

SCIENCE AND ELEMENTARY TECHNOLOGY

Primary Two (P2)

Teacher's Guide

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FOREWORD

Dear teachers,

Rwanda Basic Education Board is honored to present 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 pupils can develop ideas and make new discoveries during concrete activities carried out individually or with peers. With the help of the teacher, pupils will gain appropriate skills and be able to apply what they have learnt in real life situations. Hence, they will be able to develop certain values and attitudes allowing them to make a difference not only to their own life but also to the nation.

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

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

- Plan your lessons and prepare appropriate teaching 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 inquiry methods, group discussions, research, investigative activities, 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 into 3 parts:

Part 1: Explains the structure of this Teacher’s guide and gives you the methodological guidance;

Part 2: Gives the sample lesson plans as reference for your lesson planning process;

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 pupil’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 and translation of this teacher’s guide, particularly REB staff who organized the whole process from its beginning. Special gratitude goes to translators, illustrators and designers who carefully worked to the successful completion of this teacher’s guide. Any comment or contribution would be welcome for the improvement of this teacher’s guide for the next edition.


Dr. MBARUSHIMANA Nelson

Director General, REB



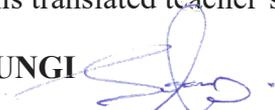
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I wish to express my appreciation to all the people who played a major role in development of this Primary Two Science and Elementary Technology Teacher’s Guide. It would not have been successful without active participation of different education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

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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.

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PART I: GENERAL INTRODUCTION

1.0. About the Teacher's guide

This part provides a sample lesson plan, developed and designed to help the teachers develop their own lesson plans. This book is a Teacher's guide for Primary Two Science and Elementary Technology subject. It is designed to accompany pupil's book and intends to help teachers in the implementation of competence based curriculum specifically Science and Elementary Technology syllabus.

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

1.1. The structure of the guide

This section presents the overall structure, the unit and sub-heading structure to help teachers to understand the different sections of this guide 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 pupils with special educational needs, active methods and techniques of teaching Science and Elementary Technology and guidance on assessment.

- **Part II: Sample lesson plan**

- **Part III: Unit development**

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

Each unit is made of the following sections:

- **Unit title:** from the syllabus

- **Key unit competence:** from the syllabus
- **Teaching and learning materials**
- **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.

- **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.

- **Key guidelines on teaching approach**

This part of the teaching guide clearly shows what is special in every unit regarding learning and teaching activities. As the updated syllabus which is competence-based shows criteria that must be considered including teaching based on learner’s ability and skills, Learner methods, Inclusive Education, use of ICT in Education, generic competences and Crosscutting issues.

- **Summary of the unit**

At the end of the unit in the pupil’s book there is a question that “**what have you discovered in this unit**” in this guide, you will find a summary of what pupils should have gained on every unit. This summary in the pupil’s book is found where it is stated as “**I have discovered that**” it clarifies what every learner should have learnt at the end of every unit.

- **Answers to the 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. The teacher must know that those answers are not the final ones, every time planning a lesson, the teacher should also prepare his/her own questions and answers as a long as he/she keeps in the same line to prove what the learners gained at the end of every unit and whether the targeted objectives have been achieved.

In the assessment, the teacher should not base on end of unit assessment only but should also give value to an assessment that should be given at the end of every lesson and this facilitates teaching and learning. This evaluation form helps the teacher to make a follow up for the pupils and also for proper communication to the parents or guardians.

In this teaching guide, an example to follow has been provided which can be used to gather information out of the end of each unit assessment.

- Additional activities (remedial, consolidation and extended activities)

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

Note: The guide ends with references.

1.2. Methodological guidance

1.2.1. Developing competences

Since 2015, Rwanda shifted from a knowledge based to a competence based curriculum for pre-primary, primary and general secondary education. For TTCs, it is in 2019 that the competence based curriculum was embraced. This called for changing the way of learning by shifting from a 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 pupil has to demonstrate what he/she is able to do using the knowledge, skills, values and attitudes acquired in a new or different or 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 a pupil can do rather than what a pupil knows. Pupils 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 pupil-centered rather than the traditional didactic approach. The pupil is evaluated against set standards to achieve before moving on.

In addition to specific subject competences, pupils 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 Science and Elementary Technology:

Generic competence	Examples of activities that develop generic competences
Critical thinking	<p>These activities require pupils to think critically about subject content. These may include:</p> <ul style="list-style-type: none"> – Work in groups in different ways e.g. taking turns, listening, taking decisions, – Observe and analyze. Example: mark out areas in the school and get different groups to record living things like insects, persons, animals, birds – Discuss and give scientific reasons of phenomenon commonly known like sun shining, raining, changing colors for plants etc – 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	<ul style="list-style-type: none"> – Research using internet or books from the library – Design a project for making toys and materials
Innovation and creativity	<ul style="list-style-type: none"> – 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	<ul style="list-style-type: none"> – Ensures good relationship between pupils, the teacher plays a big role in letting pupils cooperate as they discuss or discovering pairs, groups.

Communication	<ul style="list-style-type: none"> – Telling a story related to the lesson of SET needed to be studied – Presenting ideas verbally or in writing – Reading text related to SET
Lifelong learning	<ul style="list-style-type: none"> – Take initiative to update knowledge and skills with minimum external support – Cope with the evolution of knowledge and technology advances for personal fulfillment – 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 in the 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, a pupil 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	<p>Involves all pupils in all activities without any bias.</p> <p>Eg: Allow a pupil with physical disability (using wheelchair) to take notes or lead the team during a task or an experiment.</p>
Gender	<p>Involves both girls and boys in all activities: No activity is reserved only to girls or boys. A teacher should ensure equal participation of both girls and boys during activities as well as during cleaning and tidying up related activities after practical tasks.</p>
Peace and Values Education	<p>During group activities, the teacher will encourage pupils 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.</p>
Standardization culture	<ul style="list-style-type: none"> – Some lessons involve carrying out practical tasks. Instructions should be clear for pupils to always check if they are using appropriate materials. – Through making quality work/objects which are attractive to the community.
Environment and sustainability	<ul style="list-style-type: none"> – In order to avoid the environment pollution, before, during or after practical tasks, pupils should avoid throwing wastes anywhere; special places or appropriate containers should be used. – During field visits, pupils should be reminded of not damaging or destroying environment components or not throwing wastes in the environment.
Financial Education	<ul style="list-style-type: none"> – - When making toys and objects for example, pupils are encouraged to use well the resources by using the quantities that are just required. – Using tools and materials in a 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 ways depending on their learning pace, needs or any other special problems 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 need of each pupil in the classroom. Also a teacher must understand that pupils 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, a 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, quizzes, and outdoor activities).
- Maintain an organized classroom and limits distraction. This will help pupils with special needs to stay on track during the lesson and follow instructions easily.
- Vary the pace of teaching to meet the needs of each pupil. Some pupils process information and learn more slowly than others.
- Break down instructions into smaller, manageable tasks. Pupils with special needs often have difficulty in understanding long-winded or several instructions at once. It is better to use simple, concrete sentences in order to facilitate them to 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 pupil who has a disability with a friend without. 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 pupil. Both pupils 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 pupil is unique with different needs and that should be handled differently.

Strategies to help pupils with developmental impairment

The teacher should:

- Use simple words and sentences when giving instructions.
- Use real objects that the pupil can feel and handle, rather than just working abstractly with a pen and a paper.
- Break a task down into small steps or learning objectives. The pupil should start with an activity that she/he can do already before moving on to something that is more difficult.
- Gradually give the pupil less help.
- Let the pupil work in the same group with those without disability.

Strategies to help pupils with visual impairment

The teacher should:

- Help pupils to use their other senses (hearing, touching, smelling and tasting) to play and carry out activities that will promote their learning and development.
- Use simple, clear and consistent language.
- Use tactile objects to help explain a concept.
- If the pupil has a sight problem, ask him/her what he/she can see. Get information from parents/caretakers on how the pupil manages his/her sight problem at home.
- Make sure the pupil has a group of friends who are helpful and who allow the pupils to be as independent as possible.
- Plan activities so that pupils work in pairs or groups whenever possible.

Strategies to help pupils with hearing impairment

The teacher should:

- Strategies to help pupils with hearing disabilities or communication difficulties

- Always get the pupil's attention before you begin to speak.
- Encourage the pupil to look at your face.
- Use gestures, body language and facial expressions.
- Use pictures and objects as much as possible.
- Ask the parents/caretakers to show you the signs they use at home for communication use the same signs yourself and encourage other pupils to also use them.
- Keep the background noise to a minimum.

Strategies to help learners with physical disabilities or mobility difficulties

The teacher should:

- Adapt activities so that pupils who use wheelchairs or other mobility aids and other pupils who have difficulty in moving, can participate.
- Ask parents/caretakers to assist with adapting furniture e.g. The height of a table may need to be changed to make it easier for a pupil to reach it or fit his/her legs or the wheel chair.
- Encourage peers to help their 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 pupils achieve the key unit competence. Results from the assessment informs the teacher which pupil needs remedial, consolidation or extension activities. These activities are designed to cater for the needs of all categories of pupils; (slow, average and gifted pupils 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 pupils' 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 Two, formative assessment principle is applied through application of 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 assessment is formative it is done to give information on the progress of pupils and from there you decide what adjustments 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 achievement of 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 to allow effective learning. 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, instructional available materials, the physical/sitting arrangement of the classroom, individual pupil, teachers' needs, abilities and learning styles.

There are mainly four different learning styles as explained below:

a) Active and reflective pupils

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

b) Sensing and intuitive pupils

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

c) Visual and verbal pupils

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

d) Sequential and global pupils

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

1.2.6. Teaching methods and techniques that promote the active learning

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

What is Active learning?

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

The role of the teacher in active learning

- The teacher engages pupils through active learning methods such as inquiry methods, group discussions, research, investigative activities, 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 pupils to develop different competences by giving tasks which enhance critical

thinking, problem solving, research, creativity and innovation, communication and cooperation.

- The teacher supports and facilitates the learning process by valuing pupils' contributions in the class activities.

The role of pupils' in active learning

Pupils are the 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 pupil is engaged in active learning:

- Communicates and shares relevant information with other pupils through presentations, discussions, group work and other pupil-centred activities (role play, case studies, project work, research and investigation)
- Actively participates and takes responsibility for his/her own learning
- Develops knowledge and skills in active ways
- Carries out research/investigation by consulting print/online documents and resourceful people, and presents his/her findings
- Ensures the effective contribution of each group member in assigned tasks through clear explanations 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 emphasized in the competence Based Curriculum (CBC) are active methods. Below are some active techniques that apply in science:

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 pupil 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 development of the following skills in

pupils: observation, recording and report writing, manipulation, measuring, planning and designing.

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

- **Preparation of practical lesson/ experiment:** Checking materials to ensure they are available and are 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 pupils; introduction of the experiment: aims and objectives; setting up the apparatus; performing the experiment; writing and recording the data.
- **Discussion:** Observations and interpreting data; making generalizations and assignment: writing out of the experiment report and further practice and research.

In some cases, demonstration by the teacher is recommended when for example the 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, experiments can be done in groups but make sure every pupil participates.

B. Project work

Science and Elementary Technology teachers are encouraged to sample, prepare project work and engage their pupils to participate in the above project work as much as possible. Pupils 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 pupils' interest. This technique develops higher order of thinking as the pupils acquire and apply new knowledge in a problem-solving context.

C. Field trip

One of the main aims of teaching Science and Elementary Technology in Rwanda is to apply its knowledge for development. To achieve this aim we need to show pupils the relationship between classroom science lessons and applied science. This helps them to 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 pupils:

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

After the visit

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

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 pupils are involved in the learning process. Below are those main parts and their small steps:

1) Introduction

Introduction is the part where the teacher makes connection between the current and previous lesson through appropriate techniques. The teacher opens short discussions to encourage pupils 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 sequencings.

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 pupils' findings, exploitation, synthesis/Summary of the unit and exercises/application activities, explained below:

- **Discovery activity**

- Step 1**

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

- Step 2**

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

- **Presentation of pupils' productions**

- In this episode, the teacher invites representatives of groups to present the pupils' productions/findings.
- After three/four or an acceptable number of presentations, the teacher decides to engage the class into exploitation of the pupils' productions.

- **Exploitation of pupils' productions**

- The teacher asks the pupils to evaluate the productions: which ones are correct, incomplete or false
- Then the teacher judges the logic of the pupils' products, corrects those which are false, completes those which are incomplete, and confirms those which are correct.

- **Institutionalization (Summary of the unit/conclusion/ and examples)**

- The teacher summarizes the learnt knowledge and gives examples which illustrate the learnt content.

- **Exercises/Application activities**

- Exercises of applying processes and products/objects related to the learnt unit/sub-unit

- Exercises in real life contexts
- Teacher guides pupils to make the connection of what they have learnt to real life situations. At this level, the role of teacher is to monitor the fixation of the 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, pupils work individually on the task/activity. The teacher avoids intervening directly. In fact, the results from this assessment informs, the teacher on the next steps for the whole class and individuals. In some cases, the teacher can end with a homework assignment.

NB: ELABORATION OF INSTRUCTIONAL OBJECTIVES

Instructional objectives are done by the teacher and is the first step done while preparing his/her 40 minutes' lesson plan. Instructional objective must be adapted to the class and school context. The instructional objective requires the following four (4) elements:

1. Thinking about teaching aids (**Condition**)
2. Show clearly who is responsible for specific activities (**Audience/who/learners**)
3. Thinking about what is to be covered by the teacher delivering it to the pupil (**Contents/behavior**)
4. Showing clearly accepted ways of measuring any improvement in learning of pupils (**Degree/standard**)

Examples

Example1: (1) With the help of materials and tools available in the classroom, (2) every pupil (3) should be able to differentiate tools/materials that are often used in the classroom based on their uses (4) without misnaming or fail to mention its use

Example2: (1) by using a soft paper, (2) every pupil, (3) should be able to make a toy of a bird (4) following all processes and which can fly correctly.

PART II. SAMPLE LESSON PLAN

Name of the school.....

Teachers' name:

Term	Date	subject	Class	Unit No	Lesson No	Duration	No of pupils
Term 1	..././....	SET	2A	1	4 /6	40 min	45
Type of special education need to be catered for in this lesson and number of learners for each category		None					
Unit Title		Tools and materials used at home and at school					
Key unit competence		To be able to use and keep properly tools used at home and at school					
Title of the Lesson		Differentiating home and school tools and materials					
Instructional Objective		With the help of tools/materials found at home and in the classroom, every pupil will be able to differentiate those that are usually needed at school based on their uses without misnaming any tool or material.					
Plan for this class (location: in/outside)		Lesson takes place within the classroom					
Learning materials (for all learners)		All materials and tools available within the classroom: pen, rubber, pencil, colored pencil, chalk, colored chalk, painting materials (painting roller), paper, blackboard, table, duster, water, book covers, books, chairs.					
References		Ministry of education (2007), pupils' book of science and elementary technology, national curriculum.					

Timing for each step	Description of teaching and learning activity		Generic competences and crosscutting issues to be addressed + Short explanation
	In this lesson, learners observe classroom materials and tools and after group discussions, they will group materials or tools of the similar use.		
Introduction 5minutes	Teacher's activities	Learner's activities	
	<ul style="list-style-type: none"> - Calls the pupils to identify tools/ materials within the classroom - Asking simple questions on tools/ materials within the classroom 	<ul style="list-style-type: none"> - Answering questions asked by the teacher - identifying tools/ materials within the classroom 	<p>Cooperation, inter personal management and life skills</p> <p>As learners discuss in groups to recall what they learnt in primary one</p> <p>Inclusive education: Giving equal chance of participation among all learners including those with disabilities</p>
Development of the lesson 30 minutes	<p>Giving a topic question to pupils:</p> <ul style="list-style-type: none"> • we saw different tools/materials here in the classroom, which ones have the same uses? • putting pupils into groups • asking pupils to discuss within their groups 	<ul style="list-style-type: none"> • Observing tools/materials within the classroom • Touching tools/ materials within the classroom • Grouping tools/ materials within the classroom according to their uses 	<p>Environment and sustainability: in group discussions concerning materials and tools, teacher directs this to environment protection.</p>

	<ul style="list-style-type: none"> • leading pupils as they will be discovering the use of every tool/ material within the classroom. • Teacher should be having where to note down answers of different pupils so that he/she will be able to make a follow up of slow learners according to the answers they are giving 	<ul style="list-style-type: none"> • Answering a topic question while leading to the conclusion of the unit 	<p>Gender education:</p> <p>Girls and boys should participate equally</p> <p>Research:</p> <p>The teacher does whatever it takes in order for the pupils to be able to do research on their own while discovering new things they did not know concerning this unit</p> <p>Cooperation, inter personal management and life skills:</p> <p>good relationship between pupils is very crucial, the teacher plays a big role in letting the pupils cooperate as they are discussing and discovering the use of every tools/materials.</p>
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Conclusion: 5 min	<ul style="list-style-type: none"> • Paraphrasing a conclusion given by the pupils. • General revision for the pupils about the use of all tools/materials within the classroom • Asking pupils one by one names of tools/materials in classroom and their uses 	Identifying tools/materials used in writing and where to write and a better way of handling and taking care of them	Cooperation, inter personal management and life skills: pupils interact between one another while in the discussions, taking conclusions, teamwork, relationship, skills in normal life: The teacher encourages pupils to work as a team every time whenever there is work given.
Teacher's self-assessment:	All pupils are able to differentiate tools/materials within the classroom based on their uses with no error or misnaming them.		

PART III. UNITS DEVELOPMENT

UNIT 1:

TOOLS AND MATERIALS USED AT HOME AND AT SCHOOL

1.1. Key unit competence

To be able to use and keep properly tools used at home and at school

1.2. Teaching and Learning Materials

Pen, graphite sticks, pencil, colored chalk, toothbrush for painting, paper, board, wardrobe, cupboard, locker, mopping rag, water, wrapping papers, books, chairs, table, plates, pot, saucepans, forks, cups, dishes, mortar, drinking can, calabash bowl, broom, basket, mopping stick, sanitary towels, hoe, rake, forked hoe, wheelbarrow, bookshelf, knife, flat iron, panga (machete), weeding hoe, water, paint, clothes...etc.

1.3. List of lessons

Lessons	Objectives	Number of periods: 6
1. Tools and materials used at home and their uses	<ul style="list-style-type: none">– Explain the use of various home tools and materials.– Differentiate tools and materials used at home according to their uses.– Clean the kitchen and dining utensils.– Clean appropriately home tools and materials.	1

2. Keeping and maintaining properly materials and tools used at home	<ul style="list-style-type: none"> – Clean the kitchen and dining utensils. – Clean appropriately home tools and materials. 	1
3. School materials and their uses	<ul style="list-style-type: none"> – Explain the uses of various tools and materials used at school – Differentiate tools used at school and their uses. – Use properly various materials used at school 	1
4. Keeping and maintaining properly school materials	<ul style="list-style-type: none"> – Cleaning and proper use of school materials – Keep the school materials in the allocated places 	1
5. End of unit Assessment		1

1.4. Prerequisites

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. The learner should also be aware of basic skills needed to clean and keep well most of the key tools and materials used at home and at school. Checking of learners' prior knowledge is important.

1.5. Key guidelines on teaching approach

Unit 1 will be taught in and outside the classroom depending on how the teacher will have planned and prepared the lesson. Although in the pupil's book, there are a lot of pictures/photos of tools and Materials used at home and at school, it does not mean that a teacher should not look for real materials and tools. Photos and pictures should not serve as substitutes but instead should be used as complements in the lesson. Learners can be tasked to bring their own materials and tools from their homes to use at school, where possible.

A teacher is also supposed to take into consideration learner's prior knowledge and experience where possible, check it. He/ She should also make the lesson to be learner centered. For example, on the lessons concerning "Cleaning and maintaining home and school tools and materials, a teacher should be the one to do and also should give learners a chance to do it based on what they already know and how they normally do it at home and school so as to achieve the intended learning objectives.

Example:

Lesson 2: Keeping and maintaining properly home materials and tools

Appropriate preparation and lesson delivery

- The teacher tasks learners to bring different domestic tools and materials from their homes.
- The teacher gives the Essential Question and learners try to give possible answers. For example: Muhire normally washes dishes after eating food. However, his parent usually complains that he does not know how to wash/clean dishes very well. What about you? How do you clean/wash plates when you are at home?
- The teacher guides learners on the steps taken to wash, clean and dry plates.
- The teacher tasks learners to clean some selected different materials and asks other learners to comment (Whether they have done it well) and engages learners in group discussions on how best they can clean the selected materials.
- The teacher instructs every learner to clean thoroughly the materials he/ she brought from home and monitors them as they wash them. Where necessary the teacher helps and guides those who are not doing it well as earlier discussed in groups.
- Learners guided by the teacher, discuss their final take, findings, major steps taken to clean materials well and make a conclusion.
- Learners get their cleaned materials and prepare to take them back to their homes. The teacher gives homework activity, urging learners to always clean domestic materials/tools at home.

1.6. Summary of the unit

Every learner must show that he/she has fully learnt and understood what has been taught or discovered in this unit. In other words, they should be able to answer this Question:

“What have you discovered/ are you able to do after this lesson?” The answers form the Summary of the unit and are in the pupil’s book.

1.7. Answers to End of Unit Assessment 1

Question 1:

It is answered from the pupil’s exercise book by every pupil. Each pupil writes down the names of materials shown in the table then matches materials with its use(s) and where they are used.

	Material		Use		Group
a	Pen 		Eating		At home
b	Plate 		Pounding/ grinding		
c	Desk 		Sitting		At school
d	Mortar 		Cooking		
e	Refrigerator 		Writing		At home
f	Modern cooker 		Preserving Food and Drinks		

Question 2

Each learner will show a material he/she has cleaned/kept properly. (Wrapped exercise book, cleaned plate and handkerchief washed). For the teacher to know whether the task has been accomplished well, he should not concentrate on how well the book has been covered, but instead should check on whether all 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 with water and soap then dry it. **False.**

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

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

1.8. Additional activities

1.8.1. 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

1.8.2. Consolidation activities

1. Give 3 categories of home materials based on their uses
Answer/, Cleaning, agricultural (garden) and Cooking materials.
2. List five school tools/materials
Answer/ Duster, cupboard, chalk, books, note book.
3. State 2 most important materials that are used to clean home materials. **Answer/** water and soap.

1.8.3. 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 be able to make toys, various materials, teaching and learning aids

2.2. Teaching and Learning Materials

Pair of scissors, razor blade, papers, sorghum sticks or straws, , sticks, hard papers, bottle of water with a lid, bottle tops, masking tape , clay and fine sand, water, etc.

2.3. List of lessons

Lessons	Objectives	Number of periods: 8
1. Making a toy bird using paper	To make a toy bird using papers.	1
2. Making a square and a rectangle using papers	To make a square and a rectangle using papers	1
3. Making a toy car using sorghum sticks/straws	To make a toy car using sorghum sticks/straws	1
4. Making an airplane toy using an empty plastic bottle	To make an airplane toy using an empty plastic bottle	1
5. Making a wall clock to hang in class room using hard papers	To make a wall clock toy using a hard paper	1

6. Modeling a goat sculpture	To model a goat sculpture using clay	1
7. Modeling a bird sculpture using clay soil.	To model a bird sculpture using clay soil.	1
8. End of unit Assessment	Making toys, different materials, teaching and learning aids	1

2.4. Prerequisites

For a learner to understand easily this unit and a teacher to facilitate easily this unit, it is important that learners at least have a background of various toys and sculptures used/ found at home and at school. The teacher should have sufficient knowledge in making and modeling, taking proper care and cleaning of these different toys and sculptures respectively. Building from learners' prior knowledge and experience is important in this unit. A teacher should also use these materials in other lessons.

For example, making a wall clock toy will be useful in teaching math, making an airplane toy will be helpful in teaching about wind.

2.5. Key guidelines on teaching approach

A teacher must ensure that all learners are enabled to do well the task assigned to them (at least one toy or one sculpture) in the time given. He/ She must avoid talking a lot of irrelevant words, but instead should concentrate on guiding learners in doing the task well. Teacher's guidance should be based on what the learner knows already.

Example:

Lesson 1: Making a toy bird using papers

Appropriate preparation and delivery

- The teacher asks learners whether there is someone who knows how to make a bird toy using papers, tasks someone who is able to try, to come and do it in front of others. Then the teacher observes whether the way the pupil is doing is the same way that the teacher has prepared.

- The teacher gives instructions on how it is done properly based on the pupil's trial steps.
- The teacher instructs every learner/ pupil to get a paper and start doing as the teacher does (do as I do), step by step, as the teacher closely observes all learners if they have managed to do it well without omitting/ skipping any step: "Let us hold a paper like this...., and fold it twice on its longest side..."
- The teacher instructs learners to untie the bird toy they have made and make another one without his guidance by following the paper folding and margins established in the first practice. The teacher guides and directs those with difficulties in doing so.
- It would be good if learners make more than one bird toys in a way that satisfies the teacher.

Apart from demonstrating steps given by the teacher, a learner must also observe carefully steps followed when making toys using different materials like learning aids in the Pupil's book.

2.6. Summary of the unit

All learners must be able to show that they learnt how to make what they were taught or discovered in this Unit. In other words, they should be able to answer the question; **"what are you able to do after this lesson?"** **The answers form the Summary of the unit and are in the pupil's book.**

2.7. Answers to End of Unit Assessment 2

(Questions are in the pupil's book)

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 a beautiful 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:

- Make a toy bird using papers.
 - Cut a hard paper and make (a) a square, (b) a rectangle.
 - Make an airplane toy using sorghum sticks and papers.
 - 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, knife.)
- When preparing clay to model toys, you mix clay, Sand and water up to the level that they are fully kneaded.
 - A plastic bottle can be used to make an airplane toy.
 - When using a pair of scissors, knife or razor blade, we must be careful not to harm ourselves.
 - A square is a four sided figure with four equal sides and four right angles.

2.8. Additional activities

2.8.1. Remedial activities

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

2.8.2. Consolidation activities

1. Give at least 3 examples of materials that can be used to make toys **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

2.8.3. Extended activities

State the name of the toys that you can make from each of the following material

	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 identify the key parts of the computer and use the computer appropriately.

3.2. Teaching and Learning Materials

XO Laptops

3.3. List of lessons

Lessons	Objectives	Number of periods: 12
1. Main external parts of a computer: (i) Desktop (ii) Usual laptop (iii) XO-Laptop	<ul style="list-style-type: none">- Name the external parts of a computer- Identify the external parts of a computer	4
2. Use of main external parts of a computer: XO-Laptop	To explain the functions of the main parts of a computer we use at school.	3
3. Proper ways of maintaining a computer.	<ul style="list-style-type: none">- List the proper ways of maintaining a computer- Take care of the computers used at school.	1
4. Proper sitting posture when using a computer	To sit properly when using a computer	1

5. Danger of improper sitting when using a computer	<ul style="list-style-type: none"> - List dangers of improper sitting posture while using a computer - To prevent dangers of improper sitting posture while using a computer 	1
6. End of unit Assessment		2

3.4. 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.

3.5. Key guidelines on teaching approach

This Unit prepares a learner to use properly science and technology tools and equipment most especially a computer. At this P2 level, what is most important is enabling a learner to discover external parts of a computer, understand the uses (importance) of each part.

The teacher must remember, that teaching based on Essential Question helps a learner to discover well what they have to study based on prior knowledge and experience.

Example:

Lesson 4: Proper sitting posture when using a computer (Pupil's book Unit 3)

Proper planning and lesson delivery

- The teacher puts learners in groups of 4. He/she tasks learners to critically observe pictures under subheading 3.4 in the Pupil's book (Science and Elementary Technology Primary Two).

- The teacher asks learners in their groups to identify a pupil who is seated properly when using a computer (Pictures under subheading 3.4)
- The teacher challenges learners in their groups to discuss in defense or give reasons to defend their answers.
- Learners display and present their findings to the whole class as their teacher leads the harmonization process.

3.6. Summary of the unit

Every Learner must be able to show that he/she has learnt and understood fully what has been taught or discovered in this unit. In other words, to answer every question; **“What have you Discovered after this Lesson?”** The answers form the Summary of the unit and are in the pupil’s book.

3.7. Answers to End of Unit Assessment 3

(Questions are in the Pupil’s book)

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 to keep 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...

3.8. Additional activities

3.8.1. Remedial activities

- 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

3.8.2. Consolidation activities

- 1) What are the uses of the main external parts of a computer?

Answer: refer to the pupil's book in the corresponding unit and section

- 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

Answer: Learners sit properly as shown in the pupil's book

3.8.3. Extended activities

- 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.

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. Teaching and Learning Materials

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

4.3. List of lessons

Lessons	Objectives	Number of periods: 8
1. Main characteristics of air	Discover the presence of air Identify and explain the characteristics of air	2
2. Importance of air	List the importance of air in daily life	1
3. Relationship between air and wind.	Explain the relationship between Air and Wind	1
4. Types of Wind	Identify different types of wind	1

5. Effects of wind	<ul style="list-style-type: none"> - Explain the importance of air and wind in the environment - Explain the dangers of wind and how to prevent them. - Compare the effects of air and wind on environment 	1
6. Measures to prevent dangers of wind	<ul style="list-style-type: none"> - List out measures to prevent dangers of wind - Prevent the dangers of wind in environment (schools, homes, hospitals...) 	1
7. End of unit Assessment		1

4.4. Prerequisites

For the learners to follow and understand effectively this unit, it is important for the teacher to be more practical, engaging and involving all learners in the groups into the set of practical trial experiments and other activities as may be set by the teacher.

4.5. Guidelines

The teacher should avoid irrelevant talking but instead prepare proper tasks, questions that enable learners to critically think rather than sit and listen to the teacher.

The teacher's set activities should be equipping learners with practical skills to discover new experiences, knowledge, skills and values based on their prior knowledge and experiences.

Example:

In the lesson of discovering properties of air, a teacher should not take a lead in explaining the properties of air. But instead learners through various trial experiments, every learner will observe, smell, touch objects containing air and discover by themselves and the lesson will end after attaining the intended objectives; when every learner has found out the properties of air.

4.6. Summary of the unit

Every learner must be able to show that he/she has learnt / discovered, what was taught in a way that everyone is able to answer the question; “**What have you discovered in this lesson?**” The answers form the Summary of the unit and are in the pupil’s book.

4.7. Answers to End of Unit Assessment 4

(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 fire 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.

4.8 Additional activities

4.8.1. Remedial activities

1. 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

4.8.2. Consolidation activities

What are the 2 bad effects of wind?

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

4.8.3. Extended activities

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

- 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.

5.1. Key unit competence

To be able to explain the importance of soil, things that destroy soil and effects of water on soil.

5.2. Teaching and Learning Materials

Soil of all types, water, hoe, pictures/photos of different places with soil erosion, soil kept in transparent bottles.

5.3. List of lessons

Lessons	Objectives	Number of periods: 10
1. Types of Soil	- Identify types of soil	3
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	1
5. Measures to prevent soil damage	- List measures to prevent soil damage	1
6. End of unit Assessment		1

5.4. Prerequisites

For Learners to follow and understand effectively this unit, the teacher is advised to make enough research on the types of soil and soil composition generally, so that he/she is able to distinguish different types of soil based on texture or color.

He/she should also have sufficient knowledge on soil hazards, and practical ways to prevent soil destruction.

5.5. Key guidelines on teaching approach

The teacher in the lesson delivery must consider learner centered methods, giving learners enough time to discuss, while the teacher is facilitating and assisting learners with some challenges so as to enable learners to work and discover on their own.

The teacher must also give enough time to learners to observe, touch and feel teaching aids in groups to enhance discovery.

The teacher must also remember that teaching from known to unknown using the Essential Question is the best approach to effective and efficient teaching.

Example:

Lesson 1: Types of soil

- Example of Essential Question: Is the soil from hills similar to the soil from valleys? How do they differ?
- Learners visit different places/sites and collect soil in different transparent bottles.
- Pupils observe those soil samples, touch and feel texture, pour in water, compare, and even categorize them and name the categories.
- The teacher facilitates learners to accomplish tasks very well so as to achieve the set learning objectives.

5.6. Summary of the unit

Each learner must show that he/she has learnt and understood fully the lesson in a way that he/she will be able to answer the question; **“What have you discovered after this lesson?”** The answers form the Summary of the unit and are in the pupil’s book.

5.7. Answers to the End of Unit assessment 5

(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 modeling 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 modeling 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 modeling 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 off 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.

5.8. Additional activities

5.8.1. Remedial activities

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

5.8.2. 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.

5.8.3. 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.

6.1. Key unit competence

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

6.2. Teaching and Learning Materials

Different plants picked from school premises; (beans, maize, sorghum, banana, Eucalyptus, couch grass, star grass, euphorbia, tea coffee, black jack).

6.3. List of Lessons

Lessons	Objectives	Number of periods: 8
1. Main parts of the plant and their functions	<ul style="list-style-type: none">- List parts of a plant- Explain the functions of each part	3
2. Groups of plants	<ul style="list-style-type: none">- Identify groups of plants according to their uses	2
3. Importance of plants	<ul style="list-style-type: none">- List the importance of plants	2
4. End of unit Assessment		1

6.4. Prerequisites

For a teacher to successfully teach this Unit, he/she must know very well names of different natural and artificial plants, (in English). He / she should be able to differentiate them in terms of cultivable and non-cultivable plants. The teacher should also know parts of a plant and the importance of each part as well as the importance of various plants around his /her school premises.

6.5. Key guidelines on teaching approach

The teacher must ensure that the lesson is Learner – centered; letting learners to take a central place in the teaching and learning process while the teacher is only a facilitator.

The teacher must also ensure that learners visit three different places near the school premises to observe different plants so as to enable them distinguish between different plants found around their school area.

The teacher must take into account the fact that, introducing a lesson based on Essential Question helps learners to discover what they have got to learn, and it is the best way of teaching/ learning

Example:

Main parts of a plant and their functions

Proper planning and lesson delivery.

- The teacher asks, the Essential Question, to the whole class and will try to give possible answers.

Example: Why can't this tree fall down even when wind blows?

Answer;

Learners will respond by saying; it's because a tree has roots that holds it firmly in the soil even when a strong wind blow. (here learners will have discovered tree roots and their function).

- The teacher will continue asking various questions regarding the importance of different parts of a plant and learners will discuss in their groups as they try to find out appropriate answers, in that way they will take a lead in the lesson teaching and learning process.

6.6. Summary of the unit

Every pupil must show what he/she has learnt and be able to explain what he/she has discovered from this Unit. In other words, he/she should be able to answer this question; “What have you discovered in this lesson?” **The answers form the Summary of the unit and are in the pupil’s book.**

6.7. Answers to End of Unit Assessment 6

(Questions are in Pupil’s book)

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 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

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

Lemon.....				
		pinus,		
		grevillea		
		acacia,		
		bamboo		

6.8. Additional activities

6.8.1. Remedial activities

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

6.8.2. 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

6.8.3. 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.

7.1. Key unit competence

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

7.2. Teaching and Learning Materials

Sun, pressure lamp, fire, candle, kerosene lantern, lamp, bulb, match stick, gas lamp, firewood, glowing worm, moon, torch, clinical thermometer, iron box

7.3. List of lessons

Lessons	Learning Objectives	Number of Periods: 14
1. Source of light	List various sources of light	1
2. Meaning of darkness	Discover the source of darkness Differentiate darkness and shadow	1
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	1
4. Importance of light	Explain the importance of light on living things	2

5. Dangers of light and measures to avoid them	Discover the dangers of light on the eyes of a person Identify measures to avoid dangers of light	1
6. Sources of heat	List various sources of heat.	1
7. Importance of heat	Identify the importance of heat	1
8. Effects of heat	Identify the dangers of heat and measures to avoid dangers of heat	1
9. Types of heat measurements	Identify different types of thermometers - Distinguish the parts of a thermometer - Explain the use of the thermometer	1
10. Measuring body temperature	Measure body temperature	1
11. Relationship between sources of light and sources of heat	Explain relationship between sources of light and sources of heat	1
12. End of Unit Assessment		1

7.4. 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 be having 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.

7.5. Key guidelines on teaching approach

The teacher in the teaching process should ensure that it is learner centered. The teacher should only play a facilitation role.

He/she should allow learners to move outside the classroom to measure the distance of a shadow, observe the good and bad effects of light and heat on our surroundings.

He/she should allow and give learners enough time to try out on their own various experiments to make their own discoveries/ findings.

Example:

Lesson1: Sources of light

Lesson planning and delivery

The teacher gives the Essential question to the learners: “Where does light come from”? Pupils discuss in their groups and show the sources of light based on materials they know and use at home.

Learners will observe carefully Teaching and learning Materials the teacher brought in classroom and try to do some trial experiments to discover sources of light.

7.6. Summary of the unit

Each pupil should be able to show that he/she has learnt and understood fully all concepts he/she has been taught or discovered in this unit. In other words, to answer the question “What have you discovered after this lesson?” **The answers form the Summary of the unit and are in the pupil’s book.**

7.7. Answers to End of Unit Assessment 7

(Questions are in the Pupil’s book)

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 t 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 (charged torches), firefly, stars,

7.8. Additional activities

7.8.1. Remedial activities

1. Name two sources of light. Answer: Sun and Torch
2. Give one use of light. Answer: it helps us to see

7.8.2. Consolidation activities

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

7.8.3. Extended activities

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

Answer: - 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. Teaching and Learning Materials

Picture/photos of human sensory body parts, water, salt, glasses or cups, sugar, different types of juice, objects/ materials around the school where pupils pass.

8.3. List of lessons

Lessons	Learning Objectives	Number of Periods: 6
1. Human sensory organs: eye, ear, tongue, skin, nose	List the human sensory organs	1
2. Functions of the sensory organs	<ul style="list-style-type: none">- Explain functions of each human sensory organ- Detect and recognize various sounds, colors, smell and kinds of taste.	2
3. Ways of keeping human sensory organs healthy (washing, cleaning, brushing...)	<ul style="list-style-type: none">- List ways of keeping healthy sensory organs- Demonstrate how to take care of every sensory organ	2
4. End of Unit Assessment		1

8.4. Prerequisites

For a teacher to successfully teach this Unit, he/she must have enough knowledge on human body parts so as to enable him/her show the relationship between human body parts and human body sensory organs. He/she must know very well all human body sensory parts, their function, how to clean and maintain them safe.

8.5. Key guidelines on teaching approach

In teaching and learning process, the teacher must ensure that the lesson is learner centered while he/she takes the facilitation role, as well as preparing different activities and supporting the slow learners.

The teacher should not give direct answers to learners. He/she should instead guide them basing on their prior knowledge to enable them make their own discoveries in the process of working together in group discussions and answering questions asked by the teacher.

Example:

Lesson 1: Human sensory organs and their functions

Proper planning and delivery

The teacher gives Essential Question about one of the sensory organs. Learners will try to give their responses after their discussions in groups and observations.

Example:

Why is it that when it is cold, a person covers him/herself? How does he/she feel that the environment is cold?

Pupils will discuss in their groups, some will find out that it is because of coldness yet the body needs to be warm, others will discover that the skin detects warmth or coldness.

8.6. Summary of the unit

Each learner must show that he/she has learnt and understood what he/she was taught or discovered in this unit. In other words, he/she will answer this question very well: “What have you discovered after this lesson?” The answers form the Summary of the unit and are in the pupil’s book.

8.7. Answers to End of Unit Assessment 8

(Questions are in pupil’s book)

The assessment questions given in pupil’s book are like this;

1. *Match the function of sensory organ with its correct picture:*

Seeing	
Hearing	
Smelling	
Tasting	
Touching	

2. a) *No*
b) *Yes*
c) *Yes*
d) *Yes*

8.8. Additional activities

8.8.1. 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

8.8.2. 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

8.8.3. 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

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