SCIENCE AND ELEMENTARY TECHNOLOGY (SET)

PRIMARY TWO

(P2)

TEACHER'S GUIDE

Adapted Edition

Kigali, 2022

FOREWORD

Dear teacher,

Rwanda Basic Education Board is honoured to present to you the Primary two 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 knowledgeand 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 youthe 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

ACKNOWLEDGEMENT

I wish to express my appreciation to all the people who played a major role in development of this Primary Two Science and Elementary Technology Teacher's Guide. It would not have been successful without active participation of different education stakeholders.

I owe gratitude to different content developers, translators, illustrators, designers and all other individuals whose efforts in one way or the other contributed to the success of writing of this translated and adapted teacher's guide.

Finally, my word of gratitude goes to the Rwanda Basic Education Board staff particularly those from the Curriculum, Teaching and Learning Resources Department (CTLRD) who were involved in the whole process of writing of this translated teacher's guide.

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 ElementaryTechnology subject. It is designed to accompany Pupil's book and intends to help teachers in the implementation of competence basedcurriculum 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 teachingScience 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 learning materials, 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 knowledgeand 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 learningactivities 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 basedcurriculum 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 safeguarding 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 in order to meet the learning needs of each pupil in the classroom. Also teachermust 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 some thing 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 anddevelopment.
- 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 styles.

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 preferdiscovering 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 learnersacquire 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, demonstrations, asking open-ended 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 questionsand test learner's ideas	Prioritise class questions, 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 more about.... ? 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 themin terms of observa- tions and data	Reporting, group discus- sion, gathering information.	What do you think others might think about 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

Name of the school: ……

Teachers' name: ……..

PART III. UNITS DEVELOPMENT

Unit 1: TOOLS AND MATERIALS USED AT HOME AND AT SCHOOL

1.1 . Key unit competence

To use and keep properly tools used at home and at school

1.2 . Prerequisite

For a learner to understand easily this unit, it is necessary for a learner to have prior knowledge on the names of tools and materials used at home and schools very well.

1.3. Introductory activity and guidance

Guidance on the introductory activity:

- Ask learners to look at the pictures on page 1 of the student's book and observe what is going on

-Ask them questions 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

Possible questions are:

1. Mention some of the materials and tools you observed from the picture.
2. What are the uses of various tools and materials used at home and at school?
3. How can you maintain properly materials used at home and at school?

Answers to the possible questions:

1. Hoe, books, wheel barrow, jerry can, mattock, baskets, Dustin, mortar, pestle
2. Plates are utensils used for eating;

- Saucepans, cooking pots are utensils used for cooking;

-Folks, spoons are utensils used for eating;

- Cups are utensils used for drinking;

-Dishes are utensils used for keeping food.

- Mortar and pestle are utensils used for pounding;

-Charcoal stove and modern cooker are utensils used for preparing food. Home cleaning

3. –Washing them, cleaning them, hanging them on walls, keeping them in cupboards, keeping them in a store

1.4. List of lessons

#	Lesson title	Learning objectives	Number of periods:17

1	Kitchen and dining materials	- Explain the use of various kitchen and dining materials	2
2	Home cleaning materials	-Suggest the cleaning materials	2
3	Agriculture tools	- State examples of agricultural tools	2
4	Home storing materials	-Mention examples of storing tools	2
5	Bedroom materials	Mention bedroom materials	1
6	Living room materials	Mention various living room materials	1
7	Proper keeping and maintaining home materials and tools	Practice the maintenance of home material and tools	2
8	School materials and their uses	– Explain the uses of various toolsand materials used at school	2
9	Proper keeping and maintaining school materials	Explain the proper ways of maintaining school materials	2
10	End unit Assessment		1

Pedagogical approach for every lesson

1.4.1. Kitchen and dining materials

a) Learning objectives

-Mention the examples of kitchen and dining materials

-Explain the use of various kitchen and dining materials

b) Teaching resources

-variety of kitchen and dining materials

Charts

c) Learning activities

-Ask learners to bring different domestic tools and materials from their homes and compare with those given in the picture of the student's book on page 2

- Lead them to a school dining hall or room for them to see tools used in dining room
- Guide learners to observe pictures on page 2 of the pupil's book
- Support them to identify kitchen and dining materials.
- Guide them to group into kitchen and dining materials and make presentation to class.
- Support them to explain the uses of kitchen and dining materials they observe in the activity.

Lesson assessment and conclusion

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

Answers to the activity 1.1 on page 2 of pupil's book

Question number 2

-Plates are utensils used for eating;

- Saucepans, cooking pots are utensils used for cooking;

-Folks, spoons are utensils used for eating;

- Cups are utensils used for drinking;

-Dishes are utensils used for keeping food.

- Mortar and pestle are utensils used for pounding;

-Charcoal stove and modern cooker are utensils used for preparing food. Home cleaning materials

1.4.2. Home cleaning materials

a) Learning objectives

Suggest the cleaning materials

b) Teaching resources

Mopping stick, water, buckets, broom, dustbin, sanitary towels, soap

c) Learning activities

-Explaining the importance of home materials used for cleaning

-Ask all learners to look at activity 2 given on page 3 of the pupil's book to observe and name home materials used for cleaning

-Support them to make presentation to class.

-Encourage them to mention more which might not be in the picture

Lesson assessment and conclusion

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

Answers to the activity 1.2 on page 3 question number two in the pupils book

A broom is used for sweeping in the house and the compound;

• **A dustbin** is used for collecting rubbish swept/picked;

• **A mopping** rag is used for cleaning cement floors using water;

• **Sanitary towels** are used for cleaning window glasses, doors and home utensils;

• **Soap** is used when cleaning or washing home materials or bathing using water.

1.4.3. Agricultural tools

a) Learning objectives.

Identify the agricultural tools and state their uses

b) Teaching resources

-Charts showing agricultural tools

-Real agricultural tools

c) Learning activities

- Identifying agricultural tools and their uses

-Ask all learners to look at activity 3 given on page 5 of the pupil's book to observe and name agricultural tools

-Support them to make presentation to class.

-Encourage them to mention more which might not be in the picture

-Allow them to demonstrate on how to use some agricultural tools

Lesson assessment and conclusion

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

Answers to the activity 3 question 2 and 3 on page 4 and 5 of the pupils book

2. They are used in the garden(farming)
3. A hoe is used for digging soil/land;

A forked hoe is used for digging in dry and hard soils;

A hoe dug planter mattock is used to dig in rocky soils;

A ridging hoe is used for sowing seeds like beans;

A wheelbarrow is used to collect or carry crops, rubbish or waste materials;

An axe is used for cutting big trees and splitting firewood;
A slasher is used for slashing

1.4.4. Home storing materials

a) Learning objectives

Mention examples of storing tools

b) Teaching resources

Charts showing storing tools
Real storing tools

c) Learning activities

-Identifying home storing materials and their uses
-Ask all learners to look at activity 4 given on page 6 of the pupil's book to observe , name, and state the importance of home storing tools
-Support them to make presentation to class.
-Encourage them to mention more which might not be in the picture

Lesson assessment and conclusion

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

Answers to the activity 1.4 question number two on page 6 of the pupils book

A cupboard is used to keep different materials: plates, dishes, books and others.
A woven basket is used to keep dry foods or grains or seeds e.g. (beans, sorghum or maize.
A basket is used to keep dry foods or grains, seeds e.g. (beans, sorghum or maize...) or other small materials like jelly bottles, pullers, hair lifter e
A refrigerator/fridge used to keep or preserve drinks/food

1.4.5 Bedroom materials

a) Learning objectives.

Mention bedroom materials

b) Teaching resources.

Chart showing bedroom
Video showing different bedrooms

c) Learning activities.

- Ask all learners to look at activity 5 given on page 7 of the pupil's book to observe, name bedroom materials
-Support them to make presentation to class.
-Encourage them to mention more which might not be in the picture

-Support them to master the uses of bedrooms

Lesson assessment and conclusion

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

Answers to the activity 1.5 question number two on page 7 of the pupils book

A bed is an object for sleeping on

• **Bed sheets** are cloth materials laid on the bed to sleep on

• **A mosquito net** for covering the bed, used to protect a sleeping person from mosquitoes and other insect

• **A mattress** is an object put on the bed to sleep on

• **A blanket** is a cloth used to cover a sleeping person to protect him/her from cold

1.4.6. Living room materials.

a) Learning objectives

Mention various living room materials

b) Teaching resources

Chart showing materials in a living room

Television, couch, radio,

c) Learning activities

-Ask all learners to look at activity 6 given on page 8 of the pupil's book to observe, name materials in a living room

-Support them to make presentation to class.

-Encourage them to mention more which might not be in the picture

-Support them to master the uses of materials in a living room

Lesson assessment and conclusion

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

Answers to the activity 1.6 question number two on page 8 of the pupils book

Chairs/couch are the seats in a living room;

- **A living room table** is used to place on living room materials;
- **A television** is used for watching news, films and music
- **A radio** is used to listen to news and music in sitting room;
- **A mat** or a carpet is a decoration in the sitting room.

1.4.7. Proper keeping and maintaining home materials and tools

a) Learning objectives

Practice the maintenance of home material and tools

b) Teaching resources

Charts showing different materials being cleaned

c) Learning activities

Step 1. Guide the learners to do the activity 7 page 9 and 10 of the pupil's book

- Support them to make presentation to class.
- Encourage them to mention more which might not be in the picture
- Support them to master ways of maintaining materials and tools used at home

Lesson assessment and conclusion

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

Answers to the activity 1.7 question number 2 , 3, and 5 on page 9 to 10 of the pupils book

2. Cooking pot, clothes, plates, cups, saucepan
3. Washing, wiping, cleaning, greasing, and ironing them.
4. We clean home materials to prevent diseases.

1.4.8. School materials and their uses

a) Learning objectives

Explain the uses of various tools and materials used at school

b) Teaching resources

Note board, paper, white board, pen and pencils

c) Learning activities

- Guide learners to do activity 8 on pupils book page 11 and 12
- Support them to observe and mention school materials and their uses
- guide them to make presentation to class

Lesson assessment and conclusion

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

Possible answers from the discussion on activity 8 page 11 to 12

-**A notebook** is a material used to write in using a pen or pencil

-**A paper** is a material to write on using a pen or a pencil;

-**A white board** is also a material used to write on using a colored marker

-**A chalk board** is a material used to write on using chalk

-**A pen** or **pencil** is a material used to write on paper or note book

1.4.9. Proper keeping and maintaining school materials

a) Learning objectives

Explain the proper ways of maintaining school materials

b) Teaching resources

Charts showing ways of maintaining school materials

c) Learning activities

Activity: keeping /storing school materials on page 14 to 15 of the pupils book

- Ask the learners to do the activity on page 13 of the pupil's book
- Guide them to observe and make discussion in their small groups**.**
- Support them to make presentation to class.

Activity: Maintaining school materials

- Ask learners to observe the picture and discuss what is taking place in the picture
- Guide learners to form small groups to discuss on ways of maintaining school materials
-Support them to make presentation to class.

Lesson assessment and conclusion

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

1.5 Additional Information for the teacher

More agricultural tools.

-wheelbarrow, watering can, spade, axe, machete, milking can, hoe, mattock, spading fork, secateurs

1.6. End unit assessment

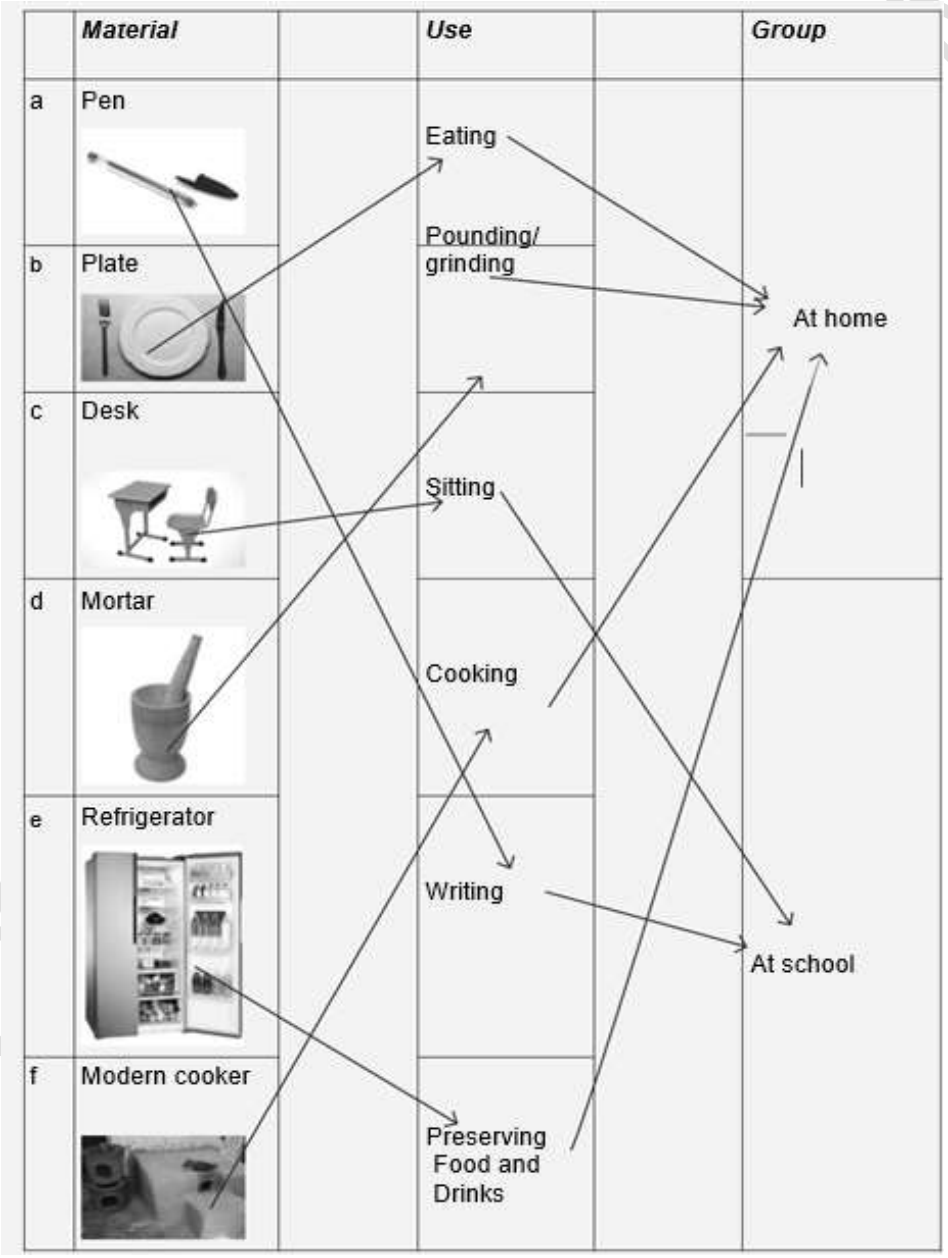
. A. **Guidance to end unit assessment/unit review exercises**

- The end unit assessment is on Page **16 to 17**…of Pupil's book
- 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 to End of Unit Assessment 1**

Question 1

It is answered from the pupil's exercise book by every pupil. Each pupil writesdown the names of materials shown in the table then matches materials withits use(s) and where they are used



Question 2

Each learner will show a material he/she has cleaned/kept properly. (Wrappedexercise book, cleaned plate and handkerchief washed). For the teacher to know whether the task has been accomplished well, he should not concentrateon how well the book has been covered, but instead should check on whetherall necessary steps have been followed by all learners. The same applies to washing of plates and handkerchief

Question 3

A map hanging in classroom, when it gets dirty, I bring it down, wash it withwater and soap then dry it. **False.**

Worn out books; we throw them away or burn them to ashes because they aretoo dirty. **False.**

When cleaning a hoe, I must wash it with water then dry it to avoid rusting.
True.

1.7. Additional activities

1.7.1. Remedial Activities:

1. Give two examples of materials used at home

Answer/ cup and plate

2. Give two examples of materials used at school

Answer/ pen and book

1.7.2. Consolidation activities:

2 Give 3 categories of home materials based on their uses

Answer/, Cleaning, agricultural (garden) and cooking materials.

3. List five school tools/materials

Answer/ Duster, cupboard, chalk, books, note book.

4. State 2 most important materials that are used to cleanhome materials.

Answer/ water and soap

1.7.3. Extended activities:

1. List down various categories of School materials

Answers / School materials include: Writing materials, Drawing Materials, Reading Materials, Storage materials,Time telling materials and cleaning materials.

2. List down various categories of home utensils and tools

Answer/ Home utensils and tools include:

Agricultural (garden) tools, Kitchen utensils, dining utensils,Sitting/living room materials and Bedroom materials

Unit 2: TOYS, VARIOUS MATERIALS, TEACHING AND LEARNING AIDS

2.1. Key unit competence

To make toys, various materials, teaching and learning aids

2.2. Prerequisite

.Learners will learn this unit better if they remember and mention various toys and sculptures used at home and at school

2.3. Introductory activity and guidance

Guidance on the introductory activity

-Start by reading the scenario in the introductory activity to the learners.
-Ask them the first question and allow them to think and suggest the answers
-Continue to ask other possible probing questions to learners until they discover and predict what they are going to study

2.4.List of lessons

#	Lesson title	Learning objectives	Number of periods: 16
1	Making a toy bird using paper	To make a toy bird using papers.	2
2	Making square using paper	To make a square and a rectangle using papers	1
3	Making rectangle using paper	To make a square and arectangle using papers	1
4	Making a toy car using sorghum sticks	To make a toy car usingsorghum sticks/straws	3
5	Making an airplane toy using an empty plastic bottle	To make an airplane toy using an empty plastic bottle	2

6	Making a wall clock to hang in class room using hard papers	To make a wall clock toyusing a hard paper	2
7	Moulding a goat sculpture	To model goat sculpture usingclay soil.	2
8	Moulding a bird sculpture using clay soil	To model a bird sculpture using clay	2
9	End unit assessment		1

Pedagogical approach for each every lesson

2.4.1. Making a toy bird using paper

a) Learning objectives

To make a toy bird using papers.

b) Teaching resources

Pair of scissors, razor blade, papers,

c) Learning activities

-Provide learners with pair of scissor to make a toy bird of their own choice

- Move around to monitor, guide and answer some oral questions which they may posse

- Guide the learners to follow the steps given in Activities 1 given on pages 19 of the Pupil's book and make a toy bird

-after let the learners display their made toy bird in their classes

-Ask them to reward the best made toy bird

Lesson assessment and conclusion

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

2.4.2. Making square using paper.

a) Learning objectives.

To make a square using papers.

b) Teaching resources

- Pair of scissors, razor blade, papers, pencil, and ruler.

c) Learning activities

-Ask all the learners to read Activity 2 given on pages 19 of the Pupil's book to understand the procedure of making a square from a paper.

-Provide a rectangular sheet of paper and a pair of scissors to each learner and ask them to carry out the activity individually. The pair of scissors may be used one by one in rotation.

-Support them to follow the steps of making a square and display after making

-Ask them to reward the best made square.

Lesson assessment and conclusion

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

2.4.3. Making rectangle using paper

a) Learning objectives

To make a square and arectangle using papers

b) Teaching resources

- Pair of scissors, razor blade, papers, ruler, and pencils

- Learning activities

-Ask all the learners to read Activity 2 given on pages 19 of the Pupil's book to understand the procedure of making a rectangle from a paper.

-Provide a rectangular sheet of paper and a pair of scissors to each learner and ask them to carry out the activity individually. The pair of scissors may be used one by one in rotation-

–Support them to follow the steps of making a rectangle.

-After let the learners display their made rectangle in their classes.

Lesson assessment and conclusion

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

2.4.4. Making a toy car using sorghum sticks

a)Learning objectives

To make a toy car using sorghum sticks/straws

b)Teaching resources

Sorghum sticks or straws, hard sticks, masking tape, bottle tops and iron rod.

c) Learning activities

-Provide learners with sorghum sticks or straw to make a toy car of their of their own choice

-Move around to monitor, guide and answer some oral questions which learners may posse

-Guide them on how to make a toy car following the procedure given on pages 21 to 22 of the Pupil's book.

-After let the learners display their made toy car in their classes

-Ask them to reward the best made toy car

-Provide the project work to the learners to continue perfecting on how to make a toy car

Lesson assessment and conclusion

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

2.4.5. Making an airplane toy using an empty plastic bottle

a) Learning objectives

To make an airplane toy using an empty plastic bottle

b) Teaching resources

Razor blade, empty plastic bottle, long stick/wire, nail.

c) Learning activities

-Ask all the learners to read Activity 4 given on pages 23–24 of the Pupil's book to understand the procedure of making an airplane toy using an empty plastics bottle

-Provide Razor blade, empty plastic bottle, long stick/wire, nail to each learner and ask them to carry out the activity individually.

–Guide them to follow steps given on page 23 to 24 of the pupil's book

- Encourage them to display their work to the rest of the classmates.

Lesson assessment and conclusion

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

2.4.6. Making a wall clock to hang in class room using hard papers

a) Learning objectives

To make a wall clock toyusing a hard paper

b) Teaching resources

Pair of scissors, box, stick/nail, pen, hard paper, iron rod

c**) Learning activities**

-Ask all the learners to read Activity 4 given on pages 24-25 of the Pupil's book to understand the procedure of making wall clock using hard paper

-Provide pair of scissors, box, stick/nail, pen, hard paper to each learner and ask them to carry out the activity individually.

-Guide them to follow steps given on page 24 to 25 of the pupil's book

- Encourage them to display their work to the rest of the classmates.

Lesson assessment and conclusion

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

2.4.7. Moulding a goat sculpture

a) Learning objectives

To model goat sculpture using clay soil.

b) Teaching resources

Clay and fine sand, water

c) Learning activities

-Provide learners with clay soil, fine sand and water to model a goat of their own choice

-Move around to monitor, guide and answer some oral questions which learners may posse

-Guide them on how to make a goat using clay following the procedure given on pages 26-27 of the Pupil's book.

-After the activity, let the learners display their made goat in their classes

-Ask them to reward the best made goat

Lesson assessment and conclusion

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

2.4.8. Moulding a bird sculpture using clay soil

a) Learning objectives

To model bird sculpture using clay soil.

b) Teaching resources

Clay and fine sand, water

c) **Learning activities**

-Provide learners with clay soil, fine sand and water to model a bird of their own choice

-Move around to monitor, guide and answer some oral questions which learners may posse

-Guide them on how to make a goat using clay following the procedure given on pages 27 of the Pupil's book.

-After the activity, let the learners display their made work in their classes
-Ask them to reward the best made bird

Lesson assessment and conclusion

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

2.5 . Additional Information for the teacher

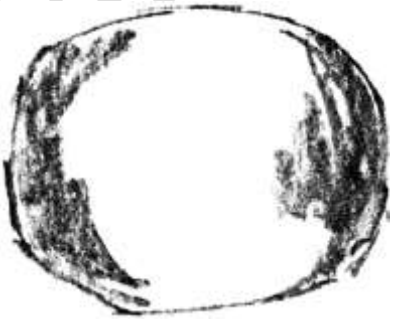
Activity A-1

Aim: Making a clay bird

You will need: clay, water and a toothpick

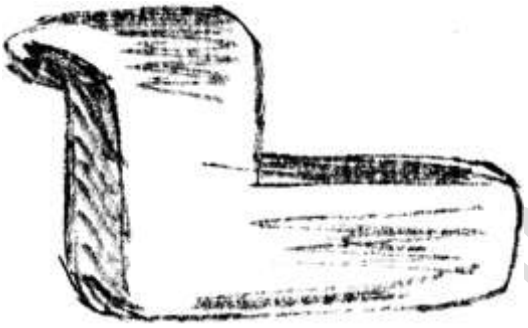
Procedure

1. Start with a ball or an egg-shaped lump of clay, modelling it with the palms of the hands.



2. Model in a solid mass with no detail.

1. Shape the clay into a bird like this.



2. Now, make head, wings and tail.

In the same way, the learners can make models of various animals like a dog.

WEB LINKS FOR CONTENT ENRICHMENT

http://www.wikihow.com/Make-Clay-Dolls

https://books.google.co.in/

2.6. End unit assessment

. A. **Guidance to end unit assessment/unit review exercises**

- The end unit assessment is on Page **29 of** Pupil's book
- 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 to End Unit Assessment 2**

1. All lessons in this unit (toys, different materials, learning aids)

require basic practical skills, because at the end of every lesson, every learner must be able to show his/ her toy made by him/herself, following the steps given by the teacher.

The first question requires each learner on his or her own to make abeautiful toy or material. Therefore, a teacher must observe whether;

- Every toy looks like the one that the teacher wants,
- Every toy has been made following the steps given by the teacher during the lesson time,
- The learner should take into consideration cautions and instructions most especially on safety precautions, against objects that may cut and harm them during the course of preparing those toys.

In the activities below, each learner will choose any two questions of

his/her choice, and answer them:

a) Make a toy bird using papers.

b) Cut a hard paper and make (a) a square, (b) a rectangle.

c) Make an airplane toy using sorghum sticks and papers.

d) Make a wall clock toy to hang in your classroom using hard papers (box materials).

2. Fill in the gaps with the correct word given below to complete the sentence (sand, plastic, square, and knife.)

a) When preparing clay to model toys, you mix clay, Sand and water up to the level that they are fully kneaded.

b) A plastic bottle can be used to make an airplane toy.

c) When using a pair of scissors, knife or razor blade, we must be careful not to harm ourselves.

d) A square is a four sided figure with four equal sides and four right angles.

2.7 . Additional activities

A. **Remedial Activities**:

1. What type of soil is used for making some of the kitchenutensils like cup, plates, pot? **Answer**/ Clay soil.
2. Give an example of a toy **Answer**/ bird sculpture

B. **Consolidation activities**:

1. Give at least 3 examples of materials that can be used to maketoys **Answer/** Plastics, papers, sticks

2. How do we call an activity of beautifying our house?
   Answer/Decoration

3. Give an example of soil type used in building of a house?
   Answers / Sand

C. Extended activities:

State the name of the toys that you can make from each of the followingmaterial

	Materials	**Answer**
A	Paper	Airplane toy
B	Dry banana fibers	Playing ball, a doll
C	Dry sorghum stick	Puppet, glasses.
D	Hard paper box	A toy car
E	Clay soil	A cow and a house

UNIT 3: COMPUTER MY FRIEND

3.1. Key unit competence

To differentiate the key parts of the computer and use appropriately the computer.

3.2. Prerequisites

For the learners to learn and understand effectively this unit, the teacher should be more practical and should try to engage learners into practical lessons. Learners should be given enough time to do more practice on the computer.This therefore requires a teacher to have enough computer application skills so that learners can get enough practical skills, attitudes and values as far as science and technology is concerned.

3.3. Introductory activity

Guidance on the introductory activity

- Ask learners to observe each one of the pictures in student's books page 30 and request each students to think about naming the main parts of computer, their uses and how to take care while using at school and at home of device displayed in picture.
- By brainstorming learners give the main parts of computer, their usages for each parts of computer and how to maintain it while using at school and at home. Finally, learners predict what they are going to learn in the unit.

Answers to introductory activity

1. The uses of the external parts of a computer are the following:
 1. **Screen/monitor**: Used for reading text or display pictures from the computer.
 2. **Antenna**: They are two and they connect a computer to the internet.
3. **Keyboard:** Part of a computer that helps us to write.
4. **Touch Pad**: Part of a computer where pupils slide their fingers to choose or select information on the computer screen.
 5**. Battery**: Part of a computer that stores electricity used by the computer.
 6. **Charger/Adapter**: A cable that connects a computer to the electricity source.
7. **Computer case:** Part of a computer that covers the internal parts of a computer
2. A computer must be maintained properly in the following ways:
    - Cleaning to remove dust
    - Covering it to avoid dust
    - Putting off after use/shutting down
    - Putting in antivirus
    - Avoid pouring water on it or putting it in rain;
    - Handling it with care to avoid falling down;
    - Avoid putting it in very hot areas;
    - Avoid putting it in a place which is not well ventilated.

3.4. List of lessons

#	Lesson title	Learning objectives	Number of periods:23
1	Main external parts of a computer: (i) XO-Laptop	• Name the external parts of a computer • Identify the external parts of a	3

		computer • Properly take care of computer parts.	
2	Main external parts of a computer: (ii) Usual laptop	• Name the external parts of a computer • Identify the external parts of a computer • Properly take care of computer parts.	2
3	Main external parts of a computer: (iii) Desktop	• Name the external parts of a computer • Identify the external parts of a computer • Properly take care of computer parts.	2
4	Use of main external parts of a computer: XO-Laptop	• Explain the functions of computer parts • To put into practice,the strategies for avoiding dangers caused by improperuse of computers • Show curiosity touse a computer.	4
5	Switching on and off the computer	• To Switch on and off a computer • To put into practice the strategies for avoiding dangers caused by improper use of computers • Properly take care of computer parts.	4
6	Proper ways of maintaining a computer	• Explain howto maintain a computer and the health habits to its user. • To follow the proper instructions while using a computer and after using it. • Properly take care of computer parts.	2

7	Proper sitting position when using computer	• Explain how to maintain a computer and the health habits to its user. • To follow the proper instructions while using a computer and after using it. • Display a sense of awareness of the dangers associated with using computers plugged to an electrical power source.	2
8	Danger of improper sitting when using a computer	• Explain howto maintain a computer and the health habits to its user. • To put into practice the strategies for avoiding dangers caused by improper use of computers • Display a senseof awareness of the dangers associated with using computers plugged to an electrical power source.	2
9	End unit Assessment		2

Pedagogical approach of every lesson

3.4.1. Main external parts of a computer: -XO-Laptop

a) Learning objectives

- Name the external parts of a computer
- Identify the external parts of a computer
- Properly take care of computer parts.

b) Teaching resources

Xo-laptop, Desktop computer, laptop, pictures of different types of computers, chalks, pens and textbooks.

c) Learning activities

Activity 1 (Refer to page 31)

- Prepare sufficient teaching and learning materials to help learners to name and identify main external parts of XO-laptop.
- At the beginning of the lesson, observe pictures showing the main parts of xo-laptop.

- Guide learners when working on activities or group work to identify main parts of XO-laptop.
- Give the learners instructions to follow when observing, identifying, and explaining what they have discovered on a main parts of xo-laptop.
- Complete learner's ideas and explanations if given unfinished or unclear and help them formulate using the right expressions, so that, they can be completely sure and confident when sharing.

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.

3.4.2. Main external parts of a computer: - Laptop

a. Learning objectives

- Name the external parts of a computer
- Identify the external parts of a computer
- Properly take care of computer parts.

b. Teaching resources

Xo-laptop, Desktop computer, laptop, pictures of different types of computers, chalks, pens and textbooks.

c) Learning activities

- Prepare sufficient teaching and learning materials to help learners to name and identify main external parts of laptop.
- At the beginning of the lesson, observe pictures showing the main parts of laptop.
- Guide learners when working on activities or group work to identify main parts of laptop.
- Give the learners instructions to follow when observing, identifying, and explaining what they have discovered on a main parts of laptop.
- Complete learner's ideas and explanations if given unfinished or unclear and help them formulate using the right expressions, so that, they can be completely sure and confident when sharing.

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.

3.4.3. Main external parts of a computer: -Desktop

a) Learning objectives

- Name the external parts of a computer
- Identify the external parts of a computer
- Properly take care of computer parts.

b) Teaching resources

Xo-laptop, Desktop computer, laptop, pictures of different types of computers, chalks, pens and textbooks.

c) Learning activities

- Prepare sufficient teaching and learning materials to help learners to name and identify main external parts of desktop.
- At the beginning of the lesson, observe pictures showing the main parts of desktop.
- Guide learners when working on activities or group work to identify main parts of desktop.
- Give the learners instructions to follow when observing, identifying, and explaining what they have discovered on a main parts of desktop.
- Complete learner's ideas and explanations if given unfinished or unclear and help them formulate using the right expressions, so that, they can be completely sure and confident when sharing.

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.

3.4.4. Use of main external parts of a computer: XO-Laptop

a) Learning objectives

- Explain the functions of computer parts
- To put into practice, the strategies for avoiding dangers caused by improper use of computers
- Show curiosity to use a computer.

b) Teaching resources

Xo-laptop, Desktop computer, laptop, pictures of different types of computers, chalks, pens and textbooks.

c) Learning activities

Activity 2 (Reference page 33)

- Helps the learners to observe the main external parts of computer as shown on student's book page 33.

-Prepare sufficient teaching and learning materials to help learners to name and identify main external parts and their uses.

- Form groups of 5-6 pupils to discuss on the pictures on pages 33 student book.

-Ask learners in their groups, questions to help them to states main external parts of computer and their uses.

-Helps the learner to discover the uses of main parts of computer.

-Give them time to discuss on the questions in their groups.

-After discussions about the asked questions and sharing ideas, give your comments and

corrections.

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.

3.4.5. Switching on and off the computer

a) Learning objectives

- To Switch on and off a computer
- To put into practice, the strategies for avoiding dangers caused by improper use of computers
- Properly take care of computer parts.

b) Teaching resources

Xo-laptop, Desktop computer, laptop, pictures of different types of computers, chalks, pens and textbooks.

c) Learning activities

-Guide learners to follow the steps on switching on and off the xo-laptop and desktop computer:

Switch ON computer

Desktop computer

Step1: Switch ON the main power supply.
Step 2: Switch ON the Uninterruptible Power Supply (UPS) .
Step3: Switch ON the power button of the system unit.
Step4: switch on the monitor

XO-laptop

1.Push the power button to turn on the laptop.

Switch OFF computer

Desktop and Laptop

Step1: Click on the Start button. A menu appears on the screen.
step2: In the right pane of the menu, click on the button. Wait till the computer shuts up.
Step3: Switch OFF the UPS.
Step4: Switch OFF the main power supply.

XO-laptop

Step1: Hover over the xo icon in the centre of the home view.
Step2: A menu appears.
Step3: Choose the shutdown option.

- Complete learner's ideas and explanations if given unfinished or unclear and help them formulate using the right expressions, so that, they can be completely sure and confident when sharing.

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.

3.4.6. Proper ways of maintaining a computer

a) Learning objectives

- Explain howto maintain a computer and the health habits to its user.
- To follow the proper instructions while using a computer and after using it.
- Properly take care of computer parts.

b) Teaching resources

Xo-laptop, Desktop computer, laptop, pictures of different types of computers, chalks, pens and textbooks.

c) Learning activities

- Puts learners in groups of 4-5. He/she tasks learners to critically observe pictures under activity 3 on page 35 in the Pupil's book (Science and Elementary Technology Primary Two).
- Asks learners in their groups to identify a pupil who is maintaining or cleaning computer properly while cleaning and materials used to clean computer (Pictures on page 35 on student book).
- Challenges learners in their groups to discuss in defence or give reasons to defend their answers.
- Learners display and present their findings to the whole class as their teacher leads the harmonization process.
- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

3.4.7. Proper sitting position when using computer

a) Learning objectives

- Explain how to maintain a computer and the health habits to its user.
- To follow the proper instructions while using a computer and after using it.
- Display a sense of awareness of the dangers associated with using computers plugged to an electrical power source.

b) Teaching resources

Xo-laptop, Desktop computer, laptop, pictures of different learners using computers, chalks, pens and textbooks, projectors, blackboard.

c) Learning activities

- Puts learners in groups of 4. He/she tasks learners to critically observe pictures under subheading 3.4 on page 36 in the Pupil's book (Science and Elementary Technology Primary Two).
- Asks learners in their groups to identify a pupil who is seated properly when using a computer (Pictures under subheading 3.4)

- Challenges learners in their groups to discuss in defence or give reasons to defend their answers.
- Learners display and present their findings to the whole class as their teacher leads the harmonization process.
- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

3.4.8. Danger of improper sitting when using a computer

a) Learning objectives

- Explain how to maintain a computer and the health habits to its user.
- To put into practice, the strategies for avoiding dangers caused by improper use of computers
- Display a senseof awareness of the dangers associated with using computers plugged to an electrical power source.

b) Teaching resources

Xo-laptop, Desktop computer, laptop, pictures of different learners using computers, chalks, pens and textbooks, projectors, blackboard.

c) Learning activities

- Helps the learners to observe the pictures of the learners take poor standing posture as shown on student's book page 38.

- Puts learners in groups of 5. He/she tasks learners to critically observe pictures under sub heading 3.5 on page 38 in the Pupil's book

- Asks learners in their groups to identify a pupil who is stand properly (Pictures under sub heading 3.5 on page 38)

-Ask learners in their groups, questions to help them to states the dangers of poor sitting posture while using computer.

-Helps the learner to discover the dangers of using improper sitting posture while using computer.

-Give them time to discuss on the questions in their groups.

-After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

3.5. Additional content of student and teacher

Most important external elements of a computer

Below is a list of the most well-known and important external elements of a computer.

1- Case

The computer case or box is the device on which the computer's motherboard is installed. Without this, the computer could not function. There are vertical and horizontal boxes.

2- Monitor

The monitor is a peripheral information output device. It is a peripheral element since it allows the communication between the user and the equipment. It is output because it materializes on the screen the information that is processed in the computer.

The monitor operates with a series of dots that are illuminated according to a binary encoding matrix. To control this system, a video card, which is an internal part of the computer, is used.

3- Keyboard

The keyboard is the computer's most important peripheral input device. It is input because it allows you to enter information into the computer.

This device consists of a series of keys and a microprocessor that transmits the information from the keyboard to the central processor of the computer.

Desktops typically have 101-key keyboards, but laptops in some cases have fewer.

Some of the most important keys of these peripheral devices are:

- Alphabetical, in which the letters are arranged.

- The number keys.

- The function keys (F1, F2... F12), which allow to execute operations of easier way.

- Navigation keys, that allow to move in the four directions.

- Escape key.

- Control keys.

- Tabulation.

- Caps lock.

- Shift, which shows the secondary functions of certain keys.

- Alt, which shows other additional functions of the keys.

- Space bar.

- Start, back, forward and end keys, which allow you to scroll up and down a page.

- Enter key.

- Clear key.

4- Mouse

After the keyboard, the mouse is the second most relevant input device on a computer. This reduces the use of the keyboard and makes navigation faster.

At first, the mouse was endowed with a sphere at the bottom. As he moved this sphere against the desk, he moved the mouse cursor on the computer screen.

Subsequently, this system was displaced by infrared technology, which is more efficient. The traditional mouse design consists of two buttons and a rotating disk.

The buttons allow you to select and open option menus, while the bar is used to scroll up and down.

5- Bugles

Horns are peripheral output devices. These allow to amplify the sounds coming from the computer. Some equipment has built-in horns, while others require the installation of external horns.

6- Microphone

The microphone is a peripheral input device. This is responsible for capturing the sounds that are produced around the computer.

Once the sound has been captured, it can be stored on the computer (as a recording), sent to another computer (as a call) or sent to the horns to be amplified.

7- Camera

The camera is a peripheral input device that is responsible for capturing images and videos. Along with the microphone, you can record videos with audio.

Information received by a camera can be stored (in the form of audiovisual recording) or transmitted to another computer (via a video call).

8-Printer

Printers are information output elements. Thanks to these, the data stored by a computer can be captured on paper.

The first printers were of impact and functioned with a technology similar to the one of the typewriters: it was printed letter by letter. However, they were very slow and noisy, so they were displaced.

Currently, the most used printers are thermal and laser printers. Thermal printers work thanks to rollers that get wet with a mixture of ink and wax.

Subsequently, the roller passes through the paper and forms the information. Black and white thermal printers use a single roller, while color printers have three (one for each primary color).

For their part, laser printers work with toner (a kind of powder), photoconductive rollers and laser beams. These printers are the fastest and most efficient on the market.

9- Scanner

The scanner is an information entry system. This works like a photocopier, because it reads an image and produces a copy of it. The difference is that the produced copy is digital and is stored in the computer's memory.

This device consists of two essential elements: an optical system and an analog-digital converter. The optical system is responsible for studying the image to be scanned, determining the colors and tones present on the page.

The information provided by the optical system is analyzed by the analog-digital converter. This transforms this data to the binary system, so that the computer can interpret and store the image.

Correct sitting position

The correct sitting position is the posture in which you hold your sit or use ergonomic furniture to keep the bones and joints in the correct alignment. This helps in decreasing abnormal wearing of joint surfaces as well as reduce stress, backache, eye strain and fatigue. Good sitting position requires a table to be of the right height relative to the chair to provide comfortable hand positioning as shown in Figure 3.2. The seat should have an upright backrest and should be high enough to allow the eyes of the user to be level with the top of the screen

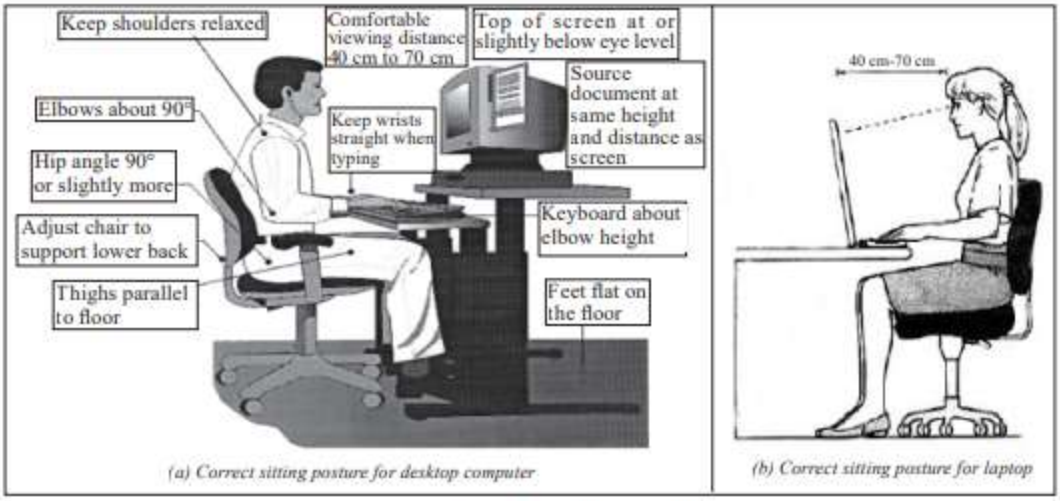


Fig 3.2: Correct sitting position

3.6. End unit assessment

a. Guidance on End unit assessment

- **The end unit assessment is at Page 39.**

- Request learners to answer all questions of the "**End unit assessment"** 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. Parts of a computer shown in the pupil's book:
   a) "Screen/monitor"
   b) Charger
   c) Key board
   d) "Touch Pad"
2. Use or function of each part of a computer mentioned above;
   a) Screen/monitor: Part of a computer where we read or display pictures on the computer.
   b) Charger: A cable that feeds power to the computer connected to

electrical extension cable / socket.

c) Keyboard: part of a computer that is used to write.

d) Touch Pad: Part of a computer used to select and search information from the computer screen by sliding a finger on it.

3. Ways of keeping a computer properly so that it does not get destroyed.

After using a computer, after the lesson, a learner is asked to wipe it off dust or dirt, shut it down, handling it with care as she/ he carries it to the place where it should be kept or any other place designed and prepared tokeep computer safe.

4. Showing proper the way of sitting when using a computer and giving explanation/reasons why, you must sit that way;

Every learner sits before his/her computer placed before him/her on the top of the desk, and then shows the proper way eyes, back, feet, fingers, are supposed to be when using a computer and give reasons why so.

Sitting well, when using a computer, keeps us free from eye problems, backache, fatigue and others…

3.7. Additional activities

3.7.1. Remedial Activities

Question

1.List the main external parts of a computer

Answer

The main external parts of a computer are screen/monitor, antenna,keyboard, touchpad, battery, charger/adapter, computer case

3.7.2. Consolidation activities

Questions

1) What are the uses of the main external parts of a computer?
2) Sit in front of a computer in order to show to your classmate, teacher or parent the right sitting posture while using a computer

Answers

1. Refer to the pupil's book in the corresponding unit and section

2. Learners sit properly as shown in the pupil's book

3.7.3. Extended activities

Questions

1) Plug your computer to a power source using the computer charger.

2) Why is it bad?
   a) To pour water on a computer?

b) To drop a computer down?

Answers: Learners give their answers and the teacher listens to them in order to supplement incomplete ones.

UNIT 4: AIR AND WIND

4.1. Key unit competence

To recognize the presence of air and explain its characteristics, importance, differentiating types of wind, effects and how to prevent its dangers.

4.2. Prerequisite

There is no previous lesson related to this new one, Air and Wind. As a teacher begin this lesson by asking questions to learners:
-To put their hand near their nose and ask what they fill/**Answer:** We fill air.
-Where this air from? / **Answer**: air is in the class and ourselves.
-Is air only in the class? **Answe**r: Even outside there is air.
Teacher: Air is around us. Without air we cannot respire. Air is everywhere.
-Ask learners to switch off a candle which is switched on.
-Why the candle is switched off? / **Answer:** Air in movement on the flame.
What are we going to learn today?

4.3. Introductory activity and guidance

Guidance on the introductory activity
-Ask learners to observe the picture and describe what is happening on the images a), b), c), d) and e).
- Let learners discuss the findings from colleagues.
-Guide learners to predict what they are going to learn.

4.4. List of lessons/sub-heading

#	Lesson title	Learning objectives	Number of periods
1	Main characteristics of air	-To discover the presence of air -Identify and explain the characteristics of air	2
2	Importance of air: Oxygen	-To list the importance of oxygen in daily life	4
3	Relationship between air and wind	-To explain the relationship between Air and Wind	2

4	Types of Wind	-To identify different types of wind	1
5	Advantages and disadvantages of wind	- To explain the importance of air and wind in the environment - To explain the dangers of wind and how to prevent them. - To compare the effects of air and wind on environment	3
6	Measures to prevent dangers of wind	- To list out measures to prevent dangers of wind. - To prevent the dangers of wind in environment (schools, homes, hospitals…)	2
7	**Assessment and remediation**		2

4.4.1. Main characteristics of air

a) Learning objectives

- To discover the presence of air.
- To identify and explain the characteristics of air.

b) Teaching resources

Bicycle pressure pump, an empty transparent bottle, bucket with water, fan or tilator, polythene paper, bicycle tyre or a ball, balloon, etc

c) **Learning activities**

- Read the content in the learners' books and other relevant texts before the lesson.
- Ask learners to carry out activity 1 and to observe what is happening
-Ask learners to report what they discover from the picture.
-Guide learners to find answers given in the book as summary to note in their note book.
- Assess learners' ability to identify and explain the characteristics of air.

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. Importance of air: Oxygen

a) **Learning objectives**

-To list the importance of oxygen in daily life.

b) Teaching resources

Bicycle pressure pump, an empty transparent bottle, candle, glass, football, water, bicycle tyre or a football, balloon, charcoal stove etc

c) Learning activities

- Read the content in the learners' book and other relevant texts before the lesson.
-Ask learners to carry out activity 2 and to observe what is happening
-Ask learners to report what they discover from the picture.
-Guide learners to find answers as there are given in the book as summary.
- Let them write short notes in their notebooks.
-Assess learners' ability to list and demonstrate importance of air.

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.

4.4.3. Relationship between air and wind

a) Learning objectives

-To explain the relationship between Air and Wind.

b) Teaching resources

Table, match boxes

c) Learning activities

- Read the content in the learner's book before the lesson.
-Let learners observe the pictures and carry out activity 3 in groups
- Let them discuss observations obtained from Activity 3.
-Ask learners to give relation between air and wind and define wind.
-Allow learners to write the definition of wind as it is given in the book.

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.

4.4.4. Types of Wind

a) Learning objectives

-To identify different types of wind

b) Teaching resources

-Pictures in the book

c) Learning activities

- Read the content in the Pupil's Book before the lesson.
- Obtain the necessary pictures in the Pupil's Book.
- Let learners to carry out Activity 4 and identify which picture is showing Light wind, Speedy wind, Strong wind and Moderate wind and explain their answers.
- Let them write short notes describing types of wind in their notebooks.

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 of the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarise the content.

4.4.5. Advantages and disadvantages of wind

a) Learning objectives

- To explain the importance of air and wind in the environment

- To explain the dangers of wind.

- To compare the effects of air and wind on environment

b) Teaching resources

-Pictures in the book

c)Learning activities

- Read the content in the Pupil's Book before the lesson.
- Obtain the necessary pictures in the Pupil's Book.
- Let learners to carry out Activity 5 and describe which is happening in the pictures a), b), c) and d.
- Allow them to compare their observations with those written in the Pupil's Book.

- Let them write short notes on advantages and disadvantages of wind.

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 of the lesson, ask again some questions on the performed activities or content learnt to assess the learning and summarise the content.

4.4.6. Measures to prevent dangers of wind

a) Learning objectives

- To list out measures to prevent dangers of wind.
- To prevent the dangers of wind in environment (schools, homes, hospitals…).

b) Teaching resources

-Pictures in the book

c) Learning activities

- Read the content in the Pupil's Book before the lesson.
- Obtain the necessary pictures in the Pupil's Book.
- Let learners to carry out Activity 6 and describe which is happening in the pictures a), b), c) and d and answer the questions asked there.
- Allow them to compare their observations with those written in the Pupil's Book.
- Let them write short notes on measures to prevent dangers of win

4.5. Additional content for student and teacher

4.5.1. Additional content for student

4.5.2. Additional information for the teacher

4.6. End unit assessment and guidance

A. Guidance on 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.

B. Answers for end unit assessment

(Questions are in the pupil's book)

1. Properties/characteristics of air:
   • Air is shapeless
   • Air occupies space and has weight
   • Air has no image
   • Air has no color
   • Air has no smell
2. Types of wind: moderate (breeze), strong (storm) wind, light (slow) wind and speedy wind (cyclone).
   • Moderate (breeze): is the normal wind which is calm and can be seen when tree leaves shake. It also dries clothes.
   • Strong (storm) wind: Is the type of wind which destroys plants, buildings and other surroundings. It can also cause soil erosion.
   • Speedy (cyclone) wind: this is also a type of wind that moves in a circular form picking materials from the ground and it also causes soil erosion. It takes a short time.
   - Light (slow) wind: It is the type of wind which is calm, helps are to burn

   3. Plant trees to protect houses and crops/plants from wind effects.
   4. In the first picture it shows that the air we breathe in classroom, is good while in the second picture, it shows that wind is important because it helps to dry clothes.

4.7. Additional activities

4.7.1. Remedial activities

a) Mention five characteristics of air.

Answers. Air has no image, Air occupies space and has weight, Air has no color, Air has no smell, Air is shapeless.

4.7.2. Consolidation activities

What are the 2 bad effects of wind?

Answer: Wind causes soil erosion, too much wind can also destroy our houses

4.7.3. Extended activities

Mention types of wind and describe each type giving its characteristics.

Answers:

• Breeze: is the normal wind which can be seen when the tree leaves shake.

• Strong: destroys the surroundings and causes soil erosion.

• Speedy wind: blows at a very high speed in a circular form and takes a short time.

• Light wind: it is calm and helps fire to burn.

UNIT 5: SOIL

5.1. Key unit competence

To explain the importance of soil, things that destroy soil and effects of water on soil

5.2. Prerequisite

Unit 2 of primary 1

-Ask learners to list toys they made in primary one last year / unit 2.
-Ask them materials used to make a cow/**Answer:** clay soil.
-Ask them if all soils can be used to make a cow/**Answer:** No.
Teacher: Therefore they are different types of soil. One of them is clay soil.

5.3. Introductory activity and guidance

Guidance on the introductory activity

As a teacher ask learners to read the situation as given in the learner's book:
" In the area where your home is located, places where you go and at your school, there are different physical features. Among them include soil. You may be asking yourself whether all soils are the same, what might be its importance, and what may damage soil or cause it to lose its value and what one can do prevent it from being damaged or lose its value". The essential questions to be answered after this unit are:

• What are the types and uses of soil?
• What can destroy soil and how to prevent them.

-Ask learners to observe the picture and describe what is happening on the images a), b), c), d) e) and f).
- Let them discuss the findings from colleagues.
-Guide learners to predict what they are going to learn.

5.4. List of lessons/sub-heading

#	Lesson title	Learning objectives	Number of periods
1	Types of Soil	Identify types of soil	4
2	The uses of soil	List and explain uses of soil	2
3	Things that destroy soil	List the things that destroy soil	2
4	Effects of water on soil	- List advantages (good effects) and disadvantages (bad effects) of water on soil	2
5	Measures to prevent soil damage	- List measures to prevent soil damage	2
6	**End unit Assessment**		**2**

5.4.1. Types of Soil

a) Learning objectives

To Identify types of soil.

b) Teaching resources

Soil, plastic bottles, water, funnels.

c) **Learning activities**

- Read the content in the learners' books and other relevant texts before the lesson.
-Collect different types of soil, clay soil, sand soil and Loam soil.
-Let learners form group of 5 and give to each the three types of soil.
-Ask each group to carry out activity 1 as it is described in the pictures a), b) and c)
- Put the learners in groups and ask them to perform the experiment described in the activity 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 interpretations on types of soil.
-Guide learners to find answers given in the book as summary to note in their note book.

5.4.2. The uses of soil

a) Learning objectives

To list and explain uses of soil.

b) Teaching resources

Pictures of the learners 'book.

c) Learning activities

- Read the content in the learners' book and other relevant textbooks before the lesson.
- Put the learners in groups and ask them to observe pictures of the activity 2.

- Ask learners to observe the pictures a, b, c, d, e and explain what people are doing.

-Guide learners to find answers as there are given in the book as summary.
- Let them write short notes in their notebooks.
-Assess learners' ability to list and explain uses of soil.

5.4.3. Things that destroy soil

a) Learning objectives

To list the things that destroy soil.

b) Teaching resources

Pictures in learners'book

c) Learning activities

-Read the content in the learner's book and other relevant textbooks before the lesson.

-Ask learners to get pictures in learners'book into their working groups.
-Ask them in their groups look at the pictures a, b, c and d in the activity 3 and describe what is happening in each picture.

-Allow them to share their findings with other groups and let them to discuss their findings.

-Guide learners to find things that can destroy based on their findings.

-Ask them to record the summary in their notebooks.

-Assess learner's to find out if they have understood the lesson.

5.4.4. Effects of water on soil

a) Learning objectives

To list advantages (good effects) and disadvantages (bad effects) of water on soil

b) Teaching resources

Pictures in the learners'book.

c) Learning activities

- Read the content in the learner's book and other relevant books before the lesson.

-Let learners observe the pictures a, b, c and d of the activity 4 in groups.

-Ask them to describe pictures where water is important to the soil and where water damages soil.

- Let them discuss observations obtained from Activity 4.
-Allow learners to write advantages and disadvantages of water on soil.
-Assess learner's to find out if they have understood the lesson.

5.4.5. Measures to prevent soil damage

a) Learning objectives

- To list measures to prevent soil damage

b) Teaching resources

-Pictures in the book

c) Learning activities

- Read the content in the Pupil's Book and other relevant books before the lesson.
-Let learners observe the pictures a and b of the activity 5 in groups and describe what happens in each picture.

- Let them discuss their findings obtained from observations.

- Let them write short notes on advantages and disadvantages of wind in their notebooks.
-Assess learner's to find out if they have understood the lesson.

5.5. Additional content/text for student and teacher

5.5.1. Additional content/text for student
Learning activities, content and application activities (numbering should have logical order with the numbering in the student book)

5.5.2. Additional information for the teacher
This section provides additional content for the teacher to have a deeper understanding of the topic.

5.6. End unit assessment and guidance
A. Guidance on 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.

B. Answers for end unit assessment

(Questions are in the Pupil's book)

1. Soil has 3 major types; clay soil, sand soil and loam soil.
   You differentiate types of soil by making experiments to check their water retention capacity in order to know how long the soil can retain /keep water.

2. Answers to this question;
a) In modelling decorations, we use clay mixed with little fine sand. **True.**
b) When we want to identify the type of soil, we are guided by its smell. **False.**
We use water and observe how faster water penetrates and how long it retains/ holds water.
c) When modelling pots, we use kneaded clay, then dry it and burn it so as to harden it. **False.**

3. Answer **YES** or **NO** in the questions below:
a) When modelling decorations, bricks, and pots we use loam soil. **NO**.
b) Sand soil is the best soil suitable for plant growth. **No.**
c) Soil Erosion is caused by running. **Yes**.

4. Not every soil can be used to construct houses because each type of soil has different capacity to hold and retain water so as to form mud.
Example: Sand soil cannot hold water for a long time, and when it loses water it breaks into pieces.

5. Other things that destroy soil apart from water are; Wind, wastes which do not rot (polythene bags, plastic bottles, metals, glasses,). Wind blow when it is too much, blowing of the top fertile

soil / humus leaving behind infertile soil that is like a desert. Wastes which do not rot destroy soil because they cause poor soil aeration (the penetration of air into soil).
6. The importance of water in soil. Water makes soil soft which enables plants to grow well.

5.7. Additional activities

5.7.1. Remedial activities

1. State at least one type of soil you know.
Answer: Sand Soil, Clay soil, loam soil.
2. Sand soil is the best soil suitable for cultivation of crops and plants. **Answer**/ No

5.7.2. Consolidation activities

1. Outline 3 types of soil.
Answer: Sand Soil, Clay soil, loam soil.
2. Describe the importance of water in soil.
Answer: Water makes soil soft which enables crops/ plants to grow, water also leads to growth of grass and animals get food.
3. State any two examples of wastes which are not good on soil.
Answer: Plastics and bottles.

5.7.3. Extended activities

1. Explain the technique (method) used when we want to know the type of soil.
Answer: We use water and observe how faster water penetrates and how long it retains/ holds water.
2. By giving an example, explain why not every soil can be used to construct houses.
Answer: Because not all soils have the capacity to hold and retain water so as to form mud.
Example: Sand soil cannot hold water for a long time, and when it loses water it breaks into pieces.

UNIT 6: PLANTS

6.1 . Key unit competence

To identify different parts of a plant, their functions and differentiate groupsof plants depending on their uses

6.2 . Prerequisite

In P1, pupils leant types of plants, cultivated and non-cultivated plants. They also saw/touched plants from the environment.

6.3 . Introductory activity and guidance

a) Introductory activity

Look at pictures **a, b, c, d** and **e** in Science and Elementary Technology pupil's book, page 66.

- Describe each one of them.
- Predict what you are going to learn in this unit.

Answer for introductory activity

Letters	a	b	c	d	e
Description of picture	Bean plant and its parts	A class in field trip	Cassava and bean plants	Fruits of coffee plant	Plant of maize

We are going to learn about plants.

b) Guidance on introductory activity

Ask learners to observer the pictures displayed in pupil's book page 66, and request them to identify all those pictures then after, let them predict what they are going to learn in this unit.

6.4 . List of lessons

#	Lesson title	Learning objectives	Number of periods

1	Main parts of the plant	• List parts of a plant • Differentiate allparts of a plant	2
2	Function of main parts of the plant	• Explain the functions of each part of the plant • Display curiosity in differentiating parts of a plant according totheir uses. • Appreciate the use of the plant	2
3	Groups of plants	• Identify groups of plants according to their uses. • Group plants according to their uses.	2
4	Socio economic importance of plants	• List the socio-economic importance of plants • Understanding the useof every plant found in the school area	2
5	Medical importance of plant	• List the medical importance of plants • Understanding the useof every plant found in the school area	2
6	End unit Assessment		2

Teaching approach for each lesson

6.4.1. Main parts of the plant

a) Learning objectives

- List parts of a plant
- Differentiate allparts of a plant

b) Teaching resources

- Samples of whole plant (picked with all parts)
- Chart of plant

c) Learning activities

- Assign learner to read pupil's book page 67 and ask them to respond to questions 1 and 2 activity1.
- Get learners in school garden / compound, ask them to pick whole plant carefully (complete plant).
- Let learner observe the picked complete plant to differentiate its different parts.
- Ask learners to list namely the different parts observed and make presentation of the group work to the rest of the class.
- After all these activities above, all the class concludes on the list of parts that compose a complete plant.

Assessment

Assess their ability to differentiate parts of the plant correctely.

6.4.2. Function of main parts of the plant

a) Learning objectives

- Explain the functions of each part of the plant
- Display curiosity indifferentiating partsof a plant according totheir uses.
- Appreciate the use of the plant

b) Teaching resources

- Images of chart of function of plant
- XO Laptop
- Library textbook

c) Learning activities

- Assign learner to read pupil's book page 67-68 and ask them to respond to questions 3 of activity1
- Let learner observe images of chart of function of plant using XO laptop/computer
- Get learners in working group and ask them to explain the function of each part of plant as observed on the chart, then let them make presentation of the group work to the rest of the class.

Note: *Make sure of your ability to move around and guide where is necessary.*

- After all these activities above, all the class concludes on the function of each part that compose a complete plant.

Assessment

Assess their ability to present ideas logically highlighting the function of parts of a plant

6.4.3 Groups of plants

a) Learning objectives

- Identify groups of plants according to their uses
- Grouping plants according to their uses

b) Teaching resources

- Chart of group of plant according to their uses
- XO Laptop
- Library textbooks

c) Learning activities

- Let learner observe chart of groups of plants using XO laptop/computer
- Get learners in working group and ask them to group the plants according to their uses, then let them make presentation of the group work to the rest of the class.

  Note: *Make sure of your ability to move around and guide where is necessary.*
- Assign learner to read Science and Elementary Technology P2 pupil's book page 68-72, observe pictures **a, b, c, d, e, f, g, h, i,** and **j** and respond to the questions 3 activity 2.
- After all these activities above, allow the whole class to conclude on main groups of plants regarding to their uses.

Assessment

Assess their ability to present ideas logically highlighting the two main groups of the plants according to their uses

6.4.4 Socio economic importance of plants

a) Learning objectives

- List the socio-economic importance of plants
- Understanding the use of every plant found inthe school area

b) Teaching resources

- Chart of socio-economic plant
- XO laptop
- Library textbook

c) Learning activities

- Let learner observe chart of importance of plants using XO laptop/computer
- Get them in working group and ask them to explain the socio-economic importance of the plants, then let them make presentation of the group work to the rest of the class.

  Note: *Make sure of your ability to move around and guide where is necessary.*
- Assign learners to read Science and Elementary Technology P2 pupil's book page 68-72 and respond to the question1,2 and 4 activity 2
- After all these activities above, allow the whole class to conclude on socio-economic importance of plants with examples.

Assessment

Assess their ability to present ideas logically highlighting the socio-economic importance of the plants.

6.4.5 Medical importance of plant

a) Learning objectives

- List the medical importance of plants
- Understanding the useof every plant found inthe school area

b) Teaching resources

- Chart of medicinal plant
- XO laptop
- Library textbook

c) Learning activities

- Let learner observe chart of importance of plants using XO laptop/computer
- Get them in working group and ask them to explain the medicinal importance of the plants, then let them make presentation of the group work to the rest of the class.

Note: *Make sure of your ability to move around and guide where is necessary.*

- Assign learners to read Science and Elementary Technology P2 pupil's book page 68-72 and respond to the question1,2 and 4 activity 2
- After all these activities above, allow the whole class to conclude on medicinal importance of plants with examples.

Assessment

Assess their ability to present ideas logically highlighting the medicinal importance of the plants.

6.5. Additional content/information for teacher

People depend upon plants to satisfy such basic human needs as food, clothing, shelter, and health care. These needs are growing rapidly because of a growing world population, increasing incomes, and urbanization.

6.6 End unit assessment

Answers to End of Unit Assessment 6

(*Pupil's book page 73*)

1. Pupils will draw a picture of a bean plant, label it and give the importance of each of the following parts:

- Roots: to hold the plant firmly in the soil and absorb its food(nutrients) from soil to the plant.
- Stem: to support leaves, flowers and fruits as well as carrying foodfrom roots to other parts of the plant.
- Leaves: to prepare food for the plant.
- Flowers: to give fruits.
- Fruits: grow into a young plant

2.

Food crops	Cash-crops	Used in fencing.	For firewood and timber	Decoration
Irish potatoes,	coffee, tea,	Euphorbia (imiyenzi),	Eucalyptus,	Flowers
beans,	pyrethrum,	*Ficusthonningii* (umuvumu)	Pines,	
banana,	cotton,		Cupressus,	
peas,			acacia,	
avocado,			grevillea,	
French beans,			euphorbia,	
pineapple,		reeds,	casuarina,	
Maize,		Trees;	calcarata,	
Lemon……				
		pines,		
		grevillea		
		acacia,		
		bamboo		

6.7 Additional activities

6.7.1. Remedial activities

1. Give any two examples of food crops? Answer/ Beans, Maize
2. State two examples of cash crops? Answer/ Tea and coffee

6.7.2. Consolidation activities

1. Give an example of a plant used for fencing. Answer/Euphorbia
2. List 3 examples of plant trees that can be used for fire wood and

timber

Answer: Eucalyptus, Pines, grevilia

6.7.3. Extended activities

1. List the main parts of the plant and their uses

Answer:

Roots: to hold the plant firmly in the soil and absorb its food (nutrients) from soil to the plant.

Stem: to support leaves, flowers and fruits as well as carrying food from roots to other parts of the plant.

Leaves: to prepare food for the plant.

Flowers: to give fruits.

Fruits: grow into a young plant.

UNIT 7: LIGHT AND HEAT

7.1. Key unit competence

To discover the sources of light and heat and the relationship between light and the shadow.

7.2. Prerequisites

A teacher to teach successfully this Unit must have sufficient knowledge on heat sources, light sources, source of shadow and darkness. He must also behaving adequate knowledge on how to use different materials that generate heat and light very well so as not to cause harm to learners, how to use different gargets used to measure heat and temperature like thermometer.

7.3. Introductory activity

Guidance on the introductory activity

- Ask learners to observe each one of the pictures in student's books page 74 and request each students to think about source of light and heat, dangers of light and heat and think on measuring human body temperature in picture.
- 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 in the unit.

Answers to introductory activity

- Major sources of light are: sun, torch, fire, candle, lanterns, Kerosene lanterns, bulbs, match stick, pressure lamp, fire wood…and others.
- **The importance of light and heat are:**
  -Light helps people to see.;
  - Light allows plants to have green color.
  - Light helps plants to make their own food (starch)
  - Heat helps in cooking foods
  -Heat helps in warming the house;
  -Heat helps in drying of clothes and crops
  -Heat helps young animals to grow well (chicken).
  -Heat helps in ironing of clothes

  Dangers of light and heat
- Too much light affects the eyes.
- Dim light also affects the eyes.
- Extreme heat can cause people to **suffer from heat-related illness,** and even **death.** People suffer heat-related illness when their bodies are unable to properly cool themselves. **Older adults, young children, and people with chronic medical conditions are at high risk for heat-related illness and death.**
- He/she uses of a thermometer is to measure the temperature of the human body, object or place.

7.4. List of lessons

#	Lesson title	Learning objectives	Number of periods:24

1	Source of light	-List various sources of light -Identify the sources of light and thesources of heat	2
2	Meaning of darkness	-Discover the source of darkness -Differentiate darkness and shadow	2
3	Relationship between light and shadow	-Identify the relationship between light and shadow - Compare the length of shadow according to the time of day (morning, midday and evening) - Approximate time by observing the shadow	2
4	Importance of light	-Explain the importance of light on living things • Avoid looking at the sun without recommended eglasses	2
5	Dangers of dim and bright light and measures to avoid them	-Discover the dangers of light on the eyes of a person -Identify measures to avoid dangers of light • Prevent dim and brightest light while reading	2
6	Definition and Source of heat	-List various sources of heat. • Identify the sources of light and the sources of heat	2
7	Importance of heat	-Identify the importance of heat -Explain the importance of heat on living things	2
8	Dangers of heat	-Identify the dangers of heat and measures to avoid dangers of heat -Prevent accidents caused by heat	2

		• Develop the discipline to avoid the dangers of light and heat -Prevent accidents caused by heat and light	
9	Types of heat measurements/thermometers	-Identify different types ofthermometers - Distinguish the parts of athermometer - Explain the use of the thermometer - To develop the culture/habit of regularly measure his/ her body temperature.	2
10	Measuring body temperature using clinical thermometer	-Measure body temperature -To develop the skill of measuring body temperature using clinical thermometer without any help	2
11	Relationship between sources of light and sources of heat	-Explain relationship between sources of light and sources of heat -Prevent accidents caused by heat and light - Use properly the objects or sources of light and sources of heat	2
12	End Unit Assessment		2

Teaching approach for each lesson

7.4.1. Source of light

a) Learning objectives

-List various sources of light

-Identify the sources of light and thesources of heat

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, fire comes from wood, pictures showing sun, moon and stars, projectors, computers, blackboard, chalks.

c) Learning activities

Activity 1 (student's book page 75)

- Prepare enough teaching and learning aid materials to help pupils know and understand

what is sources of light, …

- Give learners to follow in every activity done while observing and touching the teaching and learning aid materials.
- Guide pupils in presenting and explaining of their work to the others.
- Give individual time to every pupil to work on their own
- Be around those that need special help in their studies, and give them activities according to their abilities.
- Give equal chances to both boys and girls in class activities that enrich the lesson.
- Helps those with difficulty in observing and identifying what is the sources of light.
- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

7.4.2. Meaning of darkness

a) Learning objectives

-Discover the source of darkness

-Differentiate darkness and shadow

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, fire comes from wood, pictures showing sun, moon and stars, pictures showing darkness and shadow, projectors, computers, blackboard, chalks.

c) Learning activities

Activity 2 (student's book page 76)

- Prepare enough teaching and learning aid materials to help pupils know and understand what is darkness, …
- Give learners to follow in every activity done while observing and touching the teaching and learning aid materials.
- Guide pupils in presenting and explaining of their work to the others.
- Give individual time to every pupil to work on their own
- Be around those that need special help in their studies, and give them activities according to their abilities.
- Give equal chances to both boys and girls in class activities that enrich the lesson.
- Helps those with difficulty in observing and identifying what is darkness.
- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

7.4.3. Relationship between light and shadow

a) Learning objectives

- Identify the relationship between light and shadow

- Compare the length of shadow according to the time of day (morning, midday and evening)
- Approximate time by observing the shadow.

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, pictures showing sun, moon and stars, trees, pictures showing darkness and shadow, projectors, computers, blackboard, chalks.

c)Learning activities

Activity 3 (student's book page 77-78)

– Prepare enough teaching and learning materials to enable each learner to observe and differentiate relationship between light and shadow.

– Prepare and give the learners instructions to follow when observing and explaining relationship between light and shadow.

– Give every learner individual time.

– Be around those with special educational needs and give them activities according to their abilities as prepared and given in this book. If they need different teaching and learning materials, prepare them**.**

- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

7.4.4. Importance of light

a) Learning objectives

- Explain the importance of light on living things
- Avoid looking at the sun without recommended glasses

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, pictures showing sun, moon and stars, glasses, pictures showing plant, projectors, computers, blackboard, chalks.

c)Learning activities

Activity 4 (student's book page 79)

- Prepare enough teaching and learning aid materials to help pupils know and understand importance of light.
- Give learners to follow in every activity done while observing and touching the teaching and learning aid materials.
- Guide pupils in presenting and explaining of their work to the others.
- Give individual time to every pupil to work on their own.
- Be around those that need special help in their studies, and give them activities according to their abilities.
- Give equal chances to both boys and girls in class activities that enrich the lesson.
- Helps those with difficulty in observing and identifying importance of light.
- After discussions about the asked questions and sharing ideas, give your comments and

corrections.

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.

7.4.5. Dangers of dim and bright light and measures to avoid them

a) Learning objectives

- Discover the dangers of light on the eyes of a person
- Identify measures to avoid dangers of light
- Prevent dim and brightest light while reading

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, pictures showing sun, moon and stars, glasses, light from sun or lamp, projectors, computers, blackboard, chalks.

c) Learning activities

Activity 5 (student's book page 80)

- Prepare enough teaching and learning materials to help each learner understand dangers of dim and bright and measures to avoid them.
- Guide learners in activities of observing pictures showing the dangers of dim and bright and measures to avoid them.
- Guide learners as they observe and discuss on dangers of dim and bright and measures to avoid them.
- Be around those that need special help in their studies, and give them activities according to their abilities.
- Helps those with a difficulty /problems in observing the dangers of dim and bright and measures to avoid them.

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.

7.4.6. Definition and Source of heat

a) Learning objectives

- List various sources of heat.
- Identify the sources of light and the sources of heat

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, fire comes from wood, pictures showing sun, moon and stars, projectors, computers, blackboard, chalks.

c) Learning activities

Activity 6 (student's book page 81)

- Prepare enough teaching and learning aid materials to help pupils know and understand meaning and sources of heat.
- Give learners to follow in every activity done while observing and touching the teaching and learning aid materials.

- Guide pupils in presenting and explaining of their work to the others.
- Give individual time to every pupil to work on their own
- Be around those that need special help in their studies, and give them activities according to their abilities.
- Give equal chances to both boys and girls in class activities that enrich the lesson.
- Helps those with difficulty in observing and identifying meaning and sources of heat.
- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

7.4.7. Importance of heat

a) Learning objectives

- Identify the importance of heat
- Explain the importance of heat on living things
- Take care when touching on heated materials

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, fire comes from wood, pictures show different uses of heat, moon and stars, projectors, computers, blackboard, chalks.

c) Learning activities

Activity 8 (student's book page 84)

- Prepare enough teaching and learning aid materials to help pupils know and understand importance of heat.
- Give learners to follow in every activity done while observing and touching the teaching and learning aid materials.
- Guide pupils in presenting and explaining of their work to the others.
- Give individual time to every pupil to work on their own.
- Be around those that need special help in their studies, and give them activities according to their abilities.
- Give equal chances to both boys and girls in class activities that enrich the lesson.
- Helps those with difficulty in observing and identifying importance of heat.
- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

7.4.8. Dangers of heat

a) Learning objectives

- Identify the dangers of heat and measures to avoid dangers of heat.

- Prevent accidents caused by heat.
- Develop the discipline to avoid the dangers of light and heat.
- Prevent accidents caused by heat and light.

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, fire comes from wood, moon and stars, projectors, computers, blackboard, chalks.

c) Learning activities

Activity 7 (student's book page 84)

- Prepare enough teaching and learning materials to help each learner understand dangers of heat.
- Guide learners in activities of observing pictures showing the dangers of heat.
- Guide learners as they observe and discuss on dangers of heat.
- Be around those that need special help in their studies, and give them activities according to their abilities.
- Helps those with a difficulty /problems in observing the dangers of heat.
- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

7.4.9. Types of heat measurements/thermometers

a) Learning objectives

- Identify different types of thermometers
- Distinguish the parts of a thermometer
- Explain the use of the thermometer
- To develop the culture/habit of regularly measure his/ her body temperature.

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, fire comes from wood, moon and stars, projectors, thermometers, computers, blackboard, chalks.

c) Learning activities

Activity 9 (student's book page 85-86)

- Prepares enough teaching aids and learning materials that will enable pupils to know and understand different types of thermometers and where thermometers are used.
- Gives enough guidelines to pupils in every practice and activity being done while observing and touching on pictures of different thermometer types and where they are used.
- Guides pupils in an activity of presenting and explaining to their fellows what they have done in given assignment.
- Gives enough time to every pupil to work on their own and makes sure that every pupil participates in a given activity.

- Pupils with disabilities who need special help and attention are facilitated by the teacher and accepted to participate according to their abilities
- Helps pupils with difficulty in observation and identifying different types of thermometers and where they are used.

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.

7.4.10. Measuring body temperature using clinical thermometer

a) Learning objectives

-Measure body temperature

-To develop the skill of measuring body temperature using clinical thermometer without any help.

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, different pictures showing thermometer, moon and stars, projectors, thermometers, computers, blackboard, chalks.

c) Learning activities

Activity 10 (student's book page 87-88)

- Prepare enough teaching and learning materials to enable every learner to measure body temperature.
- Guide the learners in presenting and telling others what they've seen
- Give every learner individual time. Boys and girls should do the same activities.
- Be around those with special educational needs and give them activities according to their abilities as prepared and given in this book. If they need different teaching and learning materials, prepare them.
- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

7.4.11. Relationship between sources of light and sources of heat

a) Learning objectives

- Explain relationship between sources of light and sources of heat.
- Prevent accidents caused by heat and light.
- Use properly the objects or sources of light and sources of heat.

b) Teaching resources

Electric bulb, candle, torch, an oil lamp, fluorescent tube, different pictures show sources of light and heat, moon and stars, projectors, computers, blackboard, chalks.

c) Learning activities

Activity 11 (student's book page 88-89)

– Prepare enough teaching and learning materials to enable each learner to observe and differentiate relationship between sources of light and sources of heat.

– Prepare and give the learners instructions to follow when observing and explaining relationship between sources of light and sources of heat.

– Give every learner individual time.

– Be around those with special educational needs and give them activities according to their abilities as prepared and given in this book. If they need different teaching and learning materials, prepare them**.**

- After discussions about the asked questions and sharing ideas, give your comments and corrections.

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.

7.5. Additional content for the teacher

Importance of Heat, Uses and Applications of this energy in Life

Heat is a form of energy that exists naturally.

It quickly changes into different forms of energy like light, electricity, etc.
Life on this earth depends on heat energy for survival.
The man knew about heat and its precursor fire for ages and used it for various applications.

Heat energy, unlike other forms, can be felt by the sense of touch.

Importance of Heat

Heat and energy are quite related and are known to man before advancements in science. It has a significant role in human lives and also the environment. Heat energy helps to

1. Photosynthesis

In plants, light energy from the sun converts to heat energy and gets trapped in the leaves to form carbohydrates.
This heat energy is trapped as carbohydrates again releases the heat in the body. The heat energy is formed by the breakdown of carbohydrates in the animal tissues. This heat is measured as body temperature and is kept uniform throughout the body by blood distribution.
Besides carbohydrates, heat energy is also stored in the form of fats and, to some extent, in proteins.

Thus the energy in the form of heat is involved in food production and temperature maintenance of warm-blooded animals.

2. Enzyme reactions

Enzymes are bio-catalysts that help to enhance the speed of biochemical reactions. These

enzymes operate only at suitable temperatures, i.e., heat energy.
At low temperatures, they are inactive, and the reactions do not proceed. At high temperatures, they get denatured (destroyed). Hence, they need optimal temperature for function. So without heat, they are non-functional.

Therefore, you can notice that high body temperature, like in disorder like sunstroke body becomes weak due to physiological dysfunction.

3. In Medicine

Heat plays a vital role in health care. The heat has the ability to counter inflammation and reduce pain. Hence, heat is used in the treatment of inflammatory and pain-related problems.

Drinking hot water during a common cold or cough helps relieve the symptoms. In the case of piles or hemorrhoids, a sitz bath is recommended to minimize local pain.

Similarly, having a hot water bath reduces body pains due to the anti-inflammatory effects of heat energy.

Hence, as a part of nursing, thermotherapy is used in the form of heating pads, hot water, cloth, etc. It is believed that heat increases blood circulation, promotes healing.

4. Water cycle

The water cycle is a phenomenon responsible for the rain and life on earth. When the heat from the sun contacts water on the earth, it evaporates by forming water vapor.

This evaporation mostly happens from the oceans to form clouds. In turn, these vaporous clouds reach the land through the sky, get cooled, and cause rains. The rainwater collects in pools, ponds, rivers, etc., and the excess returns to seas and oceans.

This cycle is called a water cycle, and this happens due to the heat gain and heat loss (cooling) mechanism. When the water gets heated, it evaporates from the earth, and when the clouds get cooled, it causes rain on the planet. So heat from the sun is responsible for showers and life on earth.

During heat temperature in summers, even water on land also evaporates. The water vapor, when it rises above, convert into clouds and cause rains when cooled. But most of the water is from oceans than from land.

5. Chemical reactions

Many chemical reactions like synthesis, breakdown occur in the presence of heat energy. Due to heat energy, the electrons and atoms in the substances which are in the stable state are set into vibration.
These vibrations make it easy to form new bonds and new molecules. Thus heat brings in a change in molecules and substances. Hence you can even notice medicines containing the label

“store in a cool place.”

This is because exposing them to heat can lead to reactions and spoil the drug ingredient within.

6. Automobile motion

All the vehicles which run on petrol and coal operate due to the generation of heat energy within.

The heat energy helps the pistons to move, which is conveyed into cyclic motion, and thus, the wheels rotate.

The more the heat generated, the more the speed and strength of the movement. Therefore, heat energy is the base for all automotive vehicles like cars, buses, trucks, etc.

7. Cooking

Cooking is a daily routine at home, followed by the man to make his food. Cooking helps keep the food tasty, easy to digest and kills any microorganisms which might be harmful to health. Heat transference during cooking renders the food material and fiber more soft and pulpy.

8. Electricity generation from solar and earth

Electricity is generated by any means like by use of dam water, coal, nuclear energy, wind, and even solar energy.

Of them, solar and coal methods employ the use of heat to generate electricity.

Especially coal is used in large quantities in many countries to generate heat and thereby electric current.

Even a few advanced countries use geothermal energy (renewable) to generate electricity by safer means (non-polluting and harmful to the environment).

This geothermal energy also is heat inside the earth.

9. Melting and moulding of metals

Metals are the hardest substances that are used widely for building, vehicles, hardware, etc. These metals cannot be molded with the application of pressure. But hey can be molded easily if heated.

Sometimes hard metals like iron are heated to red hot conditions to mold them into proper shape.

10. Drying

Drying is done by the removal of water from surfaces. This is possible by wind currents and even vacuum. But the most common method is by use of heat. Sun’s heat helps in drying clothes, soil, and any other wet surfaces.

Transferring heat to moist clothes sets the water molecules into motion; thereby, they quickly move away into the air leaving the cloth dry.

11. Sterilization

This is a process to kill any microbes in drugs and other healthcare material. This aims to keep the preparation sterile until use. So heat sterilization is the most common and highly effective method of doing it.

Methods like autoclave, hot air-oven, incineration use heat energy in the process of sterilization. But the process can be achieved when the material is exposed to a specific temperature and a suitable duration of time.

12. Incubation to grow birds in the eggs

You might have heard that hens sit on their eggs to hatch them. After the hen lays its eggs, it sits on them and provides heat for the egg's embryo to grow.

It does so for 21 days, after which a fully formed chick comes out of the egg. In general, in birds, the body is quite warm due to feathers, and when they sit on their eggs, they pass on the heat. This heat energy helps in the growth of the embryo into a bird.

7.6. End unit assessment

a. Guidance on End unit assessment

- **The end unit assessment is at Page 90.**
- Request learners to answer all questions of the "**End unit assessment"** 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. Five objects that give out light are: sun, fire, candle, lantern, lamp.
2. Darkness is the absence of light.
3. Correct Sentence: (write true/false)

   a) Shadow is the absence of light. **false**.
   b) All sources of light give heat. **false**.
   c) Our eyes can be affected when we read from sunshine without protecting our eyes. **True**.
   d) The normal human body temperature is 40. **false**.

4. When heat intensity becomes severe, grass and water dry, animals lack grass to eat and water to drink.
5. Each pupil will measure his/her body temperature and explain the whole process of it.

6. Objects that give out light but do not give heat are: moon, torches without round bulb i.e. charged torches), firefly, stars.

7.7. Additional activities

7.7.1. Remedial Activities

Questions

1. Name two sources of light.
2. Give one use of light.

Answers

1. Sun and Torch

2. It helps us to see

7.7.2. Consolidation activities

Questions

1. What instrument is used to measure human body temperature?
2. Mention two uses of heat. Answer: For cooking, for drying clothes

Answers

1. Clinical thermometer

2. For cooking, for drying clothes.

7.7.3. Extended activities

Questions

1. Give 2 examples of objects that give out both heat and light
2. What are dangers of heat to both human and environment?

Answers

1. Sun and cooking stove

2. - Heat can cause accident to human and cause death.

- Too much heat from sun light can cause bush burning which causes death.

Unit 8: HUMAN SENSORY ORGANS

8.1 . Key unit competence

To identify the human sensory organs, their functions and hygiene

8.2 . Prerequisite

In P1, pupils leant main parts of human body, their functions and appropriate hygiene. They knew that each part of them comprises various organs.

8.3 . Introductory activity and guidance

a) Introductory activity

Look at the picture in Science and Elementary Technology pupil's book, page 91. Identify organs indicated by letters a, b, c, d, f.

Predict what you are going to learn in this unit.

Answer for introductory activity

Letters	a	b	c	d	F
Organs	nose	tongue	eye	ear	Skin

We are going to learn about human sensory organs.

b) Guidance

Ask learners to observer the picture displayed in pupil's book page 91, and request them to identify all organs indicated by arrow, let them predict what they are going to learn in this unit.

8.4 List of lessons

#	Lesson title	Learning objectives	Number of periods
1	Function and care of human eye	• Explain functions of human eye • List ways of keeping healthy human eye • Demonstrate how to take care of human eye	2

2	Function and care of human ear	• Explain functions of human ear • List ways of keeping healthy human ear • Demonstrate how to take care of human ear	2
3	Function and care of human skin	• Explain functions of human skin • List ways of keeping healthy human skin • Demonstrate how to take care of human skin	2
4	Function and care of human tongue	• Explain functions of human tongue • List ways of keeping healthy human tongue • Demonstrate how to take care of human tongue	2
5	Function and care of human nose	• Explain functions of human nose • List ways of keeping healthy human nose • Demonstrate how to take care of human nose	1
6	End Unit Assessment		1

Teaching approach for each lesson

8.4.1. Function and care for human eye

a) Learning objectives

- Identify human sight organ
- Explain functions of human eye
- List ways of keeping healthy human eye
- Demonstrate how to take care of human eye

b) Teaching resources

- Chart/picture of human body (unlabeled)
- Eye mask (cloth)

- objects/ materials around the school where pupils pass.
- Library textbook

c) Learning activities

- Get learners in school compound, ask them to write in their notebooks all things they can see around them.
- Get learner in pairs, assign them to blindfold partners with cloth (eye mask) then ask blindfolded partner to tell what he/she can see.
- Return back learners in classroom, ask them by observing on the human body chart displayed to identify which organ is responsible for human sight.
- Ask learners observe the pictures (a), (b), (c), (d), (e) and (f) in pupil's book page 94 to discuss appropriate ways of caring human eye healthy.
- After all these activities together, all the class concludes on the function and maintaining ways of human eye identified on the human body chart.

Assessment

Assess their ability to present ideas logically highlighting the function and care of human eye

8.4.1 Function and care for human ear

a) Learning objectives

- Identify human organ of sound
- Explain functions of human ear
- List ways of keeping healthy human ear
- Demonstrate how to take care of human ear

b) Teaching resources

- Chart/picture of human body (unlabeled)
- Objects sound like musical instruments piano, drum, flute, cymbals etc
- Library textbook

c) Learning activities

- Get learners in classroom, invite one of them to play any musical instrument

- Ask others classmates to explain their feeling
- Ask them by observing on the human body chart displayed to identify which organ is responsible for sound earing
- Ask learners observe the pictures (a), (b), (c), (d), (e) and (f) in pupil's book page 94 to discuss appropriate ways of caring human ear healthy.
- After all these activities together, all the class concludes on the function and maintaining ways of human ear identified on the human body chart.

Assessment

Assess their ability to present ideas logically highlighting the function and care of human ear

8.4.2 Function and care for human skin

a) Learning objectives

- Explain functions of human skin
- List ways of keeping healthy human skin
- Demonstrate how to take care of human skin

b) Teaching resources

- Chart/picture of human body (unlabeled)
- Water portable container
- Cold or warm water (in portable container)
- Basin (2)
- Library textbook

c) Learning activities

- Get learners running on the sun in school compound, ask them to discuss their body feeling after 5 minutes of running.

- Return back learners in classroom, Pour cold water in a basin, warm water in the other one. Ask learners to detect by own finger where water is cold and where is warm.
- Ask them by observing on the human body chart displayed to identify which organ is responsible for detecting of human coldness/ warmness
- Ask learners observe the pictures (a), (b), (c), (d), (e) and (f) in pupil's book page 94 to discuss appropriate ways of caring human skin healthy.
- After all these activities, the class concludes on the function and maintaining ways of human skin identified on the human body chart.

Assessment

Assess their ability to present ideas logically highlighting the function and care of human skin.

8.4.3 Function and care for human tongue

a) Learning objectives

- Identify human organ of taste
- Explain functions of human tongue
- List ways of keeping healthy human tongue
- Demonstrate how to take care of human tongue

b) Teaching resources

- Chart/picture of human body chart (unlabeled)
- water, salt, sugar and juice
- Home materials like glasses, jars and cups
- Library textbook

c) Learning activities

- Get learners in classroom
- Display a jar of one of the following products / solutions:
  - Water (a)

- salt water(b)
- sugar water©
- juice(d)

ask learners to identify liking of different samples displayed on the table.

- Let learner in working group taste all samples, then ask to differentiate them according to flavor of each other.
- Ask pupils to by observing on the human body chart displayed identify which organ is responsible for human taste.
- Ask learners observe the pictures (a), (b), (c), (d), (e) and (f) in pupil's book page 94 to discuss appropriate ways of caring human tongue healthy.
- After these activities all the class concludes on the function and maintaining ways of human tongue identified on the human body chart.

Assessment

Assess their ability to present ideas logically highlighting the function and care of human tongue.

8.4.4 Function and care for human nose

a) Learning objectives

- Explain functions of human nose
- List ways of keeping healthy human nose
- Demonstrate how to take care of human nose
- Library textbook

b) Teaching resources

- Chart/picture of human body (unlabeled)
- Objects smelling good like fleshly cut of lemons, coffee brewing etc..
- Library textbook
- Portable coffee container
- Glasses/cups

c) Learning activities

- Get learners in working groups,
- Assign them the following activities:
    - ✓ cut flesh lemon,
    - ✓ Pour coffee in cup/glass from portable container
- Let learners discuss the smell in this classroom, then ask them by observing on the human body chart displayed to identify which organ of human detect taste.
- Ask learners to observe the pictures (a), (b), (c), (d), (e) and (f) in pupil's book page 94, and discuss appropriate ways of caring human nose healthy.
- After all these activities together, all the class concludes on the function and maintaining ways of human nose identified on the human body chart.

Assessment

Assess their ability to present ideas logically highlighting the function and care of human nose.

8.5. Additional content/information for teacher

How do we taste and smell through the nose?

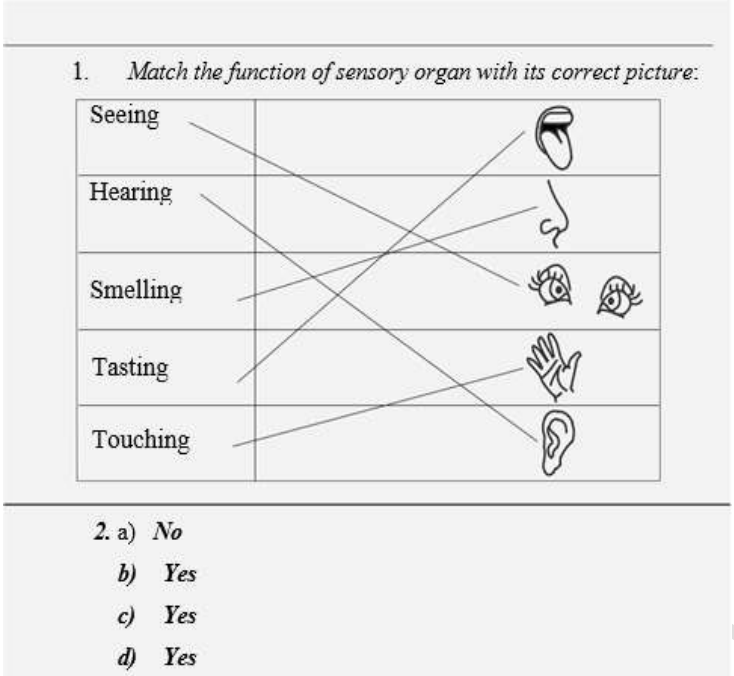
The primary detectors of taste are the **taste buds located on the tongue**. The connection of the nasal cavity to the back of the mouth/tongue allows for the detection of the all so important flavor. Back to the point that smell = 80% taste, this is why it is hard to taste anything when your nose is blocked.

8.6 End unit assessment

Answers to End of Unit Assessment 8

(Pupil's *book page 90*)

The assessment questions given in pupil's book are like this:



8.7 Additional activities

8.7.1. Remedial activities

1. What part of the body gives us a sense for seeing? Answer: Eye
2. What part of the body gives us a sense for hearing? Answer: Ear

8.7.2. Consolidation activities

1. Considering the table below, tell the part of the body used for the sense mentioned.

No	Name of a sense	Answers
1	Seeing	Eye
2	Hearing	Ear
3	Smelling	Nose
4	Tasting	Tongue
5	Touching/feeling	Skin

8.7.3. Extended activities

1. Why is it that when it is cold, a person covers him/herself? How does he/

she feel that the environment is cold?

Answer: To gain heat, because of the human skin, we are able to sense that the environment.

2. How can I keep properly my sense of seeing?

Answer: By avoiding reading in a dim or too much bright light

REFERENCES