform arithmetic operations, draw geometric shapes (parallelogram, rhombus, trapezium, regular polygons) using Turtle Art Activity and create dialogue and cartoons using Scratch Activity.

7.2. Prerequisites

Learners will learn this unit better if they know basic programming languages such as Turtle Art and know to draw rectangle, square and circles using Turtle Art that have learned in Primary 4 unit six (6). Before starting this new unit, ask them some probing questions to check if they remember what they learned in previous lessons.

7.3. Introductory activity

Guidance on the introductory activity

-Starting by showing the pictures to the learners.

-Ask them fist question and allow them to think and suggest the answers.

-Continue to ask all questions and other possible probing questions to learners until they discover and predict what they are going to study.

7.4. List of lessons

#	Lesson title	Learning objectives	Number of periods:22
1	Drawing a parallelogram using turtle art instructions	• Explain how Turtle Art can be used to draw geometric shapes. • Identify different Turtle instructions in order to draw	2

		geometric shapes. • Select and correctly associate Turtle Art instructions. • Construct geometric shapes using Turtle Art instructions. • Express desire to draw colorful shapes using Turtle Art commands.	
2	Drawing a rhombus trapezium using turtle art instructions	• Explain how Turtle Art can be used to draw geometric shapes. • Identify different Turtle instructions in order to draw geometric shapes. • Select and correctly associate Turtle Art instructions. • Construct geometric shapes using Turtle Art instructions. • Express desire to draw colorful shapes using Turtle Art commands.	2
3	Drawing regular polygons using turtle art instructions	• Explain how Turtle Art can be used to draw geometric shapes. • Identify different Turtle instructions in order to draw geometric shapes.	2

		• Select and correctly associate Turtle Art instructions. • Construct geometric shapes using Turtle Art instructions. • Express desire to draw colorful shapes using Turtle Art commands.	
4	dition and subtraction using turtle art instructions	• Identify and associate different turtle instruction in order to perform calculations (arithmetic operations) • Perform addition, subtraction, multiplication and division using turtle instructions	2
5	Multiplication and Division using turtle art instructions	• Identify and associate different turtle instruction in order to perform calculations (arithmetic operations) • Perform multiplication and division using turtle instructions	2
6	nting in scratch program	• Match a sprite with the meaning of the topic • Appreciate the way of expressing the ideas through projects	1

7	Importing and using camera in scratch program	• Practice and manage correctly the components of scratch window • Appreciate the way of expressing the ideas through projects	1
8	Creating and organization of a dialogue using scratch commands	• Associate different commands to make a dialogue/ cartoons • Create a dialogue matching the sprite Design cartoon • Be confident about the process of creating dialogues and cartoons.	2
9	Manipulation of scratch script	• Match a sprite with the meaning of the topic. • Appreciate the way of expressing the ideas through projects.	2
10	Background setting of sprite	• Dialogue by combining the background and sound accordingly. • Select the sprite and associate it with the background	2

11	Sound setting of sprites	• Be proud to arrange commands and produce animations • Dialogue by combining the background and sound accordingly. • Select the sprite and associate it with the background	2
12	**Assessment and remediation**		2

Teaching approach for each lesson

7.4.1. Drawing a parallelogram using turtle art instructions

a) Learning objectives

- Explain how Turtle Art can be used to draw geometric shapes.
- Identify different Turtle instructions in order to draw geometric shapes.
- Select and correctly associate Turtle Art instructions.
- Construct geometric shapes using Turtle Art instructions.
- Express desire to draw colorful shapes using Turtle Art commands.

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet.

c) Learning activities

(i) Ask learners to observe pictures on page 67 and discuss what they are going to

learn in the unit.

(ii) Let learners attempt Activity 7.1. Mark their books and correct them where necessary.

(iii) Show learners how to obtain the correct number of polygon sides through calculations.

(iv) Allow learners to practise drawing polygons of different sizes (6, 7, 8, 9...) in their exercise notebooks.

(v) Instruct learners to draw a hexagon using Turtle Art instructions.

(vi) Encourage learners on how to speak about the task they are doing and compare their drawings with their peers.

(vii) Guide learners through the process of creating a polygon as outlined in the pupil's Book pages 68.

(viii) Let them practise drawing different type of polygons using Turtle commands. Give them enough time to do the activities/tasks.

(ix) Go round ensuring each learner is doing the right thing. Assist learners with difficulties.

(x) Help learners understand the concepts by asking them questions on the tasks being done.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.2. Drawing a rhombus trapezium using turtle art instructions

a) Learning objectives

- Explain how Turtle Art can be used to draw geometric shapes.
- Identify different Turtle instructions in order to draw geometric shapes.

- Select and correctly associate Turtle Art instructions.
- Construct geometric shapes using Turtle Art instructions.
- Express desire to draw colourful shapes using Turtle Art commands.

b) Teaching resource

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet.

c) Learning activities

(i) Let learners know that in this lesson they will draw rhombuses using Turtle Art instruction blocks.

(ii) Ask learners to explain what a rhombus is. Listen as they present their different explanations.

(iii) Explain to them what a rhombus is in reference to Pupil's Book page 70.

(iv) Instruct learners how to draw a rhombus as they did in the previous lesson. Let them refer to the available charts showing different geometrical shapes.

(v) Encourage learners to speak about the task they are doing and compare their drawing with friends.

(vi) Now demonstrate how a rhombus is drawn using Turtle Art commands. Give them time to observe closely and follow the procedure to draw their own rhombuses.

(vii) Go round ensuring each learner is doing the right thing.

(viii) Help learners understand the concepts by asking them questions on the tasks being done.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.3. Drawing regular polygons using turtle art instructions

a) Learning objectives

- Explain how Turtle Art can be used to draw geometric shapes.
- Identify different Turtle instructions in order to draw geometric shapes.
- Select and correctly associate Turtle Art instructions.
- Construct geometric shapes using Turtle Art instructions.
- Express desire to draw colorful shapes using Turtle Art commands.

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet.

c) Learning activities

(i) Ask learners to observe pictures on page 67 and discuss what they are going to learn in the unit.

(ii) Let learners attempt Activity 7.2. Mark their books and correct them where necessary.

iii) Show learners how to obtain the correct number of polygon side through calculations.

iv) Encourage learners to speak about the task they are doing and compare their drawing with friends.

v)Guide learners through the process of creating a polygon as outlined in the pupil's Book pages 68.

vi) Let them practise drawing different type of polygons using Turtle commands. Give them enough time to do the activities/tasks.

vii) Go round ensuring each learner is doing the right thing. Assist learners with difficulties.

viii) Help learners understand the concepts by asking them questions on the tasks being done.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on

the performed activities or content learnt to assess the learning and summarize the content.

7.4.4. Addition and subtraction using turtle art instructions

a) Learning objectives

- Identify and associate different turtle instruction in order to perform calculations (arithmetic operations)
- Perform addition, subtraction, multiplication and division using turtle instructions

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, notebooks, Mathematics book.

c) Learning activities

i. Carrying out addition and subtraction.
ii. Write the topic "Arithmetic Operations" on the board.
iii. Display charts showing worked examples of different arithmetic operations for learners to familiarize with.
iv. Ask learners to work out arithmetic operations involving addition of numbers in their notebooks.
v. Guide learners through the procedure of using Turtle Art addition operationsas outlined in the Pupil's Book page 72. You can use examples from their mathematics Pupil's Book.
vi. Allow learners to explain the meaning of subtraction as used in arithmetic.
vii. Guide learners on how to use the Turtle subtraction operation as outlined in Pupil's Book page 72.
viii. Go round checking if learners are doing the correct thing.
ix. Assist slow learner by giving them personalised instructions. Assign additional work to fast learners.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.5. Multiplication and Division using turtle art instructions

a) Learning objectives

- Identify and associate different turtle instruction in order to perform calculations (arithmetic operations)
- Perform addition, subtraction, multiplication and division using turtle instructions

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, notebooks, Mathematics book.

c) Learning activities

i. Carrying out multiplication and division.

ii. Write 2 questions involving multiplication on the board. Ask learners to attempt them in their books. For example:

$2 \times 1 =$

$3 \times 2 =$

iii. Allow learners to discover how multiplication operation is carried out using Turtle Art instructions.

iv) Let one learner demonstrate how to use Turtle multiplication operation. Give learners time to observe closely and follow the procedure to complete their calculations.

v) Give learners object for them to share among themselves. Explain that sharing of things can be equated to division.

vi) Explain to the learners the meaning of division as used in arithmetic operation.Allow learners to refer from available charts showing the number palette.

vii) Guide learners on how to use division operation as outlined in the Pupil's Book page 73.

viii) Assign learners individual work on multiplication and division. Go round ensuring each learner is doing the right thing.

ix) Help learners understand the concepts by observing their tasks and helping them accordingly.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.6. Painting in scratch program

a) Learning objectives

- Match a sprite with the meaning of the topic.
- Appreciate the way of expressing the ideas through projects

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet.

c) Learning activities

(i) Introduce the lesson by asking learners to access the Scratch Activity.

(ii) Ask the learners to draw an image of a school bus with the help of geometric shapes only.

(iii) Ask them to fill colour in it with the bucket tool.

(iv) Assist learners to do individual work by practicing what is written in Pupil's book page 75 - 76.

(v) Go round ensuring each learner is doing the right thing.

(vi) Help learners understand the concepts by giving them more practical activities.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.7. Importing and using camera in scratch program

a) Learning objectives

- Practice and manage correctly the components of scratch window
- Appreciate the way of expressing the ideas through projects.

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet.

c) Learning activities

(i) Introduce the lesson by asking learners to access the camera.

(ii) Ask the learners to take his/her photo with the help of camera of computer.

(iii) Ask them to resize that photo as show on page 77 student's book.

(iv) Assist learners to do individual work by practicing what is written in Pupil's book page 77.

(v) Go round ensuring each learner is doing the right thing.

(vii) Help learners understand the concepts by giving them more practical activities.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.8. Creating and organization of a dialogue using scratch commands

a) Learning objectives

- Associate different commands to make a dialogue/ cartoons
- Create a dialogue matching the sprite Design cartoon
- Be confident about the process of creating dialogues and cartoons.

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet

c) Learning activities

(i) Ask learners to tell short stories and to act dialogues in class. Let them write short scripts of the stories in their notebooks.

(ii) Let them choose correct commands from the different command blocks and drag them to the script pane.

(iii) Allow them to work in pairs then individually on story of their choice.

(iv) Assist learners to do individual work by practicing what is written in Pupil's book page 79.

(v) Ask learners to practise organising several command blocks individually in order to create other dialogue.

(vi) Go round checking their work.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.9. Manipulation of scratch script

a) Learning objectives

- Match a sprite with the meaning of the topic
- Appreciate the way of expressing the ideas through projects

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet

c) Learning activities

(i) Introduce the lesson by asking learners to access the scratch activity and individually write down all the commands.

(ii) Ask them to discuss in groups the importance of each command block.

(iii) Let learners drag selected commands from each command block into the script pane.

(iv) Allow them to play with the commands.

(v) Go round ensuring each learner is doing the right thing.

(vi) Help learners understand the concepts by attending to their individual needs.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.10. Background setting of sprite

a) Learning objectives

- Dialogue by combining the background and sound accordingly.
- Select the sprite and associate it with the background.

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet

c) Learning activities

(i) Ask learners to click on the stage icon and see what happens.

(ii) Allow them to explore the various backgrounds available.

(iii) Ask them to observe how the sprites they have appear in different backgrounds.

(iv) Guide them on how to set backgrounds depending on the scripts created as outlined in the Pupil's Book pages 80 – 81.

(v) Give individual work to test their understanding. Assign them Practise Activity

7.3 as class work. Let them do this activity in pairs.

(vii) Go round ensuring each learner is doing the right thing.

(viii) Help learners understand the concepts by attending to their individual needs.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.4.11. Sound setting of sprites

a) Learning objectives

- Dialogue by combining the background and sound accordingly.
- Select the sprite and associate it with the background
- Be proud to arrange commands and produce animations

b) Teaching resources

XO laptops, Desktop computer, Laptops, Sugar on a disk, Projectors, Internet

c) Learning activities

(vi) Ask learners to click on the sound block and see what happens.

(vii) Allow them to explore the various sounds available.

(viii) Ask them to observe how the sound they have appear in different sprites.

(ix) Guide them on how to set sound depending on the sprite created as outlined in the Pupil's Book pages 81.

(x) Give individual work to test their understanding. Assign them Practise Activity 7.3 as class work. Let them do this activity in pairs.

(ix) Go round ensuring each learner is doing the right thing.

(x) Help learners understand the concepts by attending to their individual needs.

d) Lesson assessment and Conclusion

During the activities, keep on observing and understanding what learners do and

answer, and note their progress. At the end the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarize the content.

7.5. Additional content of student and teacher

7.5.1. Additional Information for the student

7.5.2. Additional content for the teacher

To create dialogues and speeches, you have to create a script that your sprites will act. A **script** is made up of a collection of command blocks. It is important for the learners to know how each command block works. This will help them choose the right commands to use in their respective projects.

A polygon has five or more equal sides and angles. Polygons include pentagons (5 equal sides), hexagons (six equal sides) and so on.

You obtain the angle of the polygon you want to draw by dividing 360 by number of sides you wish to have.

To draw a polygon in Turtle Art, you use the **Forward Command** and **Left/ Right commands**. You can also use the Repeat command.

7.6. End unit assessment

a. Guidance on End unit assessment

- **The end unit assessment is called "Revision activity" in the student book, at Page 82-83.**

- Request learners to answer all questions of the "**Revision activity"** during the time reserved to lesson of end unit assessment. If all questions cannot be completed in that time, request them to answer them during their self-study time or as homework.
- Mark their answers and keep records of every student's achievements.
- Provide the remedial, consolidation and extended activities when necessary.

Answers to Practice Activities 7

Reference: Pupil's book page 74

Practice Activity 7.2

1. Observe low learner start Turtle Art Activity and navigate to Arithmetic operations.

   (a) Supervise the whole session to ensure learners subtraction operator to get the right answer (i.e. 88 km – 50 km = 38 km).

   (b) Supervise to ensure learners use multiplication and division operators to calculate the number of kilometres covered each day

   10 days=50km

   1day=?

   $\frac{1\times 50\text{km}}{10\ days} =$

2. Observe how learners use arithmetic operation to multiply × height to get the area of a parallelogram.

   base = 10

   height = 6 cm = Area of parallelogram = 10 × 6 = 60 cm

Practice Activity 7.3

Reference: Pupil's book page 81

1. Bedroom photograph
2. Go round checking how learners use the XO camera to take images of various backgrounds.
3. Observe if learners follow the right steps to change Sprite to that of a bee.
4. Go round observing how learners discover on how sound setting is done using set and import options.
5. Counter check and mark learner's notebooks for the correct descriptions.
6. (a) Counter check learner's notebook for the correct answers.

   (b) Go round checking if learners have inserted the flower-bed background.

   (c) Ensure learners have shared their work.Award marks accordingly.

b. Answers for End unit assessment

1. Move one step forward
2. (a) Palette (b) Main Area
3. (a) Turtle (b) Addition, Subtraction, Multiplication and Division
4. Observe learner's activities. Award marks for use of correct command blocks and correct drawings.
5. (a) The stage

   (b) Folders
6. Importing
7. A script is a collection or stack of blocks that interlock with one another.

8. (a) A background is a setting where the sprite acts from?
   (b) Loice used paint option (location).
   (c) Evaluate learners work to see if it is identical to what is given.
9. (a), (b) and (c) - Check learners individual work. Award marks for correct activity done.
10 • Click the upload sprite from file icon.
   • The storage folders window pops up.
   • Click the picture folder or any other folder containing your image.
   • Select the image you want.
   • Click insert.
10. • ***Sound Edito***r - provides options for editing sound files.
   • ***Edit*** tab displays options to undo, redo, cut, copy, paste, delete, and select all.
   • ***Effects*** - tab displays options such as fade in, fade out, louder, softer, silence and reverse.

7.7. Additional activities

a. Remedial Activities

Questions

1. We draw shapes in Turtle Art using instruction blocks found in Turtle Art pallet.
   (a) True (b) False
2. You can draw shapes by sequencing instruction blocks correctly. **True / False**
3. Create dialogue sprite will act. **True / False**
4. Use the following instruction blocks to draw a six sided polygon.
   (a) Forward 200 (b) Left 60 (c) Repeat 6 times

ANSWERS

1. (a) True

2. (a) True

3. (a) True

4. Observe and follow learners closely as they use instructions blocks to draw a six sided polygon. At the end of the period counter check and give marks based on the shapes drawn.

b. Consolidation Activity

Questions

1. When you use the repeat command you should also use the Start command. Explain why it is necessary?

2. Explain the following words as used in sprite activity:

   (a) Spriting (b) Paint Option

   (c) Import Option (d) Camera

3. (a) Organise learners into pairs. Let them Practise drawing rhombus using the Turtle Art command blocks.

   (b) Ask them to use the Turtle Arithmetic commands to calculate the perimeter of the rhombus.

Answers

1. The repeat command helps you to avoid writing the same commands several times. On the other hand, Start Command will help you run your Turtle Art script.

2. (a) Spriting is the act of creating or modifying objects that act for use in dialogues and cartoons.

   (b) The Paint option gives you a background with tools that allow you to draw and paint sprite of your own choice.

   (c) This option allows you to choose different sprite from the existing one.

3. Supervise the whole session to ensure learners use and follow the right procedure. Award marks based on effective use of command blocks and pixel values.

(c) **Extension Activity**

Questions

1. Use write activity to type short notes on the following topics:
   (a) Drawing regular polygon shapes
   (b) Parallelogram
   (c) Rhombus
   (d) Trapezium
   (e) Drawing a 6 sided polygon in Turtle Art
   (f) Arithmetic operations
   (g) Background setting
2. Draw three different regular shapes using Turtle Art.
   (a) Calculate the perimeter of these shapes.
   (b) Calculate the Area of these shapes.

Answers

1. a) To draw regular shapes:
   - Use the forward command and left / right command.
   - You can also use repeat command to repeat same actions.

b) Arithmetic deals with counting and calculations of numerical data. Turtle Art has a number palette that contains operators useful in carrying out mathematical calculations. When you click on this palette, several operations are displayed. These include: addition, subtraction, multiplication and division.

c) Dialogue and cartoons can be created as scratch projects in Scratch Activity. These projects can then be shared among Scratch Activity users we use the following to create dialogue and cartoons: Sprite, paint options, import option and the camera.

Unit 8: Water

8.1 Key unit competence

To purify water for drinking and explain dangers of polluted water

8.2 Prerequisite

Water is a very important substance. It is the main component of the earth as it covers about 71% of the earth's surface. Water is important for survival of plants and animals. The amount of water on earth is constant. It circulates through the water cycle continuously.

Safe unpolluted water is essential for humans, plants, animals and other life forms. Polluted water harms many living organisms. It is therefore important to keep our water sources clean.

8.3 Introductory activity

a) Guidance:

Ask learners to observe the pictures (a, b, c, d, e and f) in P5 Science and Elementary Technology textbook, on page 86, and request everyone to think about meaning of each picture in real context. By brainstorming, learners give meaning in our context, for the displayed pictures of introductory activity on unity 8 of P5 textbook. Learners finally predict what they are going to learn in the unit

b) Answers for revision activities

The pictures (**a)**, (**b)**, and (**e)** of the introductory activity of unity 8 allow to think about water importance in plants and human/animals' nutrition and human hygiene. The picture (**c**) displays water purification method, water pollutants for (**d**) while the picture (**f**) illustrating water storage in our context. In this unit we are going to learn about water.

8.4 List of lessons

#	Lesson title	Learning objectives	Number of

			periods
1	Identification of importance of water	• Explain the importance of water. • Recognize the importance of water.	1
2	Identification of sources of water	• List various sources of water • Develop positive attitude to the environment and protection of water sources from pollutants	1
3	Identification of properties of water	• Identify properties of water • Draw a simple water cycle	1
4	Water cycle	• Explain the components of water cycle	2
5	Effects of rain water	• Identify the effects of rain water • Explain the effects of rain water.	1
6	Prevention of danger of rainwater	• Explain methods of protecting the environment from rainwater • Apply methods of protecting the environment from rain water	2
7	Identification of water pollutants	State sources of water pollutants	1
8	Dangers and prevention of water pollution	• Identify sources of water pollution • Explain dangers of polluted water.	2
9	Water purification methods	• Identify methods of water purification. • Differentiate methods of water purification.	2

		• Make a simple water filter using local materials • Produce drinking water through filtration, chemical treatment and boiling water • Develop curiosity about water purification.	
10	Water storage (Portable water for drinking, Water for general purpose use.)	• Explain different water storage techniques • Apply different ways of storing water. • Appreciate the importance of storing water.	1
11	**Assessment and remediation**		2

8.4.1 Identification of importance of water

a) Learning objectives

- Explain the importance of water.
- Recognising the importance of water.

b) Teaching resources

- Charts/photographs of use of water
- Pictures showing uses of

water

- Water mops, pieces of cloth
- Laptop, books in the library

c) Learning activities

i. Ask learner to observe introductory pictures in Pupil's Book page 86. Let them discuss in pairs to identify the pictures as well as predict what they are going to learn in the unit.
ii. Ask learners to write down three daily uses of water.
iii. Ask learners through group discussion to identify uses of water in their homes and at school.
iv. Display chart showing uses of water. You can also let them observe pictures in pupil's Book page 86.
v. Let them identify uses of water shown in Activity 8.1
vi. Explain to them uses of water highlighted in Pupil's Book pages 86 – 89.
vii. Practise Activity 8.1 in the Pupil's Book page 86 and fill in correctly.
viii. Lesson assessment and Conclusion:
    - Assess their knowledge of the uses of water at home and in school and theirsurroundings.
    - Allow learners to give other uses of water not mentioned in the Pupil's Book.

Answers for learning activity 8.1

Water is used for different purpose:

1. As human food: drinking and cooking
2. In sanitation: bathing, washing food, washing clothes, washing utensils, cleaning floors, cleaning toilets
3. In farming: watering plants, water for animals, cleaning tools and farm

structures and mixing farm chemicals.

4. In industry: all factories need enough water in order to work well.

8.4.2 Identification of sources of water

a) Learning objectives

- List various sources of water.
- Recognise sources of water.

b) Teaching resources

- Source of water charts
- Source of water pictures
- Laptop
- Library books/textbooks

c) Learning activities

i. Take learners for a field visit to observe sources of water.

ii. Assign learners to discussion groups to identify sources of water in their district.

iii. Let them observe charts and pictures in their books and record their findings in their notebooks.

iv. Ask the learners to present their findings to other members of their class.

v. Allow learners to discuss natural and man-made sources of water in their district.

vi. Ask learners to use the XO laptops or books in the library to identify natural and man-made sources of water that are not in their district.

vii. Assign them Activity 8.3 and 8.4 as homework.

Lesson assessment

Assess if they can identify water sources in the district as well as distinguish between natural and man-made water sources.

Answers to activity 8.3

ii. a. Rain water, b. River, c. Lake, d. Ocean

iii. Other water sources: seas, springs, streams

Answers to activity 8.4

The man-made water sources are: (a) well, (b) dam

8.4.3 Identification of properties of water

a) Learning objectives

- Identify properties of water.
- Investigate properties of water through experimentation.

b) Teaching resources

- Water container chart/picture
- Water in a container
- A transparent glass with a lid
- Salt

c) Learning activities

i. Ask learners to collect the materials needed as mentioned above

ii. Ask learners to get into their discussion groups.

iii. Ask them to investigate properties of water as outlined in Activity 8.5 in Pupil's Book page 92.

iv. Let the learners discuss and record the properties they have investigated in their groups.

v. Let them observe charts and pictures in their library books and record their findings in their notebooks.

vi. Ask the learners to present their findings to other members of their class.

vii. Consolidate the learners' findings about water properties identified and other relevant properties.

Lesson assessment

Go round checking their participation and assess the accuracy of learner' findings about

water properties.

Answers for Activity 8.5

iii. Potable water properties:

- Colorless,
- Odorless,
- Tasteless,
- Good solvent.

8.4.4 Water cycle

a) Learning objectives

- Identify the component of water cycle
- Explain the components of water cycle

b) Teaching resources

- Water cycle chart/ picture

c) Learning activities

i. Assign learners to discussion groups to identify components of water cycle.

ii. In their learning groups let them perform the experiment in Activity 8.6 in Pupil's Book page 93

iii. Let them discuss the process of condensation, evaporation and precipitation in their investigation.

iv. Let them observe charts and pictures in their books and record their findings in their notebooks.

Note: They can also use their XO laptop to research.

v. Ask the learners to present their findings to other members of their class.

vi. Consolidate the learners' findings about water cycle.

Assessment

Go round checking their participation and assess the accuracy of learner' findings about explanations on components of water cycle.

8.4.5 Effects of rain water

a) Learning objectives

- Identify the effects of rain water
- Explain the effects of rain water.

b) Teaching resources

- Handout of story about effect of rain water
- Handout of learning activity 8.7 in P5 Science and Elementary Technology textbook on page 94

c) Learning activities

i. In pairs, ask the learners to observe pictures and answer questions on the activity 8.7 in pupil's book, page 94. Then, in pairs, learners read the story about effects of rain water on the environment in Pupil's Book page 95-96,

ii. Let them answer questions in their notebooks as class work,

iii. By brainstorming learners give positive and negative effect of rain water

iv. Guided by teacher, learners summarize their findings about effect of rain water.

Lesson assessment

Go round checking their participation and assess the accuracy of learner' findings about effects of rainwater on environment

8.4.6 Prevention of dangers of rainwater

a) Learning objectives

- Explain methods to protect environment from rainwater danger

- Apply methods to protect the environment from rain water danger

b) Teaching resources

- Tree seedlings
- Hoe
- Tape measure
- Machete
- sweet potato vine
- Handout on how to make terraces/ditches and plant trees/seedlings

c) Learning activities

i. Collect sweet potato vines, tree seedlings, hoes, machetes and tape measure.

ii. Ask pupils to read handout on how to make terraces/ditches and plant trees/seedlings (measures and spacing of seedlings).

iii. Get pupils into different working groups

iv. In their working groups, ask learner to make terraces, others to make ditches while other plant sweet potato vines / tree seedlings.

Note:

- ✓ Ask them to take care while using the tools as they can hurt themselves.
- ✓ Ask them to clean the tools after use.

v. Let them take care of their plots in turns, water the trees and vines and protect them from animals.

vi. Ask them to make short notes on ways of preventing dangers of rainwater.

Lesson assessment

Go round checking their participation and assess measurement regarding proper spacing between seedlings planted and standards of ditches or terraces measures.

8.4.7 Identification of water pollutants

a) Learning objectives

State sources of water pollution

b) Teaching resources

- Water pollutants charts
- Polluted water source
- Water source
- Pictures in Pupil's book

c) Learning activities

i. Visit a polluted water sources for learners to observe and identify water pollutants, or display charts / pictures showing polluted water sources and water pollutants.

ii. In group discussions, let learners make notes on what they have observed from the field or from the charts/ pictures

iii. Allow them to make presentations in class, then in-puts of classmates are added after validation

iv. The summary of water pollutants is taken in pupil's notebook.

Assessment

Mark learners' work to assess the effectiveness of the field visit as a learning method.

Assess their ability to articulate ideas to highlight the main pollutants of water.

8.4.9 Danger and prevention of water pollution

a) Learning objectives

Explain dangers of polluted water

Practice ways to avoid water pollution

b) Teaching resources

- Water pollutants charts
- Polluted water source

- Clean water source
- Pictures in Pupil's book page 101

c) Learning activities

i. Allow learners to Visit a polluted water sources for learners to observe danger of water pollution, or display charts / pictures showing danger of water pollution.

ii. In group discussions, let learners note what they have observed from the field or from the charts/ pictures and propose ways of preventing the danger of water pollution

iii. Allow them to make presentations in class, then in-puts of classmates are added after validation

iv. The summary of dangers of water pollution and their prevention is taken in pupil's notebook.

Assessment

Mark learners work to assess the effectiveness of the field visit.

Assess their ability to articulate ideas to highlight the dangers of water pollution and how to prevent them.

8.4.10 Water purification methods

a) Learning objectives

- Identify different methods of water purification
- Differentiate different methods of water purification

b) Teaching resources

- Charts of experiment set up of water purification
- Source of heat
- Pan/pot with a lid
- Water (from river/dam)

- Sieve/white piece of cloth
- Small containers

c) Learning activities

i. Collect all materials needed for water purification experiment as mentioned above

ii. Get pupils into working groups

iii. Assign learners to working groups to experiment activity 8.12 ((i), (ii), (iii), (iv)) pupil's book page 102

iv. Guide them on how to carry out an experiment on water purification Pupil's Book page 102. Let them answer the questions after the experiment.

v. Go around and make guidance where is needed.

vi. Ask learners to make a short report explaining the necessity of each step.

vii. Let them to present what they performed by this experiment

Lesson assessment

- Mark the learners work in class to assess their mastery of the content
- Assess purification involvement by filtration, boiling and chemical treatment.

8.4.12 Making a water filter using local materials

a) Learning objectives

Make a water filter

b) Teaching resources

- A large plastic bottle
- Coarse sand
- Beaker
- Clean coton wool

- Small gravel
- Clean sand
- Paper filter
- Charcoal
- Sharp knife or razor blade

c) Learning activities

i. Display to learner a filter as shown on page 104 pupil's book,

ii. Assign learners to follow the picture to make their own water filter.

iii. Allow them to make a water filter as outlined on page 104 as their class work.

Assessment

- Mark the learners work in class to assess their mastery of the content
- Assess how they are making a water filter in class.

8.4.13 Water storage (Portable water for drinking, Water for general purpose use.)

a) Learning objectives

- Explain different water storagetechniques
- Apply different ways of storing water.

b) Teaching resources

- Pictures of water storage containers
- Drawings in Pupil's Book
- Real containers e.g. pots, jerry cans, tank, bottles

c) Learning activities

i. Ask the learners what they use at home to store water.

ii. Write them on the board.

iii. Display the real objects in their groups, let them discuss others storagecontainers that are not on the board.

iv. Let them observe pictures and drawing in Pupil's Book page 105 and name ways in which they can ensure they always have safe drinking water.

v. Allow the group leader to present to the other Pupil's

vi. Encourage learners to valid together the input from other groups.

vii. Let pupils take content summary in their notebooks.

Note:

- Encourage them to boil water and carry it in small portable bottles in order for them to always have safe drinking water.
- Let them role-play the games in Activity 8.13 pupil's book page 104, at their own free time and supervise them.

Assessment

Mark their work to assess what they have learnt. Assess also their attitude change by carrying drinking potable water at school in small potable bottles.

8.5. Additional information for teacher

8.6. End unit assessment

Mark their work to assess what they have learnt.

a) Guidance:

- This part provides the answers of end unit assessment with cross reference to the textbook
- The teacher's guide suggests additional questions and answers to assess the key unit competence.

- Assessment activities are designed in integrative approach to assess the key unit competence with cross reference to the textbook.

b) Answers for revision activities

Possible Answers for Revision Activity 8

(Pupil's Book page 105 – 106)

1. **Sanitation:** refers to the cleanliness of the body and the surroundings.
2. (a) Farming (b) Sanitation
   (b) Cleaning tools (d) Mixing chemicals
3. (a) crops-herbicides
   (b) animals-pesticides
4. Irrigation is watering of crops.
5. • It is colorless
   • It has no smell
   • It is tasteless
   • It is a good solvent
   • It has a boiling point of 100 degrees
   • It has a melting of 0 degrees
6. • Causes floods and landslides.
   • Causes soil erosion.
   • Causes water borne diseases when there is too much rain.
   • Destroys the infrastructure.
   • Disrupts peoples activities.
7. (a) The water is polluted by waste from factories being dumped into the water source.
   (b) By avoiding draining industrial waste and domestic sewage into water sources.
8. • Polluted water may contain germs and parasites that affect people and livestock.

- Dissolves chemicals may poison human beings and animals.
- When polluted water is used in farming it pollutes the soil making it unfit for farming.
- Water with excess fertilisers, pesticides or herbicides make the land dry.
- Polluted water kills soil microorganisms.
- When oil or solid waste covers the water surface it prevents sunlight reaching water plants.
- Water animals such as fish die due lack of adequate oxygen when oil floats on water.

9.
- Practise proper hygiene.
- Avoiding bathing, watering animals and washing clothes in the water sources.
- Practise farming methods that reduce soil erosion.
- Avoid draining of industrial waste and domestic sewage into water sources.
- Solid wastes should be disposed properly.
- Clear accidental oil spills as soon as they happen.
- Use of controlled amount of farm chemicals such as fertilisers, pesticides and herbicides

10. (a) (i) boiling

(ii) filtration

(b) Boiling and chlorination because:

- In boiling the high temperature kills micro-organisms in the water.
- In chlorination the chemicals kill the micro-organisms in the water.

11. (a) use filtration method to remove observable waste.

(b) Make the water safe for drinking by boiling.

8.7. Additional activities

a) Remedial Activity

- Give learners oral questions for oral responses on importance of water.
- Give learners activities involving matching uses of water, sources of water and ways of purifying water to their pictures.
- Present pictures to learners that enable learners to mention the various uses of water, water pollutants and water purification methods.
- Provide gap filling questions for them to give short answers.

Example of Questions

1. Substances that cause harm to the living things in our environment are know as _____.
2. is the loss of water through the stomata in plant leaves.

b). Consolidation Activity

- Give learners structured questions, engage them in group discussion on effects and prevention of water pollution. Group leaders to present their findings.
- Give learners matching activities, gap filling questions as well as simple structured questions.
- Engage learners in role play in discussing the effects to water pollution.
- Give leaners multiple choice questions e.g.

Example of Questions

Which among the following is the BEST method of purifying water?

(a) Chlorination (b) Filtering

(c) Adding salt (d) Boiling

c) Extension Activity

- Let learners to write short essay or report on the importance of water in theirlocal homes, how water sources are polluted and how to prevent pollution ofwater.
- Allow learners research about other water pollutants and prevention.

- Learners to make water filters and rearrange the materials to come up with the most suitable filters.
- Learners to participate in an activity in their local area involved in controlling water pollution e.g. removal of solid waste along river banks.

Answers to Practise Activity 8

Practise Activity 8.1

1. (a) A

   (b) In diagram A, the water is used sparingly. That is just enough water is used to wash the utensils without wastage. In B a lot of water is going to wastefrom the running tap. Not all of it is utilized in washing utensils.

2. (a), (c) and (d) – Recreation

(c) and (e) – Transportation

Practise Activity 8.2

1. It has both good and bad effects (refer to 1 above).
2. (i)
   - Provides water for home use.
   - Provides water for plants to grow.
   - Makes animal food to grow.

   (ii) floods, traffic congestion, inability to do some activities.
3. Observe learners working see whether they can locate the map of Rwanda and indicate Rwamagana, Gicumbi and Karongi on it.

Answers to Remedial, Consolidation and Extension Activities

a) Remedial Activity

1. Pollutants

2. Transpiration

b) Consolidation Activity

(b) Boiling

Unit 9: SOIL

9.1.Key unit competence

To prepare the soil for cultivation and use fertilizers

9.2. Prerequisite

Soil allows plants, animals and organisms of all kinds to grow and thrive. Agriculture plays a very important part in the development of our country. Country with healthy soil is a country with less poverty. If soil is protected and improved, then human society will be better off. Learners need to appreciate the fact that agriculture is a major source of income to the people and the country.

9.3. Introductory activity

Guidance:

Ask learners to observe the pictures ((a), (b), (c), (d), (e) and (f)) in P5 Science and Elementary Technology textbook, on page 108, and request to everyone to think about identity of each picture (caption with short explanation). By brainstorming, learners give meaning for the displayed pictures of introductory activity on unity 9 of P5 textbook. Learners finally predict what they are going to learn in the unit.

9.4. List of lessons

#	Lesson title	Learning objectives	Number of periods
1	Preparation of ploughing soil	• Identify steps of soil preparation for cultivation. • Prepare ploughing soil for cultivation • Appreciate well prepared ploughing soil for cultivation	2
2	Preparation of harrowing soil	• Prepare harrowing soil for cultivation. • Appreciate well prepared harrowing soil for cultivation.	2
3	Levelling of soil (seed bed preparation) for cultivation	• Prepare seedling bed • Appreciate well prepared seedling bed	2
4	Fertilization of soil	• Identify organic and chemicals fertilizers • Select fertilisers • Prepare organic fertilisers	2
5	Importance of fertilizers	• Explain importance of fertilisers • Select proper fertilizers • Appreciate the importance of fertilisers in our environment • Show concern in the proper use of	2

		fertilisers	
6	Rules of applying organic fertilizers	•Explain rules for applying of organic fertilisers •Use the organic fertilizers •Show concern in the proper use of the organic fertilisers	2
7	Rules of applying artificial fertilizers	• Explain rules for applying of artificial fertilisers • Use the artificial fertilizer • Show concern in the proper use of the artificial fertilisers	2
8	**Assessment and remediation**		**1**

9.4.1 Preparation of ploughing soil

a) Learning objectives

- Identify steps of soil preparation for cultivation.
- Prepare ploughing soil for cultivation
- Appreciate well prepared ploughing soil for cultivation

b) Teaching resources

- Machetes
- Pupil's books
- Hoes
- Tractors
- Charts /pictures of prepared land for cultivation ready for harrowing step.

a) Learning activities.

i. Gather all relevant tools and materials.

ii. Identify a suitable site for land preparation.

iii. Read the content in Pupil's Book page 109-110

iv. Display charts and pictures of land preparation in class. Let the learners discuss the steps of land preparation shown.

v. Organise learners into groups of 5. Assign the learners plots of land.

vi. Let learners start ploughing soil for cultivation by following the steps outlined in Activity 9.1 on page 108-109, regarding clearing the land and the digging for the first time.

vii. Let learners maintain and conveniently store the materials used during cleaning and digging of the land

Assessment

Assess the learners' ability to:

- Identify all the activities involved in land preparation.
- Practise the land preparation activities before planting seeds in their plots.

9.4.2 Preparation of harrowing soil

a) Learning objectives

- Prepare harrowing soil for cultivation.
- Appreciate well prepared harrowing soil for cultivation.

b) Teaching resources

- Tractors
- Hoes
- Pupil's books
- Charts /pictures of prepared land for cultivation ready for leveling step

c) Learning activities

i. Read the content in Pupil's Book page 110

ii. Gather all relevant tools and materials.

iii. Organise learners into groups of 5. Assign the learners plots of land.

iv. Let learners start preparing the harrowing soil for cultivation by following the steps outlinedin Activity 9.1 on page 108-109 regarding harrowing soil.

v. Display charts and pictures in class. Let the learners discuss the steps of land preparation shown.

vi. Let learners start ploughing soil for cultivation by following the steps outlined in Activity 9.1 on page 108-109, regarding clearing the land and the digging for the first time.

vii. Let learners maintain and conveniently store the materials used during harrowing of the land

Assessment

Assess the learners' ability to:

- Identify all the activities involved in land preparation specifically harrowing of land for cultivation
- Practise the land preparation activities expected by the step of second cultivation of land.

9.4.3 Leveling of soil for cultivation

a) Larning objectives

- Prepare seedling bed
- Appreciate well prepared seedling bed

b) Teaching resources

- Rakes
- Hoes
- •Pupil's books
- •Charts/ Pictures showing leveling of land for cultivation

c) Learning activities

i. Read the content in Pupil's Book page 110

ii. Gather all relevant tools and materials.

iii. Organise learners into groups of 5. Assign the learners plots of land.

iv. Let learners start preparing the harrowing soil for cultivation by following the steps outlinedin Activity 9.1 on page 108-109 regarding harrowing soil.

v. Display charts and pictures in class. Let the learners discuss the steps of land preparation shown.

vi. Let learners start ploughing soil for cultivation by following the steps outlined in Activity 9.1 on page 108-109, regarding clearing the land and the digging for the first time.

vii. Let learners maintain and conveniently store the materials used during harrowing of the land

Assessment

Assess the learners' ability to:

- Identify all the activities involved in land preparation specifically harrowing of land for cultivation
- Practise the land preparation activities expected by the step of second cultivation of land.

9.4.4 Fertilization of soil

a) Larning objectives

- Identify organic and chemicals fertilizers
- Select fertilizers
- Prepare organic fertilizers

b) Teaching resources

- Organic fertilizers • Chemical fertilizers
- Plot of prepared land • Charts of compost manure and manure in a zero-grazing unit

c) Learning activities

i. Assign learners into working groups.

ii. Obtain different types of fertilizers: Allow learners collect various for making organic fertilisers and obtain some inorganic fertilizers from shop as outlined in Activity 9.2 in learners book.

iii. Allow learners to classify the materials obtained into natural and artificial fertilisers.

iv. Ask learners to prepare compost manure following the steps outlined into activity 9.3 page 113.

v. Display charts of the activities in the classroom and the learners discuss them.

vi. Discuss the various types of organic manure and how to prepare them.

vii. Guide the learners in a discussion on chemical fertilisers and their contents.

viii. Let the learners discuss the advantages and disadvantages of using fertilisers.

ix. Allow the learners to use the fertilisers on plots of land.

Assessment

- Assess the learners' ability to correctly make compost manure.
- Assess learners' ability to correctly group fertilisers as organic and inorganic.
- Award marks for correct presentation and positive attempt.

9.4.5 Importance of fertilizers

a) Learning objectives

- Explain importance of fertilizers
- Appreciate the importance of fertilizers in our environment
- Show concern in the proper use of fertilizers

b) Teaching resources

- Charts/picture of plants in a farm where are used fertilizers
- Charts/ Pictures of plants in a farm where are used fertilizers

c) Learning activities

i. Let learner read content in Pupil's Book page 115 to investigate the importance of fertilizers

ii. Put learners in working groups

iii. Let learners observe the charts/ picture displayed in classroom.

iv. Ask them to discuss the difference between plants in a farm where are used fertilizers and plants in a farm where are not used fertilizers.

v. Let learners discuss the advantages and disadvantages of using fertilizers.

Assessment

Assess the learners' ability to appreciate the importance of fertilizers in our environment

9.4.6 Rules of applying organic fertilizers

a) Learning objectives

- Explain rules for applying of organic fertilizers
- Use the organic fertilizers
- Show concern in the proper use of the organic fertilizers

b) Teaching resources

- organic manure
- Plot of prepared land
- Charts of compost manure

c) Learning activities

i. Let learners read rules of applying fertilizers as outlined in Activity 9.4 on pupil's Book page 116.

ii. Research different types of organic manure and rules of applying them.

iii. Allow learners to choose specific types of organic fertilizers.

iv. Allow the learners to use the organic fertilizers on plots of land.

v. Supervise them when applying the fertilisers.

vi. Ask learners to make a report on the proper application of organic fertilizers and make their presentation in the classroom.

Assessment

Assess the learners' ability to

(i) Apply the correct amount of fertiliser using protective clothing.

(ii) Group fertilisers as natural and chemical.

9.4.7 Rules of applying artificial fertilizers

a) Learning objectives

- Explain rules for applying of artificial fertilizers
- Use the artificial fertilizer
- Show concern in the proper use of the artificial fertilizers

b) Teaching resources

- inorganic fertilizers •
- Plot of prepared land • Charts of containers of inorganic manure

c) Learning activities

i. Let learners read rules of applying fertilisers as outlined in Activity 9.4 on pupil's Book page 116.

ii. Research different types of inorganic/artificial manure and rules of applying them.

iii. Allow learners to choose specific types of inorganic fertilizers.

iv. Allow the learners to use the artificial fertilizers on plots of land.

v. Supervise them when applying the fertilisers.

vi. Ask learners to make a report on the proper application of fertilizers and make their presentation in the classroom.

Assessment

Assess the learners' ability to apply the correct quantities of fertilizers.

9.5. Additional content/information for teacher

9.6 Answers of end unit assessment

(Pupil's Book page 118)

1. (a) → (c)
   (b) → (a)

(c) → (b)

2. • Land clearing
   • Ploughing/primary cultivation.
   • Secondary cultivation
   • Levelling
3. Secondary cultivation helps to break down huge lumps of soil into fine particles.It helps to increase the germination rate of seeds.
4. (a) • Organic fertilisers are made from animal and plant waste or remains. They are natural fertilisers.
   • Inorganic fertilisers are made from chemicals in factories. They are artificial fertilisers.

   (b) Organic or natural fertilisers. They improve the physical properties of soils such as drainage, capillarity and water retention. It introduces decomposersto the soil.
5. (a) Straight

   (b) Compound
6. Wood ash adds nutrients such as potassium and phosphorus into the manure.
7. Plants that are almost flowering are cut and chopped into small pieces. These pieces are then ploughed into the soil and left to rot or decompose.
8. (a) Heap method is used when the weather is wet. It prevents dampening of the manure.

   (b) Pit method is used when the weather is dry. It prevents manure from excessheat.
9. (a) Farmyard manure

   (b) Compost manure

   (c) • They take a long time to be ready for use.
   • They may contain weed seeds and micro-organisms.

(a) (i) Rake (ii) Machete (iii) Hoe

(b) (i) (ii)

(ii) (i)

(iii) (iii)

10. Observe learner's project. Following guidelines on proper plant care, award learner's marks at the end of the project.
11. Observe learners project. Following guidelines on proper plant care, award learners marks at the end of the project.

9.7 Additional activities

a) Remedial Activity

- Learners to list down, in order, steps of land preparation and describe their importance.
- Learners to practice all land preparation activities in their school farm as the teacher observes and gives guidance.
- Oral questions to be used during the activities for oral responses.
- Give learners structured questions on fertilisers.

Example of questions

1. Fertilisers are MAINLY grouped into _____ and _____ _.
2. Four examples of organic fertilisers are ___, ____, ____ and ___.

b) Consolidation Activity

- These activities should help learners recapture content on land preparation procedures, prepare natural fertilisers and rules of applying fertilisers.
- Let learners classify a list of chemical fertilisers into straight and compound fertilisers in a table for example:

Example of questions

1. Group fertilisers that you know as required in the table below.

Chemical fertilisers	
Straight	**Compound**
1. Urea 2. _____ 3. _____ 4. _____	1. Diammunium phosphate 2. _____ 3. _____

- Give leaners multiple choice questions that help learns remember the taught content example.

2. Fertilizer that contains two or more major nutrients are known as

_.

(a) straight fertilizer (b) compound fertiliser

(c) manure (d) nitrogenous fertiliser

Answers to Remedial, Consolidation and ExtensionActivities

a) Remedial Activity

(a) Natural (organic) and Artificial (inorganic)

(a) Organic mulches, farmyard manure, green manure and compost manure.

c) Consolidation Activity

1.

Chemical fertilisers	
Straight	**Compound**
1. Urea	1. Diammunium phosphate
2. Single supper phosphate	2. Calcium ammonium nitrate
3. Sulphate of potash	3. Monoammonium phosphate
4. Ammonium sulphate nitrate.	4. NPK: Nitrogen Phosphorous potassium

2. (b)

Unit 10: Animals

10.1 Key unit competence

To explain and practice effective chicken farming

10.2 Prerequisite

Poultry farming is part of modern farming. Keeping chicken is a source of income for many farmers. Chicken farming requires a small amount of space and is easy to manage. Farmers should be encouraged to keep chickens since there is a growing demand for meat and eggs. Meat and eggs are sources of protein.

10.3 Introductory activity

Guidance

Assign learners to observe the pictures ((a), (b), (c), (d), (e), (f), (g), (h) and (i)) in P5 Science and Elementary Technology textbook, on page 120, and request everyone to think about description of each picture (picture title with short explanation). By brainstorming, learners try to give meaning of each of the

displayed pictures through introductory activity of unity 10 of P5 textbook. Learners finally will be asked to predict what they are going to learn in the unit.

10.4 List of lessons

#	Lesson title	Learning objectives	Number of periods
1	Conditions of good chicken house	• Identify features of a good chicken house • Construct a good chicken house	2
2	Types of chicken breeds	• Explain the types of chicken breeds. • Identify the qualities of a good chick to rear. • Identify a good breed to rear.	1
3	Reproduction of chickens	• Identify the steps of chicken reproduction • Apply basic techniques to chicken reproducing	2
4	Proper feeding of chicken	• Identify the different types of chicken feeds • Explain how to feed chicken properly	1
5	Chicken parasitic diseases	• List chicken parasitic diseases • Identify the signs and symptoms of parasitic chicken diseases.	1
6	Chicken infectious diseases	• List chicken infectious diseases • Identify the signs and symptoms of chicken infectious diseases.	2
7	Prevention of chicken diseases	• Identify ways of preventing chicken diseases. • Give the importance of keeping chickens healthy.	1

8	Importance of chicken farming	•Explain the importance of practising chicken farming. Recognize the importance of keeping chickens. Develop an awareness on the value of keeping chickens.	2
9	Chicken farming process	• Identify different ways of rearing chickens. • Managing a small chicken farming project.	1
10	**Assessment and remediation**		2

10.4.1 Conditions of good chicken house

a) Learning objectives

- Identify features of a good chicken house
- Prepare a small-scale poultry farming project
- Construct a good chicken house

b) Teaching resources

- Charts/pictures of good chicken house
- Textbook with pictures of good chicken house
- •Real objects for example, a chicken house
- •Local materials for poultry house

c) Learning activities

i. Ask learners to observe introductory pictures on page 120. Allow them to discuss in pairs about the identity of the pictures. Let them explain briefly what they will learn in the unit.

ii. Ask learners to attempt questions 2 in Activity 10.1 individually in their books.

iii. Allow learners to compare their responses in Activity 10.1 in groups of 4.

iv. Let learners make presentations in class. Give them probing questions to allow them discover conditions of a good chicken house. Correct them where necessary

Assessment

Assess learners' ability to identify features of a good chicken house.

Assign learners to construct a poultry house at home using local materials

10.4.2 Types of chicken breeds

a) Learning objectives

- Explain the types of chicken breeds.
- Identify the qualities of a good chick to rear.
- Identify a good breed to rear.

b) Teaching resources

- Charts/pictures /photographs of chicken breeds
- Real animals (chicken
- XO laptop

Textbook with pictures of chicken breeds

c) Learning activities

i. Take learners to a poultry farm near the school. Allow them to observe the chicken houses type of chicken breeds kept and how chicken are cared for.

ii. Let learners write short notes basing on questionnaires you provided them with.

iii. Display pictures and charts showing different chicken breeds.

iv. Let learners observe the features of the chickens. Ask them to discuss briefly about pictures.

v. Allow them to browse on their XO laptop to see various breeds of chicken as well.

vi. Discuss with them content in Pupil's Book page 122. Ask them to write short note in their notebooks.

Assessment

Check learners' communication abilities as they talk about chicken breed

10.4.3 Reproduction of chickens

a) Learning objectives

- Identify the steps of chicken reproduction
- Apply basic techniques to chicken reproducing

b) Teaching resources

- Charts/Pictures/ photographs about chicken reproduction
- XO laptops

c) Learning activities

i. Ask learners to research in the library or using their XO internet 'Chicken reproduction'.

ii. Ask learners to read the story in Activity 10.3 Pupil's Book page 123-124 in pairs.

iii. Ask them to discuss and answer questions in the story as well.

iv. Discuss with them how reproduction in chicken takes place as outlined in Pupil's Book pages 123 - 125.

v. Ask them to research from their XO laptops about reproduction in chicken. Letthem write short notes on the subtopic and present their findings in class.

Assessment

Listen to the learners as they read the story to gauge their literacy skills.

Listen to learners' presentations to find out if they understand chicken reproduction.

10.4.4 Proper feeding of chicken

a) Learning objectives

- Identify the different types of chicken feeds
- Explain how to feed chicken properly

b) Teaching resources

- Real object (feeds)
- Charts/ Photographs of chicken feeds
- XO laptops
- Chicken pictures when feeding

c) Learning activities

i. Take them to a nearby poultry farm. Let them observe the different breeds of chicken and feeds given to them.
ii. Let them feed the chicken (if possible).
iii. Ask learners to research chicken feeding using XO laptop.
iv. When learners go back to school, assign learners into groups, display charts and pictures and let them discuss the practise of good feeding and hygiene in chickens.
v. Let them write short notes about chicken feeding.
vi. Let them present their findings to the rest of the class.

Assessment

Assess the learners understanding of chicken feeds.

10.4.5 Chicken parasitic diseases

a) Learning objectives

- List chicken parasitic diseases
- Identify the signs and symptoms of parasitic chicken diseases.

b) Teaching resources

- Real object (unhealth chicken and health chicken)
- Charts and pictures (unhealth chicken and health chicken)
- XO laptops

- Textbooks

c) Learning activities

i. Ask learners to research in the library or using their XO laptops internet "Common chicken parasitic diseases".

ii. Assign learners in discussion groups.

iii. Allow learners to discuss their findings on "common chicken disease".

iv. Display the chart and photographs. Using relevant probing questions explain to them common chicken parasitic diseases.

v. Ask them to write short notes in their notebooks.

Assessment

Listen to learners' contributions and answer to gauge if they have understood intended content.

10.4.6 Chicken infectious diseases

a) Learning objectives

- List chicken infectious diseases
- Identify the signs and symptoms of chicken infectious diseases.

b) Teaching resources

- Real object (unhealth chicken and health chicken)
- Charts and pictures (unhealth chicken and health chicken)
- XO laptops
- Textbooks

c) Learning activities

i. Ask learners to research in the library or using their XO laptops internet "Common chicken infectious diseases".

ii.Assign learners in discussion groups.

iii. Allow learners to discuss their findings on "common chicken infectious disease".

iv. Display the chart and photographs. Using relevant probing questions explain to them common chicken infectious diseases.

v. Ask them to write short notes in their notebooks.

Assessment

Listen to learners' contributions and answer to gauge if they have understood intended content.

10.4.7 Prevention of chicken diseases

a) Learning objectives

- Identify ways of preventing chicken diseases.
- Give the importance of keeping chickens healthy.

b) Teaching resources

- Real object (unhealth chicken and health chicken)
- Charts and pictures (unhealth chicken and health chicken)
- XO laptops
- Textbooks

c) Learning activities

vi. Get learners in their working groups

vii. Ask them to research in the library or using their XO laptops internet "all Common chicken diseases" (list).

viii. Allow learners to tell how they prevent chicken diseases in their homes.

ix. Discuss as a class general measures taken to prevent diseases in the poultry farm you had visited earlier

x. Ask them to write short notes in their notebooks.

Listen to learners' contributions and answer to gauge if they have understood

intended content.

10.4.8 Importance of chicken farming

a) Learning objectives

- Explain the importance of practising chicken farming.
- Recognize the importance of keeping chickens.
- Develop an awareness on the value of keeping chickens.

b) Teaching resources

- Real objects (chicken and its products)
- Photographs
- Charts of chicken market and its products
- CDS and projectors

c) Learning activities

i. Get learners in working Groups
ii. Ask learners to revisit Activity 10.3 and read paragraph 5. Allow them to talk about benefits of chicken in their homes.
iii. Display various photographs or CDs or projectors or charts showing market of chicken and their products.
iv. Let learners discuss in pairs and write short notes about what they have observed.
v. Ask learners to read the importance of keeping chicken they have written.
vi. Write down the importance of chicken farming on the board.
vii. Ask them to write a brief report on the importance of chicken farming in their district based on their visit to a poultry farm earlier on.
viii. Mark their reports and let learners present some of the reports to the class. All the class discuss on these reports presented and add input where necessary to make together consolidated note on importance of chicken.

Assessment

Assess their ability to present ideas logically highlighting the importance of keeping chickens in worldwide in general and specifically our community.

10.4.9 Chicken farming process

a) Learning objectives

- Identify different ways of rearing chickens.
- Managing a small chicken farming project.

b) Teaching resources

- Charts/ pictures of chicken farming system
- Books on chicken farming

c) Learning activities

i. Ask learners to identify various ways of rearing chickens in their locality.

ii. Guide them to identify the common methods of rearing chickens. Display charts for them to observe pictures showing methods of rearing chicken.

iii. Let them refer to the content in Pupil's book page 13o-133 to identify various ways of rearingchickens. Discuss the pictures and content in the Pupil's Book.

iv. Let them set up a project of managing a chicken farm in the school

Assessment

Assess their ability to recognize and appreciate various chicken rearing methods.

Assess management of the project of chicken farm at the school

10.5. Additional content/information for teacher

10.6 End unit assessment

Possible Answers for Revision Activity 10

(*Pupil's Book page 133*)

1. Keeping of chickens for meat, eggs or both.
2.
   - Should have adequate lighting.
   - Should be built where there is good drainage.
   - The open side of the chicken house should face away from the direction of the wind.
   - Should be built where is no disturbance from people and animals.
   - Should have adequate space and good ventilation.
   - Should be built in a way that it will be easily cleaned.
   - Should be well built to avoid the leaks.
   - The lower walls should be well constructed to avoid predators.
3. (a) Egg laying/layers (b) Meat type/broilers (c) Dual purpose
4. (a) Incubation: This is when a hen sits on her egg for 21 days in order for themto hatch

   (b) Cannibalism: Is where domestic hens reared for eggs production eat all or parts of another hen.

   (c) Quarantine: This is separating a sick bird from the flock so that it does not spread the disease.
5.
   - Sheds some belly feathers and becomes warmer.
   - Stays in the nest longer than usual.
   - Does not lay many eggs.
   - Makes a croaking noise.
   - May be aggressive.

6. Coccidiosis and ascarids.

7. To control the spread of infections.

8 (a) • Source of food • Source of employment • Droppings from chicken can beused as manure in the farm • Chicken bones and egg shells make feeds forother animals • Chicken feed on insects that destroy crops

(b) (i) Feathers

(ii) Used to fill pillows and duvets

- Free range system
- Deep litter system
- Fold system
- Battery system

10. (a) • they require less space to keep
- chickens grow quickly
- chicken feeds can be found easily

(b) • Difficulty in finding balanced chicken feeds.
- Difficulty in controlling chicken.

11. (a) Construct a chicken house for them, give them balanced feeds and water. Vaccinate them.

(b) -Keeping them in a good chicken house.

-Chasing away predators.

10.7 Additional activities

a) Remedial Activity

- Learners to visit a chicken farm in their local area and list down: types of chicken houses, breeds of chicken and identify their products (Pupil's can be guided using questionnaires).
- Give learners structured questions and gap filling questions on content learnt

e.g. (1) Chicken reared for meat production are known as b_ _ i _ _ s

- Give learners matching questions on the animal with their products, e.g.

  (2) Match the given chicken breed with correct products.

Chicken	Product
(a) Broiler	(a) Eggs and meat
(b) Layers	(b) Meat only
(c) Dual purpose	(c) Eggs only

- Ask learners oral questions for oral answers on breeds of chicken their reproduction and importance of chicken farming.

b) Consolidation Activity

- From knowledge gathered from the farm visit, the Pupil's to be in manageable groups and establish a chicken in school. Let them build a good chicken house and take care of the chicken in groups.
- Give learners structured questions an gap filling questions to be used in checking retention of content taught.

Example of questions

1. Name the 3 main types of chicken breeds.
2. Why is it important to clean a chicken coop regularly?

c) Extension Activity

- Learners to research and identify the specific breeds of chicken commonly reared in the local area. They are to identify the other breeds reared in otherareas.
- Leaners to write an essay or report on the local chicken diseases and parasitesas well as preventive measures practised by the local farmers.

Example of questions

1. Identify 3 commercial feeds given to layers.
2. Describe briefly how you can keep chickens healthy?

Answers to Remedial, Consolidation and ExtensionActivities

a) Remedial Activity

1.

→ Broilers a b

~~b~~ → c

~~c~~ → a

b) Consolidation Activity

1. L
   a
   y
   e
   r
   s
   B
   r
   o
   i
   l
   e
   r
   s
   Dual purpose
2. To prevent chicken from being infected by pests and diseases.

c) Extension Activity

1. Layer
   s

mash

Oyste

r

shell

2. You can keep chicken healthy by feeding them properly, keeping their house clean, disinfecting the feeding and watering equipment and adding preventive drugs to chicken feeds or drinking water.

Answers to practice activity 10.1

1. (a) Lack of calcium in their diet.

   (b) Give them a diet consisting of good quality layer feed and crushed egg shellor oyster shell.

2. (a) Cannibalism in chickens is whereby chicken are kept close confinement and they peck one another.

   (b) Allow the chicken in an enclosed outside run to keep them busy and allow them to peck greens, ground and insects.

   - Provide large handful of fresh greens in their houses.

Unit 11: Plants and environment

11.1 Key unit competence

To explain the importance of plants and deforestation's effects on the environment

11.2 Prerequisite

Plants are part of our environment. They play a pivotal role in making our environment healthy and habitable. They provide food, shade and give us oxygen. Trees also attract rain and this ensures a constant food supply for animals.

11.3 Introductory activity

Guidance

Assign learners to observe the pictures ((a), (b), (c), (d), (e) and (f)) in P5 Science and Elementary Technology textbook, on page 135, and request everyone to identify each picture (picture title with short explanation). By brainstorming, learners try to give meaning of each of the displayed pictures through introductory activity of unity 11 of P5 textbook. Learners finally will be asked to predict what they are going to learn in the unit.

11.4 List of lessons

#	Lesson title	Learning objectives	Number of periods
1	Identification of importance of plants	• Name different types of crops • Group the types of crops according to their uses • Explain uses of different crops • Recognise the type of crops • Show sustainable desire to protect and care for the plants.	2
2	Common importance of trees on environment	• Investigate different common importance of trees. • Explain the common importance of trees. • Show a desire to protect trees	2

3	Other importance of trees	• Investigate different specific use of trees • Explain specific use of trees • Agree to protect and care for the existing trees	2
4	Afforestation and its importance on environment	• Demonstrate ways of taking care of trees. • Describe the causes and effects of deforestation. • Analyse different ways of maintaining trees. • Show concern on how to fight against causes and effects of deforestation. • Agree to protect and care for the existing trees.	1
5	Deforestation and its effects on environment	• Define causes of deforestation • Discuss the causes and effects of deforestation • Describe the causes and effects of deforestation. • Show concern on how to fight against causes and effects of deforestation.	2
7	Prevention of deforestation	• Analyse different ways of maintaining trees. • Demonstrate ways of taking care of trees. • Agree to protect and care for the existing trees. • Show concern on how to fight against causes and effects of deforestation.	1
8	**Assessment and remediation**		1

11.4.1 Identification of importance of plants

a) Learning objectives

- Name different types of crops
- Group the types of crops according to their uses
- Explain uses of different crops
- Recognise the type of crops
- Show sustainable desire to protect and care for the plants.

b) Teaching resources

- Different types of crops
- Charts
- Pictures
- Herbal medicines

c) Learning activities

i. Read the content in Pupil's Book page 135.

ii. Ask the learners to bring different types of plants.

iii. Obtain relevant charts and pictures before the lesson.

iv. Let learners observe and briefly describe the introductory pictures. Let them predict what they will learn in this unit.

v. Take learners to a nature walk around the school locality. Ask them to identify cash crops that are grown.

vi. Let them also identify food crops and medicinal plants.

vii. When back in class, ask learners to name different types of plants they know.

viii. Write their answers on the board.

ix. Display charts with various plant parts. Display some examples of herbal medicines.

x. Lead a discussion on various uses of plants.

xi. Allow learners to write crops used as cash crop, human food, animal feed andfor medicinal purpose.

xii. Lead the learners into a discussion on other importance of plants.

xiii. Organise crops according to their uses.

Assessment

Assess the ability of a learner:

- To recognise various types of crops.
- To explain uses of different types of plants.

11.4.2 Common Importance of Trees on Environment

a) Learning objectives

- Explain the uses of trees
- Observe different uses of trees
- Investigate different uses of trees
- Show a desire to protect trees

b) Teaching resources

- Pictures.
- Charts.
- Trees in the school compound.
- Products made from wood.

c) Learning activities

i. Investigating the importance of trees for the environment.
ii. Read the content in Pupil's Book page 142.
iii. Obtain the necessary charts and pictures.
iv. Identify some tress in the school compound and assess their relevance to the lesson.
v. Ask learner to answer questions (a) and (b) in Activity 11.4 on page 140.
vi. Allow learners to discuss the importance of trees for the environment based on their responses to question (c).
vii. Ask them to list some different types of trees. Help them to discover how treesare

useful to the environment.

viii. Display some objects made from trees.

ix. Let the learners discuss the type of trees found in their homes and their uses intheir groups: ornamental, fruit trees, agro-forestry, timber trees and fuel trees.

x. Ask them to write down the uses discussed. Mark their work.

Assessment

Assess ability of learners to discuss and explain various uses of trees.

11.4.3 Other importance of trees

a) Learning objectives

b) Investigate different specific use of trees

c) Explain specific use of trees

d) Agree to protect and care for the existing trees

b) Teaching resources

- Pictures/ Charts of Ornamental trees, fruit trees, agroforestry trees, timber trees, fuel tree
- Textbooks that comprise content/pictures of different kind of trees
- Trees in the school compound.
- Products made from wood.

c) Learning activities

i. Assign learners read textbooks to investigate the importance of trees for the environment.

ii. Identify some trees in the school compound and assess their relevance to the lesson.

iii. Ask learner to answer questions in Activity 11.6 on page 144.

iv. Display some objects made from trees.

v. Let the learners discuss the type of trees found in their homes and their uses in their groups: ornamental, fruit trees, agro-forestry, timber trees and fuel trees.

vi. Let pupils read the content in Pupil's Book page 144-145.

vii. Ask them to write down the uses discussed. Mark their work.

Assessment

Assess ability of learners to investigate and explain various uses of trees.

11.4.4 Afforestation and its importance on environment

a) Learning objectives

- Discuss the meaning of afforestation
- Discuss advantages of afforestation
- Demonstrate ways of taking care of trees.
- Agree to protect and care for the existing trees.

b) Teaching resources

- XO laptop
- Pictures/ Charts/ Photographs of afforestation method

- Textbooks that comprise content/pictures of afforestation advantages
- Trees in the school compound.
- Products made from wood.

c) Learning activities

i. Assign learners to explore school compound and its surrounding. Allow them to visit a planted forest near their school if any.

ii. Let them read books that allow them to explore and discuss the effects of afforestation on the environment.

iii. Get some magazines, pamphlets and photographs showing environment/forest/garden conservation.

iv. Ask learners to observe the soil around the forest and the animals living in theforest.

v. Let the learners feel the air around the forest.

vi. Allow learners to visit a place without trees. Ask them to compare theenvironment of this place and the environment of the forest.

vii. Lead the learners to plant trees around the school.

viii. After all these activities, ask the learners to discuss and write short notes on:

a. Importance of afforestation.

ix. Research and write more about ways of maintainingtrees.

Assessment

Assess learners' ability to observe and record importance of afforestation

11.4.5 Deforestation and its causes

a) Learning objectives

- Define and discuss the causes and effects of deforestation
- Describe the causes and effects of deforestation.
- Analyse different ways of maintaining trees.
- Demonstrate ways of taking care of trees.
- Show concern on how to fight against causes and effects of deforestation.
- Agree to protect and care for the existing trees.

b) Teaching resources

- Charts/Photographs/ pictures of deforestation and environment/forest conservation
- XO laptop

c) Learning activities

i. Get some magazines, pamphlets and photographs showing deforestation and forest conservation

ii. Allow learners to visit a forested area and a deforested area. Ask them to compare the environment of these areas.

iii. Ask them to discuss the effects of deforestation on the environment

iv. After all these activities, ask the learners to discuss and write short notes on:

   a. Causes of deforestation.

   b. Effects of deforestation.

v. Research and write more about effects of deforestation.

Assessment

Assess learners' ability to observe and record causes of deforestation and effects of deforestation.

11.4.6 Prevention of deforestation

a) Learning objectives

- Apply steps of planting tree
- Describe different ways of maintaining trees.
- Show concern on how to fight against causes and effects of deforestation.
- Demonstrate ways of taking care of trees.

- Agree to protect and care for the existing trees.

b) Teaching resources

- XO laptop
- Pictures/ Charts/ Photographs of planting tree
- Books that comprise content/pictures of way of planting and care tree
- Seedlings of different trees
- Hoe

c) Learning activities

i. Allow learners to visit a place without trees. Ask them to compare the environment of this place and the environment of the forest.

ii. Get learners into working groups, let read books to discuss steps of planting trees.

iii. Ask the learners to discuss and write short notes on planting trees and make presentation to the class.

iv. Lead pupils to plant various seedlings of trees (ornamental trees, fruit trees, ect) around school and ask them to be responsible of ways maintaining seedling planted.

Assessment

Assess learners' ability to respect ways of maintaining seedlings effectively.

11.5. Additional content/information for teacher

11.6 Answers for end unit assessment

(Pupil's Book page 149)

Possible Answers for Revision Activity 11

1. (a) Ginger
   - Neem powder

   (Any other appropriate answer)
2. - Sunflower
   - Groundnuts
   - Coconut
3. Coffee, tea, cotton, cashew nuts *(Appropriate answers depending on the district)*
4. - Control soil erosion.
   - Recycle air through the process of photosynthesis.
   - Shelter for wildlife and birds.

(Any other appropriate answer)

5. Trees use carbon dioxide to carry out photosynthesis. They release oxygenwhich is required by animals and human beings.
6. (a) Afforestation – This is planting trees where they did not exist.

(b) Deforestation – This is cutting down trees.

(c) Ornamental plants – trees that beautify a place.

7. (a) Planting trees together with crops.

(b) The trees should have deep roots, should allow light to the crops, shouldsurvive regular pruning and should add nutrients to the soil.

(c) This Practise ensures production of food, animal feeds and also providetrees for fuel, construction and other uses.

8. (a) By planting trees. Trees act as wind breaks and help to reduce the badeffects of wind.

(b)
- Increased soil erosion
- Destruction of shelter for wildlife
- Formation of deserts

9. (a) Food crops are crops/plants grown for consumption (to be eaten).

(b) Food crops grown can vary examples include:

- Maize
- Rice
- Beans
- Cassava
- Irish Potatoes
- Millet
- Bananas
- Sweet potatoes

10. Importance of

(a) Trees to domestic animals include:

- Shade
- Sheds or shelters are made from trees
- Cleaning the air
- Some are sources of food to animals

(b) Wild animals

- Source of food
- Shelter
- Hiding place

11.
- Dig a hole to the desired depth.
- Mix manure and with soil dug up from the hole.
- Plant your tree seedling to the same depth it was in the nursery seedbed.
- Compact the soil around the seedling.
- Apply some mulch then water it.
- Put a fence around it to protect if from animals (leave the top open to letsunlight in).

11.7 Additional activities

a) Remedial Activity

- Give matching for learners to identify importance of trees and other plants inthe environment.
- Allow learners to verbally say uses of trees and plants that they know.
- Provide gap filling questions and multiple-choice questions to enable learnersidentify effects of deforestation and afforestation to the environment.

Example of Questions

2. Planting trees where there were no trees is known as_____.

3. Which among the following is an effect of defforestation?

   (a) Heavy rainfall (b) Dry river beds

   (c) Increased reproduction in wildlife (d) fertile soil.

d) Consolidation Activity

- Let leaners discuss and make presentation in class on importance of trees andthe environment.
- Give learners structured and open-ended questions based on the contentcovered.
- Allow learners to debate about importance of afforestation.
- Give learners questions involving classifying plants and outlining their importance.
- Give learners "fill in gap" questions on effects of deforestation.

Example of Questions

1. Identify any 4 uses of plants.
2. Describe briefly any 3 importance of trees on the environment.

e) Extension Activity

- Ask learners to list down major plants grown in their district.

- Let learners classify them (cash crops and food crops, medicinal) and state theiruses.
- Ask learners to research on medicinal plants in Rwanda and cash crops grownin Rwanda.
- Learners to write a short essay on effects of deforestation and the need toconserve trees.

Example of Questions

1. Name any 3 plants that are fed to cows in your area?
2. Write a brief report on causes of deforestation, effects of deforestation andways of preventing deforestation.

Answers to Practise Activities 11

Practise Activity 11.1

	Crop		Product
1	(a)	→	(b)
2.	(b)	→	(d)
3.	(c)	→	(e)
4.	(d)	→	(a)
5.	(e)	→	(c)

Practise Activity 11.2

1. Look and assess the examples of medicinal plants given by the learners and addother information if necessary.

	Medicinal plants	What it cures
3.	Garlic	– Cure and prevent diabetes, asthma and common cold.
4.	Sunflower	– Oil used as a lubricant to treat constipation and externalwounds for healing.
5.	Tumeric	– Prevent cancer, prevent heart attack, relief pain, forproper eye vision.
6.	Clove oil	– Cures athletes foot, ringworm, diarrhoea and relief pain.
7.	Straw berry	– Leaves are used to treat rashes, diarrhoea, liver diseasesand kidney stones.
8.	Water lily	– Dried roots and leaves are used to treat lung, intestinaland skin diseases.

Practise Activity 11.3

1. (a) ⟶ (c)
2. (b) ⟶ (d)

3. (c) ⟶ (a)

4. (d) ⟶ (b)

Answers to Remedial, Consolidation and Extension Activities

a) Remedial Activity

1. Afforestation

2. (b) Dry river beds

b) Consolidation Activity

1. (i) Improves weather conditions of a place.

   (ii) Control soil erosion.

   (iii) Recycle air through photosynthesis

   (iv) Shelter for wildlife and birds.

2. • Trees beautify a place.

   • They can be used as firewood.

   • They provide fruits.

c) Extension Activity

a. Grass • Corn (maize) plant

b. (Any other relevant answer)

Causes of deforestation

- Creation of agricultural land.
- Creation of homes for settlement.
- Construction and expansion of roads, towns and cities.
- Commercial use of trees such as for making paper, making timber and makingposts.

Effects of deforestation

- Climates
- Destruction of animal habitats.
- Increased soil erosion.
- Extinction of some plants.

Preventing deforestation

- Recycling of waste paper.
- When you cut a tree replace it.
- Government to regulate harvesting of trees.

- Using existing trees properly.

(Any other relevant answer)

Unit 12: DIGESTIVE SYSTEM

12.1 **Key unit competence**

To explain different stages of digestion and prepare a balanced diet

12.2 Prerequisite

The human body is made up of many systems. A system is a group of glands and organs that work together to perform one function. Examples of systems in our bodies include the breathing system, the digestive system, the reproductive system.

12.3 Introductory activity

Guidance

Assign learners to observe the pictures ((1), (2), (3), (4) and (5)) in P5 Science and Elementary Technology textbook, on page 151, and request everyone to identify each picture (picture title with short explanation). By brainstorming, learners try to give meaning of each of the displayed pictures through introductory activity of unity 12 of P5 textbook. Learners finally will be asked to predict what they are going to learn in the unit.

12.4 **List of lessons**

#	Lesson title	Learning objectives	Number of periods

1	Parts and function of digestive system	•Identify major parts of the digestive system •Explain functions of major parts of digestive system •Drawing the digestive system •Appreciate the need to have a digestive system	1
2	Identification of stages of digestion		2
3	Hygiene of digestive system		1
4	Components of balance diet		1
5	Identification of balanced diet elements		1
6	Nutrition deficiency diseases		1
7	Prevention of nutritional deficiency diseases		1

8	Preparation of a balanced diet		1
9	**Assessment and remediation**		1

12.4.1 Parts and function of digestive system

a) Learning objectives

- Identify major parts of the digestive system
- Explain functions of major parts of digestive system
- Drawing the digestive system
- Appreciate the need to have a digestive system

b) Teaching resources

- Chart/ picture of digestive system
- Pictures in Pupil's Book
- Blackboard

c) Learning activities

i. Ask learners to discuss in pairs the pictures in Pupil's Book page 153.

ii. Probe them to give correct description as well as predict what they are going to learn in the unit.

iii. Ask learners to sit in pairs. Let each learner ask their partner to describe the movement of food from the mouth to the anus.

iv. Let them touch their body to demonstrate movement of food along the digestivesystem.

v. Display the wall chart of the digestive system.

vi. Ask them to draw it in their notebooks and name the parts they know.

Assessment

- Listen to the learners as they describe the movement of food.
- Evaluate if they know food moves from the mouth to the anus.
- Mark the digestive system they have drawn.

12.4.2 Identification of stages of digestion

a) Learning objectives

- State stages of digestion
- Explain the stages of digestion

b) Teaching resources

- Charts/ pictures of human digestive system
- Blackboard
- Library textbooks
- simulated pictures of human digestion
- XO browser

c) Learning activities

i. Get learner into working groups. Assign them to observe charts/textbooks pictures/simulated pictures of the human digestive system and discuss on the digestion process

ii. Ask the learners to label the digestive system that they have drawn in their notebooks.

iii. Guide them on how to label the parts that they have not labelled.

iv. After all these activities, ask the learners to discuss and write short notes/reports on human digestion process

v. Mark their reports and let learners present some of the reports to the class. All the class discuss on these reports presented and add input where necessary to make together consolidated note on human digestion process.

Assessment

Check learners' confidence and communication ability to explain the human digestion process.

12.4.3 Hygiene of Digestive system

a) Learning objectives

- Keep the digestive system healthy
- Care for the digestive system.
- Be cautious while eating different types of food.

b) Teaching resources

- Charts/ pictures of human digestive system
- Blackboard

- Library textbooks
- simulated pictures of human digestion
- XO Browser

c) Learning activities

i. Allow the learners to discuss in their groups how to keep the digestive system healthy

ii. They also have to use their browser or books in the library to research ways of keeping the digestive system healthy.

iii. Let them write notes in their notebooks.

iv. Share with other members of the class by group work presentations.

v. Assign them to design posters that encourage healthy digestive system.

vi. Let them hang the posters at the back of their class.

vii. After all these activities, ask the learners to discuss and write short notes/reports on how they can help their own digestion

viii. Mark their reports and let learners present some of the reports to the class. All the class discuss on these reports presented and add input where necessary to make together consolidated note on human digestion process.

Assessment

- Appraise those who have designed good posters.
- Award them marks.

12.4.4 Components of balance diet

a) Learning objectives

- Identify the components and elements of a balanced diet.
- Recognise benefits of a balanced diet.
- Appreciating the need to eat a balanced diet.
- Desire to eat a balanced diet.

b) Teaching resources

- Real food e.g. beans, maize, fruits, potatoes, water,
- Charts / Pictures of common components groups of balanced diet
- Pupil's books
- Notebooks

c) Learning activities

i. Ask learners to collect different types of food over the weekend and bring them to class.

ii. Assign them working groups. Let them present all the foods they have collectedon the table.

iii. Ask them to list in their notebooks the types of foods they have collected.

iv. Tell them to draw the table on Pupil's Book page 158 in their notebooks. Allow them to place each food in Activity 12.5 in its correct group.

v. Discuss the various components of a balanced diet as outlined on pages 159 -160.

vi. Go round ensuring that learners have grouped various foods in their correctgroups to make a balanced diet.

vii. Ask them to place the food that they brought to class into their correct food groups.

viii. Using the table they have made to guide them on how to prepare a balanceddiet.

ix. Warn them to be careful while using fire as it can burn them.

x. Let them practise good food hygiene when serving and eating their food.

Assessment

Assess the learning participation and record it in the rag table by observing theway they group the food correctly.

12.4.5 Identification of balanced diet elements

a) Learning objectives

- Identify the components and elements of a balanced diet.
- Recognise benefits of a balanced diet.

- Appreciating the need to eat a balanced diet.
- Desire to eat a balanced diet.

b) Teaching resources

- Real food e.g. beans, maize, fruits, potatoes, water,
- Charts / Pictures of elements of balanced diet
- Pupil's books
- Notebooks

c) Learning activities

i. Ask learners to collect different types of food over the weekend and bring them to class.
ii. Assign them working groups. Let them present all the foods they have collected on the table.
iii. Ask them to list in their notebooks the types of foods they have collected.
iv. Tell them to draw the table on Pupil's Book page 158 in their notebooks. Allow them to place each food in Activity 12.5 in its correct group.
v. Discuss the various components of a balanced diet as outlined on pages 159 - 160.
vi. Go round ensuring that learners have grouped various foods in their correct groups to make a balanced diet.
vii. Ask them to place the food that they brought to class into their correct food groups.

Assessment

Assess the learning participation and record it in the rag table by observing the way they group the food correctly.

12.4.6 Nutritional Deficiency Diseases

a) Learning objectives

- State nutritional deficiency diseases.
- Say how to prevent nutritional deficiency diseases.
- Prevent nutritional deficiency diseases.

b) Teaching resources

- Chart/Pictures/Photographs for deficiency diseases
- Pupil's books
- XO laptop

c) Learning activities

i. Ask learners to sit in their working groups.

ii. Ask the learners to research in the library or using their XO internet about "common nutritional diseases

iii. Allow them to discuss pictures, photographs and charts about children suffering from deficiency diseases.

iv. Assign them to make comments on general signs and symptoms of deficiency diseases then presenting to the other members of the class.

v. Allow them to write in their notebooks identification of nutritional deficiency diseases.

vi. Let them give their notes for marking.

Assessment

Mark their books and award them marks.

12.4.7 Prevention of nutritional deficiency diseases

a) Learning objectives

- State nutritional deficiency diseases
- Discuss how to prevent nutritionaldeficiency diseases

b) Teaching resources

- Chart/Pictures/Photographs for prevention of deficiency diseases
- Pupil's books
- XO laptop

c)Learning activities

i. Ask the learners to research in the library or using their XO internet about "prevention of nutritional diseases

ii. Ask learners to sit in their working groups.

iii. Allow them to list deficiency diseases through pictures, photographs and charts about children suffering from deficiency diseases.

iv. Allow learners to read library textbook on prevention of nutritional deficiency diseases

v. Let them make note/report on prevention of deficiency diseases then presenting to the other members of the class.

vi. Allow learners to write in their notebook summary content on prevention of deficiency diseases

Assessment

Assess the learning participation by listening the way learner explains how to prevent nutritional deficiency diseases through their group work presentation.

12.4.8 Preparation of a balanced diet

a) Learning objectives

- List the component of a balanced diet
- Prepare a balanced diet.
- Show habit to recognizeand prepare and eat a balance diet as a way toprevent nutritional deficiency diseases.

b) Teaching resources

- Real food e.g. beans, maize, fruits, potatoes, water, etc
- Balanced diet chart • Pupil's books • Notebooks

c) Learning activities

i. Assign learners to collect from home important factors/things for a balanced diet

ii. Ask them to place the food that they brought to class into their correct food groups.

iii. Let learners to use the table they have made to guide them on how to prepare a balanced diet.

iv. Warn them to be careful while using fire as it can burn them.

v. Let them practise good food hygiene when serving and eating their food.

Assessment

Assess learners' ability to group correctly various foods into components of balanced diet.

12.5.Additional content/information for teacher

12.6. Answers for end unit assessment

Possible Answers for Revision Activity 12

(*Pupil's Book page 166*)

1 (a) Digestion – this is the process by which food is broken down into smallerparticles.

(b) Absorption – is the uptake of digested food into the body.

(c) Ingestion – when food enters the body through the mouth.

(d) Egestion – this is the removal of the undigested food materials from the body.

2. Draw parts of the digestive system.

(See Pupil's Book page 153)

3. *Mark learners sentences based on correct use of grammar, factual information etc.* forexample:
    - The alimentary canal is a long tube.
    - The gall bladder produces bile.
    - Teeth chew food well.
    - Food passes through the gullet.

4. • Gastric glands
- Salivary glands

5. • Eat well cooked food.
    - Always eat plenty of fruits and vegetables.
    - Drink well boiled or treated water.
    - Avoid eating of raw or uncooked food.
    - Wash all foods eaten raw thoroughly with clean water.
    - Limit eating fatty and sugary foods.

6. (a) Vitamins
    (b) Carbohydrates
    (c) Proteins

7. (a) Kwashiorkor

   (b) iron

8. (a) Rickets

   (b) • Feed the children with food rich in vitamin D and phosphorus.

   • Expose babies to morning and evening sunlight.

   (c) Sea fish, crabs, taking iodized salt in food.

9.

Meal	**Foods**		
Breakfast	Milk	Orange	Arrowroots
Lunch	fish	Spinach	Green grams
Dinner	Beans	Mangoes	Rice

Mark any other relevant answer.

10. • She/he can prepare simple meals when left alone at home.

• He/she knows how to prepare balanced meals.

• It encourages a child to try out new foods.

(Any other relevant answer)

11. Supervise learners' activities. Award marks for safe handling of fire, proper preparation of food and observation of good hygiene Practises during servingof food.

12.7. Additional activities

a) **Remedial Activity**

- Ask learners to draw and label parts of the digestive system.
- Learners to say aloud the parts of the digestive system pointed by the teacher using a model/chart. Learner to briefly describe their functions.
- Learners to identify examples of types of food and the deficiency diseasesdemonstrated in pictures/charts or real items.
- Use multiple choice questions and filling in gap questions to check on themastering of content taught.

Examples of Questions

1. The following types of food are important in preventing anaemia EXCEPT _____.

   (a) Liver (b) Milk (c) Spinach (d) Kidney.

2. Digestion starts in the _____ and ends in the anus. (Stomach, mouth)
3. Fruits and vegetables are _____ _. (carbohydrates, proteins, vitamins)

b) Consolidation Activity

- Allow learners to discuss in groups the parts and functions of the digestive system using a model. The group leader to present their findings.

- Give learners groups of food substances and let them classify them in groups ofproteins, carbohydrates, vitamins.
- Learners to discuss in groups on hygiene of digestion.
- Oral questions and structured questions to be used to recap the content taught.

Examples of Questions

1. Draw digestive system and name the parts.
2. Give two examples of food rich in proteins.
3. Describe briefly how you can prevent kwashiorkor.

c) Extension Activity

- Ask learners to draw and label major parts of the digestive system.
- Allow learners to describe the digestion process briefly using short sentences.
- Give learners a list of foods for them to classify into their correct food groups.
- Ask learners to write short essays on causes of deficiency diseases and possibleways of preventing them.

Examples of Questions

1. Describe briefly how digestion takes place in the ileum.
2. Name three types of mineral nutrients.
3. Write down three signs of a person suffering from anaemia.

Answers to Practise Activities 12.1

1. Dehydration
2. Digestion, absorption of food.
3. Constipation

Answers to Remedial, Consolidation and ExtensionActivities

a) Remedial Activity

1. Milk
2. Mouth
3. Constipation

b) Consolidation Activity

1. Figure digestive system
2. • Fish
   • Beans and any other relevant answer.
3. (i) Children should be breast fed up to 2 or 3 years.

(ii) Weaning foods should constitute a balanced diet with lots of proteins.

(iii) Children should be provided with food rick in proteins

c) Extension Activity

1. • As food leaves the stomach, it enters the upper part of the ileum know asthe duodenum. Bile and pancreatic juices mix with food here.
   • Bile is produced by the liver and stored in the gall bladder. Pancreatic juiceis produced by the pancreas. it helps in further digestion of food.
   • Digested food is absorbed in the ileum and taken to the blood stream.
2. • Calcium
   • Iron
   • Phosphorous and any other relevant answer.
3. • Pale skin
   • Loss of appetite and general body weakness.
   • Short of breath and dizziness.

Unit 13: Reproductive system

13.1. Key unit competence

To practice hygiene and recognize sexual characteristics and responsible behavior

13.2. Prerequisite

Learners have learned the parts of human body and their functions in lower primary. They also know that adult people give birth to children. They observed in their life that children, youth, adults and old people demonstrate different behaviors and

characteristics. As teacher, you may ask some questions to check what learners know on reproduction before starting the new unit.

13.3 Introductory activity and guidance

Guidance on the introductory activity

- Ask learners to observe introductory pictures in Pupil's Book. Let them describe each picture.
- Help learners to predict what they are going to learn in the unit.

13.4 List of lessons/sub-heading

#	Lesson title	Learning objectives	Number of periods
1	Functions of human reproductive system	-To recognise the male and female reproductive systems. -To give the functions of the male female reproductive systems.	4
2	Hygiene of the male and female	-To explain how to maintain the hygiene of male \and female	2

	genital organs	reproductive organs. - To Practise cleaning and hygiene of external male and female organs. - To show concern to care for the genital male and female organs. -To develop care and appreciation of the genital male and female organs	
3	Primary Sexual characteristics in human	-To identify sexual characteristics in human	2
4	Puberty characteristics in boys and girls	-To identify sexual characteristics of boys and girls at puberty. - To Practise principles of responsible sexual behaviour of boys. -To appreciate the importance of talking about changes at puberty. To show concern to care for genital organs	2
5	Safe responsible behavior and choices	-To explain responsible sexual behaviour. -To practise the principles of responsible sexual behaviour. -To be aware of responsible sexual behaviour	4

11	**Assessment and remediation**		2

13.4.1. Lesson One: Functions of human reproductive system

d) Learning objectives

-To recognise and describe the male and female reproductive external parts.

-To give the functions of the male and female reproductive systems.

e) Teaching resources

Charts, Picture in Pupil's books, Internet, Relevant textbooks, Models

f) Learning activities

- Read the content in the learners' books and other relevant texts before the lesson.
- Let learners present their findings from their research and guide them in the discussions.
- Obtain the relevant charts, models and pictures.

- Let the learners to name some parts of their bodies. Encourage them to name reproductive parts well.
- Ask learners to give the functions of some body parts.
- Lead the learners in the discussion of the male and female reproductive systems.
- Display charts and pictures of male and female reproductive organs (see student book). Let learners observe and identify the external parts of the reproductive systems.

- Display charts of male and female reproductive organs. Let learners observe and identify their external parts.
- Assess learners' ability to:
  • Draw and label external parts of the male and female reproductive system.
  • Explain the functions of the male and female genital organs.

- **Answers for introductory activity**,

-Picture a): Female reproductive system

- Picture b): Male reproductive system

-Picture c): A wife nursing her child

-Picture d): Two children a boy and a girl standing side-by-sideness.

Answer to learning activity 13.1

The major function of the reproductive system is **reproduction**

13.4.2. Lesson two: Hygiene of the male and female genital organs

a) Learning objectives

To explain how to maintain the hygiene of male and female reproductive organs.

b) Teaching resources

Charts, Picture in Pupil's books, Internet, Relevant textbooks, Models, Soap, water

c) Learning activities

- Read the content in the learners' book and other relevant texts before the lesson.
- Obtain the relevant charts, models and pictures before the lesson.
- Group the learners according to their gender (in groups of 5).
- Let learners of male gender discuss how they practise hygiene of their genital organs.

-Lead the learners in the discussion

- Let learners of female gender discuss how they practise hygiene of their genital organs.

-Lead the learners in the discussion

- Demonstrate how underwear should be washed and stored as shown in the activity 13.2 of the student's book
- Let all learners practise washing and keeping the underwear properly.
- Let them write short notes in their notebooks.

-Assess learners' ability to clean their underwear using soap and water.

-Assess learners' ability to explain how to practise hygiene of genital organs.

Answer to Activity 13.2. Change into clean under wear by washing them and dry them

13.4.3 Lesson three: Primary Sexual characteristics in human

a) Learning objectives

To identify and name Primary Sexual characteristics in human

b) Teaching resources

Charts, Pictures, Reference books, XO laptops

c) Learning activities

- Read the content before the lesson.
- Obtain the necessary pictures and charts for the lesson.
- Put learners in groups of 5 and let them discuss their findings from research
- Guide them in their discussions to identify the primary sexual characteristics in boys and girls.
- Provide additional information that learners have not discussed.

- Assess learners' ability to identify and name primary sexual characteristics in human.

13.4.4. Lesson seven: Puberty characteristics in boys and girls

a) Learning objectives

To identify sexual characteristics in boys and girls at puberty.

b) Teaching resources

Charts, Pictures, Illustrations, Models

c) Learning activities

- Read the content in the learner's book before the lesson.
- Obtain the necessary pictures and charts for the lesson.
-Let learners discuss Activity 13.3 in groups.
-Assess their work.
- Let learners to observe pictures on secondary sexual changes in boys and girls in the Pupil's' Book
- Ask leaners to do Activities 13.4 and 13.5 individually and go round assessing their responses.
-Ask learners to describe the secondary sexual changes observed in boys and girls from the pictures.
- Let learners describe characteristics that are specific to boys.
- Ask learners to read aloud the short stories in Pupil's' Book on secondary changes in both boys and girls.

- Put learners in groups of 5 and let them discuss and identify the sexual characteristics taking place in boys and girls during puberty.
- Provide additional information that learners have not discussed.
-Find out if the Pupils can write down the changes that occur during puberty. Write them in a table as shown below

Changes in boys	Changes in girls

Answer to Activity 13.4.

Enlargement of the breasts and the hips become broader.

Practice Activities 13.1 and 13.2.

Refer to learners'book

13.4.5. Lesson five: Safe responsible behaviour and choices

a) Learning objectives

-To practise the principles of responsible sexual behaviour.

-To be aware of responsible sexual behaviour

-To explain responsible sexual behaviour

b) Teaching resources

Charts, Pictures, Internet, Magazines

c) Learning activities

- Read the content in the Pupil's Book before the lesson.
-Let learners discuss questions of the activity 13.6 and share their point in their class.
-Guide the learners to find out emotional and social changes during
-Introduce the lessons through probing questions on acceptable behaviour in the society and risky behaviour.
- Let learners to read the story in Activity 13.7 and allow them to discuss the story.
-Guide the discussions.
-Let them answer the questions given individually, then present their answers in groups.
-Guide the learners to find out some safe and responsible sexual behaviour for the lesson.
- Built on the responses from the story to enlighten learners about responsible behaviour.

- Get learners involved in the discussions. Allow presentation of educative case studies.

-Ask learners to make short notes on the sub-topic.

-Observe and discuss behaviour change in daily life.

- Make class presentations on responsible behaviour.

Answers to Practise Activities 13.3

1. B. They are playing in the field while A are playing on the road.

2. • Premarital sex

• Fighting

• Truancy

• Tobacco smoking

(Any other relevant answer)

3 • Self discipline

• Well organised

• Responsible

• Has respect

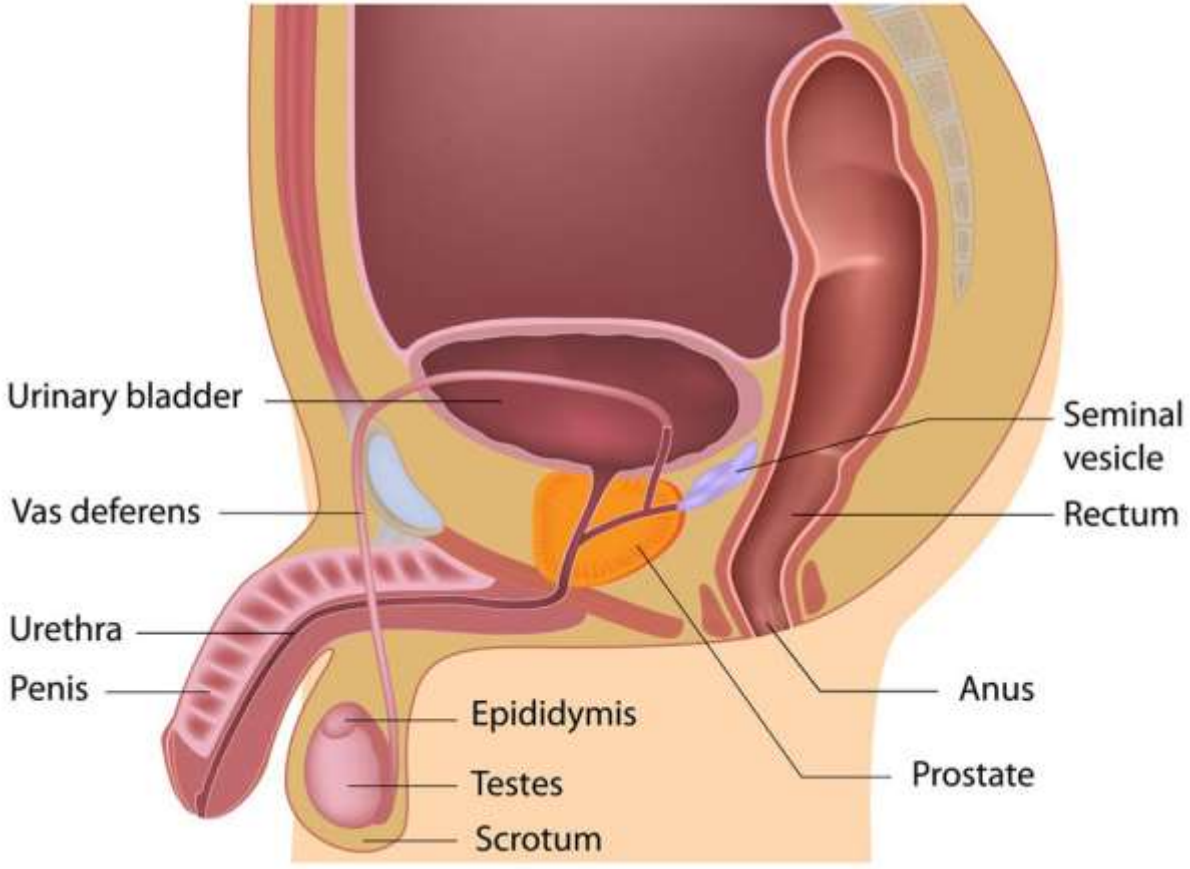
(Any other relevant answer).

13.5. Additional content for the student

Lesson three: Primary Sexual characteristics in human

Male primary sexual characteristics

Male primary sexual characteristics are:
The penis and the scrotum (the bag of skin that holds and helps to protect the testicles) all of which allow a male to make and deliver sperm.

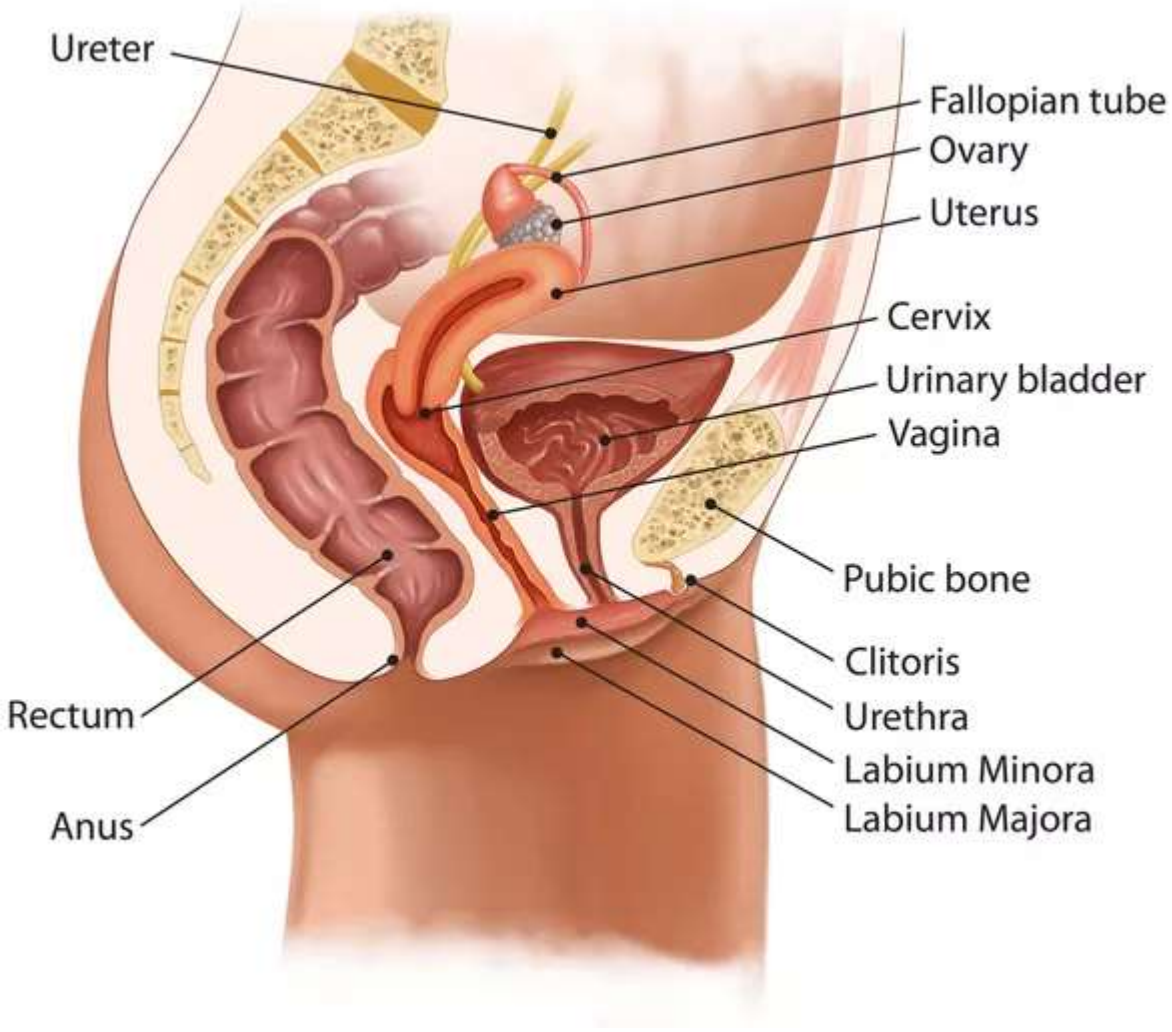

Urinary bladder
Vas deferens
Urethra
Penis
Seminal vesicle
Rectum
Anus
Epididymis
Testes
Scrotum
Prostate

Female primary sexual characteristics

Female primary sexual characteristics are:

The vagina, uterus, fallopian tubes, clitoris, cervix, and the ability to bear children.

They all mature when sex hormones are released during puberty.


Ureter
Fallopian tube
Ovary
Uterus
Cervix
Urinary bladder
Vagina
Pubic bone
Clitoris
Urethra
Labium Minora
Labium Majora
Rectum
Anus

13.6. A. Guidance on End unit assessment

The revision activity 13 is in place of end unit assessment

- This part provides the answers of end unit assessment with cross reference to the textbook
- The teacher's guide suggests additional questions and answers to assess the key unit competence.
- Assessment activities are designed in integrative approach to assess the key unit competence with cross reference to the textbook.

Possible Answers for End Unit assessment / Revision Activity 13

B. Answers for end unit assessment/Revision activity 13

1. Reproduction is the process of giving rise to young ones.

2. (a) Penis (b) Scrotum (c) Labia majora (d) Labia minora

3. a) Females

• Bathing regularly with soap and water.

• Change into clean clothes after bathing.

• Wipe the genitals with tissue paper after urinating.

b) Males

• Bathing regularly with soap and water.

• Change into clean clothes after bathing.

• Visit the hospital in case of abnormal discharge or rashes.

• (Mark any other relevant answers).

4.

• Fighting

• Stealing

• Use of drugs

• Irresponsible sexual behaviour

5. Irresponsible sexual behaviour can lead to:

• Rejection by family members

• Unwanted pregnancies

• School dropouts

• Contracting sexually transmitted diseases

6.

Social and emotional changes occur at puberty.

Some

• Social changes are brought about by societal structure or outlook for example social changes, searching for identity, seeking for independence and influence by friends.

• Are brought about by hormonal changes.

7.

(a) Avoid risky behaviour. (b) Suffer from guilt, they can be caught and be punished, embarrassment. (c) A good friend. He gives good advice.

8. (a) Appearance of public hair, genitals develop, sometimes pimples appear.

Boys	Girls
• Broadening of shoulders	• Enlargement of breasts.
• Breaking of voice.	• Menstruation.
• Wet dreams.	• Widening of hips.

9.

(a) Puberty is a stage where a boy or a girl becomes sexually mature and is able to reproduce.

(b) It prepares boys and girls physically and sexually for reproduction.

10.

(a) Maintain proper hygiene, Wash clothes regularly, Shave/trim hair under the armpits.

(b) We can choose good friends by:

• Observing their behaviour.

• Chasing friends who promote positive values.

• Avoiding manipulative people.

• Choose supportive people.

• (any relevant answers)

11.

• Politely declining the advance to avoid hurting him/her.

• Tell your classmate that it is wrong to write love letters.

• Seek guidance and counselling from trusted friend.

• Report to a responsible adult if he or she persists.

13.7. Additional activities

a) **Remedial Activities**: Suggestion of Questions and Answers for remedial activities for slow learners.

Using charts with unlabelled pictures ask learners to identify by saying aloud the parts of the male and female reproductive system.

• Provide pictures that are partially labelled for learners to complete.

Example of Questions

1. External parts of males: P _ n _ _

2. External parts of females: Mo_ _ P_ b _ _

• Give 'Yes' and 'No' questions to help learners understand hygiene of male and female genital organs.

• Provide pictures/pictures of male and female for learners to observe and identify changes during puberty.

• Allow learners to read customised short stories on responsible behaviour.

• Give learners leading questions for them to answer orally e.g.

3. The urethra allows _____ and _____ to pass through it.

Answers to Remedial Activities

1. Penis

2. Mons pubis

3. Sperms and urine

b) Consolidation activities: Suggestion of questions and answers for deep development of competences.

1. Give pictures for male and female reproductive systems for learners to label the major parts.
2. Give tables to be filled in by the individual learners after discussion in groups.

Example of Questions

1.

Hygiene of female genitals	Hygiene of male genitals
1	
2	
3	

4	
5	

• Provide charts for learners to identify parts of the male and female anatomy that are similar.

2.

Female organ	**Male organ**
Clitoris	Penis
Ovary	Testis
_____	_____

Answers to Consolidation Activities

1.

Hygiene of female genitals	**Hygiene of male genitals**
1. Bath regularly.	• Bath regularly.
2. Change into clean underwear.	• Wear clean underwear
3. Wipe genitals.	• Shake penis gently after urinating.
4. Do not insert objects into vagina.	• Uncircumcised boys clean the area under foreskin.

5. Visit the doctor in case of abnormal discharge.	• Seek medial attention in case of abnormal discharge.

2.

Female organ	**Male organ**
Vaginal opening	Urethra opening

(c) Extension Activity

Discuss and identify other safe responsible behaviour with your parents at home and list to them down.

Unit 14: Light

14.1 Key unit competence

To demonstrate the existence of light, explore its properties and transmission according to intensity.

14.2 Prerequisite

The source of light energy learnt in the unit 6 of P3 is a prerequisite of this unit and will therefore help Students to learn it

better. Learners have already knowledge on sources of light. As a teacher ask some questions on the source of light

14.3 Introductory activity

Guidance on the introductory activity.

-Ask learners to form groups and name pictures found in the student book.

-Ask learners to describe each picture and explain the role of materials or elements found in the picture.

-Guide them to predict what they are going to learn.

14.4. List of lessons/sub-heading

#	Lesson title	Learning objectives	Number of

			periods
1	Types of medium for light propagation (Transparent, Translucent and opaque)	- To explain transmission of light through various media. - To demonstrate the transmission of light through different media.	
2	Propagation of light in straight line	- To discuss and explain propagation of light. -To investigate how light travels.	
3	Reflection of light	- To explain the meaning of reflection of light. - To design experiments to show reflection	
4	Refraction of light	- To Explain the meaning of refraction of light. -To design experiments to show refraction of light. - To appreciate the benefits of light.	
5	**Assessment and remediation**		

14.4.1. Lesson One: Types of medium for light propagation (Transparent, Translucent and opaque)

a) Learning objectives

- To explain transmission of light through various media.
- To demonstrate the transmission of light through different media.

b) Teaching resources

Papers (oiled and clear), torch, notebooks, Charts, Pictures in Pupil's books, Clear polythene paper, Clear glass, Candles, Nails, Pieces of cardboard.

c) Learning activities

- Collect required teaching and learning resources and take them to class.
- Assign learners into working groups.
- Display the charts and let them to observe and discuss how light travels through different media.

- Display learning materials to be used on the table. These materials are mentioned in the Activity 14.2 in Pupil's Book
- Allow them to carry out experiment described in Activity 14.2 in Pupil's Book
- Let the group secretary record the observations made.
- Let them share with the rest of the class about the findings and discussion.
- Allow them to compare their observations with those written in the Pupil's Book.
- Let learners explain how light travels through various media.
- Assess if learners can investigate and explain how light travels through different media: ask some questions to assess achievement of instructional objective. During assessment activity, learners work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform you on next steps for the whole class and individuals. You can end with a homework assignment.

Answers to Practise Activity 14.1.

1. - Comes in various colours and patterns.
   -Enhances privacy and security.
   -Prevents splintering of glass.
   -Prevent damage to the skin by the sun
2. -Oiled paper,

-Some plastics,

-Ice,

- Tissue paper.

14.4.2. Lesson two: Propagation of light in straight line

a) Learning objectives

-To discuss and explain propagation of light.

-To investigate how light travels.

b) Teaching resources

Source of light e.g. candle / torch, Card board, Board, Notebooks, Pens.

c) Learning activities/Activity 14.1

-Assemble all the learning materials and come with them to class.

-Display the materials to be used on the table.

-Put the learners in groups and ask them to perform the experiment described in the activity 14.1.

-Go round observing learners as they carry out the activity and help them if there are any challenges.

-Let them give their observations and conclusion on how light travels. Allow to compare results and present their findings in class.

-Guide leaners to write appropriate observations and conclusion in their exercise books.

-Assess them to know if they have understood the content:

In this step you ask some questions to assess achievement of instructional objective. During assessment activity, learners work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class and individuals. This lesson can end with a homework assignment.

Answer to activity 14.1

Refer to learner's book page 184

14.4.3. Lesson three: Reflection of light

a) Learning objectives

- To explain the meaning of reflection of light.
- To design experiments to show reflection of light.

b) Teaching resources

Mirror, Source of light (torch or sun), Wall, Pencil, Ruler, Water in a glass, Charts, Pictures in Pupil's books, Board, XO laptop.

c) Learning activities

-Make sure all teaching and learning materials are available.

-Ask learners to get into their working groups.

-Ask the learners to carry out the experiment on reflection of light following the steps outlined on Pupil's Book in the activity 14.3.

-Let them record their observations in their notebooks and discuss n the results.

-Let them search from XO laptop on how reflection of light takes place.

- Allow them to share their findings with other groups to see what they have written and let them to discuss their findings.

-Assess learner's presentations to find out if they have understood the concept. In this step you ask some questions to assess achievement of instructional objective. During assessment activity, learners work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class and individuals. This lesson can end with a homework assignment.

Answer to activity 14.3

Refer to learner's book page 187

14.4.4. Lesson three: Refraction of light

a) Learning objectives

-To Explain the meaning of refraction of light.

-To design experiments to show refraction of light.

-To appreciate the benefits of light.

b) Teaching resources

Mirror, Source of light, Wall, Pencil, Ruler, Water in a glass, Charts, Pictures in Pupil's, Books, XO laptop.

Answers to activities / Activity 14.4

Refer to learner's book page 184

c)Learning activities

-Make sure all teaching and learning materials are available.

-Ask learners to get into their working groups.

-Ask the learners to carry out the experiment on refraction of light following the steps outlined on Pupil's Book, activity 14.4. Let them record their observations in their notebooks.

-Let them record their observation in their exercise notebooks.

-Let them search from XO laptop on how refraction of light takes place.

-Allow them to share their findings with other groups to see what they have written.

-Assess learner's presentations to find out if they have understood the concept: In this step the teacher asks some questions to

assess achievement of instructional objective. During assessment activity, learners work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class and individuals. You can end with a homework assignment.

Answer to activity 14.4

Refer to learner's book page 189

14.5. A. Guidance on End unit assessment

The revision activity 14 is in place of end unit assessment

- This part provides the answers of end unit assessment with cross reference to the textbook
- The teacher's guide suggests additional questions and answers to assess the key unit competence.
- Assessment activities are designed in integrative approach to assess the key unit competence with cross reference to the textbook.
- Possible Answers for Revision Activity 14 instead of end unit assessment is used in the student 'book

B. Answers for end unit assessment/Revision activity 14

1. Beam

2.

Transparent	**Translucent**	**Opaque**
Drinking glass	Frosted glass	Stone
Polythene paper	Oiled window pane	Wood

3.

(a) Reflection – is the bouncing back of light when it falls on a surface.

(b) Refraction – is the bending of the light ray when it travels from one medium to another different medium.

4. • Regular reflection

• Irregular reflection

5. Observe the following: The learner should put the ruler in water and observe it from above. The learner should report that the ruler appears bent. Refraction occurs because light travels at different speeds in different media.

6. flat shiny surfaces.

7. (a) Regular reflection.

(b) (i) Incident rays

(ii) Reflected rays

8. • The floor of swimming pools appearing raised.

• Formation of a rainbow.

• Riverbeds appearing shallow.

9. (a) In setup 1, James could see the candle.

In setup 2, Rose could not see the candle.

(b) Light travels in a straight line.

10. (a) Reflection

(b) For observation around corners/barriers.

11. (a) Used in making windows, drinking glasses and windscreens.

(b) Making of frosted glass of bathrooms.

(c) • Making of doors that one cannot see through.

• Making walls and roofs.

14.6. Additional activities

a) **Remedial Activities**: Suggestion of Questions and Answers for remedial activities for slow learners.

• Ask learners oral questions for oral answers as they carry out experiments on light.

• Give learners multiple choice questions to help learners recap what they have learnt through out the topic. e.g. Which among the following is a natural way of lighting the house?

(a) using skylights (b) Electricity (c) Using hurricane lamps (d) Using candles

• Give learners gap filling questions on light e.g. Light from a torch travels in _____ direction.

• Give pictures or examples of sources of light for them to identify.

Example of Questions

1. Light cannot pass through _____ objects. (transparent, opaque)
2. Light helps us to _____. (walk, see)
3. _____ is bouncing back of light rays. (refraction, reflection)

Answers to Remedial Activities

1. Opaque 2. See 3. Reflection

(b) Consolidation Activity

• Give learners tables and questionnaires for them to fill in as they perform experiments.

• Give learners structured questions and matching items in order for them to understand concept on light propagation, light transmission and laws of propagation.

• Learners to discuss in groups and write down some of the importance of light in our lives.

Example of Questions

1. Define the word propagation.

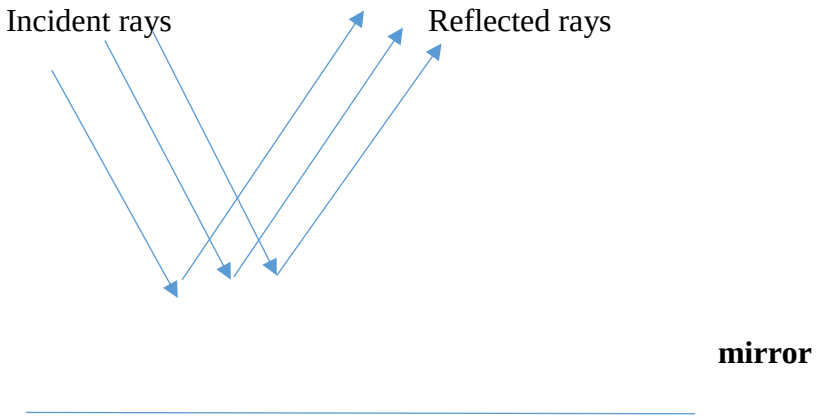
2. Light is reflected back when light falls on a _____ surface.

Answers to Consolidation Activities

1. To move, spread or travel

2. Smooth shiny

3.Incident rays Reflected rays Mirror



3. Draw the two types of rays.

(c) Extension Activity

• Ask learners to research and describe briefly the concepts of light propagation, light transmission and laws of light.

• Ask learners to collect an assortment of various items and classify them as transparent, translucent or opaque materials.

• Ask learners to research and write down application of refraction and reflection of light in our daily life.

Ask learners to briefly write down in order the steps followed in setting various experiments on light propagation.

Example of Questions

1. List down three transparent materials.

2. name the three medium of light transmission.

3. Why do swimming pools look raised?

Answers to Extension Activities

1. Clear water, air, glass window.

2. Transparent, translucent, opaque.

3. Because of the refraction of light at the surface of water

Unit 15. Electricity

15.1. Key unit competence

To construct, manage an electric circuit and explain its importance.

15.2. Prerequisite

Students will learn better if they have understanding on electricity. Students have already learnt electricity in the unit 9 of P3: sources and uses of electricity, dangers of electricity and their prevention. Teacher should ask some questions to check what learners know on electricity before starting the new unit.

15.3 Introductory activity and guidance

Guidance on the introductory activity

- Ask learners to form groups, to observe the pictures found in the student book.
- Ask learners to identify each picture and explain the role of materials found in the picture.
- Guide learners to predict what they are going to learn.

15.4 List of lessons/sub-heading

#	Lesson title	Learning objectives	Number of periods
1	Importance of electricity	-To outline the importance of electricity. -To explain the production of electricity. -To identify the importance of electricity.	1
2	Production of electricity (using a simple dynamo and human power; Solar panel)	-To describe how electricity is produced. -To produce electricity using a bicycle dynamo and solar panel.	2
3	Common tools and materials used in electricity	-List common materials and tools used in electricity. -To use common tools and materials used in electricity.	2

4	Constructing and Controlling Simple electric circuit	-To explain methods of controlling electric circuit. -To explain the dangers of electric circuit. Skills -To construct a simple an electric circuit. -To manage an electric circuit.	2
5	Dangers of electricity	-To explain the dangers of electric circuit.	2
6	**Assessment and remediation**		1

15.4.1. Lesson one: Importance of electricity

a) Learning objectives

-To outline the importance of electricity.

-To explain the production of electricity.

-To identify the importance of electricity.

b) Teaching resources

XO laptop, Bulbs, Radios, Torch and Charts.

c) Learning activities/Activity 15.1

-Ask one learner to switch on lights in class. Let other learners put dry cells in a torch and light it. Let another learner connect

an XO laptop on electricity and switch it on.

-Ask learners in class to discuss the events.

-Ask learners to look at pictures of activity 15.1 in Pupil's Book and to identify and discuss the uses of those pictures.

-Display charts showing uses of electricity. Let them discuss the uses in pairs. Allow them to make short notes.

-From the discussions find out importance of electricity.

-Go round checking their notes and responses to Activity 15.1.

-Assess learner's presentations to find out if they have understood the concept: Assign learners 'ability to identify and explain the importance of electricity in daily life. In this step the teacher asks some questions to assess achievement of instructional objective. During assessment activity, learners work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class and individuals. You can end with a homework assignment.

Answers to Activity 15.1

1. Production of light by using electricity as source of energy.
2. Production of heat or frigid by using electricity as source of energy.
3. Enlarge circular holes in solid material and transport by using electricity as source of energy.
4. Giving information and Communication by using electricity as source of energy.

15.4.2. Lesson two: Production of electricity.

a) Learning Objective.

To describe how electricity is produced.

b) Teaching resources

Dry cells, Battery, Bicycle dynamo, Simple solar panels, Wires

c) Learning Activities

-Visit an electricity producing plant as it is proposed in the activity 15.2.

-Allow learners to ask questions from power plant experts on how electricity is produced.

-Go back to school and compare notes written from the producing plant.

-Acquire the required materials such a simple solar panel, bulbs, dry cells, battery and wires.

-Let learners do Activity 15.3 and Activity 15.4 in class.

-Supervise their activities and help them where necessary.

-Guide learners to produce electricity using a simple dynamo and simple solar panel as outlined in the student book respectively.

-Allow learners to discuss various ways of producing electricity in their groups.

-Ask learners to make short notes on ways of producing electricity.

-Obtain the charts and pictures.

-Research on the internet about production of electricity.

-Encourage them to make sketches of the process as well.

-Assess the learners' ability to explain ways of producing electricity and to produce electricity using solar panels and simple

dynamos.

Answers to Practise Activity 15.1

1. This is electric energy derived from water falls or fast running water.
2. They are connecting and fixing electric power lines to the poles.
3.
(i) Nyabarongo Hydro-Electric Power Station
(ii) Rukarara Hydro-Electric Power Station
(iii) Rusumo Hydro-Electric Power Station
(And any other relevant answer)

Answer to Practise Activity 15.2 1.
Diagram to be drawn PAGE 194

15.4.3. Lesson three: Common tools and materials used in electricity.

a) Learning Objective

-To list common materials and tools used in electricity.

-To use common tools and materials used in electricity.

b) **Teaching resources**

Common materials used in electricity, Common tools used in electricity, Charts and pictures of common electricity tools and materials.

c) **Learning Activities**

-Ask learners to study tools in Activity 15.5 and 15.6

-Ask them to answer questions in the activities individually in their notebooks.

-Display some tools and materials that are available for learners to identify.

-Let them identify common tools used in electricity and their uses.

-Explain to them tools and materials that they do not know.

-Let them demonstrate how those tools are used.

-Assess the learners'ability to identify common materials and tools used in electricity and explain their uses.

Answers to Activity 15.5 and 15.6

Common tools used in electricity

(a) Fish tape, (b) Tape measure, (c) Circuit tester, (d) Ladder, (e) Hammer, (f) Wire stripper, (g) Electric drill, (h) Electrician level, (i) Screw driver, (j) Flash light, (k) Hack saw, (l) Cutting pliers / side snipes.

Common materials used in electricity

(a) Fuse, (b) Plug, (c) Cable, (d) Conductor, (e) Conductor, (f) Switch, (g) Dry cell, (h) Screw, (i) Bulb, (j) Plug, (k) Adaptor.

15.4.4. Lesson four: Constructing and controlling simple electric circuit.

a) Learning Objective.

-To construct a simple electric circuit.

-To explain methods of controlling electric circuit.

b) Teaching resources

Screw driver, Fuse, Tester, Bulb, Wires, Charts, Photographs, Switches

c) Learning Activities

-Read the content in the pupil's book.

-Ask learners to construct a simple electric circuit as shown in Activity 15.7

-Ask them to record their observations.

-Guide learners to manipulate the circuit in Activity 15.8 by connecting and disconnecting the switch/ controlling the circuit. Ask them to write their observations as well.

-Ask learners to make a simple electric circuit that can be controlled as project work.

-Ask some questions to assess achievement of instructional objective. During assessment activity, learners work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class and individuals. You can end with a homework assignment.

15.4.5. Lesson five: Dangers of electricity

a) Learning Objective

-To explain the dangers of electric circuit.

b) Teaching resources

-Screw driver, Fuse, Tester, Bulb, Wires, Charts, Photographs, Switches

c) Learning Activities

-Read the content in the pupil's book.

-Visit some electrical installations and observe the warning signs on them.

-Find out the meaning of each of these warning signs.

-Ask learners to do activity 15.9 from (ii) to (iii) and note findings.

-Ask learners to read the poem on dangers of electricity in Activity 15.9.

-Let them answer questions individually in their books.

-Show learners video clips or pictures showing dangers of electricity. Allow them to discuss.

-Assess learners' ability to recognise and draw the warning signs and give the meaning of each sign.

-Write down the safety precautions when using electricity.

15.5. A. Guidance on End unit assessment

The revision activity 15 is in place of end unit assessment

- This part provides the answers of end unit assessment with cross reference to the textbook
- The teacher's guide suggests additional questions and answers to assess the key unit competence.
- Assessment activities are designed in integrative approach to assess the key unit competence with cross reference to the textbook.
- Possible Answers for Revision Activity 14 instead of end unit assessment is used in the student 'book

B. Answers for end unit assessment/Revision activity 15

1.False

2. It will not give light. The circuit is incomplete.

3.

• Dry cells

• Solar panel

• Car battery

• Diesel or petrol generator (Any other appropriate answer)

4. Solar panel produces electricity by changing light energy from the sun to electricity.

5. (Evaluate learners' work to know if they can draw an electric circuit with two batteries and one bulb correctly)

6.

• Copper wires

• Aluminium wires

• Silver wires (Any other appropriate answer)

7.

• Do not use electrical appliances with damaged parts.

• Do not operate electrical appliances with wet hands.

• Do not overload circuits. (Any other appropriate answer)

8. Dry cells, wires, bulb, bulb holder

9. Add more dry cells

10. (a) The dry cell got used up and lost chemical energy.

(b) Put a switch to the circuit and control the flow of electricity in the electric circuit.

11.

(a) Radio, refrigerator, television, electric iron (Any other appropriate answer)

(b) It can cause electric shock or fire.

(c)

• Avoid using it.

• Take it for repair.

14.6 Additional activities

(a) Remedial Activity.

- Give learners oral questions on some of the uses of electricity.

- Give learners pictures and photographs showing uses of electricity. Ask learners to say the correct answers.

-Give learners multiple choice questions, Yes and No question items and simple incomplete sentences for them to fill in. These are to help them recapture the content covered.

Examples of Questions

1. The following are importance of electricity EXCEPT.

(a) Lighting houses

(b) To power electrical gadgets

(c) Communication

(d) Used in gas cookers.

2. Solar panels convert _____ energy from the sun to electricity. (heat, light)

3. The path through which electricity flows is know as _____. (electric circuit, electric current)

Answers to Remedial Activities.

(a)Remedial Activity

1. (d) Used in gas cookers

2. Light energy

3. Electric circuit

(b) Consolidation Activity

• Give learners pictures showing uses of electricity, sources of electricity, tools used and materials used in electricity. Give learners pictures showing dangers of electricity as well. Let learners fill in short descriptions concerning the pictures.

• Give learners structured questions, open ended questions and short essay questions to test content taught.

• Give learners practise on constructing simple electric circuit and manage the circuits.

• Give learners table to fill in individually.

Examples of Questions

Material	**Function**
1. Wire	_____
2. Bulb	_____
3. Dry cell	_____
4. Fuse	_____

Answers to Consolidation Activities

1. Conduct electric current in the circuit.

2. Converts electric current to light energy.

3. Is the source of electric power.

4. It breaks the circuit.

(c) Extension Activity

- Let learners draw pictures showing application/uses of electricity with short descriptions of the picture.
- Give learners short essay questions on sources and dangers of electricity.
- Ask learners to write short notes on possible uses of tools and materials used in electricity.
- Learners to draw and label parts of a simple electric circuit.
- Let learners make simple electric circuits.

Examples of Questions

1. How does a car battery produce electricity?

2. Draw a simple circuit and label the components.

3. What is a fuse? What is its importance in an electric circuit?

Answers to Extension Activities

1. It has chemicals that are able to store current electricity. This electric power is able to flow in electric circuits in form of electric currents to the electric devices.

2. Wire Bulb Dry cell

DIAGRAM TO BE DRAWN PAGE 195

3. A fuse is an electric device that breaks the circuit.

• The fuse breaks the flow of current to the electric device in order to protect it from damage. This happens especially if there is high electric flowing in the circuit

Unit 16: Materials

16.1. Key unit competence

-To classify materials according to their properties in metals and non-metals and calculate their density.

16.2. Prerequisite

Students will learn better if they have understanding on what is a material, if they can group them based on their physical properties.

As a teacher you introduce the lesson by asking some questions like:

-What is a material?

- What are common properties of materials?

16.3. Introductory activity and guidance.

Guidance on the introductory activity.

-Ask learners to name materials which are around them (**Answers:** pens made of glasses, chairs made of trees, papers, quod, books, windows made of metals and glasses, stones, ….)

-Ask them again to observe and describe the pictures in the learners' book.

- Guide learners to use the pictures a), b), c), d), e), f), g), h and i to predict what they are going to learn.

16.4. List of lessons/sub-heading

#	**Lesson title**	**Learning objectives**	**Number of periods**
1	Classification of materials: Non-metals,	-To identify common metals and non-metals	2

	Metals	-To develop concern towards using different metals.	
2	Physical properties of metals	-To describe physical properties of metals	1
3	Uses and maintenance of common metals	-To explain the uses of objects made from metals. -To identify what metals common objects are made of. -To identify objects made from metals. -To maintain metals.	2
4	Density: Definition and Calculation	-To explain how to calculate density. -To differentiate density of regular objects from irregular objects. Skills -To determine density of objects experimentally. -To calculate density.	2
5	Relative density and its applications	To explain how to calculate relative density of an object. -To justify the applications of relative density in daily life. -To calculate relative density. -To apply relative density in life.	2
6	**Assessment and remediation**		**1**

16.4.1. Lesson one: Classification of materials: Non-metals, Metals

a) Learning objectives

-To classify materials into metals and non-metals

b) Teaching resources

-Real objects e.g bell, thread, nail, spoon, plastic pens, books, glass, sauce pan etc., Charts, Wooden handle or rug, Drawing in Pupil's books, Source of heat.

c) Learning activities

-Collect all the items needed for the lesson and bring them to class.

-Ask learners to list materials used at home and at school.

-Group various objects collected according to their properties.

-In their groups let them discuss reasons for grouping of materials as either metal or non-metal.

-Guide the learners to group the materials as metals or non-metals.

-Let each group draw the table in Activity 16.1 in their notebooks and complete the table.

-Guide learners when answering to activity 16.1(iii), (iv), (v).

-Assess learners' ability to recognise metals and non-metals from many materials given.

16.4.2. Lesson two: Physical properties of metals

a) Learning objectives

-To investigate and list physical properties of metals.

b) Teaching resources

-Heat source, Nail, Wooden handle or a piece of cloth about the conductivity and non-. conductivity

c) Learning activities

-Instruct leaners to carry out Activity 16.2 in groups of four.

-Supervise their activities to prevent accidents.

-Let them discuss the property of metals investigated and other properties as well

-Ask them to follow all proposed steps in this activity,

-Learners give observations,

-Guide students to give conclusion about conductivity or non-conductivity of metals,

-Help leaners to find any other physical properties of metals,

-Assess learners' ability to investigate and list metal physical properties,

16.4.3. Lesson three: Uses and maintenance of common metals

a) Learning objectives

To explain the uses of objects made from metals and to maintain them.

b) Teaching resources

Real objects e.g. spoons, coins, sauce pans, necklaces etc., Pens, Notebooks, Charts, XO laptops.

c) Learning activities

-Ensure all the learning materials are available in class,

-Observe and feel materials made from metals,

-Classify objects according to metals they are made of,

-Ask learners to place metallic materials on a large surface.

-Allow them to touch the materials as outlined in Activity 16.3 Pupil's Book,

-Ask them to say what metal each material is made of,

-Ask them to discuss ways of maintaining metals,

-Explain to them uses of metals and type of metals used to make objects.

-Assess learners' ability to recognise metals that common materials are made of and their maintenance.

Answers to Practise Activities 16.1

1.(i) In building and construction

(ii) In electronics like TV, mobiles and fridges.

(iii) In farming we require metal tools.

(iv) Making locks, lockers and cupboards.

(Any other relevant answer)

2. Copper

3. Iron Copper Tin (Any other relevant answer.)

16.4.1. Lesson four: Density: Definition and Calculation

a) Learning objectives

-To explain how to calculate density, to differentiate density of regular objects from irregular ones.

b) Teaching resources

-Learning/Teaching Materials, Real materials, Board, Textbooks

c) Learning activities

-Ensure that all teaching and learning materials are available,

-Distribute all materials needed for the lesson in the groups of learners,

-Ask learners to perform activity 16.7,

-Ask them to sit in their working groups. Tell them to discuss and define the term density,

-Explain and show to learners how to calculate density,

-Assign them 2 Practise questions on calculating density,

-Let them follow the steps in pupil book to carry out the experiment,

-Ask them to use the values recorded to calculate density,

-Observe learners as they do experiments to know if they have understood the content.

16.4.5. Lesson five: Relative density and its applications

a) Learning objectives

To explain how to calculate relative density of an object and justify the applications of relative density in daily life.

b) Teaching resources

Charts, Real objects, Pictures in Pupil's Book, Board, Pen and books

c) Learning activities

-Ensure all learning resources are available in class.

-Ask learners to explain what relative density is. Give them time to research using their XO.

-Show them pictures of a hydrometer. Explain to them that a densitometer is used to measure density.

-Distribute the materials for Activity 16.7 in their groups.

-Let them follow the steps on Pupil's Book to carry out their experiment on floating and sinking.

-Allow them to discuss the behaviour of different objects in water (floating and sinking) and relative density.

-Ask them to record their findings in their notebooks.

-Let them present their work for marking.

-Analyse the results strengths and weaknesses of individual learners.

16.5. A. Guidance on End unit assessment

The revision activity 16 is in place of end unit assessment

- This part provides the answers of end unit assessment with cross reference to the textbook
- The teacher's guide suggests additional questions and answers to assess the key unit competence.
- Assessment activities are designed in integrative approach to assess the key unit competence with cross reference to the textbook.
- Possible Answers for Revision Activity 16 instead of end unit assessment is used in the student 'book

B. Answers for end unit assessment/Revision activity 16

Possible Answers for Revision Activity 16

1. Metals and Non-metals

2. - They are poor conductors of both heat and electricity.
   - Most of them have a dull appearance.
   - They are soft and break easily.

3.

(a)	Spoon	Steel / Iron

(b)	Rwandan 100 franc coin	Copper
(c)	Electric wire	Copper
(d)	Iron sheets	Iron
(e)	Diamond necklace	Diamond

4.

• Conductivity of heat

• Their heaviness

• Their sonorousness

• Their malleability

• Their appearance.

5. • Collect water in a measuring cylinder or marked container.

• Note the initial levels off water in the cylinder. Record it as initial volume of water.

• Tie a piece of thread around the ring.

• Lower the ring gently into the measuring cylinder.

• Note the final levels of water. Record it as a final volume of water.

• Find the volume of ring as follows:

Volume of metal = final volume of water – Initial volume of water

6. (a) density = mass volume

(b) 1000 /50 = 20 kg/m^3

7. Mass = volume × Density = 12 × 10 = 120 g

8. 85 – 63 = 22 cm^3

9. (a) It is used to measure mass of different materials.

(b) kilograms

10. (a) Objects with higher density than water sink and objects with lower density float.

(b) • In making ships Ship have lower density than the water.

• In building parts of aeroplanes.

• Making of swimming and diving equipment.

11. (a) Galvanising is applying a protective zinc coating to iron.

(b) • Painting the iron sheets to prevent corrosion.

• Can apply a protective zinc coating to iron sheets to protect them from rusting

16.6. Additional activities

(a)Remedial Activity

-Let learners collect various materials and classify them as metal and non-metallic

materials.

- Learners to investigate and say aloud the properties of metals.

- Give simple multiple choice questions to test use and maintenance of metals.

- Give and demonstrate simple calculation on density.

Example of questions

1. Natural materials are classified into two (a) _____ (b) _____.

2. _____ is the mass of an object divided by the volume. (weight, density)

3. Objects that have a lower density than water _____ on water. (sink, float)

Answers to Remedial Activities

1. (a) Metals
   (b) non-metals
2. Density
3. Float

(b) Consolidation Activity

-Let learners carry out simple practicals and fill their findings in a table.

- Let learners sit in groups and identify the properties of metals.

- Give learners structured questions and open ended questions for learners to answer correctly.

Example of questions

1. List down five common metals.

2. How do you calculate density?

3. What is the use of gold and silver.

Answers to Consolidation Activities

(a)Remedial Activity

1. (a) Metals

   (b) non-metals

2. Density

3. Float

(b) Consolidation Activity

1. Iron, copper, silver, gold, tin, aluminium

2. When you divide the mass of that substance by its volume M/ V

3. Making jewellery

(c) Extension Activity

- Learners to research and write down reasons for classifying materials into their metallic or non-metallic.

-Learners to research and write down other properties of metals.

-Learners to make a brief summary on properties of metals and their maintenance.

-Using charts, give relatively complete calculations involving density.

Example of questions

1. Define galvanisation.

2. Describe briefly reasons for grouping materials as non-metals and metals.

3. Calculate the density of wood that has a mass of 500 kg and volume of $20m^3$.

Answers to Extension Activities

1. Process of applying protective zinc coating to iron.

2. They are poor conductors of heat and electricity, they are soft, break easily and most have dull appearance.

3. 500 kg /20 m^3 = 25 kg/m^3

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