Science

Teacher Guide

Primary Grade 3

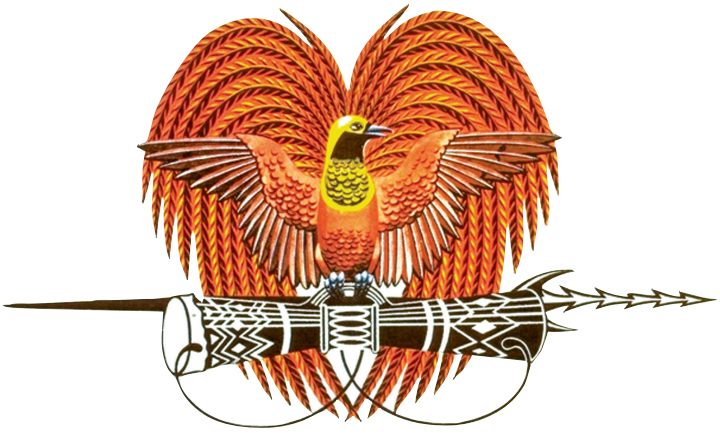
Standards Based

Papua New Guinea
Department of Education

Science
Teacher Guide

Primary
Grade 3

Standards Based



Papua New Guinea
Department of Education

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Secretary's Message

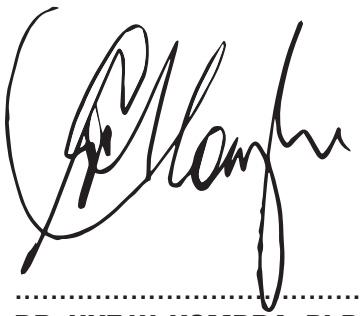
This Science Teacher Guide for Grade 3 was developed as a support document for the implementation of Science syllabus for grades 3, 4 & 5. The document provides guidelines for teachers on how to plan and program teaching and learning activities. It also contains sample guided lessons and assessments tasks with suggested teaching and learning strategies that teachers can use to work towards the achievement of content standards in the syllabus.

The Science subject is fundamental in life and a pillar for the ongoing and future development of this nation. Hence, it is critical to develop the learners' understanding of scientific concepts, skills and processes, and nurture the students' love for Science to enable them to be scientifically literate. This Teachers Guide will help teachers to expand the broad content from the syllabus into teachable programs. It has been designed with a view of making the students understand the basic scientific knowledge and skills in accordance with daily experience and prior knowledge about the environment.

The intention at this level is to set sound foundation for children to learn Science concepts and skills and to gradually develop the love for Science and expand the knowledge and understanding as they progress from one level to the next.

Teachers are encouraged to read this teacher guide carefully to become familiar with the content so that they can be confident to try out new concepts and strategies and to teach the content well. They can also adjust to suit the needs of the students needs.

I commend and approve this Grade 3 Science Teacher Guide to be used in all Primary Schools throughout Papua New Guinea.



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DR. UKE W. KOMBRA, PhD
Secretary for Education

Introduction

The teacher guide contains helpful information that you should read and familiarize yourself with before actual implementation. The information and guidelines provided in this book will assist you to interpret and translate the content prescribed in the Grade 3, 4 and 5 Primary Syllabus into teachable activities. The suggested teaching and learning ideas given are to assist you to plan quality science lessons when, where and how to use benchmarks in relation to the attainment of standards.

The teacher guide also guides you on how to create and design an active and interactive teaching and learning environment. It contains samples of assessment tasks that will help you to create assessment tasks that can be measured against the intended content standard. The teacher guide will give you an opportunity to prepare learning activities that will motivate your students to think critically and communicate ideas freely with other students in the class.

The content of this teacher guide features the following:

- key features of the subject
- teaching and learning strategies
- planning and programming
- content overview
- content background information
- samples of guided lessons
- assessment and reporting of the subject, and
- resource materials.

How to use the Teacher Guide

You are encouraged to use this Teacher Guide as the main reference to plan and implement the grade three contents as prescribed in the Grades 3, 4 & 5 Primary Science syllabus. For effective implementation of Science in grade 3, you are encouraged to do the following:

1. Read the teacher guide thoroughly and carefully.
2. Read the syllabus and become familiar with strands, units, content standards and performance standards which are further expanded in the teacher guide.
3. Take note of the ideas, strategies, and processes that you feel comfortable with and those you find difficulty with.
4. Meet with other teachers, discuss and share ideas to better understand the teacher guide. Below are suggestions on how you can improve your understanding.
   - use the teacher guide to do planning for the year's instructional programs.
   - conduct in-services on sections of the teacher guide to assist other teachers.
   - conduct awareness to other stake holders about the teacher guide.

Introduction

Key Features

The key features outlined in this section are identified as unique to Science and are important in the planning and teaching of sceince. The key features of the grade 3 to grade 5 Science subject emphasises recommended knowledge, skills and processes and provide ideas on how to teach Science without a laboratory.

Using the senses

Most people don't know what a scientist really does. Many people think a scientists spends his day mixing up chemicals in a laboratory. But a scientist is really like a detective. The scientist wants to find out why things happen. He or she starts by looking for clues. The scientist observes things very carefully. He or she uses his five senses.

Scientists describe the things they observe and write down descriptions. They do the experiments and often they measure things. They collect results and record them. If they are not satisfied with their results, they repeat the same experiment.

Scientific Processes and Skills

Scientific inquiry may be defined as the activities and processes which scientists and students engage in to study the natural and physical world around them. In its simplest form, scientific inquiry may be seen as consisting of two critical aspects: the what (content) and the how (process) of understanding the world we live in. Teaching science as inquiry must therefore go beyond merely presenting the facts and the outcomes of scientific investigations. Students need to be shown how the products of scientific investigations were derived by scientists and be provided opportunities to:

- ask questions about knowledge and issues that relate to their daily lives, society and the environment
- be actively engaged in the collection and use of evidence and
- formulate and communicate explanations based on scientific knowledge.

Through inquiry learning, students can acquire knowledge and understanding of their natural and physical world based on investigations, apply the skills and processes of inquiry and develop attitudes and values that are essential to the practice of science.

Introduction

The table below shows the degree of responsibility students have in posing and responding to questions, designing investigations, and evaluating and communicating their learning (student-directed inquiry) in an inquiry – based learning compared to the degree of involvement of the teacher (teacher-guided inquiry).

Essential features of Science as Inquiry	**More ⟷ Less Amount of Student Self-Direction / Amount of Guidance from Teacher Or Material**			**Less ⟷ More**
1. Question Students engage with an event, phenomenon or problem when they	pose a question	select among questions	sharpen or clarify questions provided	accept given questions
2. Evidence Students give priority to evidence when they	determine what constitutes evidence and collect it	are directed to collect certain data	are given data and told how to analyse	are given data and told how to analyse
3. Explanation Students construct explanations when they....	formulate their own explanation after summarizing evidence	are guided in process of formulating explanation from evidence	are given possible ways to use evidence to formulate explanation	are provided with evidence
4. Connection Students evaluate their explanations when they...	examine other resources and form links to explanations	are directed toward sources of knowledge	are given possible connections	are provided with connections
5. Communication Students communicate and justify their explanations when they.....	form reasona-ble and logical arguments to communicate explanations	are coached in development of communication	are provided guidelines for communication	are given steps and procedures for communication

Adapted from *Inquiry and the National Science Education Standards*, *National Research Council (2000)*

Science without a laboratory

Science processes and procedures can be taught and learned without a conventional Science laboratory. Science without a laboratory is a reality for Papua New Guinea primary schools. With this in mind, the Primary Science Grades 3, 4 & 5 Syllabus together with the teacher guides have been specifically designed to assist you to plan and design worthwhile learning opportunities for all students irrespective of the school's location.

Students and teachers are encouraged to use the resources that are readily available to them in their own surroundings. Students' safety is of great importance and should be guaranteed before actually using the improvised materials. Local knowledge and situations become very important in this approach.

Teaching and Learning Strategies

A primary purpose for inquiry – based instruction is for students to learn fundamental science concepts, principles, and theories as well as to develop science process skills and attitudes that are essential for scientific inquiry. Science teachers are already using a variety of teaching and learning strategies in their lessons. These strategies can be mixed and matched.

Concept Cartoon - in concept cartoons, minimal language is used. Visual images are utilised to present concepts or questions relating to one central idea or word.

Concept Mapping - this is a strategy to present meaningful relationships among concepts. Concept maps are useful in organising and linking concepts or ideas.

Co-operative Learning - activities are structured such that each student assumes certain responsibilities and contributes to the completion of tasks. In working with others, students are exposed to different points of views and solutions in accomplishing a common goal.

Demonstration - is commonly used to scaffold the learning process. This approach is recommended when the learning activity is not safe or too complex for students to set up on their own.

Field Trip - learning activity outside the school. It provides opportunities for students to explore, discover and experience science in everyday life.

Games - engage students in play or simulations for the learning of concepts or skills. This is useful in helping students to visualise or illustrate objects or processes in the real world.

Investigation - students engage in activities that mirror how scientists think and what they do in a decision making process, such as asking or posing questions and planning or designing investigations.

Problem Solving - engages students in finding solutions to problems by applying scientific knowledge and skills.

Projects - they are learning activities that require students to find out about an object, event, process or phenomenon over a few weeks.

Questioning - Questions are useful tools in the scientific inquiry process. Both teachers and students should engage in cycles of questions-answers-questions throughout the learning process.

Role Play, Drama, Dance and Movement - allow students to express their understanding of scientific concepts and processes in a creative way.

Stories - telling stories about everyday life where scientists can capture students interest and engage them in talking about science. Either the teacher or students can be the story creator or teller.

Strategies for Active and Independent Learning (SAIL)

The SAIL approach emphasises learning as a formative and developmental process in which instruction and assessment point the way for students to continuously learn and improve. Learning expectations and rubrics are used to describe what students should know and be able to do. This would help students know where they are in the learning process and how they can improve.

Information and Communication Technologies (ICT)

ICT supports the inquiry process and also facilitates student collaboration and self-directed learning. For example, online collaborative tools allow students to share and discuss their ideas or findings within the school, and also extend their learning through consulting field experts. Internet enabled devices could be used to facilitate data collection and analysis in situated learning. Students can also explore and visualise abstract concepts using simulations tools to manipulate the variables to deduce a relationship between the variables.

Teaching and Learning Strategies

What are some features of an inquiry classroom?

An inquiry classroom is visibly different from a traditional classroom in the following ways:

Inquiry Classroom	Traditional Classroom
Students often work in groups	Students tend to work alone
Emphasis on understanding of concepts	Emphasis on mastery of facts
Allows for pursuit of student questions	Follows a fixed curriculum closely
Activities rely on a variety of sources	Activities rely mainly on textbooks and workbook materials
Students are viewed as thinkers with their own theories about the world	Students are viewed as **"blank slates"**
Teachers facilitate an interactive learning environment	Teachers tend to disseminate information to students
Teachers seek to understand student learning	Teachers tend to seek correct answers
Assessment is interwoven with teaching	Assessment tends to be separate from teaching

Adapted from *In Search of Understanding: The Case for Constructivist Classrooms, Brooks & Brooks (1993).*

Although participation by students in hands-on activities is desirable, it is equally important that they are mentally engaged with scientific reasoning and methods. Research indicates that science process skills are best learnt when used to understand specific scientific content. Understanding content without process or vice versa is insufficient to nurture students as inquirers.

Safety for Primary Students

When teaching Science ,teachers must ensure that students know how to follow safety guidelines and handle apparatus with care. Safety must be given the highest priority. Correct and safe techniques, as well as a wise selection of experiments, resources, materials, and field experiences appropriate to age levels, must be carefully considered regarding the safety precautions for every instructional activity.
While no comprehensive list exists to cover all situations, the following should be reviewed to avoid potential safety problems. Appropriate safety procedures should be used in the following situations:

- observing wildlife; handling living and preserved organisms; and coming in contact with natural hazards, such as poison ivy, ticks, mushrooms, insects, spiders, poisonous plants and snakes,
- engaging in field activities in, near, or over bodies of water,
- handling glass tubing and other glassware, sharp objects, and lab ware,
- handling natural gas burners, Bunsen burners, and other sources of flame or heat,
- working in or with direct sunlight (sunburn and eye damage),
- handling chemicals and other hazardous substances.

Students with special needs (Inclusive Learning)

Some students have special needs. This includes students who are gifted and those who are disadvantaged. Gifted students should be given opportunities to extend their learning. Students with physical or intellectual impairments and emotional or learning difficulties need special support in the classroom. Teachers have a responsibility to ensure that the learning needs of these students are met. All students are individuals and all have the right to quality education in order to reach their full potential.

Planning and Programming

Planning and Programming is organising the content from the syllabus into teachable plans for delivery in the classroom using approaches such as long, medium, short term plans. For example:

- yearly overview is a long term plan
- termly overview is medium term plan and
- weekly and daily plans are short term plans.

Yearly Plan

When planning an instructional program begin with the yearly plan. The yearly plan is organised by terms in a school year. The main or key information that forms the content of the plan are provided in both the syllabus and the teacher guide. These are the;

- strands,
- units and,
- content standards.

Weekly Plan

A weekly plan of the program of instruction is a plan of an instruction program for teaching and gives the teacher specific outline of the Units, Content Standards and Performance Standards for instruction (teaching) which the teacher follows in a term. This guides the teacher to organize the teaching program for the number of weeks in each term.
To compile a plan for a week's program teachers will need to organize the plan using the:

- units
- content standards
- performance standards
- lesson titles.

Teachers should use the term overview to see the order of units organised, and then use this order to plan the weekly program. The weekly plan is implemented through a timetable that is planned for the subjects in the Primary level.

Planning and Programming

Timetable

Sample Timetable

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 - 8:15	Assembly	Assembly	Assembly	Assembly	Assembly
8:15 - 8:30	Listening	Oral Expression	Listening	Oral Expression	Listening
8:30 - 9:00	Spelling	Spelling	Mathematics	Spelling	Social Science
9:00 - 9:30	Talking	Talking	Talking	Mathematics	Mathematics
9:30 - 10:00	Written Sentences	Written Sentences	Written Sentences	Written Sentences	Written Sentences
10:00 -10:30	← **RECESS** →				
10:30 - 11:00	Reading	Reading	Reading	Reading	Reading
11:00 - 11:30	Science	Mathematics	Science	Science	Written Expression
11:30 - 12:00	Social Science	Social Science	Social Science	Science	SocialScience
12:00-1:00	← **LUNCH** →				
1:00 - 1:30	Mathematics	Science	Mathematics	Mathematics	Mathematics
1:30 - 2:00	Health	Science	Health	Arts	Arts
2:00 - 2:30	Arts	Health	PE	PE	Sports
2:30 - 3:00	PE	Arts	Hand writing		

Sample Time break up

Subjects	Time analysis		Time variation	
	Min Per Less	Recom. Time	+	-
Listening	3 x 15	45		
Talking	4 x 15	60	15	
Oral expression	2 x 15	30		
Reading	5 x 30	150		
Written Sentences	5 x 30	150		
Hand writing	1 x 15	15	15	
Spelling	2 x 15	30	15	
Written Expression	1 x 30	30		
Mathematics	8 x 30	240		
Science	2 x 30 + 2 x 60	180	15	
S/Science	5 x 30	150		
Health	3 x 30	90		30
Arts	3 x 30 + 1 x 45	135		
Physical Education	2 x 30 + 1 x 60	120		
Sports	1 x 60	60		
R/Education	1 x 60	60		
Assembly	5 x 15	75		
Block Time	3 x15	45		30
		1650	**60**	**60**

Content Overview

This section presents the overview of Science content scope for grade three. The content is organised into the following:

- Life
- Physical Science and
- Earth and Space.

These broad learning areas are known as strands. From these strands, units are developed and drawn from the units are topics. The overview below will help you understand the process in identifying the scope of the content of learning – strand, units and topics are translated into content standards.

Here is the scope of learning for grade three (3) in Primary Schools.

Content Scope of Learning for Primary Science Grade 3

Strand	Unit	Grade 3	Grade 4	Grade 5
		Topic	Topic	Topic
Life	Plants	• Plant parts and their functions	• Life cycle of plants	• Plant growth
	Animals	• Animal parts and their functions	• Life cycle of animals	• Reproduction and heredity of animals
	Human Being		• Skeletal and Muscular system	
	Interaction and Relationship in the environment	• Observing our Environment	• Living things in the environment	• Habitat and adaptation • Energy in Food
Physical Science	Energy	• Energy • Light • Magnet	• Sound • Electricity 1	• Heat • Electricity 2
	Force and motion	• Moving objects	• Forces, motion and machines	• Motion and machines
	Matter	• Properties of matter • Substances and mixtures	• Air • Matter changes	• Three states of matter • New matter
Earth and Space	Our Earth	• The Earth • Rocks • Soil	• Importance of soil for human being	• Rocks, minerals and fossils
	Weather and climate		• Observing weather	• Weather and seasons
	Space	• Observing the sun	• Observing the moon	

Content Overview

Yearly Overview

The yearly overview is a plan designed to organise the learning content for grade three students in primary schools.

<table>
<tr><th>Week</th><th>Term 1</th><th>Term 2</th><th>Term 3</th><th>Term 4</th></tr>
<tr><td>1</td><td>Orientation
Revision Work</td><td>Revision Work</td><td>Revision Work</td><td>Revision Work</td></tr>
<tr><td>2
3</td><td rowspan="2">LIFE
Observing our Environment</td><td rowspan="3">LIFE
Plants parts and their functions</td><td>Physical Science
Energy around us</td><td>Earth and Space
The Earth</td></tr>
<tr><td>4</td><td>Physical Science
Properties of Light</td><td>Earth and Space
Rocks and soil</td></tr>
<tr><td>5</td><td rowspan="4">Physical Science
Properties of Matter</td><td rowspan="2">Physical Science
Moving objects</td><td rowspan="2">Physical Science
Energy (Magnets)</td></tr>
<tr><td>6</td><td>LIFE
Animal parts and their functions</td></tr>
<tr><td>7
8</td><td rowspan="2">Earth and Space
Observing the Sun</td><td rowspan="2">Report Writing</td></tr>
<tr><td>9</td><td></td></tr>
<tr><td>10</td><td colspan="3">Testing and Compiling of Marks</td><td>Speech Day</td></tr>
</table>

Content Overview

Termly Overview

The term overview is a plan of an instructional program for teaching. It provides the teacher with the specific units, topics and lesson titles suggested to be planned and delivered within a term. The term overview is organised by the:

- strand
- unit
- topic.

Term 1 overview

Week	Strand	Unit	Topic	Lesson title	Periods/s (30mins)
1	Orientation and Revision Work				
2	Life	Interaction and Relationship in the Environment	Observing the Environment	Components of the environment	1
				Man-made and Natural Environment	1
				Types of Natural Environment – Rainforest, Grassland, Rivers	2
3				Living things in the environment	1
				Non-living things in the environment	1
				Classifying living things	1
				Classifying non-living things	1
4				Relationship between living and non-living things	1
				Where do plants grow?	1
				Where do animals live?	1
				Living things depend on the environment	1
				Unit Review	1
5	Physical Science	Matter	Properties of Matter	What is matter?	1
				Classifying matter-Physical properties	2
				Comparing weight of matter	2
6				Matter takes up space	2
				Let's measure the weight of the object by changing its shape and volume	2
7				Unit Review	1
				Daily Mixtures	1
				Mixtures and substances	1
8				Properties of mixtures	1
				Separating mixtures - filtration	2
9				Separating mixtures - sieving	2
				Unit Review	1
10				Testing and Compiling of Marks	

Content Overview

Term 2 overview

Week	Strand	Unit	Topic	Lesson title	Periods (30mins)
1	Revision Work				2
2	Life	Plants	Plants parts and their functions	Plants Around Us	1
				Parts of a plant	2
				Classification of Leaves (i)	2
3				Classification of Leaves (ii)	1
				Classification of Plants according to roots	2
				Classification of Flowers	1
4				My Flower Collection	1
				Classification of plants according to their stem	1
				Functions of plant part	1
5				Basic needs of plants	2
				Uses of plants	1
				Unit Review	
6	Life	Animals	Animal parts and their functions	Body parts of an insect and their functions	1
				Body parts of a bird and their functions	1
				Body parts of a fish and their functions	1
				Body parts of a frog and their functions	1
7				Body parts of a dog and their functions	1
				How do animals feed?	1
				How do animals move?	1
				Classifying animals based on how they move	2
				Basic needs of animals	1
8				Unit Review	1
	Earth and space	Space	Observing the Sun	What is the Sun?	1
				Importance of the sun to living things	2
				Observing shadows	2
9				Movement of the sun and the position of the shadow	2
				Movement of the Sun	1
				Day or night	1
10	Testing and Compiling of Marks				

Content Overview

Term 3 overview

Week	Strand	Unit	Topic	Lesson title	Periods (30 mins)
1	Revision work				
2	Physical Science	Energy	Energy around us	What is energy?	1
				Properties of energy	2
				Different types of energy	2
3				Uses of energy	2
4		Light	Properties of light	Sources of light	1
				Properties of Light	2
				Can light pass through?	2
5				How can you see an object	1
				How is shadow formed?	1
				Unit review	1
6		Force & Motion	Moving objects	What is a force?	1
				Types of forces- pushing and pulling	1
7				Function of force	1
				What is a simple machine?	1
8				Types of simple machine – Incline plane	2
				Types of simple machine – lever	2
				Types of simple machine – pulley	2
9				Daily uses of simple machines	2
				Unit Review	1
10	Testing and compiling of assessment				

Content Overview

Term 4 overview

Week	Strand	Unit	Topic	Lesson title	Periods (30 mins)
1				Revision Work	
2	Earth and Space	Our earth	The Earth	What is the Earth made of?	1
				Types of Natural Resources	2
				Uses of Natural Resources	2
				Uses of trees to humans	1
				Uses of soil to humans	1
3				Use of the sea	1
				Review	1
		Our earth	Rock and Soil	Observing rocks	1
				Components of rocks	1
				Types of rocks and minerals	2
				Review	1
4				What is soil?	1
				Components of soil	1
				Classification of soil	1
				How much water can you hold?	2
				Importance of soil for plants	2
				Importance of soil for animals	1
5				Unit Review	1
6	Physical Science	Energy	Magnet	Materials attracted to a magnet	1
				Magnetic and non-magnetic materials	2
7				Properties of magnets	1
				Effects of magnets	2
				Strong and weak points of a magnet	1
8				Earth – a big magnet	2
				Locating North and south direction using a magnet	1
				Using magnets to make toys	2
				Review	1
9				Assessment and Report Writing	
10				Speech day Preparation	

Content Overview

Yearly Lesson Overview

The yearly lesson overview has the lesson titles which are organised from term 1- 4 for the year. There are **99** lessons altogether including the revision lesson/follow-up lessons. These lesson titles are expected to be taught by grade 3 teachers throughout the country.

Strand	Unit	Main topic	Sub topic	Lesson	Suggested Lesson Title
Life	Interaction and relationship in the Environment	Observing Our Environment	1-1 Environment Around Us	1	Components of the environment
				2	Man-made and Natural Environment
				3	Types of Natural Environment - Rainforest, Grassland, Rivers
			1-2 Living Things and in the Environment	4	Living things in the environment
				5	Non-living things in the environment
				6	Classifying living things
				7	Classifying non-living things
			1-3 Interaction Between Living Things and Environment	8	Relationship between living and non-living things
				9	Where do plants grow?
				10	Where do animals live?
				11	Living things depend on the environment
			Review	12	Unit Review
Physical Science	Matter	Properties of Matter	2-1 Describing Matter	13	What is matter?
				14	Classifying matter-Physical properties
			2-2. Comparing Matter	15	Comparing weight of matter
				16	Matter takes up space
			2-3. Measuring Matter	17	Lets measure the weight of the object by changing its shape and volume
				18	Unit Review
			2 - 4. Mixtures	19	Daily Mixtures
				20	Mixtures and substances
				21	Properties of mixtures
				22	Separating mixtures- filtration
				23	Separating mixtures- sieving
			Review	24	Unit Review
Life	Plants	Plant Parts and their Functions	3 - 1. Parts of Plants	25	Plants Around Us
				26	Parts of a plant
				27	Classification Leaves (i)
				28	Classification of Leaves (ii)
				29	Classification of Plants according to their roots
				30	Classification of plants according to flowers
				31	My Flower Collection

Content Overview

Strand	Unit	Main topic	Sub topic	Lesson	Suggested Lesson Title
Life	Plants	Plant Parts and their Functions		32	Classification of plants according to their stem
			3 - 2. Functions of Plant Parts	33	Functions of plant part
			3 - 3. Basic Needs of Plants	34	Basic needs of plants
			3 - 4.Uses of Plants	35	Uses of plants
			Review	36	Unit Review
Life	Animals	Animal Parts and their Function	4-1. Body Parts of Animals	37	Animals Around Us
				38	Body parts of an insect and their functions
				39	Body parts of a bird and their functions
				40	Body parts of a fish and their functions
				41	Body parts of a frog and their functions
				42	Body parts of a dog and their functions
				43	How do animals feed?
			4-2. Uses of Body parts	44	How do animals move?
				45	Classifying animals based on how they move
			4-3. Basic needs of Animals	46	Basic needs of animals
			Review	47	Unit Review
Earht and Space	Space	Observing the sun	5 - 1. Properties of the Sun	48	What is the Sun?
				49	Importance of the sun to living things
			5 - 2. Movement of the Sun	50	Observing shadows
				51	Movement of the sun and the position of the shadow
			5 - 3. Day and Night	52	Movement of the Sun
				53	Day or night
Physical Science	Energy	Energy	6 -1. Energy Around Us	54	What is Energy?
				55	Properties of energy
				56	Different types of energy
				57	Uses of energy
				58	Sources of light
		Light	7-1. Properties of Light	59	Properties of Light
				60	Can light pass through?
				61	How can you see an object
				62	How is shadow formed?
				63	Unit Review
		Force and Motion	8 -1. Objects in Motion	64	What is a force?
				65	Types of forces- pushing and pulling
				66	Function of Force
				67	What is a simple machine?

Content Overview

Strand	Unit	Main topic	Sub topic	Lesson	Suggested Lesson Title
Physical Science	Force & Energy	Force	8-2. Simple Machines	68	Types of simple machine – Incline plane
				69	Types of simple machine – lever
				70	Types of simple machine – pulley
				71	Daily use of Simple Machines
				72	Review
Earth and Sapce	Our Earth		9-1. The Earth	73	What is the Earth made of?
				74	Types of Natural Resources
				75	Uses of Natural Resources
				76	Uses of trees to humans
				77	Uses of soil to humans
				78	Use of the sea
				79	Review
			10.1 Rocks and Minerals	80	Observing rocks
				81	Components of rocks
				82	Types of rocks and minerals
				83	Review
			10.2 Properties of Soil	84	What is soil?
				85	Components of soil
				86	Classification of soil
				87	How much water can you hold?
				88	Importance of soil for plants
				89	Importance of soil for animals
				90	Unit Review
Physical Science	Energy	Magnet	11-1. Properties of Magnet	91	Materials attracted to a magnet
				92	Magnetic and non-magnetic materials
				93	Properties of magnets
				94	Effects of magnets
				95	Strong and weak points of a magnet
				96	Earth –a big magnet
				97	Locating North and south direction using a magnet
				98	Using magnets to make toys
				99	Review

Background Information

The background information will assist teachers who are not familiar with the content of a particular unit or topic to enhance his or her planning and to teach with confidence in the classroom. As most primary teachers are generalist and not specialist in subject matter, it is important that for each unit in the syllabus, there is background content information for the teachers to use. Secondly, most Primary Schools in Papua New Guinea are situated in the remotest areas do not have sufficient resource books. This section will provide content and technical understanding for teachers to develop daily teaching plans.

Strand 1: Life

Unit 1: Plants

Topic: Plant parts and their functions

Parts of plants

- Basic parts of most plants are roots, stems, leaves and flowers

Table 1: Parts of a Plant and their functions

Parts of a Plant	Functions of plant parts
1. Flower	Make fruits that hold seeds.
2. Leaf	Use light, air, water, and nutrients to make food for the plant.
3. Stem	Holds up the plant and moves water and nutrients through it.
4. Root	Hold the plant in the soil and takes in water and nutrients from the soil.

Some of the common plants in Papua New Guinea are;

- Hibiscus flower
- Bougainvillea flower
- Sun flower
- Periwinkle flower
- Orchid
- Herliconia
- Aloe Vera
- Morning glory.

Figure 1: Example of Flowering plant

Background Information

There are many different kinds of plants. If you look at different plants you will notice many things that are different but also things that are the similar. We know that most plants have stems, roots and leaves, and that many others have flowers, seeds and fruit. If we want to compare plants, we can compare these plant structures.

You can look at the different structures of plants and compare their:

- size
- color
- shape.

Basic needs of plants

- All living things grow and change.
- All living things need **sunlight, food, water,** and **air** to live.

1. Sunlight

Plants need sunlight to grow and live. Green plants use sunlight, water and carbon dioxide gas to make food.

2. Air

Just like animals and people, plants also need air to live and grow. Plants use carbon dioxide to make food so that they can grow.

3. Water

Plants need water to grow and to make food. Some plants need more water than others. The amount of water a plant needs depends on the type of plant. If the plant does not get the amount of water it needs it will die. Some plants are able to grow in very dry areas, such as cacti in the desert. These plants have adapted (changed) over many, many years to be able to survive in these conditions.

4. Nutrients or minerals from the soil

Most plants grow well if they are planted in soil. Their roots absorb the dissolved nutrients from the soil. Plants are anchored in the soil by their roots. To make sure plants get enough of these mineral nutrients we often add some fertilizer or compost to the soil.

Background Information

Unit 2: Animals

Topic: Animal parts and their Functions

Body parts of animals and their uses

Animals look different from each other. They have different physical characteristics. These physical characteristics help animals to meet their needs. For example, animals have different body parts to help them move and eat. Animals act in different ways. Animals have different behaviours. These behaviours help animals meet their needs. Animals can survive because they react and behave in certain ways.

Table 1: Body parts of animals and their uses

Animal	Body parts	Uses
1. Mammals	Hair/fur	Covers part of their bodies and keep their body warm
	Eyes	Helps the mammal to see the surroundings
	Legs	Some mammals have four legs while some have two legs. These legs help the mammals to move around from one place to another.
2. Birds	Beak	Helps to crush and crack seeds and grains to make it softer before eating.
	Wings	Help birds to fly.
	Claws	The feet and claws can be used for climbing, protecting, holding food, swimming and perching.
	Tail	Tail balances the body during flight
3. Fish	Fins	Allows the fish to stay upright, move and maneuver in the water.
	Spine	Hard structure that supports the fins and is used for defense.
	Tail fin	Helps to propel the fish.
	Scales	Protective gear covers on fish that prevents injury or disease and also indicates age.
	Gills	Supplies the fish with oxygen that they need from water. Gills are one of the important parts on a fish.
4. Amphibians (frog)	Eyes	The eyes bulge out enabling the frog to see in almost all directions.
	Feet	The feet are webbed to help the frog swim.
	Hind legs	Frogs have powerful hind legs which they use for jumping.
	Forelegs	The small front legs prop the frog up when it sits.

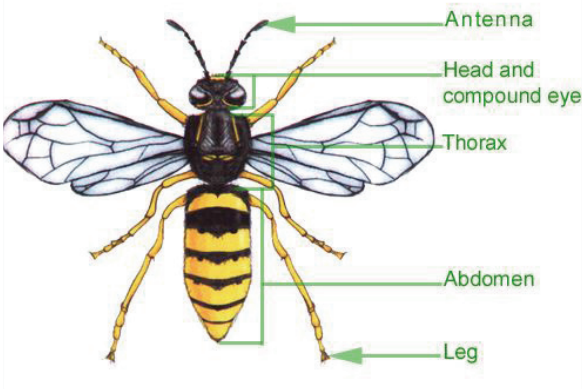
Background Information

Animal	Body parts	Uses
5. Reptiles	claws	Claws help reptiles to dig, climb and defend themselves
	feet	Some of their feet and webbed which helps them to move
	shell	Some reptiles like turtles use their shell which is a hard protective covering to defend and protect themselves.
	scales	Scales on some reptiles like snake assist with movement and can help protect them from predator and also retain moisture by preventing the evaporation of water thought the skin.

Basic needs of animals

- In order to survive, animals need air, water, food and shelter (protection from predators and the environment).

Body parts of an insect



- An insect's body is divided into three regions:
  1. **The head**
  2. **The thorax**
  3. **The abdomen.**

- The most visible parts of the body of an adult insect are;
  - head,
  - antennae,
  - mouth parts,
  - thorax,
  - wings and the
  - abdomen
- The **head** is the anterior of the three body regions of an adult insect. It bears the eyes (usually a pair of the compound eyes, the **antennae** and the **mouthparts**.
- The **thorax** is the middle of the three body regions of an adult insect. It is composed of 3 segments. It bears 3 pairs of **legs** (one on each segment) and usually 2 pairs of wings. Some insects have only one pair of **wings.**
- The **abdomen** is the posterior of the three regions of an adult insect. It is composed of 11 segments. The abdomen bears the external genitalia of the insect. In female insects these consists of an ovipositor.
- The adult insect has 2 pairs of **wings**, but for some (for example flies) have only 1 pair of wings. Usually the wings are membranous but in some insects they can be leathery or hard. Sometimes the wings bear small hairs or scales.
- Adult insects have 6 **legs.** Each segments of the **thorax** bears 1 pair of legs. The legs are segmented. Often the last segment of the leg bears a small claw. In some insects, the legs are specially adapted for jumping.
- The **head** of most adult insects bears a pair of **antennae.** Insects use the **antennae** to detect odors or they use them as tactile (touch) organs. Antennae of different insects are very variable in form and size.
- The **mouthparts** of an adult insect can be of different types. In many species they are of the chewing type, for example in **grasshoppers** and **beetles**. Others have **sucking mouthparts** for example shaped like stylets in bugs and aphids or shaped like a coiled tongue in **butterfly** and **moths**. The different types of mouthparts determine how the insect feeds.

Background Information

Unit 4: Interaction and Relationship in the Environment

Topic: Observing our environment

Environment around us

- All physical surroundings on Earth are called the environment. The **environment** consists of all **living** and **non-living** things which surround us.
- There are two main categories of environments. The physical and biological environments are different because the physical environment focuses on the earth, water and the atmosphere while a biological environment focuses around the living things that make up the environment.
- The basic **components** of the environment are;
  1. The air
  2. The water
  3. The rocks and soil or the earth
- **Natural environment** are environment that are entirely natural, they therefore form 'Natural environment. *Examples* of natural environment are forest,sea,grassland.
- There are many things which are made by man. They are called **man-made** things. Man has made things to satisfy his needs. Man-made environment are environment which are created by human being. *Example of* village, town
- Human beings, plants and animals are some examples of living things. Even though plants cannot move from one place to another, they move their stems to face the sun; hence they are also living things.

Living things and Non-living things in the environment

- Things which cannot grow, move, breathe and reproduce are called **non-living things.** Certain non-living things like mountains, rivers, clouds, rain are also natural. These things are the gifts of nature; remember we cannot make these things ourselves.
- Living and non-living things interact with each other by forming an ecosystem, where living things can obtain nutrients
- All the parts of an **environment** work together. Every living thing in an environment depends in some way upon other **living** and **non-living** things in the environment. A wide variety of plants use sunlight, water carbon dioxide, soil, temperature and rainfall to grow in this environment.
- Examples of the relationship between living and non-living things include plants getting minerals from the soil and making food using the sunlight.
- Everything that is living needs a home. A plant is a living thing. Because there are many different kinds of plants they grow in many different places. The place that a plant lives is called a habitat. There are many different habitats that make a home for plants. Some plants grow in hot dry places like in a desert. The desert is a habitat. These plants do not need as much water as other types of plants.
- Some plants grow in forest or caves that get very little sunlight. This is a special home just made for these plants. Some plants even grow in water, lakes, and rivers and even in the ocean.
- Some animals live on land like wallaby, cow and pig, etc. Some animals live on trees like cuscus, tree kangaroo, etc. Some animals live in water like fish, octopus, shark, etc. Some animals live on land as well as in water like crocodile, tortoise, frog, etc.

Background Information

Strand 2: Physical Science

Unit 1: Energy

Topic: Energy

Types of energy

There are different types of energy. The two main types are;

a) **Potential Energy** - is stored energy. This energy is referd to as potential energy because if it were released, it would do a lot of work.

b) **Kinetic Energy** – is energy in motion. Moving water and wind are good examples of kinetic energy.

Other types of energy

c) **Mechanical energy** - is the energy of motion that does work. Example, the wind turning a windmill.

d) **Chemical energy** - is energy caused by chemical reaction. Example food when cooked.

e) **Electrical energy** - when electricity creates motion, light or heat.

f) **Heat energy** - is energy that is pushed into motion by using heat.

Properties of light

- Light travels in a straight line.
- Light travels much faster than sound.
- We see things because they reflect light into our eyes.
- Shadows are formed when light is blocked by an object.

Transparent, Translucent and opaque objects

- Light transmission capacity varies from object to object.
- Transparent objects allow all the light to pass through them,
- Translucent objects allow partial light to pass through.
- Opaque objects allow no light to pass through.

Density of materials

The amount of light that can pass through an object depends on its density; Opaque objects are the densest, thus allowing no light to pass through. Translucent objects are less in density, whereas the transparent ones are the least dense.

- **Refraction** is the bending of light as it passes from one substance to another.
- Refraction occurs because light bends. A lens is a piece of transparent material. It is usually made of glass and has at least one curved surface. For example **concave** and **convex lens.**
- A **concave lens** is thinner in the middle and thicker at the edges.

A concave lens is also called diverging lens. A concave lens will disperse light and make an image.

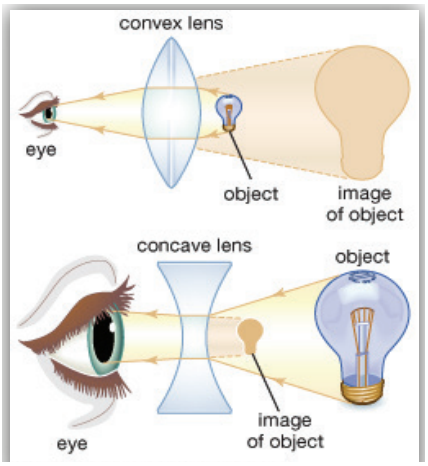


Figure 1: Convex and Concave lens

Background Information

- A **convex lens** is thicker in the middle and thinner at the edges. A convex lens is called a converging lens. A convex lens will focus light and make an image.
- A convex lens makes the objects look larger and further away. Convex lenses correct far sightedness.
- A concave lens makes objects look smaller and closer. Concave lenses correct near sightedness
- **Reflection** occurs when light ray hits a surface and bounces off. The angle at which they ray hits the surface is equal to the angle at which it bounces.
- Reflections are usually caused by shiny things, such as mirrors, that show a reversed image of whatever is placed in front of them.

Characteristics of magnet

- Magnetism is the force of attraction or repulsion of a magnetic material.
- Like poles repel each other and unlike poles attract each other.
- Poles of a magnet always come in pairs, if you cut a magnet in half; you get two (2) magnets.
- Magnetic material that can both attract and repel other magnets. Iron is most common.
- Part of the magnet where the force is the strongest is known as the pole Each magnet has two poles – **north** and **south.**
- Material that is often attracted to magnets and a good electrical conductor is metal.
- Magnets come in all shapes and size such as bar magnet, Horseshoe magnet and U-shaped magnet.

Figure 4b: Horse shoe and bar magnet

Uses of magnets in daily life

Magnets have a lot of uses in daily life. They are;

- used in electrical bells,
- used in TV screens, computer screen, telephone and tape recorders,
- used in the refrigerators to keep the door close,
- used to sort out the magnetic and non-magnetic substances from scrap,
- used to construct the electric motors and generators which convert electrical energy into mechanical energy and vice versa,
- used in magnetic compass which is used to find the geographical directions.

Background Information

Unit 2: Force and Motion

Topic: Moving Objects

Objects in motion

- A force is a push or pull
- Motion of an object changes when a force acts upon the object.
- An object remains in motion, or at rest, unless a force acts on it.
- Always a change in the position of an object.
- Sometimes it may involve a change in direction too.
- Friction is a common force that stops things moving or slow things down.

Figure 1: Object at rest

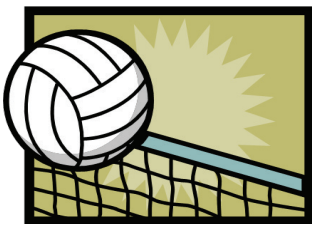


Figure 2: Motion of an object changes when a force acts upon it.

Simple machines

- Simple machines are tools that make work easier.
- A **lever** is a simple machine that has a stiff bar that moves about on a fixed point (fulcrum).
- A lever is used to push, pull or lift things. *For example;* shovel, see-saw.
- A **pulley** is a simple machine that has a wheel that holds a rope or a cable around it.
- A pulley can be used to lift heavy objects by changing the direction or amount of force. *For example;* a flagpole uses a pulley to raise the flag.
- An **inclined plane** is a simple machine that has a flat surface that is raised so that one end is higher than other.
- An incline plane helps move heavy objects up or down. *For example;* a ramp is an example of an incline plane.

a) Flagpole - pulley

b) Sea-saw - lever

c) Ramp - inclined plane

Figure 3: Examples of pulley, lever and inclined plane

Background Information

Unit 3: Matter

Topic: Properties of matter

Describing matter

Matter is anything that has **mass** and **takes up space (volume)**.**Mass** is the amount of matter in an object and is measured with a balance.
Volume is the amount of space an object takes up and is measured with a ruler or graduated cylinder.

- Physical properties are characteristics or features that describe matter. Some examples include;
  - Color
  - size
  - shape
  - texture/hardness

Comparing properties of weight
Comparing the weights of objects lets you know that some are heavy and others are light. Size and weight are not always related and that big objects can sometimes be light and that small objects can sometimes be heavy.

- **Volume** is a measure of the size of an object, just like height and width are ways to describe size.
- **Density** is an amount of mass in a given space. It is a way to measure how thick an object is. The denser an object is, the less likely it is to float.

Mixtures and substances
Matter can be classified into two groups;

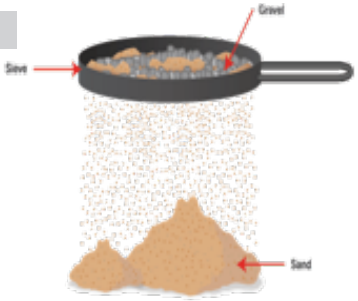
1. pure substance
2. mixtures

Pure substance is a matter that has the same composition and properties throughout. A *mixture* is a combination of two or more substances where each substance retains its own identity.

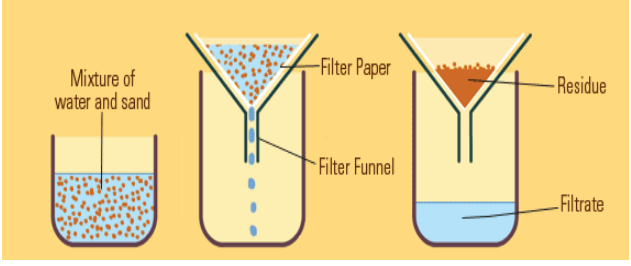
Separating mixtures
Substances in a mixture are physically combined and so they can be separated using these processes such as filtering and sieving. **Filtration** is a method used to separate mixtures composed of solids and liquids where solids are taken out of liquid. *For example,* mixture of sand and water.
The filtration process involves the use of a filter paper placed in the filter funnel. The funnel is placed in a beaker and the mixture of water and sand is poured into the funnel. The liquid part drains through the filter paper into the beaker, leaving the solid sand particles trapped on the filter. In **filtration**, the liquid part collected is called the filtrate and the solid bit the remained on the filter paper is called the **residue.**

- Sieving is a method used to separate solids of different sizes

Sieving method



Filtration method



Background Information

Strand 3: Earth and Space

Unit 1: Our Earth

Topic: The Earth

Surface of the Earth

The different types of surface features include mountains plains, valleys, bodies of water (rivers, oceans, lakes) and deserts.

Natural Resources

A natural resource is anything that people can use which comes from nature. People do not make natural resources, but gather them from the Earth. Example of natural resources are;

- air
- water
- trees
- iron
- coal.

Natural resources can be *renewable* such as water, trees **or** non- renewable resource such as natural gas, oil, copper. Natural resources provide us with the things we need in order to live, including food, clothing, water, air, shelter, land, and energy. Many natural resources are limited and cannot be renewed. Other resources are limited and cannot be renewed, but they may last a very long time.

Properties of rocks and minerals

1. Rocks are made of minerals.
2. Minerals are not made by people, they are naturally occurring substances.
3. Rocks and minerals are related but have different characteristics.

Table 1: Comparison of the characteristics of minerals and rocks

Characteristics of minerals and rocks	
Minerals	**Rocks**
Pure (made of same substance)	More than one mineral
Some have crystals	No single crystals
Pure (made of same substance)	Not usually as pretty
Usually pretty	No definite shape
Pure (made of same substance)	Colour is not the same
Usually have a shape	Some have fossils

Scientist use four (4) properties to identify minerals. They are colour, lustre, streak and hardness.

Background Information

Characteristics of soil

Soils are mixtures of minerals, water, air and many organisms that are decaying remains of once -living things. There are five (5) components of soil

1. **Rock** - is solid and made of mineral.
2. **Sand** - is made up of tiny grains of worn down rock. It doesn't hold water and has few nutrients.
3. **Silt** - is very small, broken pieces of rock. It is larger than clay, but smaller than sand. It is powdery when dry.
4. **Clay** - holds water well, it is sticky and can be shaped when it is wet. But, it is very hard when dry. Clay has many nutrients.
5. **Humus** - is made of leaves, twigs, small animals, or other decayed substances. Humus adds many nutrients to the soil and is in the topsoil.

Soil classification is the separation of soil into groups each having similar characteristics. The three (3) types of soils are sandy, loamy and clay.

Table 2: Characteristics of the three (3) types of soil

Characteristics of the three (3) types of soil	
1. Loamy soil	This type of soil has very fine particles and contains humus for supporting plant growth and is commonly used for growing food.
2. Sandy soil	This type of soil is known for its large particles and rough texture and allows water to pass through it quickly.
3.Clay soil	This type of soil has the finest particles of all soils and holds water well.

Importance of soil for living things

1. Soils store water for plants.
2. Soils provide habitat for animals that live the in the soil such as mice, worm.
3. Soil supports plant life and is important to life on Earth.
4. Soil is one of the most important things on our planet. It is important for the plants and animals.

Background Information

Unit 2: Space

Topic: Observing the Sun

Properties of the Sun

The sun gives life to the Earth and the Earth would have no life at all without energy it receives from the sun.

Movement of the Sun

During the day, the Sun appears to move through the sky. This happens because the Earth is spinning on its axis. In Papua New Guinea if we look south and follow the path of the Sun in the sky during the day, it looks like this;

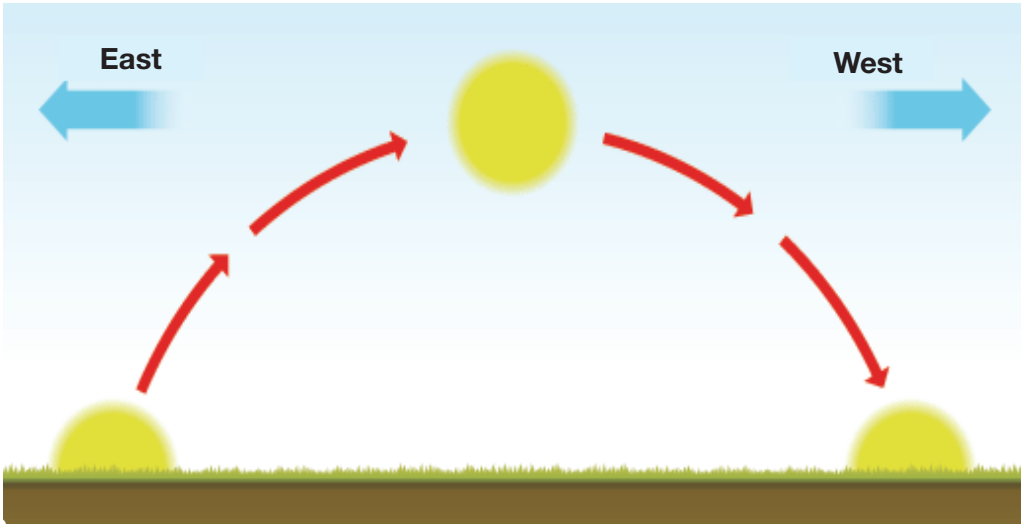


Figure 1: Movement of the Sun

The sun appears to move from east to west. That's because the Earth is spinning towards to the east, so we see the Sun first appear there at the start of the day. The Sun rises in the east and sets in the west. One way to remember which way the Earth turn is to remember **"we spin"**, which means the Earth spins from west to east.

The sun does not actually rise, the Earth moves on its own axis (imaginary line through the centre of the earth from pole to pole).The earth moves from west to east while the sun rises in the east and sets in the west.

Background Information

Day and night

The sun lights up one half of the earth, and the other half is in shadow. As the Earth spins we move from shadow to light and back to shadow and so on. It is daytime in Papua New Guinea when our part of the planet is lit by the sun. And it is night-time in Papua New Guinea when our part of the planet is facing away from the sun.

The Earth is a sphere, or ball, which spins round and round as it travels around the sun. One side of the of the Earth faces the Sun, while the other side faces away into space. The side facing the Sun is bathed in light and heat – we call this **daylight.** The side facing away is cooler and darker, and experiences **night.** Because the Earth is constantly spinning, the line between day and night is always moving around the planet. A day lasts 24 hours that is how long it takes for the planet to spin around once.

The earth's rotation causes day and night. Earth takes 24 hours to make one complete turn, so an Earth day is 24 hours long.

Figure 2: The Sun and the Earth

A: Guided lesson - Sample 1

Lesson **No.3**

Strand 1 : Life

Unit 4: Interaction and relationship in the environment

Lesson title: Types of Environment - Rainforest, grassland and river

Content standard: 3.1.4 Investigate and describe the interaction between living and non-living things in the environment.

Objective: By the end of this lesson, students can be able to:

- identify living and non-living things in the grassland and forest environments.
- classify living things found in the grassland and forest environments.

Key concepts:

- The natural environment is made of different land forms and living things.
- The grassland environment is made up of mainly grass with few or no trees.
- The forest environment is a thick forest with many big and small trees.

Knowledge, Skills, Attitudes and Values (KSAV)

Knowledge	Skills	Attitudes & Values
• Different types of environment support different types of living things • Some plants and animals can be found in both environments – in the grassland and in the forest	• Identify living and non- living things that are found in grassland and forest environment • Classify living things in grassland and forest based on their	• Appreciate and respect opinions of their classmate • Taking care of living things that live in grassland and forest environments

Materials/references:
Science syllabus/Teachers guide, pictures and posters of grassland and forest environment

Handle sharp objects with care

Teachers Notes:

1. This activity will require you to select any type of natural environment that is near your schools location. This is an outdoor activity therefore, ensure that safety precautions are taken and your students are told to follow safety guidelines. Prepare questions that students will copy into their notebooks as a guide for them to carry out this activity.
2. It is advisable to have your students work in groups as they will be discussing and deciding on their responses to the guided questions.

A : Guided lesson - Sample 1

Teaching and Learning Activities

Plant	What does it look like?	Animal	What does it look like?

Summary

There are different natural environments around us. Grassland and forest environments are some examples of natural environment. Each type of environment has its own plants and animals, and non-living things. Animals survive by eating plants that grow in that environment. They also eat other animals. Some animals eat both plants and other animals while there are animals that only feed on plants. Plants make their own food.

Blackboard Plan

Title: Types of Environment- Grassland, forest and river

Key Question: Which living things can you find in each environment?

Activity Complete the table.

Plant	What does it look like?	Animal	What does it look like?

Discussion

- Discuss why some living things are found in both environments.

SUMMARY

There are different natural environments around us. Grassland and forest environments are some examples of natural environment. Each type of environment has its own plants and animals, and non-living things. Animals survive by eating plants that grow in that environment. They also eat other animals. Some animals eat both plants and other animals while there are animals that only feed on plants. Plants make their own food.

A : Guided Lesson – Sample 1

Introduction:

Begin the lesson by talking about the natural environment. Students will also describe the kinds of environment they live in. Explain that the natural environment comes in many different land forms with a variety of plants and animals growing and living in each type of environment.

Body:

Explain the activity then take your students to a selected environment around the school. Ask the guided questions to help the students begin their short exploration. Students explore the site and write down the things they see.

Note: Students may not get to see a variety of animals in that particular environment. A follow-up activity in the next lesson will enable students to learn more about the two (2) environments.

Activity:

1. Students orally present their findings. This can be written up in two columns under 'plant' and 'animal'.
2. Students discuss and make assumptions about what the animals eat and who eats them. Encourage students to describe physical features of the plants and animals they came across in their exploration. You may come up with a table like the example below:

Plant	What does it look like?	Animal	What does it look like?
Fern	Has a lot of small leaves and it's green	A butterfly	It's yellow and has 2 large wings
Palm tree	Has green leaves and a brown trunk	A praying mantis	Has long legs and is green
Grass	Some green and some brown	A caterpillar	It's fat and is yellow and brown. Has plenty legs

Conclusion:

Sum up the lesson by asking related questions and give homework to students by asking them to bring pictures of different plants and animals.

Evaluation:

Have I provided a good set of guided questions? Were my instructions clear? Have the students classified plants and animals correctly? Have the students completed their results table?

A: Guided Lesson – Sample 2

Lesson **No.65**

Strand 2: Physical Science

Unit 2: Force and motion

Lesson title: Types of forces - Pushing and pulling

Content standard: 3.2.4 State the uses of simple machines and explain how force is applied on objects.

Objective: By the end of the lesson, students can be able to:
- distinguish between a pull and a push force
- identify various actions as a push or a pull.

Key concepts:
- Pulling and pushing causes objects to change their positions

Knowledge, Skills, Attitudes and Values (KSAV)

Knowledge	Skills	Attitudes & Values
• A force is a push or pull • A pulling force moves the object inwards • A pushing force moves the object outwards.	• Demonstrate pushing and pulling force • Observe and identify the difference between pushing and pulling force.	Appreciate the use of force in daily life.

Materials/references:

Pictures of pulling and pushing forces charts, ball (can be toy or real) cartridge, papers, scissors and glue (pictures of people digging in the garden, swinging on a rope or a baby in a bilum, playing tug-of-war game, cutting, pulling things)

Teacher's Notes:

1. Explain to students that we cannot see all types of forces but force makes the world go around.
2. These concepts are better understood by students when they are introduced to activities that they do at home, at school, at play and in what they do nearly every day.
3. You can do these activities with your students outside the classroom. This will require you to select a good shady area in your school so you can choose volunteers to demonstrate some of the activities. These simple activities will enable your students to grasp the concept of a 'push', a 'pull', a 'movement', the 'distance' and the use of 'energy'.
4. One of the activities in this lesson is an outdoor activity, therefore, ensure that safety precautions are taken in the use of some tools for demonstration.
5. Prepare questions and the activity sheet in advance to guide the students to be engaged in a discussion after each activity. They may have to copy these questions into their notebooks as a guide for them to discuss the activity.

A: Guided Lesson – Sample 2

Summary

When you push a friend on a swing or a billum with a baby inside, you are using a force. The harder the push the further the object goes. Pulling has a similar action. Gravity is a natural force. It pulls everything down towards the earth.

Blackboard Plan

Title: Types of forces-Pushing and Pulling

Key Question: Is it a push or a pull ?

Activity Complete the table.

Force (action used)	Push or Pull

SUMMARY

When you push a friend on a swing or a billum with a baby inside, you are using a force. The harder the push the further the object goes. Pulling has a similar action. Gravity is a natural force. It pulls everything down towards the earth.

A : Guided Lesson – Sample 2

Introduction:

Begin the lesson by demonstrating a pull and push in the classroom such as pulling or pushing your chair, moving your books on the table, etc. Ask the students to tell you what you were doing or had just done. Briefly explain the two (2) forces that you had just demonstrated. It's good to use questions that will make the students think and respond to those questions.

Body:

Get the students into their science groups and explain the activity carefully. This includes the safety guidelines. You are to choose a few volunteers to demonstrate the simple activities listed in the worksheet. Make sure there are also some spaces given for suggested activities. Distribute the worksheets and take them to the selected area in the school to carry out these activities.

Note: Students may want to suggest similar simple activities, therefore, it is good to encourage that. You can agree to about two (2) to three (3) extra activities. This also helps students to learn more as they will understand the concepts better when they take charge of their own learning.

Activities:

1. Students observe the demonstrated activities carefully. They discuss in their groups and agree about the types of forces used.
2. They then fill in their results table.

Result table:

Force (action) used	Push or pull
Kicking the ball	A push
Digging	A push
Swinging a bilum with a baby	A push

3. Back in the classroom each group finalizes their answers and report on their results. You will complete one that is written on the chalk board.
4. Allow students to correct their answers on their copies.
5. Re-enforce this lesson by displaying the charts showing the different forces on the chalkboard.

Conclusion:

Discussion about the different forces displayed on the chart.

Evaluation:

Have I provided enough handouts and pictures of different types of forces? Have the students identified and differentiated the types of forces well?

A : Guided Lesson – Sample 3

Lesson **No.10**

Strand 1 : Life

Unit 4: Interaction and relationship In the environment

Lesson title: Where do animals live?

Content standard: 3.1.4 Investigate and describe the interaction between living and non-living things in the environment.

Objective: By the end of this lesson, students can be able to identify and describe the habitats of animals.

Key concepts:
- Animals have a home called a habitat.
- There are different habitats for all animals.

Knowledge, Skills, Attitudes and Values (KSAV)

Knowledge	Skills	Attitudes & Values
• Some animals can be found in more than one habitat. • Animals live where they find food easily and in places where they feel secure	• Identify different habitats around them • Identify and classifying animals that are found in more than one habitat	• Appreciate and respect the different habitats • Develop and attitude of taking care of animals habitat

Materials/references:

Science syllabus/Teachers guide, copies of the results table for each group, pictures and posters of different habitats such as the rainforest, coral reef, grassland, etc., pictures of animals living in the different habitats.

- Do not touch or disturb any living creature while they are in their homes.
- Wash hands after touching animals

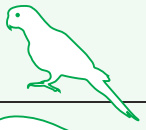
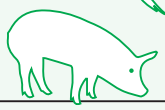
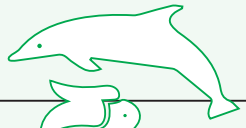
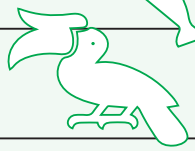
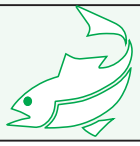
Teacher's Notes:

The environment in which an animal lives in is referred to as its habitat. A habitat is a place where living things live and how they survive in that area. Animals live in habitats that are suited to them. Some of this habitats include grasslands, rainforest and deserts. Humans also help animals by providing habitats for them. Some people build dams or fish pond to create habitats for fish, while others take in pets, like dogs and cats and provide habitats for them in their homes.

1. Posters and pictures of animals and their habitats are to be prepared and have ready before this lesson.
2. This activity will require a lot of discussions and may involve answering questions to begin the discussions. Prepare some questions for your students to help them to carry out these discussions.
3. It is advisable to have your students work in groups as they will be discussing and deciding on their responses to the guided questions.

A : Guided Lesson – Sample 3

Activity: Where do they live?
1. Complete the table by writing down the names of the habitats of the animals.

Animals	Where they live?
Parrot 	
Pig 	
Dolphin 	
Hornbill 	
Crocodile 	
Fish 	

Summary

Animals are living things and have certain needs that they must meet in order to survive. Shelter is one of the basic needs apart from food, water and air. Where do different animals make their homes? Animals live in places where they find food easily while others make their homes in different places for security reasons. Some animals, like herons live in the seashore and they catch fish. This is their habitat. Many animals build homes for their young. Some animals build nests in trees. Others dig burrows underground.

Blackboard Plan

Title: Where do animals live?

Key Question:Where do they live?

Activity: Complete the table.

Animals	Where they live?
Parrot	
Pig	
Dolphin	
Hornbill	
Crocodile	
Fish	

SUMMARY

- Animals are living things and have certain needs that they must meet in order to survive.
- Shelter is one of the basic needs apart from food, water and air.
- Animals live in places where they find food easily while others make their homes in different places for security reasons.
- Some animals, like herons live in the seashore and they catch fish. Many animals build homes for their young. Some animals build nests in trees. Others dig burrows underground.

A : Guided Lesson – Sample 3

Introduction:

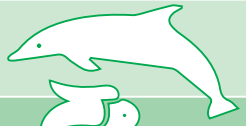
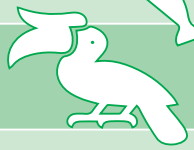
Begin the lesson by talking about the natural environment and all the living things found in that environment.

Body:

Students will describe the kinds of environment they know. Explain that the natural environment comes in many different land forms with a variety of plants and animals growing and living in each type of environment. Focus on the kinds of animals they know who live in these environments. Explain that the activity will be carried out as group work. Give each group the guided questions.

Activity:

1. Complete the table by writing down the names of the habitats of the animals.
2. Each group will discuss and write down their responses in the table.

Animals	Where they live?
Parrot 	
Pig 	
Dolphin 	
Hornbill 	
Crocodile 	
Fish 	

Conclusion:

Sum up the lesson by asking related questions to find out if your students have grasp the concept about the way animals live.

Evaluation:

Have I provided a good set of guided questions? Were my instructions clear? Have the students classified plants and animals correctly? Have the students completed their results table?

A : Guided Lesson – Sample 4

Lesson **No.60**

Strand 2 : Physical Science

Unit 1: Energy

Lesson title: Can light pass through?

Content standard: 3.2.2 Investigate and describe the properties and effects of light when it strikes an object.

Objective: By the end of the lesson the student can be able to identify the materials or objects that allow, partly allow or not allow light to pass through.

Key concepts:

- Light passes through some materials

Knowledge, Skills, Attitudes and Values (KSAV)

Knowledge	Skills	Attitudes & Values
• Light travels in straight line • Light can pass through some objects only.	• Identify objects that allow or do not allow light to pass through.	• Show curiosity to find objects that allow light to pass through.

Materials/references:

Various materials to test if light can pass through, torch, battery and bulbs

- Handle glass objects with great care.
- Do not direct light to your eyes.

Teachers Notes:

From the previous lesson, the students learnt that light travels in straight lines. They also discovered that light can pass through various objects. This lesson further explains that light can pass through some objects while others will not allow light to pass through. Some objects like stone, wood and cardboard do not allow any light to pass through them.

Transparent objects allow nearly all light to travel through them so objects on the other side can be seen. Examples of transparent materials include, air, water and clear glass.

Translucent objects block some light but allow some light to travel through them.
Examples of translucent materials are waxed papers

Opaque objects do not allow light to pass through them.
Examples of opaque objects are card box, rock, wood, and book

Students should be given the opportunity to make their own predictions of the materials they choose to test. This predictions could be what the students already know or just assumptions. After the predictions, they then proceed to the main activity by testing them individually.

A : Guided Lesson - Sample Lesson 4

Teaching and Learning Activities

Activitiy 1: Can light pass through?

1. Collect 10 different materials.
2. Predict what would happen to the objects if light was directed towards this objects. Use the key below
3. Complete the table below
4. Share your results with your classmates

Item	Prediction	Allow light to pass through (A)	Allow some light to pass through (S)	Not allow light to pass through (N)
1.				
2.				
3.				
4.				

Questions

1. What happens when light hits a clear glass? (passes through)
2. What happens when light hits a waxed paper? (Some passes through)
3. What happens when light hits a piece of cardboard? (it is stopped)

Summary

- Transparent objects allow nearly all light to travel through them. Examples of transparent materials include, air, water and clear glass.
- Translucent objects block some light but allow some light to travel through them. Examples of translucent materials are waxed papers.
- Opaque objects do not allow light to pass through them. Examples of opaque objects are card box, rock, wood, and book.

Blackboard Plan

Title: Can light pass through?

Key Question: Which objects can light pass through?

Activity: Complete the table.

Item	Prediction	Allow light to pass through (A)	Allow some light to pass through (S)	Not allow light to pass through (N)
1.	Write students responses			
2.				
3.				

Discussion

- Discuss how objects allow light to travel through them

SUMMARY

- Transparent objects allow nearly all light to travel through them. Examples of transparent materials include, air, water and clear glass.
- Translucent objects block some light but allow some light to travel through them. Examples of translucent materials are waxed papers
- Opaque objects do not allow light to pass through them. Examples of opaque objects are card box, rock, wood, and book

A : Guided Lesson -Sample Lesson 4

Introduction:

Demonstrate the lesson with a lead up activity by first flashing torch light towards the classroom wall. Ask the students to observe carefully. Switch off the torch than place a transparent material and switch on the torch. Ask the children about the difference of light in the two activities demonstrated. Ask the children" Can light pass through the blackboard? If yes/no why?" Now let's find out if all objects allow light to pass through them.

Body:

Explain the lesson and direct students into their groups. Have the students to complete the table by making their predictions and writing it on the result table. Allow the students to do the experiment by testing the different materials using the torch light. Record their results on the result table.

Teacher's Activities

Draw the result table on the board. Do an example for the class to see, by first predicting and then test or confirm by using the torch. Move from group to group to ensure students are doing what you expect. Supervise and guide students to complete the activity. Allow groups to present their results

Students' Activities

Students carry out the activity and record the data onto the result table by placing a tick in the right column. Students report their group findings for class discussion.

Result Table

Item	Prediction	Allow light to pass through (A)	Allow some light to pass through (S)	Not allow light to pass through (N)
1.				
2.				
3.				
4.				
5.				

Conclusion:

Sum up the lesson stating that not all objects allow light to pass through while some materials allow all light and some do not allow light at all.

Evaluation:

Have the students identified and classified the materials well? Were the students able to fill the result table correctly?

A : Guided Lesson -Sample Lesson 5

Lesson **No.52**

Strand 3 : Earth and Space

Unit 3: Space

Lesson title: Movement of the Sun

Content standard: 3.3.5 Observe and describe the movement of the sun over a period of time.

Objective: By the end of the lesson the students can be able to:
- observe and identify that the sun moves from east to west.
- realize that the earth spins from the opposite direction, west to east.

Key concepts:
- The sun does not move around the Earth.

Knowledge, Skills, Attitudes and Values (KSAV)

Knowledge	Skills	Attitudes & Values
• The earth moves or spins around the sun on its axis. • The earth moves from west to east while the sun rises in the east and sets in the west.	• Identify that the sun seem to move from east to west while the earth spins from west to east • Demonstrate how the earth moves around the sun using torch light and globe	• Appreciate and value the sun as the source of life on earth • Respect

Materials/references: Torch, globe map, ball, sphere

- Do not flash torch light direct to the eyes of the person holding the globe.
- Take extra care when demonstrating the earth moving around the sun.

Teachers Notes:

The earth rotates on its own axis. This causes us to think that the sun is moving across the sky. There is another effect that makes the Sun's path different each day. The earth is revolving (spinning) around the sun, so each day of the year the Earth is at a different point in its orbit. Because the Earth is facing the Sun at different angle each day, the path the Sun makes in the sky will be different each day of the year. The different paths the Sun makes is what causes the seasons.

The Earth rotates or spins toward the east, that's why the sun, moon all rise in the east and make their way westward across the sky.

This lesson will lead to imaginations and misconceptions therefore careful explanations and demonstration by the teacher will assist students at this level to gain basic understanding of the earth's movement. The earths shape and how it rotates around the sun should be demonstrated using a globe or improvise with local materials such as a ball or any object that is spherical in shape. The teacher can draw a sketch world map and have it glued on a ball to enable students to identify places/countries that are facing the sun and those that are not. If you have internet access you can download pictures and videos to aid your teaching.

A : Guided Lesson -Sample Lesson 5

Demonstration

Does the Sun set at the same place every day of the year?

Demonstrate to the class by showing the shape of the earth using a globe and how the earth spins on its axis.

Discussion:

1. Why does the sun move across the sky during the day?
2. What would happen if the earth and the sun were spinning? Provide suggestions.

Summary

- The sun does not move. The earth moves.
- The earth moves from the west to the east while the sun rises in the east and sets in the west.
- The path the sun makes is different every day of the year.

Blackboard Plan

Title: Observing the Sun

Key Question: Does the Sun set at the same place every day of the year?

Activity:

Discussion

1. Why does the sun move across the sky during the day?
2. What would happen if the earth and the sun were spinning? Provide suggestions.

Summary

- The sun does not move. The earth moves.
- The earth moves from the west to the east while the sun rises in the east and sets in the west.
- The path the sun makes is different every day of the year.

A : Guided Lesson -Sample Lesson 5

Introduction:

Ask lead up questions. Can you feel the earth moving? Does the sun move around the earth? If yes/no can you feel or see it? **We don't see or feel the earth moving because everything on earth is moving with us.** State the lesson objective. Now let's find out how the earth and sun moves.

Body:

Demonstrates to the class the shape of the earth using a globe and how the earth spins on its axis. Demonstrates phase by phase with explanation and guided questions.

Activities

Direct students into groups for the group activity. Supervise students to ensure they all have a feel of the globe as earth and torch as the sun.

Students Activities

Students in groups holding and shining the torch light as the earth spins. When the torch light is flashed on the west side of the globe the east side experiences darkness. Students do the activity moving the globe from west to east while a student stands with the torch light from the east. Students answer simple related questions about the direction and places on earth that experiences day or night. Students name some countries that have day light and some that have night. (if possible)

Conclusion:

Teacher sums up the lesson by stating that the earth moves around the sun on its own axis which causes day and night. Half of the earth that faces the sun has **day light** while the other half that doesn't face the earth experiences **night.**

Evaluation:

Have the students identified the relationship between earth and sun in relation to their movements? Were they able to identify main countries that have day light and night using the globe?

Guided Lesson

Lesson **No. 1**

Strand 1 : Life

Unit 4: Interaction and Relationship in the Environment

Lesson title: Components of the Environment

Content standard: **3.1.4** Investigate and describe the interaction between living and non-living things in the environment.

Objective: By the end of the lesson the students can be able to explain that the environment provides everything for living things in order to survive.

Key concepts:

- The environment that we live in is made up of living and non-living things

Knowledge	Skills	Attitudes & Values
• The environment is made up of living and non-living things. • Living things are the things that have life while non-living are things that do not have life.	• Identify characteristics of living and non-living things. • Classify things in the environment into living and non-living things.	• Show ownership and care for environment.

Materials: Variety of materials in the environment (books, rocks, dog, cats)

- Do not disturb animals and plants.

Teacher's Notes:

The Environment that we live in provides everything that we need in order to live. The house that we sleep in, the trees, the rock, flowers, the animals, all these things that we see around us make up the environment. They are called the **components of the environment.**

Living things are the things that have life. They reproduce, grow and die. Plants and animals are examples of living things that we often find in our environment. They provide basic needs like food and shelter that we need in order to stay alive.

Non-living things are the things that do not grow, or reproduce or do not have life. Most of the non-living things we can see. Stones, chairs, cups, water and soil are only few examples. Some non-living things we cannot see, such as the air. These are very useful in our lives.

Teaching and Learning Activities

Complete the table by listing down the things you find in the environment around you.

Living Things	Non- living things
1. 2. 3.	1. 2. 3.

Summary

- The things that make up the environment are called the components of the environment.
- Living things are the things that have life. They grow, reproduce and have life.
- Non-living things do not have life.

Guided Lesson

Lesson **No. 2**

Strand 1 : Life

Unit 4 : Interaction and Relationship in the Environment

Lesson title: Man-made and Natural-made Environment

Content standard: **3.1.4** Investigate and describe the interaction between living and non-living things in the environment.

Objective: By the end of the lesson the students can be able to:

- identify and list different man-made environments.
- identify and list the natural made environments.

Key concepts:

- Man-made environment is the environment that is built by man.
- Natural environment is the environment that is made by nature.

Knowledge	Skills	Attitudes & Values
• Natural environment means all living and non-living things that are natural. • Human beings use their skill and technology to create things from the natural environment so that their needs can be satisfied.	• Differentiate between natural environment and man-made environment. • Identify and name natural and man-made environment.	• Accept and appreciate the natural and man-made environment.

Materials: Pictures of the different types of environment

Teacher's Notes:

Components in our environment which are entirely natural form the Natural Environment. Examples of natural environment includes the forest, soil, the grassland in which animals live and the corals where the fish live. These are the environments that are naturally built by nature.

Man-made environment is the surroundings that have been built by people to meet their needs. When the population grows, there are more people. This means more houses to be built in villages, towns and cities. Land is cleared for houses, farming, factories, offices and parks. Structures are built and more power is needed. Transport is used to travel within and between other places. The man-made environment is putting pressure on the Earth's natural environment. Man-made environment is using up more space and more energy. Examples of man-made environment include towns, transport, cities, villages, communication systems etc.

Teaching and Learning Activities

Fill in the table by writing five examples of natural environment and five man-made environment.

Natural Environment	Man-made Environment
1. 2.	1. 2.

Summary

- There are two main types of environment, natural environment and man-made environment.
- The natural environment is the surroundings that are part of nature and are not made by humans.
- Man-made environment is the surroundings that have been built by people to meet their needs.

Guided Lesson

Lesson **No. 4**

Strand 1 : Life

Unit 4: Interaction and Relationship in the Environment

Lesson title: Living things in the Environment

Content standard: **3.1.4** Investigate and describe the interaction between living and non-living things in the environment.

Objective: By the end of the lesson the students can be able to explore and find out about the living things around them.

Key concepts:
- Living things need water, air, food and shelter to live
- Living things grow and reproduce

Knowledge	Skills	Attitudes & Values
• Living things are those that have life. • Living things need water, air, food, shelter, grow and reproduce in order to survive.	• Identify living things in the environment. • Identify the characteristics of living things.	• Respect and care for living things

Materials: Sample pictures of living things found in the environment

Teacher's Notes:
In this lesson students will learn about living things. Living things are things that are alive. To stay alive they need **air, water, food** and **shelter.** These are called **needs.** Without these needs, living things will die. Besides these needs, living things also **grow** and **reproduce,** that is they have young ones (babies). Living things can move from place to place to satisfy their needs. Plants and animals are living things

Teaching and Learning Activities

Activity 1

Make a list of living things that you can find in the following places.

Classroom	Home	Sea
1. 2. 3. 4.	1. 2. 3. 4.	1. 2. 3. 4.

Guided Lesson

Activity 2: Filling in blanks

Use the words to complete the sentences.

food, water, shelter, sunlight, air

1. All living things need _____to drink.
2. All living things need to eat _____.
3. All living things require _____to live in.
4. All plants require _____ to grow.
5. All living things need to breathe _____.

Summary

- All things in the environment can be grouped into living and non-living things.
- Living things have life. They need air, water food and shelter in order to stay alive.

Guided Lesson

Lesson **No. 5**

Strand 1 : Life

Unit 4: Interaction and Relationship in the Environment

Lesson title: Non-Living things in the Environment

Content standard: **3.1.4** Investigate and describe the interaction between living and non-living things in the environment.

Objective: By the end of the lesson the students can be able to identify non-living things that are found in the environment.

Key concepts:

- Non-living things do not have life

Knowledge	Skills	Attitudes & Values
• Non-living things do not move, grow or reproduce by themselves. In other words they do not have life. • Non-living things exist in three groups – solids, liquids and gases.	• Identify characteristics of non-living things. • Classify living things into solids, liquids and gases.	• Appreciate and accept that non-living things are important in life.

Materials: pictures of non-living things

Teacher's Notes:

Non - living things are the things that do not have life. They do not grow, produce young ones (babies). They do not breathe in air, or eat. Examples of non-living things are books, pencils, shoe, air, water, clothes and soil.

Teaching and Learning Activities

1. Complete the table by writing the non- living things that you can find in the following places.

Classroom	Home	Sea / Land
1. 2. 3. 4. 5.	1. 2. 3. 4. 5.	1. 2 3. 4. 5.

Guided Lesson

2. Using the information collected above in activity 1, classify them into solid, liquid and gas.

Solid	Liquid	Gas

Summary

- Non- living things are the things that do not have life. They do not grow or produce young ones.
- Examples of non-living things are rocks, books, pencils, bag, stone, nails etc.
- Non-living things can be classified into solid, liquid or gas.

Guided Lesson

Lesson **No. 7**

Strand 1 : Life

Unit 4: Interaction and Relationship in the Environment

Lesson title: Classifying non-living things

Content standard: **3.1.4** Investigate and describe the interaction between living and non-living things in the environment.

Objective: By the end of the lesson the students can be able to classify non - living things according to their uses.

Key concepts:

- Non-living things can be classified or grouped into many ways according to their uses

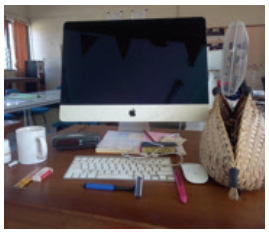
Knowledge	Skills	Attitudes & Values
• Non-living things can be classified according to their uses	• Identify and classify non-living things according to their uses	• Appreciate the uses of non-living things

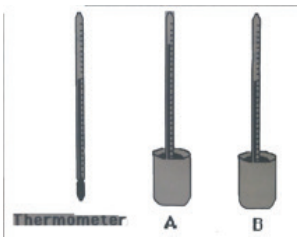
Materials: Pictures of different non-living things

Teacher's Notes:

The world around us is filled with a variety of things. We see so many different things every day. Inside our house or school we use furniture, electronics, food, drinks, books etc. these are all non-living things and can be classified into various ways according to how they are used.

Non-living things are the things that have no life. This means they do not breathe in air, they do not grow and they do not reproduce. Non- living things can be classified in many ways according to how they are used.





Teaching and Learning Activities

Activity 1

a) Draw at least three things in the classroom which are not a living things.

b) Draw at least three things outside of the classroom which are non - living things.

Activity 2:

Look at the following pictures below. Classify this non-living things according to their uses.

Summary

- Non- living things can be classified according to their uses.

Guided Lesson

Lesson **No. 8**

Strand 1 : Life

Unit 4: Interaction and Relationship in the Environment

Lesson title: Relationship between living and non-living things

Content standard: **3.1.4** Investigate and describe the interaction between living and non-living things in the environment.

Objective: By the end of the lesson the student will be able to:

- describe the relationship between living things and non-living things
- identify living things that depend on non-living things.

Key concepts:

- Living things and non-living things depend on each other for survival

Knowledge	Skills	Attitudes & Values
• Living things need non-living things in order to live.	• Identify living things that depend on non-living things. • Give examples of living things depending on non-living things.	• Accept that living things need non-living things in order to survive.

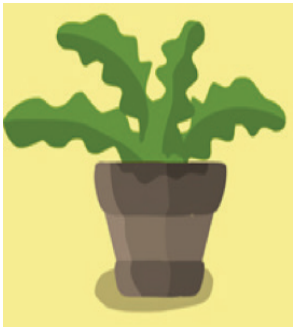
Materials: a flower pot with flower growing.

Teacher's Notes:

In this lesson the students will learn about the relationship between living things and non-living things. In the previous two lessons they looked at each environment in detail and this lesson will link the previous lesson.

The environment is consist of living and non-living things. Living things need non-living things to survive. For example, a plant is a living thing and water, air and soil are non- living things. The plant needs water, air and soil which are all non-living things. Without this non-living things the plant will not grow. Similarly animals as a living thing needs air, which is a non-living thing in order to survive.

Types of Living things	Non-living things that living things depend on
Animals	Air to breathe, water to drink, place to live, hiding place (protection
Plants	Sunlight, air, water, use soil to grow
People	Air to breathe, water to drink, soil for growing food and making pottery and technology to make life better.



Guided Lesson

Teaching and Learning Activities

Activity 1

From the diagram on the right. Write down the things that are living things and those that are non- living things

Living things	Non- Living things
1. 2.	1. 2

Summary

- Plants depend on sunlight, air and water to make food and use soil to grow.
- Animals depend on non-living things like air to breathe, water to drink and a place to live in.
- People depend on air to breathe, water to drink, use soil to grow food and making pottery and technology to make life better.

Guided Lesson

Lesson **No.10**

Strand 1: Life

Unit 4 : Interaction and Relationship in the Environment

Lesson title: Where do animals live?

Content standard: **3.1.4** Investigate and describe the interaction between living things in the environment.

Objective: By the end of the lesson the students can be able to identify and describe the different places where animals live.

Key concepts:

- Animals live where they find food easily.
- Animals live in places that they feel secure.

Materials: Pictures of animals living in various places

Teachers Notes:

Animals are living things and have certain needs that they must meet in order to survive. Shelter is one of the basic needs apart from food, water and air. Where do different animals make their homes? Animals live in places where they find food easily while others make their homes in different places for security reasons. Some animals, like herons live in the seashore and they catch fish. This is their habitat. Many animals build homes for their young. Some animals build nests in trees. Others dig burrows underground.







Teaching and Learning Activities

Activity 1

Complete the table by filing the places these animals live in.

Animals	Where they live?
Parrot	
Pig	
Dolphin	
Hornbill	
Crocodile	
Fish	

Summary

- Animals live different places. Forest animals live on the trees, bushes on the ground or under the ground.
- Wetland animals live in the water., on grasses, trees, or on plants floating on the water.
- Ocean animals live on ocean's surface, ocean floor or in the corals.

Guided Lesson

Lesson **No. 13**

Strand 2 : Physical Science

Unit 3: Matter

Lesson title: What is matter?

Content standard: **3.2.5** Investigate and identify the properties of objects by examining their weight and volume.

Objective: By the end of the lesson the students can be able to:
- define what is matter.
- understand that matter can be classified into solid, liquid or gas.

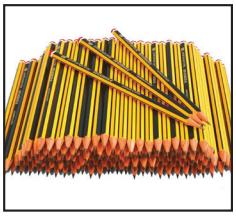
Key concepts:
- Matter is anything that takes up space and has mass

Knowledge	Skills	Attitudes & Values
• Matter is anything that occupies space and has mass. • Matter can be classified into solid, liquid and gas.	• Identify the different forms of matter. • Classify matter into solid, liquid and gas.	Show curiosity in learning about matter.

Materials: pictures/ samples of different things

Teacher's Notes:
The topic on matter is a new concept and students might find it hard to understand easily. Teachers are encouraged to ensure that this particular lesson is taught well and students fully understand the concept before proceeding to the other lessons that follow. For uniformity in the activity, teachers can organise a particular section in the classroom. A table with books, bottles containers, chalk box, duster and chalk is just an example of the preparation what teacher can do.

Everything around us is made of matter. The desks, chairs that you are sitting on is made of matter. The plants, animals and the person sitting next to you is also matter. The wall clock hanging on the wall is matter. Matter is anything that takes up space and has mass. Mass is the amount of matter in an object. In scientific work and most of the world, matter is measured by mass. Matter can also be measured by weight.

Guided Lesson

Teaching and Learning Activities

Activity 1:

a) List ten things that you find in the classroom that are matter.
b) List five things that you can see outside of the classroom that is matter.
c) Organize the things listed in activity a and b in the table below.

Natural Matter	Man-made Matter
1. 2.	1. 2.

Summary

- Matter is what everything around is made of. Examples of matter are the tables, books, chairs, chalk, blackboard, clock and clothes.
- There are some things which are not matter. Examples of things that are not matter include energy, thought or ideas, time, sunlight, feelings or shadow

Guided Lesson

Lesson **No.14**

Strand 2 : Physical Science

Unit 3: Matter

Lesson title: Classifying Matter - Physical Properties

Content standard: **3.2.5** Investigate and identify the properties of objects by examining their weight and volume.

Objective: By the end of the lesson the student can be able to identify and group matter using their five senses.

Key concepts:

- Matter can be classified based on their physical properties.

Knowledge	Skills	Attitudes & Values
• Matter can be classified according to their physical properties. • Physical properties of matter include colour, shape, size, texture.	• Classify matter according to their physical properties.	• Enjoy learning about matter. • Appreciate the use senses to classify physical properties of matter.

Materials: A variety materials, yellow bottle lid, ripe banana

Teacher's Notes:

In the previous lesson the students learnt that matter is anything that takes up space and has mass. Students by now have a fair idea about matter. This lesson extends their understanding about matter by giving them the opportunity to classify matter.
To classify matter, it requires us to use our five senses. We use our eyes to see the colour, size and shape of a matter. We use our hands to feel the hardness, softness, roughness and smoothness of matter. We use the tongue to taste matter to find if the matter is sweet, sour or bitter. We use the sense of smelling to find if the matter stinks or has a pleasant smell. We also use the sense of hearing to hear sounds.

Teaching and Learning Activities

Activity 1:

1. Collect any ten objects that you can find. Note that one of the properties of the two objects should be common for both. One has been done as an example.
2. Draw a table like the one shown below on the board.

Object 1	Object 2	Similarities	Difference
Yellow bottle lid	Ripe Banana	Colour,	Shape, texture, size

3. Write the objects in the columns and make your comparison.
4. Record your findings.
5. Share result with class (if time permits).

Summary

- All matter have their own properties.
- The properties of matter can be described by using the five senses (seeing, smelling, tasting, hearing, touching).
- Properties of matter include the size, colour, shape, weight, texture, hardness or smell.

Guided Lesson

Lesson **No. 15**

Strand 2 : Physical Science

Unit 3 : Matter

Lesson title: Comparing weight of matter

Content standard: **3.2.5** Investigate and identify the properties of objects by examining their weight and volume.

Objective: By the end of the lesson the students can be able to :
- understand that weight is a property of matter.
- compare weights of different matter.

Knowledge	Skills	Attitudes & Values
• Weight is a property of matter. • Weight can be compared using a beam balance.	• Predict which object is heavier than the other. • Compare weights of different matter using a beam balance.	Acknowledge the weights of different materials Accept the results when comparing weights.

Materials: A variety of materials collected from previous lessons, a balance

- Handle the beam balance with care.
- Ensure to gently put different weights on the beam balance.

Teacher's Notes:

This lesson will require a balance. In the case of no balance, teachers are encouraged to make a simple balance using available resource. Before actually comparing the weights of objects, ensure that there is equal distance from the end to the centre.

As defined in the previous lesson, matter is anything that takes up space and has mass. Mass is the amount of matter in an object. In scientific work and most of the world, matter is measured by mass. Matter can also be measured by weight.

In order to compare the weights of objects, we have to use a balance. A balance is an instrument that is used to compare the weights of matter.

Teaching and Learning Activities

Which object is heavier?

Activity 1: Comparing Weight

Using the balance, compare the weights of these different items-

Object 1	Object 2	Prediction	Results
1. 2.			

Summary

- Weight is a property of matter.
- Weight can be measured or compared using a beam balance.

Guided Lesson

Lesson **No.16**

Strand 2 : Physical Science

Unit 3: Matter

Lesson title: Matter takes up space

Content standard: **3.2.5** Investigate and identify the properties of objects by examining their weight and volume.

Objective: By the end of the lesson the students can be able to :
- understand how matter takes up space by doing a simple experiment.
- understand that two different matter cannot occupy the same space.

Knowledge	Skills	Attitudes
• Matter is anything that has mass and takes up space. • Two objects cannot occupy the same space at the same time.	• Observe the change in the level of water. • Calculate the volume of the stone.	• Appreciate the results from each group

Key concepts:
- Matter can be classified according to their size, colour and texture.

Materials: masking tape, glass (tank), small/ large size rocks, 30cm string

- Handle equipment with care.
- Be careful when placing rocks into the tank.

Teacher's Notes:

Volume is the amount of space an object takes up. The volume of an object can change depending on the surrounding temperature. However, its mass will remain the same. All matter takes up space. Two objects cannot occupy the same space at the same time. An object must move before another object can occupy the space.

Volume of stone = (Volume of water and stone – Volume of water)

Activity 1: Measuring the volume of a stone.

1. Stick a length of tape down the side of the glass.
2. Half fill the glass with water. Mark the water level on the tape.
3. Tie the string around each rock. Lower each rock into the water (one at a time) and mark the water level.
4. Share your ideas with your classmates.

Guided Lesson

Activity 2

1. Draw a table as shown below.

Material	Volume
Water	
Water and stone	
Stone	

2. Fill the measuring container with some water and record the volume of the water.
3. Tie the string around each rock. Lower each rock gently into the water and mark the water level.
4. Record the volume of the water and stone in the table.
5. Find the volume of the stone.

Summary

- Two objects cannot occupy the same space at the same time.
- The stone takes up the space of the water therefore increase the level of the water.
- The bigger the size of the rock, the greater the increase in the water level.
- The increase of the volume of water is known as the volume of the stone.

Guided Lesson

Lesson **No.25**

Strand 1: Life

Unit 1: Plants

Lesson title: Plants around us

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to observe and make a list of different plants around the school.

Key concepts

- There are a variety of plant species on the earth. Each plant species has its own size, shape, colour and structure.
- All plants can be grouped into two main groups: flowering and non-flowering plants.

Knowledge	Skills	Attitudes
• Plants can be classified into flowering and non-flowering plants. • Each plant has its own use.	• Classify plants into flowering and non-flowering plants. • Identify uses of common plants.	• Develop caring attitudes about plants. • Value the use of common plants.

Materials: A4 paper, pencil

- Do not touch plants or animals that are poisonous.
- Always follow teachers instruction.

Teacher's Notes:

The focus of this lesson should be within the school environment where different plants can be found. Students should be taken outside and given the opportunity to observe and list as many plants as possible that they see around them.

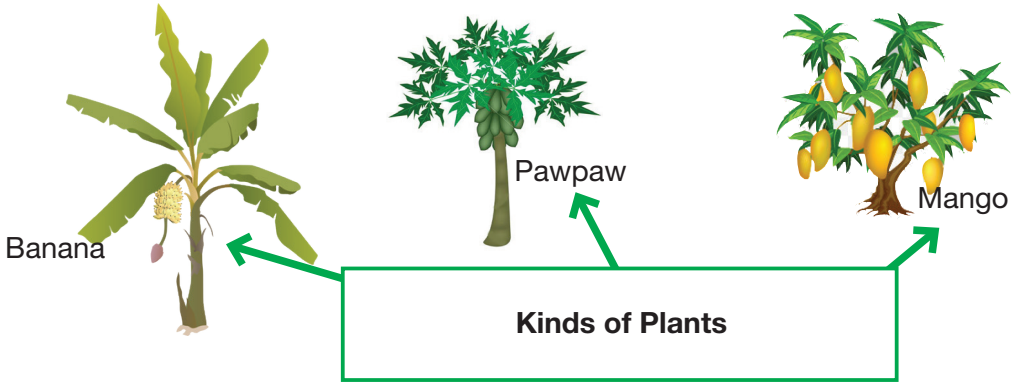
There are more than 350,000 identified species of plants on the earth. Each species is different in size, shape, color and structure and are grouped in two groups, flowering and non-flowering. The largest flowering plants are trees, which can grow up to 112m in height. The smallest flowering plant is the duckweed, which is only 0.5mm in length. Colors of plants range from dark greens to varied colors of their flowers.Plants do not move around from place to place as animals do. They can however be blown from by the wind or carried by water and animals. Plants live on land and in the water. Animals cannot live without plants. Therefore, wherever there are animals you are sure to find plants too.

Guided Lesson

Teaching and Learning Activities

Activity 1:

1. Take the students outside to places where suitable plants can be found.
2. Tell the students to observe and make a list of different plants that they see around them.



Activity 2:

Draw the different plants that you can see around you and write their names.

Summary

- Plants can be grouped into two main groups: flowering and non-flowering plants.
- There are different species of plants. They have different sizes, shape, colour and structure.
- Plants are living things and do not move around like animals.
- The largest flowering plants are trees.

Guided Lesson

Lesson **No.26**

Strand 1 : Life

UNIT 1 : Plants

Lesson title: Parts of a plant

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to draw and label parts of a plant.

Key concepts

- A plant has different part. Each part helps the plants in different ways.

Knowledge	Skills	Attitudes
• Non-flowering plants have roots, stems and leaves. • Flowering plants have roots, stem, leaf, fruit and flower.	• Identify the different parts of a flowering and non-flowering plant.	• Care and respect for plants. • Value the importance of each plant part.

Materials: Flowering Plant, chart.

Teacher's Notes:

The lesson is a continuation from the previous lesson where children were given the opportunity to list down plants they see around them. This lesson will specifically look at the plant parts only. The functions of plants will be looked in Lesson 33. To enhance student maximum participation, teacher can organise students in pairs. Teachers are encouraged to allow students to talk freely.

Plants have parts. Most plants have roots, stems and leaves. Some plants have flowers. Each part helps the plant in a different way.

- Be careful when handling poisonous flowers.
- Use handgloves when handling plants with torns.

Teaching and Learning Activities

Looking at the Plant parts.

1. Take the students outside to places where suitable plants can be found.
2. Tell the children to get a plant each and bring it back to the classroom.
3. Tell the children to look at their plants and using their prior knowledge label the different plant parts.

Activity 1

Students label the parts of the plant.

Summary

- Most plants have roots, stems, and leaves. Some plants have flowers and fruits while others don't.

Guided Lesson

Lesson **No. 27**

STRAND 1 : Life

Unit 1 : Plants

Lesson title: Classification of leaves (i)

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to:
- have classified leaves into two groups of their choice.
- state that classification is something that all people (including scientists) do.

Key concepts:
- Classification is a way of sorting/ grouping things according to similarities.
- Plant leaves can be classified into different groups.

Knowledge	Skills	Attitudes
• Classification is a way of sorting things according to similarities. • Leaves of plants can be classified according to their uses.	• Classify leaves according to their uses.	• View classification as an important way of sorting things.

Materials: Variety of Leaf samples, pictures of different leaves or posters.

- Be careful when handling poisonous flowers.

Teacher's Notes:

Classification is putting things which are the same in some way into a group and giving it a name. There are many different ways of classifying things. There is no "right way" to classify things. Any way is right. People classify things in that way which is right for them the way they find easiest and most useful.

Traditional way of classifying leaves is based upon the way in which the leaves are used – either as food or for decoration.

Before giving the activity do a quick demonstration of how things can be sorted out into groups. Example different colour objects or use the class itself *e.g.* boys and girls, tall children and short children.

Teaching and Learning Activities

Key Question: Which way is the right way to classify plants?

1. Give each group about 10 leaves: some food leaves and some singsing leaves (Do NOT tell the children some are used for food and decorations).

   a) Tell the children to sort their leaves into two groups (or sets) in any way they like so that all the leaves in one group are the same in some way, and all the leaves in the other group are also the same in some way but the two groups are different from each other.
   b) Ask group leaders to explain to the class how their group formed their sets.

Guided Lesson

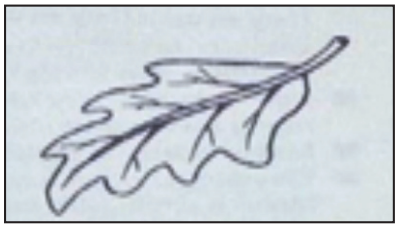
Activity 1. Classifying leaves

Students sort the leaves into two groups of their own choice and stick them on a table like the one below.

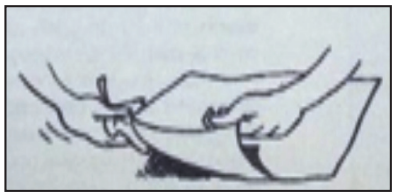
Group 1	Group 2

Activity 2. Making Leaf prints

Using the leaves that were classified in the previous lesson to make leaf prints.



1. Find a leaf.



2. Put it under a piece of paper.

3. Hold the paper very still.

4. Rub a crayon over the top of the leaf.

5. Cut out the leaf shape.

6. Paste the leaf onto a piece of paper.

7. Now let's make some more

(Teachers Idea Book)

Summary

- There are many different ways of classifying things. (Remind them of how different groups classified their leaves at the start of the lesson).
- There is no "right way" to classify things. Any way is right. People classify things in that way which is right for them,- the way they find easiest and most useful.
  Traditional way of classifying leaves is based upon the way in which the leaves are used – either as food or for decoration.

Guided Lesson

Lesson **No. 28**

Strand 1: Life

Unit 1: Plants

Lesson title: Classification of Leaves (ii)

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to:
- classify leaves into simple and compound leaves.
- classify leaves into those with parallel veins and those with a network of veins.

Key concepts:
- Leaves can be classified into simple and compound leaves.

Knowledge	Skills	Attitudes
• Leaves can be classified into simple and compound leaves • Leaves can also be classified according to the vein patterns- parallel and network	• Identify and leaves into simple and compound leaf. • Identify and classify leaves into parallel or network veins.	• Appreciate the importance of plants • Care and respect for plants.

Materials: Many different leaves, Types of Leaves Chart, hand lenses.

- Some leaves might be poisonous. Do not touch leaves if you are not sure of them.

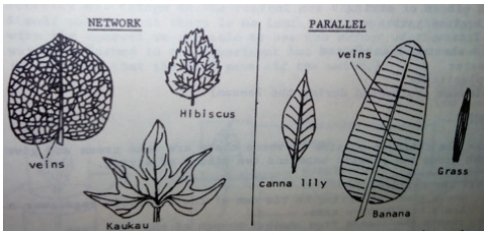
Teacher's Notes:

The previous lesson was based on the traditional way in which we can classify leaves. This lesson will focus on the shapes of the leaves and patterns that are formed by the veins on the back of the leaves.

Explain to the students that they are going to classify their leaves by grouping them, but this time instead of looking at their shape they must look at the patterns on them. Tell the children to look carefully at their leaves (both sides) with and without the hand lens and look at the lines on the leaves to see the patterns they make. Try to get the children to see that the veins form two types of patterns – NETWORK and PARALLEL. Show children a few examples of each type then tell them to sort their own leaves into these two groups

Simple leaf is in one piece. It has a leaf blade only like the hibiscus and taro or it may be divide into portions like pawpaw or cassava which are not completely separate.

Compound leaf is made up of many separate pieces. Each piece (or leaflet) has a separate stalk, but all of them are joined to the one common leaf stalk e.g. rain tree, aibika,



Guided Lesson

Plants which are *monocotyledons* usually have parallel veins and those which are dicotyledons usually have network veins. ***(The terms monocotyledons and dicotyledons are too difficult at this stage. Do not tell this to the students).*** The veins are tubes which carry food and water.

Teaching and Learning Activities

Activity 1: Classifying leaves

a) Tell the children to sort their leaves into the two groups: simple and compound.

b) Tell the children to mix their leaves up again into one group.

c) Tell the children to sort the leaves again, this time into parallel veins and network veins.

Questions

1. What are leaves which are made up of one part only called? (Simple Leaves)
2. What are leaves which are made up of several separate parts called? (Compound leaves)
3. What are veins which form little boxes like a mosquito net called? *(Network)*
4. What are veins which do not cross over each other called? *(Parallel veins)*

Summary

- **Simple leaf** is in one piece. It has a leaf blade only like the hibiscus and taro or it may be divide into portions like pawpaw or cassava which are not completely separate.
- **Compound leaf** is made up of many separate pieces. Each piece (or leaflet) has a separate stalk, but all of them are joined to the one common leaf stalk e.g. rain tree, aibika,
- Veins that do not cross over each other are called **parallel veins.**
- Veins which form patterns or little boxes like a mosquito net are called network veins.

Guided Lesson

Lesson **No. 29**

Strand 1 : Life

Unit 1: Plants

Lesson title: Classification of plants according to their root

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to classify roots into three groups (fibrous roots, tap roots and food storage roots).

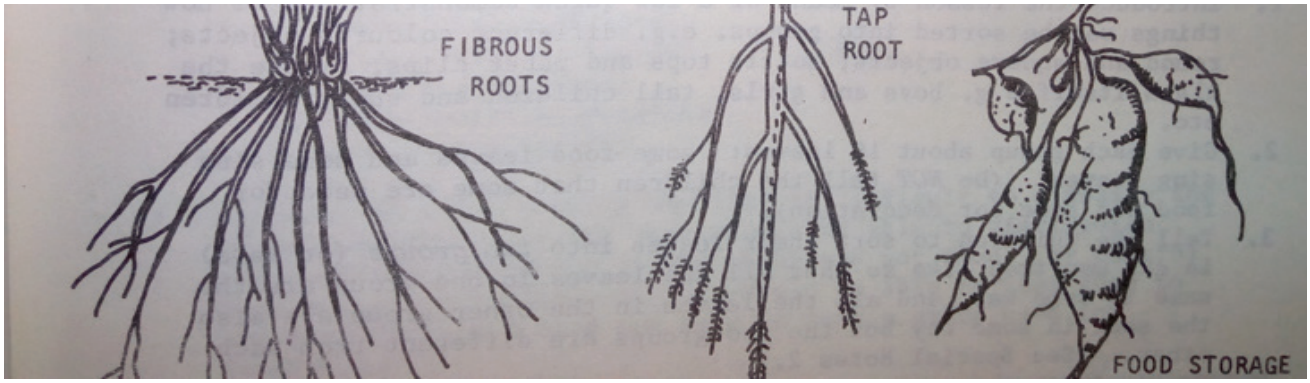
Key concepts:
- There are two main types of roots- tap roots and *fibrous roots.*
- Roots hold the tree firmly to the ground and also transport water and nutrients for the plants.

Knowledge	Skills	Attitudes
• Fibrous roots have many small roots growing from the stem. • Tap roots have one large main root with smaller roots growing from it. • The food storage roots store food.	• Classify plants into tap root and fibrous root. • Differentiate between tap root and fibrous roots.	• Appreciate how roots are classified.

Materials: : Trays, bush knife, water containers, razor blades, hand lens, different plants.

- Wash any of the underground parts which are very dirty with water.
- Take extra care when handling the knife.
- Wash hands after handling roots.

Teacher's Notes:
Roots are the underground parts of a plant. There are two types of roots: tap roots and fibrous roots. Tap roots have one large main root with the smaller roots growing out from it. Fibrous roots have no main root but many small roots growing from the bottom of the stem. Near the tips of roots are small hair-like things called root hairs. Roots have two main uses. They hold the tree firmly in the ground and they get water and nutrients for the plants from the soil. Some roots store food. These roots are usually swollen and large. Kaukau, yam and carrots store food in their roots.



Guided Lesson

Teaching and learning activities

Key Question: How many types of roots types can you find?

1. Take the students outside to places where suitable plants can be found
2. Tell the students to:
   - Collect many different plant parts from underneath the ground.
   - Put all the small plants in one place.
   - Only collect plants that are less than 1 meter high.
   - Bring bigger plants to you so that you can cut off the top parts of plants about 15cm above ground level.

Activity 1

3. Tell the children to look carefully at the underground plants and sort them into three groups:

   a) Those with many parts, often small (fibrous roots).
   b) Those made up of a few main parts, with some small parts (tap root).
   c) Those with mainly large, round parts (food storage).

Fibrous Roots	Tap Roots	Food storage

Summary

- ***Roots*** are the parts of plants which grow under the ground.
- ***Fibrous root*** has many small roots growing from one point.
- ***Tap roots*** have one main root with smaller roots growing from it the small hair-like things on roots are called Root hairs.

Guided Lesson

Lesson **No. 30**

Strand 1: Life

Unit 1 : Plants

Lesson title: Classification of flowers

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to:
- classify flowers into two groups of their choice
- make a collection of pressed flowers.

Key concepts:
- Flowers can be classified into different groups.

Knowledge	Skills	Attitudes
• Flowers can be classified into groups. • Flowers can be used for decoration and as herbal remedies.	• Classify flowers into groups according to their choices.	• Appreciate the use of flowers.

Materials: Old exercise books or newspapers, 6 boards, heavy stones and pairs of scissors.

- Be careful when handling poisonous flowers.
- Handle scissors with care.

Teacher's Notes:
Flowers are the most standout parts of the plants and they vary greatly in appearance. Some are large, brightly coloured and sweet smelling. Others are small, odourless, and usually not noticed. Their appearance is directly related to how they are pollinated. Flowers that rely on insects and birds for pollination are usually brightly coloured and sweet smelling. Flowers that are self-pollinated by the wind usually have small, non-distinct flowers that do not have fragrance.

Before the lesson you will have to find suitable areas near the school to collect flowers.

Several flowers should be arranged apart from each other on one sheet paper. Then another sheet of paper is placed on top. More flowers can be arranged on this with another sheet of paper on top of it and so on. You should end up with alternate layers of flowers and paper. The flowers should not be glued to the paper

Guided Lesson

Teaching and Learning Activities

1. Give each group one pair of scissors. Take them outside and allow them to collect flowers for 15 minutes, using the scissors where possible to cut the flowers.
2. Bring the students back into the classroom and give out the sheets of paper (or exercise books).
3. Tell the students to look carefully at the flowers and group them into the following groups;
   - big flowers and small flowers
   - brightly colored and dull
   - sweet smelling and odorless.
4. Show the students how to place their flowers between the sheets of papers (see Special Notes).
5. Tell the children to write their names on their group's collection.
6. Put the flower collection between the boards piled one on top of the other and put heavy stones on the top.

Summary Questions

Questions to ask the children

1. How many different flowers did your group collect? *(Ask individuals)*
2. Are all flowers the same size? *(NO)*
3. Are all flowers brightly colored? *(NO)*
4. What plants have very small flowers? *(e.g. grass)*
5. Do some big trees have flowers? *(YES)*

Guided Lesson

Lesson **No. 31**

Strand 1 : Life

Unit 1: Plants

Lesson title: My flower collection

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to state at least three (3) changes that take place in flowers when they are pressed.

Key concepts:

- The pressed flowers lose a lot of water and become dry.

Knowledge	Skills	Attitudes
• The flowers lose water and become dry. • The flowers colour changes and they become thinner, lighter and more brittle.	• Identify the difference between fresh flowers and pressed flowers. • Explain why the flowers lose water.	• Appreciate the use of flowers.

Materials:

Pressed flower display collection, large sheets of cardboard or paper, pins, sticky tape or glue, a tray of newly picked flowers (not necessary).

Teacher's Notes:

It will help the students if you make a collection of fresh flowers just before the lesson and display them for the children to compare their pressed flowers.

When flowers are pressed they lose water and become dry. This prevents them from rotting so that a pressed flower collection will last for a long time. As well as losing water the flowers colour usually changes and they become thinner, lighter and more brittle (hard and crisp)

Teaching and Learning Activities

Key Question: What happened to the colours of the flowers?

1. Tell the group leaders to take their group's collection of pressed flower.
2. Ask the children to tell you how the flowers have changed after being pressed for a week (Dryness, colour, thickness, weight, etc.
3. Give each group a sheet of cardboard or display board and some pins, sticky tape or glue and tell the children to fasten their flowers to the cardboard or display board.
4. Display all collections for others to see.

Summary Question

Questions to ask children:

1. State three things that happen to a flower when it is pressed?
   (Dries up, loses its colour, becomes thinner, becomes brittle, becomes lighter
2. What substance is lost from a flower when it is pressed? (water)

Guided Lesson

Lesson **No.32**

Strand 1: Life

Unit 1: Plants

Lesson title: Grouping plants according to their stem

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to classify plants into woody or herbaceous stems.

Key concepts:
- Stems help the plants to stand upright.
- Stems provide the pathway for water and food to reach other plant parts.

Knowledge	Skills	Attitudes
• Stem is the pathway for water and food to reach the other plant parts. • Plants can be classified into woody or herbaceous stems.	• Identify and classify stems into herbaceous or woody.	• Appreciate that stems are classified into two groups.

Materials: various plants, a white flower with a long stem, water, food colouring (or blue ink), a bottle.

- Take extra care when using food colouring.

Teacher's Notes:
Stems help support the leaves, flowers and fruits of plants. They also provide a pathway for water and food to flow between the roots and leaves. Some green stems help make food. Other stems store food. Stems can classified as either woody or herbaceous. Trees, shrubs and vines have woody stems. Flowers, herbs and vegetables have herbaceous stems. Woody stems are usually able to survive more severe conditions than herbaceous stems.

Teaching and Learning Activities

Key Question: How does water move along the stem?

Activity 1
Complete the table by placing the plants under the correct column. Group plants according to woody or herbaceous stems.

Kaukau, hibiscus flowers, vines, aibika ,

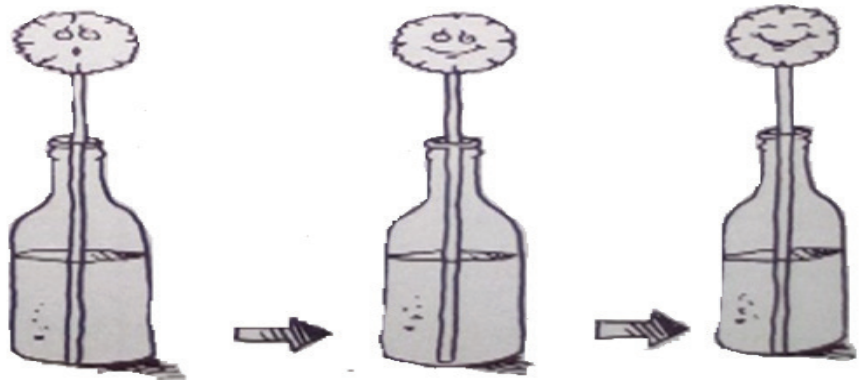
Woody	Herbaceous

Guided Lesson

Activity 2:
How does water move in stems?

1. Fill the bottle half way with water.
2. Add some food coloring to the water.
3. Stand the flower and wait for a few hours.
4. Record your observation.

Question
What happened? (Colour the flowers to show bit by bit what happened.)



Discussion

Why did it happened?

Guided Lesson

Lesson **No.33**

Strand 1 : Life

Unit 1: Plants

Lesson title: Functions of Plant Parts

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to state the functions of each plant parts.

Key concepts:

- Different parts of a plant perform different roles in order for plants to live.

Knowledge	Skills	Attitudes
• The different parts of the plant perform different roles that help the plant to grow.	• Identify and state the functions of each plant part.	• Develop an attitude to care for plants.

Materials:
Flowering plant, chart.

- Always take care when handling plants.
- Wash hands after handling plants.

Teacher's Notes:

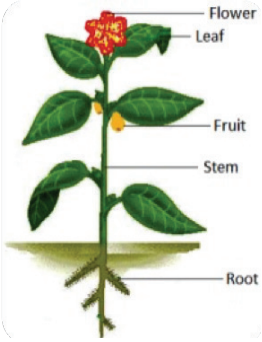
In the previous lesson, the students learnt about the different parts of a plant. This lesson links the plant parts with their functions. If possible, students can use their plants from the previous lesson to assist them in this lesson.

Roots and stems help plants get what they need to grow. **Roots** take in water and nutrients from the ground. They hold the plant in the ground.

A **stem** connects the roots to other plant parts. Stems carry water from the roots to the leaves and other plant parts. Stems also help a plant to stay upright.

Most plants have **leaves.** The leaves make the food for the plant. Leaves **give off oxygen** that people and animals breathe. Leaves are different in shape and size and also are food for people and animals.

Flowers and seeds. Many flowering plants have flowers. A **flower** is a part of a plant that makes seeds. A seed has a new plant inside. When it is planted, a new plant grows.



Guided Lesson

Teaching and Learning Activities

Key Question: Which part of the plant is important?

1. Take the students outside to places where suitable flowering plants can be found.
2. Tell the children to get a plant each and bring it back to the classroom.
3. Tell the children to look at their plants and label the different plant parts and state the functions of each part.

Activity 1:
Student discuss and complete the table below.

Part of Plant	Function
Root	
Stem	
Leaves	
Flowers	

Activity 2
Choose a word from the box below to fill in the blanks.

breathes	fruit	seeds	tubes	up	food	minerals	soil	water

Choose a word from the box below to fill in the blanks.

1. The roots hold the plant firmly in the _____.
2. The roots get _____ and _____ from the soil.
3. The stem holds the leaves _____ in the air.
4. The stem has lots of little _____ which carry water and minerals from roots to the leaves.
5. The plant _____ through its leaves.
6. The plant makes _____ in its leaves.
7. The flowers are where the plant its _____ and _____.

Summary Question

- Each part of a plant has a special function in order for the plant to grow.
- Roots take in water and nutrients from the soil.
- The stem carries the water and nutrients from roots to other parts of the plant.
- The leaves collect light from the sun to make food.
- The flowers produce seeds that have new plants.

Guided Lesson

Lesson **No.34**

Strand 1 : Life

Unit 1: Plants

Lesson title: Basic needs of plants

Content standard: **3.1.1** Investigate and explain the parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to describe the basic needs of plants.

Key concepts:

- Plants need sunlight, water, air and nutrients from the soil in order to live.

Knowledge	Skills	Attitudes
• Plants are living things and need water, air, sunlight and nutrients from the soil to grow well.	• Identify the basic needs of plants. • Explain why plants should get the right amount of basic needs.	• Accept the fact that plants need to get the right amount of water, sunlight, air and nutrients from the soil.

Materials: Flowering Plant, chart.

Teacher's Notes:

Plants are very important for living things. Without plants, all living things will die. Plants provide energy that is needed for living things to survive. They can be found in almost every environment. How do plants grow?

Plants are living things. Like any other living things, plants need water, air, sunlight, nutrients from the soil and space to grow well.

Different plants need different amounts of these things. If they do not get the correct amounts, the plants will not grow well and may eventually die.

Sunlight - Plants need sunlight to grow and live. Green plants use sunlight, water and carbon dioxide gas to make food.

Air - Just like animals and people, plants also need air to live and grow. Plants use carbon dioxide to make food so that they can grow.

Water - Plants need water to grow and to make food. Some plants need more water than others. The amount of water a plant needs depends on the type of plant. If the plant does not get the amount of water it needs it will die. Some plants are able to grow in very dry areas, such as cacti in the desert. These plants have adapted (changed) over many, many years to be able to survive in these conditions.

Nutrients or minerals from the soil

Most plants grow well if they are planted in soil that is rich with nutrients.
Plants are anchored in the soil by their roots.

- Their roots absorb the dissolved nutrients from the soil.
- To make sure plants get enough of these mineral nutrients we often add some fertilizer or compost to the soil.

Summary

- Plants need space, water and nutrients from the soil to grow healthy.
- Plants need sunlight , air and water to make their own food.

Guided Lesson

Lesson **No. 35**

Strand 1: Life

Unit 1: Plants

Lesson title: Uses of plants

Content standard: **3.1.1** Investigate and explain parts of plants and state their functions.

Objective: By the end of the lesson the students can be able to:
- identify uses of plants to living things.
- describe that humans and animals depend on plants for survival.

Key concepts:
- Human beings use plants to make other products.
- Living things need plants to survive.

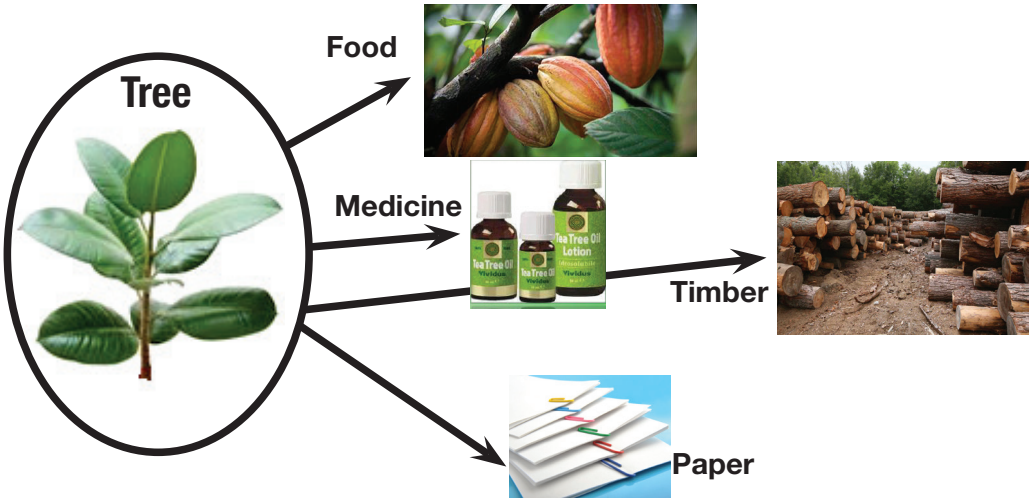
Knowledge	Skills	Attitudes
• Plants can be used as food, for building materials, for clothing and medicine. • Plants are a source of food for animals and humans.	• Identify the different uses of plants.	• Appreciate uses of plants.

Materials: Samples of products made from trees (can be pictures)

Teacher's Notes:

This lesson talks about the importance and value of plants to living things. Living things use plants as food, for building materials, for clothing and for medicine. There are many plants we use for food and we also eat different parts of the plants. We eat roots of tapioca, onion, yam, taro and sweet potato. We eat the stem of the sugar cane and sago. We eat the fruits of tomato, banana, melon and oranges. We eat the leaves of the cabbages, aibika, pumpkin and we eat flowers of cauliflower and broccoli. We get our tea, oil palm, rubber, copra, coffee all from plants.

We make many different things from plants. Timber sawn from trees, bamboos and grasses for roofs of houses and making mats are also important and inexpensive building materials. Tapa cloth has been a traditional material for clothing. Paper is also made from trees.



Guided Lesson

Teaching and Learning Activities

Key Question: What is the use of this plant?

1. Get the students outside and collect plants of their choice. Remind them that they must have a reason for choosing a particular plant.
2. Ask the students about the uses of plants that they have picked.
3. Give examples of everyday use of plants.
   (When you read a book, sit on a chair, sleep on a grass mat, light a fire, drink some fruit juice, and sweep a house)

Activity

1) Make a list of things in the classroom or in your home that came from trees?

Classroom	Home

2) Which part of the tree has been used to make the things listed above?

Revise the following ideas with the children

- Plants are living things and have many uses.

Guided Lesson

Lesson **No. 37**

Strand 1 : Life

Unit 2 : Animals

Lesson title: Animals around us

Content standard: **3.1.2** Investigate and explain body parts of animals and state their functions.

Objective: By the end of the lesson the students can be able to:
- know that each group of animal is different in their features and characteristics
- know that animals are different in size, shape, structure, weight, colour, body covering, where they live and in other ways.

Key concepts:
- Animals are living things.
- They grow, reproduce and have life.

Knowledge	Skills	Attitudes
• There are many different animals around us. • Each animal is different from each other.	• Group animals according to special groups	• Develop a caring attitude towards animals.

Materials:
Chart containing pictures of various animals.

Teacher's Notes:
Every day we see many different types of animals around us. Each animal or group of animals are different in their features and characteristics. They are different in size, shape, structure, weight, colour, body covering, where they live and in other ways. Animals also have different means of communication, reproduction, movement and feeding habits Before the lesson the teacher should Write this words on flash cards. This will be used in the activity part of the lesson.

Teaching and Learning Activities

Key Question: In what ways are animals different?

Activity 1

Fly | fruit | meat | crawl | insects | fur | swim | skin | climb | scales | feathers | plants

Use the words from the flash cards to complete the table below

Animal	Movement	Covering	Food
Crocodile			
Cuscus			
Bird			
Frog			

Summary
- There are many animals around us.
- Animals are different in size, how they move, eat, body covering, structure and shape.

Guided Lesson

Lesson **No.38**

Strand 1 : Life

Unit 2 : Animals

Lesson title: Body parts of an Insect and their functions

Content standard: **3.1.2** Investigate and explain body parts of animals and state their functions.

Objective: By the end of the lesson the students can be able to:

- examine several different insects.
- identify and name the parts of an insect correctly.

Key concepts:

- All insects have six (6) legs and a body divided into three (3) parts.
- All parts of the insect have different functions.

Knowledge	Skills	Attitudes
• The body of an insect is divided into three parts- head, thorax and abdomen. • All the parts of the insect perform different roles to enable the insect to live.	• Identify the three main body parts of an insect. • State the function of each body part.	• Appreciate the composition of the insect body parts and their functions.

Materials: A beetle, butterfly or moth for each child (see Special Notes), an ant and one mosquito, fly or bee for each child, sheets of paper, hand lens, material trays or boxes, Chart- PARTS OF INSECT"

- Handle insects with care.
- Wash hands with soap after touching an insect.

Teacher's Notes:

An insect has three main body parts. The front part is called the *head.* The middle part is called the *thorax.* The last part is called the *abdomen.*

- The head is the anterior of the three body regions of an adult insect. It bears the eyes (usually a pair of the compound eyes, the **antennae** and the **mouthparts.**
- The **thorax** is the middle of the three body regions of an adult insect. It is composed of 3 segments. It bears 3 pairs of **legs** (one on each segment) and usually 2 pairs of wings. Some insects have only one pair of **wings.**
- The **abdomen** is the posterior of the three regions of an adult insect. It is composed of 11 segments. The abdomen bears the external genitalia of the insect. In female insects these consists of an ovipositor.
- The adult insect has 2 pairs of **wings,** but for some (for example flies) have only 1 pair of wings. Usually the wings are membranous but in some insects they can be leathery or hard. Sometimes the wings bear small hairs or scales.
- Adult insects have **6 legs**. Each segments of the **thorax** bears 1 pair of legs. The legs are segmented. Often the last segment of the leg bears a small claw. In some insects, the legs are specially adapted for jumping.
- The **head** of most adult insects bears a pair of **antennae**. Insects use the antennae to detect odors or they use them as tactile (touch) organs. Antennae of different insects are very variable in form and size.
- The **mouthparts** of an adult insect can be of different types. In many species they are of the chewing type, for example in **grasshoppers** and beetles. Others have sucking mouthparts for example shaped like stylets in bugs and aphids or shaped like a coiled tongue in butterfly and moths. The different types of mouthparts determine how the insect feeds.

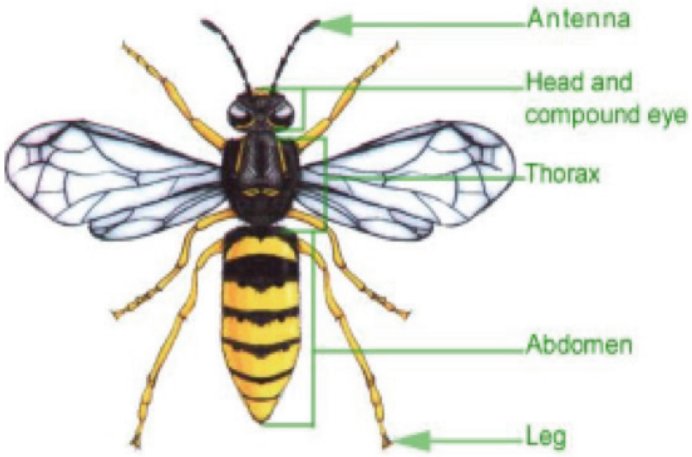
Guided Lesson

Teaching and Learning Activities

Key Question: How many body parts does an insect have?

Activity 1

1. Give each student three (3) different types of insects and a sheet of paper.
2. Ask individual students to come to the front of the class and point in turn to each of these parts on the chart.
   - At the same time ask the other children to point to these parts on their own insects



3. Tell the students to place their insects side by side on the paper and look at them more closely both with hand lens and without hand lens.
4. Tell them to count the number of legs on each different insect. Do the same for the wings, the feelers, the eyes and the stomach.

5. Ask the students to:
   - name those body parts for which all their insects have the same number
   - Name an insect which has a different number of any body part
     (E.g. Ants have no wings, flies have 1 pair and butterflies have 2 pairs)
   - look at the colour of each insect.
   - work in groups and select:
     a) The biggest insect.
     b) The most beautiful insect.

- Tell a child from each group to place these insects on display for other classes to see.

Summary

1. How many parts is an insect's body divided into? (3)
2. Name these parts. (Head, chest , stomach)
3. How many legs do insects have? *(6)*
4. Do all the insects have wings? *(NO)*
5. Name an insect which does not have wings. *(Ant)*
6. Most insects have two pairs of wings; name an insect which has only one pair. *(Fly)*

Guided Lesson

Lesson **No.39**

Strand 1 : Life

Unit 2: Animals

Lesson title: Body parts of a bird and their functions

Content standard: **3.1.2** Investigate and explain body parts of animals and state their functions.
Objective: By the end of the lesson the student will be able to:
- identify and label the different parts of a bird
- identify the different roles of each part.

Key concepts:
- Most birds can fly.
- Birds have body parts that help them to fly.

Knowledge	Skills	Attitudes
• Birds have body parts that enable them to stay alive.	• Identify the body parts of birds and function state their functions.	• Develop carin attitudes for birds.

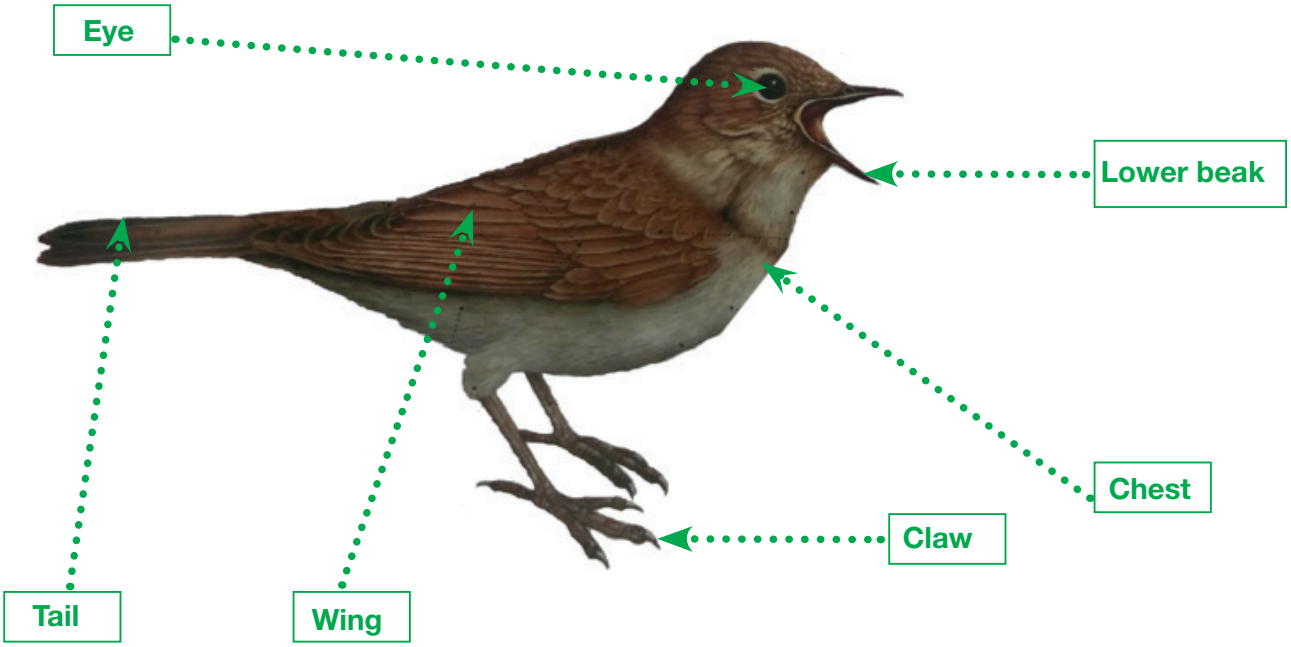
Materials: Bird Chart

Teacher's Notes:

Birds are animals that have feathers and most can fly. They lay eggs with hard shells.

Feathers cover almost every part of a bird's body. The feathers are strong and light to help birds fly. The feathers also keep a bird warm. Most birds lose their feathers and grow new ones every year. Birds have different feather colors- red, blue, green, yellow and others. Birds use their wings to fly. Their wings are shaped to provide lift, enabling them to fly.

Birds have **beaks** instead of jaws with teeth. There are many shapes and sizes of beaks. The shape of the beak depends on what the bird eats. Toucans are tropical birds with huge, curved beaks. They use their beaks to crack open nuts. Sparrows and finches have thick beaks that are perfect for crushing seeds.



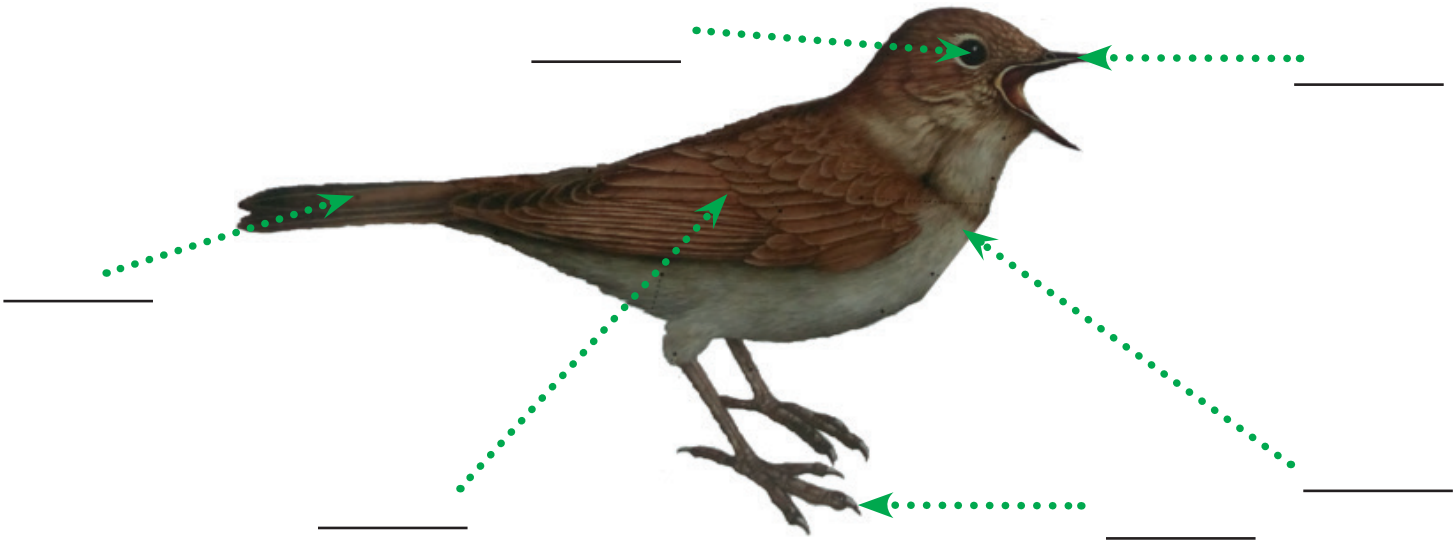
Guided Lesson

Teaching and Learning Activities

Key Question: How do birds use their body parts?

Activity 1: Use the words below to label the body parts of a bird.

Tail feathers, breast, wings, throat, eyes, claws, beaks



Body Part	Function
Feathers	Crack open nuts and seeds
Beak	Helps the bird to locate food or danger
Wings	Covers almost every part of a birds body. Protects the bird from
Eyes	Used for walking or sometimes used to catch preys
Legs	Used for walking or sometimes used to catch preys

Activity 2:
Draw an arrow to match the body parts of the bird with its function.

Summary

Questions to ask the children

1. Which part of the bird is used for eating?
2. Which part of the bird's body is used for flying?

Guided Lesson

Lesson **No. 40**

Strand 1 : Life

Unit 2 : Animals

Lesson Title: Body parts of a fish and their functions

Content standard: **3.1.2** Investigate and explain body parts of animals and state their functions.

Objective: By the end of the lesson the students will be able to:
- identify and label body parts of a fish
- state the functions of each body parts of a fish.

Key concepts:
- Fish live in fresh water and salt water. They breathe through their gills.
- Fish cannot survive on land.

Knowledge	Skills	Attitudes
• Fish have body parts that are different from other animals. • Fish live in the water and breathe through their gills.	• Identify body parts of fish and state their functions.	• Show curiosity in learning.

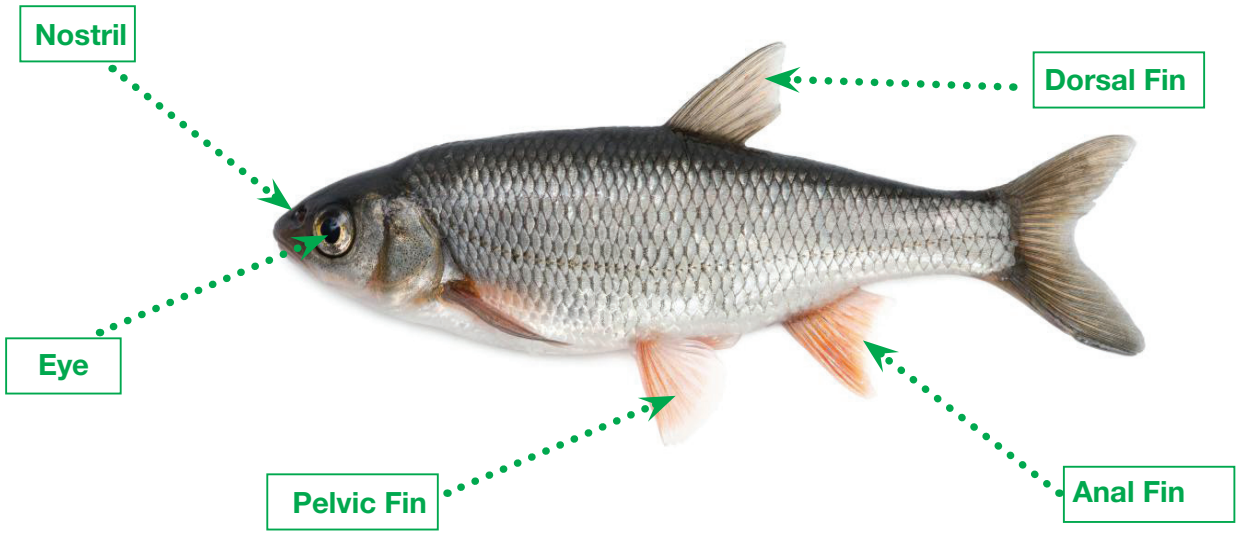
Materials: Dish of water (fresh water or salt water), a live fish.

Teacher's Notes:

In this lesson the students will learn about Fish. Fish have body parts that are different from other animals. The combination of gills, fins and the fact that they live only in water make fish different from all other animals. Fish spend all their lives in the water. They eat and breathe in the water.

There are more than 24, 000 different species of fish in the world. Most fish have skeleton made of bones but some, like shark have a skeleton made of cartilage.

Fins are important for helping the fish to stabilise themselves when they swim.



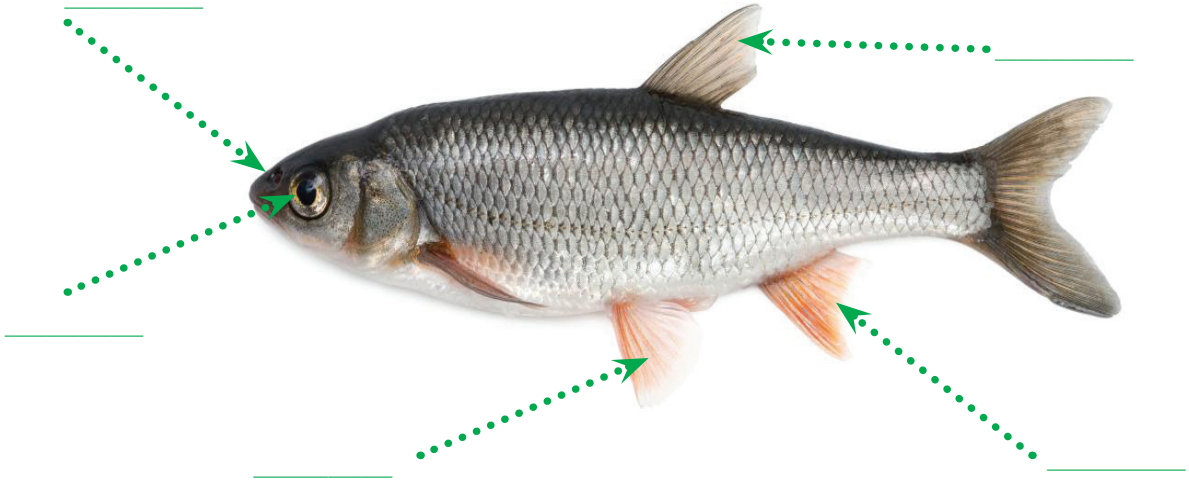
Guided Lesson

Teaching and Learning Activities

Key Question: How is a fish different from other animals?

Parts of a Fish.
Label the fish using the parts listed below.

Dorsal fin, eye, pectoral fin, pelvic fin, nostril



Activity 2:
Match the body part with their function.

Body Part	Function
Eye	Used to breathe in air .
Mouth	This part of the fish (dorsal, pectoral, and pelvic) help fish to swim in water.
Gills	Used for to seeing.
Scales	Just like their other fins, a tail fin helps fish to swim.
Fins	It is used to take in food.
Tail	It is used for protection.

Guided Lesson

Lesson **No. 41**

Strand 1: Life

Unit 2 : Animals

Lesson title: Body parts of a frog and their functions

Content standard: **3.1.2** Investigate and explain body parts of animals and state their functions.

Objective: By the end of the lesson the students can be able to identify the body parts of a frog and explain the different functions of each body part.

Key concepts:
- Frogs can live both on water and on land.

Knowledge	Skills	Attitudes
• Frogs belong to a group of animals called amphibians. • Frogs live both on land and in the water. • Frogs have body parts. Each part has its own function	• Identify the different body parts of frogs and state their functions. • Explain why frogs live in both land and water.	• Develop positive attitudes towards learning.

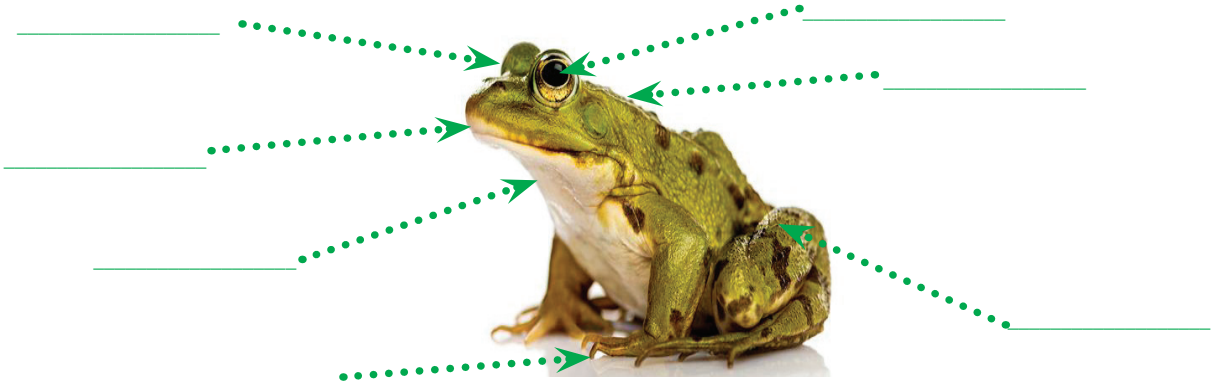
Materials: Frog chart, worksheet

Teacher's Notes:
Frogs are small animals belonging to a group called vertebrates (animals with backbones) known as amphibians. They live part of their lives in the water and the other part on the land. The word amphibian comes from the two Greek words, "amphi" which means "both" and bios which means life. Amphibians are cold blooded animals and their body temperature is the same as the temperature in which they live in. Their skin absorbs water into the body so they do not have to drink water to survive.

Frogs have **two** strong **hind legs** to enable them to leap forward at a great distance.
The **two** front **legs or arms** are short. They are used to prop the frog up when it sits.

Teaching and Learning Activities

Activity 1: Labelling
Use the words to label the different parts of the frog.
Hind limb, lower mouth, eye, web foot, ear, upper mouth, throat



Guided Lesson

Lesson **No. 42**

Strand 1: Life

Unit 2 : Animals

Lesson title: Body parts of a dog and their functions

Content standard: **3.1.2** Investigate and explain body parts of animals and state their functions.

Objective: By the end of the lesson the students can be able to identify the body parts of a dog and state their functions.

Key concepts:

- Dogs are humans best friends.
- Dogs have a very strong sense of smelling.

Knowledge	Skills	Attitudes
• Dogs have different body parts that enable them to live. • Dogs have a very good sense of smelling.	• Identify the different body parts of dogs and state their function.	• Respect dogs as human's best friend.

Materials: Chart on parts of a dog.

Teacher's Notes:

Parts of a Dog

Ears - dogs have different ear sizes and shapes. They can be short, pointed or long or floppy. The ears are very sensitive to sounds. They can hear noises that are four times further away.

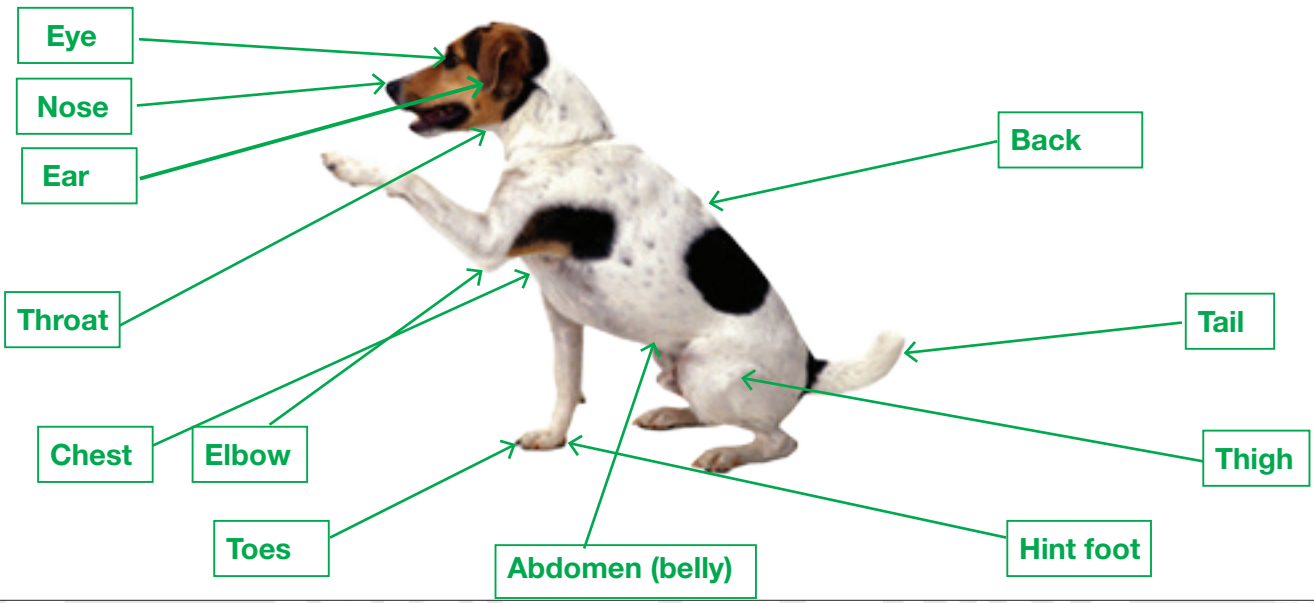
Eyes - the eyes of the dog are meant to see. They see better at nightfall and can spot moving things better than things that stand still.

Muzzle - the part of the dog where the nose, mouth and whiskers are.

Nose - used for smelling. Smelling is dog's number 1 sense. They always have their nose to the ground.

Whiskers - they are found around the nose, eyes, upper lips and chin. They are used to sense vibrations in the air. This helps them to identify the shape, size and how close objects are.

Back - the back of the dog.



Guided Lesson

Lesson **No. 43**

Strand 1: Life

Unit 2: Animals

Lesson title: How do animals feed?

Content standard: **3.1.2** Investigate and explain body parts of animals and state their functions

Objective: By the end of the lesson the students can be able to:
- know that animals are different in many ways
- identify the different movements of animals and how they feed.

Key concepts:
- Animals use different body parts to move.
- Birds have different beak shape for feeding purpose.

Knowledge	Skills	Attitudes
• Animals have different teeth shapes depending on the type of food they eat. • Birds have different beaks that enable them to eat certain type of food .	• Identify animals with different types of teeth structures and the food they eat. • Identify the shapes of birds beak and identify the type of food they eat.	• Show curiosity to learn about how animals feed.

Materials: Bird Chart, Animal chart

Teacher's Notes:

Birds have special shaped beaks to catch food. Animals have teeth that are different shapes so they can eat different kinds of food. Animals have different body parts that allow them to move in different ways to catch food and protect themselves.







Guided Lesson

Teaching and Learning Activities

Key Question: Why do birds have different beak shapes?

Copy and complete the following chart.

Chart A

Match the Birds in Column A with how they eat in Column B.

Column A Column **B**

Bird	How Birds Eat
Pelican	Tear meat
Heron	Scoops fish
Parrot	Spears fish

Chart B

Match the animals in column A with the type of teeth in column B with what it eats in column C.

Column A **Column B** **Column C**

Animal	Type of Teeth	How Birds Eat
Crocodile	Round and Flat	Eats fruits
Cow	Sharp & pointed	Eats meat
Cuscus	Round & Pointed	Eats grass

Summary

- Animals have various shape of teeth depending on the type of food they eat.
- Birds have different types of beaks which is made for certain types of food.

Guided Lesson

Lesson **No. 44**

Strand 1 : Life

Unit 2 : Animals

Lesson title: How do animals move?

Content standard: **3.1.2** Investigate and explain body parts of animals and state their functions.

Objective: By the end of the lesson the student can be able to understand and know the dif ferent ways of animals move.

Key concepts

- Different animals use different body parts to move.

Knowledge	Skills	Attitudes
• Different animals move in different ways depending on their body structure. • Animals move around to find food and to protect them from other animals.	• Identify the different ways animals move. • Explain why animals move in this manner.	Accept the different ways animals move.

Materials: Animal chart

Teacher's Notes:

Animals move in different ways. They swim, climb, hop, crawl, walk, jump, run, fly and glide. Many animals have body parts that are made especially for movement. Wallabies use their tails and legs to jump and run. Birds have wings and feathers for flying and gliding. Some turtles have legs called flippers that help them to swim. Fish use their fins and body to move through the water. Animals move to protect themselves.

Teaching and Learning Activities

Activity 1: Movement of animals

Complete the table by filling in the body part of the animals and the type of movement it does.

Example of animals	Body part	Type of movement
Turtle	Flippers	Swim
Dog		
Bird		
Lizard		
Wallaby		
Crocodile		
Rooster		

Summary

- Animals move in different ways depending on their body structure.
- Animals swim, climb, hop, crawl, walk, jump or fly.

Guided Lesson

Lesson **No. 54**

Strand 2 : Physical Science

Unit 1: Energy

Lesson title: What is energy?

Content standard: **3.2.1** Describe how energy changes from one form to another.

Objective: By the end of the lesson the student can be able to define and explain what energy is.

Key concepts:
- Energy is required to enable things to work or move.

Knowledge	Skills	Attitudes
• Energy is required to enable things to work or move. • There are different forms of energy and can be converted from one form to another.	• Identify the different forms of energy.	• Appreciate the function of energy in everyday life.

Materials: Radio, batteries (new and used), torch

Teacher's Notes:
How do you feel when you have lots of energy? How are new batteries different from 'flat' ones? Put them into a CD player or a torch and you can certainly tell the difference. Energy makes things happen. You can't see energy. You can't weigh it, and it doesn't take up space as matter does. Everything you do needs energy. In fact, everything that happens needs energy. Without it nothing will go. It simply makes things happen when it changes from one form into another.

Non-living things also need energy. Many machines need electrical energy to work. The more machines we use, the more electrical energy or electricity we need. Energy comes in different forms such as light, heat, sound, and electricity.

Teaching and Learning Activities

Activity 1 Ask the students to make a list of activities that they like doing during their free time.
- Does the activity require you to have meals?
- Brainstorm 'what is energy?'
- Construct a concept/mind map of what is energy.
- Explain to the students that energy is the ability to do work.

Activity 2 Make a list of the different energy that you can find in the environment around you.

Summary

- Energy is the ability to do things.
- Some forms of energy are light energy, electrical energy, heat energy and sound energy.

Guided Lesson

Lesson **No. 56**

Strand 2 : Physical Science

Unit 1: Energy

Lesson title: Types of Energy

Content standard: **3.2.1** Describe how energy changes from one form to another.

Objective: By the end of the lesson the student can be able to identify the different types of energy and give examples of each type.

Key concepts

- Humans use various types of energy for many different resons.

Knowledge	Skills	Attitudes
• There are various types of energy- light, sound, heat and electrical energy. • Humans use various types of energy for many different purposes.	• Explain the different types of energy. • Differentiate between each type of energy.	Show curiosity in exploring the various types of energy .

Teacher's Notes:

In the previous lesson, the students looked at energy. This lesson looks at the various forms of energy: light energy, sound energy, heat energy and electrical energy.

Light energy - Light is the energy that allows us to see things. Without this energy, we could not see things around us. Burning things, very hot objects and stars all release light. Light energy from the sun, called solar energy, is used by plants in the process of photosynthesis to make food.

Sound energy - Sound is a form of energy that helps us to hear. It is caused by vibrating objects such as a guitar string or the skin of a drum. The bigger the vibrations, the louder the sound.

Heat energy - Heat energy is energy that an object has because of its temperature. The hotter the object is, the more heat energy it has. Heat energy moves from a hotter object to a colder one. When you put your cold hands around a hot cup of tea, heat energy moves from the cup to your hands, making them warmer.

Electrical energy - Electricity has electrical energy and is widely used because it is easily transmitted by wires to the place where it is needed. It can be changed into other forms of energy by electric lights, computers, hair dryers, TV sets, washing machines, toasters etc.

Activity Complete the table by writing an example of the form of energy.

Type of Energy	Example
Light	Sunlight
Sound	
Heat	
Electrical	

Summary

- Light is the energy that allows us to see things.
- Sound is a form of energy that helps us to hear.
- Heat energy is energy that an object has because of its temperature.
- Electricity has electrical energy and is widely used because it is easily transmitted by wires to the place where it is needed.

Guided Lesson

Lesson **No. 57**

Strand 2 : Physical Science

Unit 1 : Energy

Lesson title: Uses of energy

Content standard: **3.2.1** Describe how energy changes from one form to another.

Objective: By the end of the lesson the student will be able to recognise and give examples of the uses of different types of energy.

Key concepts:

- People need energy to live.

Knowledge	Skills	Attitudes
• Different types of energy have different types of uses.	• Identify different types of energy and state their uses.	Appreciate the use of energy in our daily life.

Materials: Pictures of different types of energy

Teacher's Notes:

This lesson will focus on the various uses of the forms of energy (light energy, sound energy, heat energy and electrical energy.) already learnt in lesson.

Light energy

Light is used in various ways. In the homes, we use light to lighten our home. We also use light to control cars, aeroplanes and ships. The light directs or controls the traffic. Plants also use light to make their own food. This is done through a process called ***photosynthesis.***

Sound energy

Sound is a form of energy that helps us to hear. It is caused by vibration. When we talk, our voice box vibrates that causes the sound to come out from our mouth. This helps us to communicate with each other. Musical instruments produce sounds that we hear in music. Horns in the cars also produces sound.

Heat energy

Heat energy is the energy that we can feel because of its temperature. We use heat energy to cook food, warm the place during cold season, dry clothes, and preserve food and also to charge batteries.

Electrical energy

Electricity has electrical energy and is widely used because it is easily transmitted by wires to the place where it is needed. We use electricity to turn on lights, computers, hair dryers, TV sets, washing machines, toasters etc.

Teaching and Learning Activities

Type of Energy	Uses of the energy
Light	Sunlight
Sound	
Heat	
Electrical	

Guided Lesson

Lesson **No. 58**

Strand 2 : Physical Science

Unit 1 : Energy

Lesson title: Sources of light

Content standard: **3.2.2** Investigate and describe the properties and effects of light when it strikes an object.

Objective: By the end of the lesson the student will be able to:
- identify the different sources of light
- list examples of man-made and naturally made light sources.

Key concepts
- There are various sources of light. Some are natural while others are built by humans.

Knowledge	Skills	Attitudes
• There are various sources of light. • Some sources of light are natural while others are made by humans.	• Identify man-made and natural sources of light.	• Show curiosity in learning about sources of light.

Materials: candle,lamp, torch

- Do not look directly to the sun.

Teacher's Notes:

Light is a form of energy that is needed to see things. All living things need light in order to live. Animals including human beings need light to see while plants need light to make their food. The sun is our main source of light. Other major sources of light apart from the sun are those that are devised by people such as:

- Light bulbs in lamps or torches
- Burning kerosene in lamps
- Burning candles
- Burning wood or grass
- Light from mobile phones.

Like the Sun, other stars give out light. But because the stars are so far away from the Earth, we don't get much light from them. On some nights we get light from the moon. The moon does not make this light. The light that we see or get from the moon is actually the light from the Sun that bounces off the moon and comes to the Earth.

Teaching and Learning Activities

Activity 1: Write at least three man-made light and three natural light.

Summary

- Light is an energy that helps us to see things around us.
- Objects that produce light are called the sources of light.

Guided Lesson

Lesson **No.59**

Strand 2 : Physical Science

Unit 1 : Energy

Lesson title: How does light travel?

Content standard: **3.2.2** Investigate and describe the properties of light and effects of light when it strikes an object.

Objective: By the end of the lesson the student will be able to understand the manner in which the light travels.

Key concepts:

- Light travels in straight lines.
- Light can travel through space and air.

Knowledge	Skills	Attitudes
• Light travels in straight. • Light travels faster than sound.	• Investigate how light travels.	• Show curiosity to learn about how light travels.

Materials: a torch, blu-tak, sharp pencil, five square cards, black paper or card, scissors

- Be careful when handling sharp objects.

Teacher's Notes:

Light travels fast. It travels much faster than sound. It travels 300 million meters in one second. This is very very fast. This is why when there is a storm we see lightning before we hear the sound of the thunder. When light travels from one place to another it travels in a *straight line*. It does not bend. It does not go around the objects.

Light can travel through space where there is no air. It travels from the Sun to the Earth. Light can also travel through water and air. Although light can easily pass through some objects like air, water and clear glass, other things like waxed paper allow only part of the light to pass through. Some objects like stone, wood and cardboard do not allow any light to pass through them.

Teaching and Learning Activities

"How does light travel?"

1. Cut five square cards 16 cm x 16 cm.
2. Poke a hole in the center of each card.
3. Line the cards up in a row. Use a blue-tack to stand them up.
4. Put a black card at the end of the row. (It should not have a hole). Shine the torch at the cards.
5. What happens?
6. Try moving the cards closer together or further apart.

Summary

Properties of light

- Light travels in straight lines.
- Light travels faster than sound.
- We see things because they reflect light into our eyes.
- Shadows are formed when light is blocked by an object .

Guided Lesson

Lesson **No. 62**

Strand 2 : Physical Science

Unit 1 : Energy

Lesson title: How is shadow formed?

Content standard: **3.2.2** Investigate and describe the properties of light and effects of light when it strikes an object.

Objective: By the end of the lesson the students will be able to:
- recognize what is needed to make a shadow
- illustrate how shadows change shape and direction.

Key concepts
- Shadow is formed when light is blocked by an opaque object.

Knowledge	Skills	Attitudes
• A shadow is formed when light is completely or partially blocked by an object.	• Investigate the variables that affect shadows formed and communicate findings.	• Show curiosity to learn about how shadows are formed.

Materials: battery, torch, an object

- Do not be exposed to sunlight for more than 5 mins.
- Do not look directly to the sun.

Teacher's Notes:
From the previous lesson the students learnt that light can pass through certain objects. This lesson focuses on what happens when light is blocked by an object. Shadows are formed when light is blocked by an object in its path. An object does not have to be opaque to cast a shadow. *Translucent* and *transparent* materials cast shadows that are pale and *fuzzy.*

If we shine light on to an object that blocks light it forms a shadow. Because light does not bend or go around the object, or through the object, the area behind the objects that blocks the light becomes dark and almost the same shape as the object. If you move the object blocking the light, the shadow will move. If you change the shape of the object the shape of the shadow will also change. If you change the size of the object, the size of the shadow will change.
Making shadows can be fun. Children enjoy going outdoors on a sunny day and making shadows with their bodies.

Teaching and Learning Activities
Discussion
1. Why do shadows sometimes frighten people?
2. What happens to the shadow when the light source is directly overhead?
3. If the light source moves to the other side of the object, how does it affect the object?

Summary

- Shadows are formed when light is blocked by an object.
- Shadow of objects forms different shapes when light is shown at different parts of the object.
- the size of an object's shadow changes when the objects is moved closer or further away from the light source.

Guided Lesson

Lesson **No.64**

Strand 2 : Physical Science

Unit 2: Force and motion

Lesson title: What is a force?

Content standard: **3.2.4** State the uses of simple machines and explain how force is applied on objects.

Objective: By the end of the lesson the student will be able to:
- identify and classify objects by the way they move
- explain how an object can move faster.

Key concepts:
- Force is a push or pull.

Knowledge	Skills	Attitudes
• Define force as a push or a pull. • A pulling force is an inward force and pushing force is an outward force.	• Classify different movements as pushing or pulling force.	• show curiosity in exploring about forces.

Materials: chair, ball and anything that can be pushed or pulled

Teacher's Notes:

A force is a push or a pull. When you set in motion **the push** is a force. Same way if I tug, or pull, on something. **The pull** is a force.
There are two types of FORCES -
1. A pulling force
2. A pushing force

Teaching and Learning Activities

1. Demonstrate the following to the students. Remind them to tell you whether the force that was used is push or a pull.

1. Stand close to your table. Slowly move your chair out and take your seat (Pull)
2. Kick a ball to a student. (Push)
3. Walk to the classrom door and open the door. After sometime close the door again.(Pull and then push)
4. Move back to where the chair is and slowly put it back to the original position. (Push)

Activity 2
List all forces on chart paper, sorting into pushes and pulls.

Summary

- A force is push or pull.
- A push is a force moving something away from us.
- A pull is a force moving something towards us.
- A larger force is needed to move a heavy object.
- A smaller force is needed to move lighter objects.

Guided Lesson

Lesson **No.67**

Strand 2: Physical Science

Unit 2: Force and motion

Lesson Title: What is a simple machine?

Content standard: **3.2.4.** State the uses of simple machines and explain how force is applied on objects.

Objective: By the end of the lesson the student can be able to:
- understand the definition of a simple machine
- identify the different types of simple machines .

Key concepts
- A simple machine helps to make work easier.

Knowledge	Skills	Attitudes
• A simple machine is a machine that uses small force to overcome a load. • There are six types of simple machines.	• Identify the different types of simple machines and give everyday examples of their use.	• Appreciate the fact that simple machines make work easier.

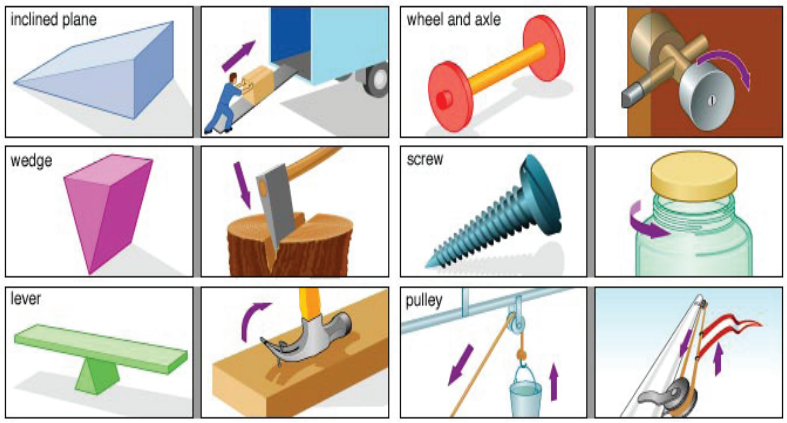
Materials: Pictures of simple machines (scissors, screw driver, spoon)

Teacher's Notes:
A simple machine is a machine that uses force to make work easier. It has none or very few moving parts. Examples of simple machines used every day are scissors, axe, bicycle, removing a nail with a hammer, our teeth splitting food.

Scientists have identified 6 types of simple machines. They are;

- Levers
- Pulleys
- Inclined Planes
- Screws
- Wheel & axle
- Wedges.

Simple Machines



Summary

- A simple machine is a tool or device that can make it easy to work
- There are six (6) types of simple machine; lever, pulleys, inclined planes, wheel and axle, wedge and screw

Guided Lesson

Lesson **No.68**

Strand 2: Physical Science

Unit 2: Force and motion

Lesson title: Types of simple machines - Inclined Plane

Content standard: **3.2.4.** State the uses of simple machines and explain how force is applied on objects.

Objective: By the end of the lesson the students can be able to identify and explain what an incline plane is.

Key concepts:

- Inclined plane is a machine that can make loading and unloading easier.

Knowledge	Skills	Attitudes
• Inclined planes make loading and unloading easier.	• Use an incline plane to move heavy load with less energy and force.	• Appreciate the use of simple machines to improve the quality of life.

Materials: Plank, disk, weights (bag of stone), rope, box.

Teacher's Notes:

An inclined plane is a simple machine. It is a flat surface that is higher on one end. You can use this machine to move an object to a lower or higher place. Inclined planes make the work of moving things easier. You need less energy and force to move objects with an inclined plane.

Examples of inclined planes:

- Ramp
- Slanted road
- Path up a hill
- Slide
- Skateboard park.

Teaching and Learning Activities

A ramp is a machine even if it does not look like one. You can pull a load up a ramp using less force than you would need to lift it vertically.

1. Place the plank with one end on the floor and the other on a desk.
2. Attach the rope to the box.
3. Add weights to the box.
4. Pull the weight along the ramp.
5. Remove the ramp and carry the load vertically.

Discuss the difference between carrying the load vertically and pulling it on the ramp.

Summary

- An inclined plane is a simple machine made up of a flat and slanted surface.
- An inclined plane helps make it easier to move heavy object from a low place to a higher place.
- Examples of inclined planes are stairs, ladder or ramp.

Guided Lesson

Lesson **No.69**

Strand 2: Physical Science

Unit 2: Force and motion

Lesson title: Types of simple machines - Levers

Content standard: **3.2.4.** State the uses of simple machines and explain how force is applied on objects.

Objective: By the end of the lesson the students can be able to:
- know and understand the use of levers
- identify and name the components of levers.

Key concepts
- A lever has three parts - load, fulcrum and effort.

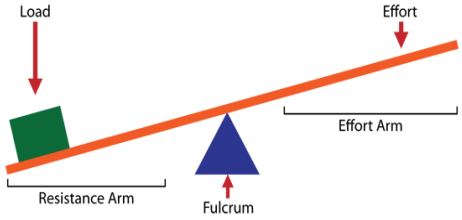
Knowledge	Skills	Attitudes
• A lever is used to lift heavy objects or to break things that require a large amount of force. • A lever has three components- fulcrum, the effort and the load.	• Use levers to lift heavy objects or to break things. • Identify the three components of a lever.	• Appreciate the use of simple machines to improve the quality of life.

Materials: a plang, load (mass), fulcrum (rockor box)

Teacher's Notes:

A lever is a simple machine .Levers make it easy to lift heavy objects or to break things that require a substantial amount of force. A lever has three components: the fulcrum, the effort, and the load. The fulcrum is the fixed point where the lever pivots. The ***effort*** is the external force applied to the lever, and the ***load*** is the weight intended to be moved by using the lever. The ***effort arm*** is the length of the lever from the fulcrum to the effort, and the ***resistance*** arm is the length from the fulcrum to the load.

Examples of levers:
- Seesaw
- Spatula
- Hammer
- Wooden spoon
- Pancake turner
- a Hammer (when it is used to pull a nail out of a piece of wood)
- Bottle opener
- Crow bar



Student Activities
1. What is a lever?
2. What is a lever used for?
3. Can you think of any examples of levers?

Summary

- A lever is a simple machine made up of the arm and fulcrum.
- The bar of the lever is called the arm.
- The fulcrum is the point which the lever turns or balances.

Guided Lesson

Lesson **No.70**

Strand 2 : Physical Science

Unit 2 : Force and motion

Lesson title: Types of simple machines - Pulleys

Content standard: **3.2.4** State the uses of simple machines and explain how force is applied on objects.

Objective: By the end of the lesson the student can be able to explain what a pulley is and what it does.

Key concepts:

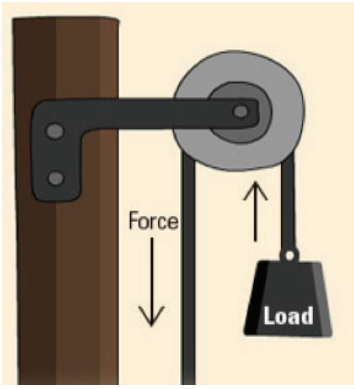
- Pulley is a simple machine that is used to lift very heavy loads with less effort.

Knowledge	Skills	Attitudes
• A pulley is made up of a wheel and a rope. • Pulleys are used to move loads upwards, downwards or sideways.	• Identify and explain the use of pulleys.	• Appreciate the use of simple machines to improve the quality of life.

Materials: pulleys, ropes , masses (Rocks)

Teacher's Notes:

What is a pulley? When using a pulley do we push, pull, or both? (Pull) How does it make work easier?
Pulley: This simple machine is made up of a wheel and a rope. The rope fits on the groove of the wheel. One part of the rope is attached to the load. When you pull on one side of the pulley, the wheel turns and the load will move. Pulleys let you move loads up, down, or sideways. Pulleys are good for moving objects to hard- to -reach places. It also makes the work of moving heavy loads a lot easier.
A crane uses a pulley to move a heavy wrecking ball. Without the use of a pulley, the wrecking ball would be very hard to move.



Examples of places where pulleys can be used:

- Flag poles.
- Clothes lines.
- Sailboat.
- Blinds.
- Crane.

Summary

- A pulley is a simple machine made up of a wheel with a groove through which the a rope moves.
- A pulley helps make it easier to lift an object.
- A pulley changes the direction of a force.

Guided Lesson

Lesson **No.80**

Strand 3: Earth and Space

Young children are naturally interested in everything they see around them—soil, rocks, streams, rain, snow, clouds, rainbows, sun, moon, and stars. During the first years of school, they should be encouraged to observe closely the objects and materials in their environment, note their properties, distinguish one from another and develop their own explanations of how things become the way they are.
By observing the day and night sky regularly, children will learn to identify sequences of changes and to look for patterns in these changes. As they observe changes, such as the movement of an object's shadow during the course of a day, and the positions of the sun and the moon, they will find the patterns in these movements. They can draw the moon's shape for each evening on a calendar.

Unit 1: Our Earth

Lesson title: Observing rocks

Content standard: **3.3.2** Investigate and describe properties of rocks and minerals.

Objective: By the end of the lesson the student can be able to:
- collect, examine and classify rocks
- state at least 4 ways in which rocks can be classified (e.g. size, colour .hardness, shape etc.

Key concepts:
- Rocks come in different sizes, shape, material and properties.

Knowledge	Skills	Attitudes
• Rocks come in different sizes, shape, material and properties.	• Rocks can be classified according to their physical properties.	

Materials: Rock samples, butcher paper, markers

Teacher's Notes:

The activity in this lesson will require the students to go out of the classroom to collect rock samples. To save time, students should be asked to bring in the samples before the lesson. Get the students into activity groups. Make sure that the students have enough rock samples and the samples are clean so they can see them clearly. The activity will require some time therefore you should allow students enough time to classify rocks into different sets they want to.

Reinforce that rocks come in different shapes, colour, and size and are found everywhere.

Teaching and Learning Activities

Activity 1

1. a) Divide the rocks into two groups of their choice.
   b) Give reasons for their answers.
   c) Combine the rocks again into one group.
   d) Divide the rocks again, this time into three sets in any way of their choice.
   e) Explain and give reason for their choice.

Guided Lesson

2. Tell each group to combine their rocks again into one set and then in turn make two new sets as follows;
   - big rocks and small rocks,
   - smooth rocks and rough rocks,
   - brown rocks and rocks which are not brown,
   - round rocks and rocks which are not round,
   - hard rocks and soft rocks,
   - heavy rocks and light rocks.

Activity 2:

1. In groups label the rocks samples.
2. Draw a chart on a butcher paper and put a tick at the correct columns.
3. Do a group presentation.

	SHAPE	COLOUR	SIZE	FEEL	SHINES
Rock # 1					
Rock # 2					
Rock # 3					
Rock # 4					

Summary

- There are many types of rocks. Limestone, sandstone are examples of rocks.
- Each rock is different from each other. Some are dark colored while others are light. colored. Some are soft while others are hard. Some are heavy while others are light.

Guided Lesson

Lesson **No.84**

Strand 3: Earth and Space

Unit 1 : Our Earth

Lesson title: What is soil?

Content standard: **3.3.3** Investigate and explain the characteristics of soil and its importance to living things.

Objective: By the end of the lesson the students can be able to discuss that different soil have different colors, feel different, contain different amounts of water, plant and animal matter.

Key concepts:

- There are different types of soil.

Knowledge	Skills	Attitudes
• Soil is a mixture of weathered particles of rock and decaying organic matter. • Soil supports earth life.	• Understand the composition of soil. • Identify and list the importance of soil for living things.	• Show curiosity to learn about soil. • Appreciate the fact that soil supports earth life.

Materials: A large container of garden soil, a large container of each of many other different kinds of soil (sandy, clayey, swampy)10 hand lenses, 40 sheets of paper(the different soil should be placed on these before the lesson), 10 glass jars with cover, 2 buckets of water, 40 Result Tables, 10 beakers (or similar containers) for water.

Teacher's Notes:

The Earth's entire surface was probably solid rock at one time. These rocks were weathered or eroded by wind and rain and also fast moving waters to produce the soil. Soil is a mixture of these weathered particles of rock and decaying organic matter. Environmental forces such as wind and water act on rock to break it down into smaller and smaller pieces. Leaves branches, bones and other once-living things are slowly decomposed by bacteria, fungi and insects. Insects also turn the soil, keeping it full of space for air and water.

Teaching and Learning Activities

Key Question: What is soil made up of?

Prediction: Soil is made up of sand, small rocks and dead leaves

Activity 1

1. Give soil samples and other materials to each group.
2. Tell the children to :
   - Place garden soil in the glass jar until it is about 1/3 full of soil.
   - Use a beaker to pour water from the bucket into the jar containing soil until the jar is 1/2 full.
   - Put the lid on the jar for a few minutes *(Solid particles settle to the bottom).*
   - Ask the children what they can see from top to bottom in the jar.

Summary

- Soil is a mixture of pieces of rocks, dead plants and animals and other minerals.
- The solid particles of the soil settle to the base of the jar. The light particles float.

Guided Lesson

Lesson **No. 86**

Strand 3 : Earth and Space

Unit 1: Our Earth

Lesson title: Classification of soil

Content standard: **3.3.3** Investigate and explain the characteristics of soil and its importance to living things.

Objective: By the end of the lesson the student can be able to know the different types of soil.

Key concepts:

- Soil is classified according to the size of the grains or sediments it contains.
  a) Clay soil is made up of tiny grains and feels smooth.
  b) Sandy soil is made up of large grains and feels gritty.
  c) Loam is a mixture of sand and clay.

Knowledge	Skills	Attitudes
• There are three types of soil - clay, sandy and loamy. • Each soil is different in colour, grain and size.	• Classify soil into sandy, loamy or clay soil.	• Show curiosity to learn about soil. • Appreciate the fact that soil supports earth life.

Materials: different soil samples, hand lens

Teacher's Notes:

The colour and texture (or feel) of the soil depends upon the amounts of sand, clay and humus present. Basically there are three types of soil

Sandy soil
These soil have the largest particles (mainly sand) and have large spaces between particles. They contain the most air and the least water and usually have little humus.

Clay Soil
These soils are made up of smallest particle (e.g. clay) packed very close together. They contain little air but can hold a lot of water stuck to the surface of the particles. Clayey soils often become water logged with too much water, as water cannot easily drain away from them.

Garden soil *(loam soil)*
These soils are mixture of small and large particles (clay and sand). They are well aired and drained. They also contain the most humus and therefore the best soils for growing plants and making gardens

Guided Lesson

Teaching and Learning Activities

Tell the children to take each sample of soil (including garden soil) and feel and look at each one closely with the hand lens to see:

- The colour.
- The way the soil holds together.
- The size of the particles.
- How much water there is in the soil?
- How much plant matter there is in the soil?
- If any animals are present?
- What the soil feel like?



Tell the children to fill in their result table.

Kinds of Soil	Colour	Feel	Holding Together	Plant Matter
Sandy				
Clay				
Swampy				
Garden				

Questions

Ask the children these questions;

a) Which soil has the darkest colour? (Swampy soil)
b) Which soil feels stickier? (Swampy soil)
c) Which soil feels the driest? (Sandy soil)
d) Which soil has the most plant matter (Garden or swampy soil)

Tell the children to look at the glass jar again without moving it, and ask them what they see. (The soil has settled to the bottom of the jar in layers). Keep some jars so that children can look at the soil next week.

Summary

- There are different types of soil- sandy soil, loamy soil or clay soil.
- Each soil is different from each other in terms of color, particle size and texture.

Guided Lesson

Lesson **No. 87**

Strand 3: Earth and Space

Unit 1: Our Earth

Lesson title: How much water can each soil hold?

Content standard: **3.3.3** Investigate and explain the characteristics of soil and its importance to living things.

Objective: By the end of the lesson the student can be able to explain that different types of soils hold different amounts of water.

Key concepts:

- Different types of soil hold different amount of water.

Knowledge	Skills	Attitudes
• Different soil hold different amounts of water.	• Explain why different soil hold different amounts of water.	• Show curiosity to learn about soil • Appreciate the fact that soil supports earth life.

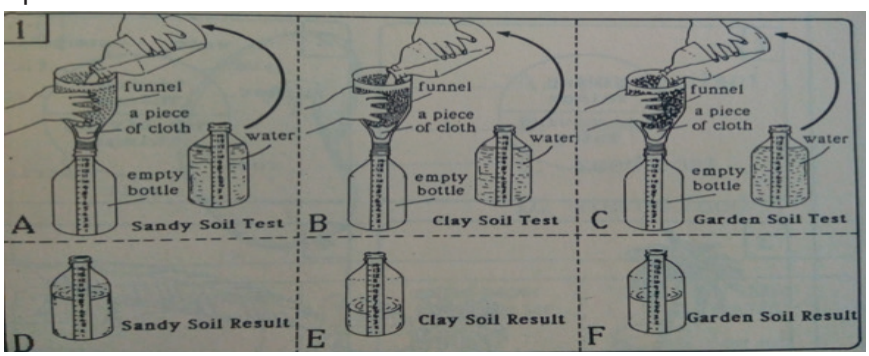
Materials: 10 funnels, 10 jars, 10 small pieces of rag, cotton wool or paper, 10 syringes, some dry sandy soil, dry clayey soil and dry garden soil, Result Table, 10 small containers of water

Teacher's Notes:

1. Result Table:

Type of soil	Amount of water put in (cm^3)	Amount of water which comes out (cm^3)	Amount of water which stays in (cm^3) together
Sand			
Clay			
Garden			

2. A piece of rag or cotton wool must be placed in the funnel before putting in the soil.
3. The funnel should be washed and dried and a new piece of rag or cotton wool used before testing each soil sample.
4. Make sure the different types of soil are all dry. You will need to crush the clay as it should be in the form of fine, small particles.



Guided Lesson

When the soil particles are small (e.g. clay), then the spaces between the particles are also small; and when they are large (e.g. sand) the spaces are large. However, although the spaces small in clayey soil, there are very many more spaces than in the same volume of sandy soil. In a clayey soil about half of the total volume is empty space, but in a sandy soil only about one third is empty space. This explains why clay soil can hold more water than sandy soil. As well as empty space, garden soil also contains humus which holds water by acting like a sponge. This explains why garden soil can hold more water than sandy soil.

Teaching and Learning Activities

1. Tell each group to:
   - Plug the stem of their funnel (see special notes)
   - Fill the funnel to the top with dry sandy soil
   - Put the stem of the funnel into a glass jar.
   - Put 5 lots of 20ml (cm^3) of water (100ml altogether) onto the sandy soil with a syringe, being careful that no water overflows.
   - Wait until water stops dripping from the end of the funnel.
   - Remove funnel and use syringe to measure how much water came through the soil into the jar.
   - Record their results in their Result table
2. Tell the children to repeat the experiment with dry clay and dry garden soil.
3. Let the children compare their results and see if they can tell you which soil holds the most water in it, and which soil holds the least water in it.

Summary

1. Which soil holds the most water? (Clay or garden depending on the amount of humus in the garden soil)
2. Which soil holds the least water? (Sand)
3. In which soil would crops suffer most from a shortage of water? (Sand; because it is not able to hold water well).

Guided Lesson

Lesson **No. 91**

Strand 2 : Physical Science

Unit 1: Energy

Lesson title: Materials that are attracted to a magnet

Content standard: **3.2.3** Investigate and explore the characteristics and functions of magnets.
Objective: By the end of the lesson the student can be able to list the different materials that are attracted to the magnet.

Key concepts:
- Magnetic materials, mostly metals will be attracted to the magnet.
- Not all metals will be attracted to the magnet.

Knowledge	Skills	Attitudes
• Magnets can exert a push or pull. • Not all metals are attracted to a magnet.	• Investigate materials that are attracted to a magnet. • Identify metals that are attracted to a magnet and those that are not attracted to a magnet.	• Show curiosity in exploring materials that are attracted to a magnet.

Materials: Bar magnet, assorted materials.

- Do not drop the magnet because it might lose its strength.
- Do not throw the magnet because it is dangerous.
- Do not place bank cards, laptops close to a magnet.

Teacher's Notes:

A magnet is an object that attracts metals such as iron and steel. It has a force that pulls objects made of steel and iron to it. **Not all metal** objects will be attracted to the magnet.

Some plastics can be attracted to magnets, because a magnetic material was added when they were manufactured. When objects are attracted to the magnet, there is a force that is **pulling** the object towards the magnet.

The activity that follows is fun filled activity. Students should be given the opportunity to explore and find out by themselves the different materials in the classroom that are attracted or not attracted to the magnets.

Remind the students to observe the safety rules while doing this activity.

1. Collect a magnet from the teacher and hold the magnet as explained by the teacher.
2. Together with the students Select objects inside your classroom and use the magnet to test them.
3. Observe and take note of things that are attracted or not attracted by the magnet.

Object	Attracted	Not attracted
1.		

4. Share your results with your classmates.

Summary

- A magnet is an object that attracts metals such as iron and steel.
- There are different shapes and sizes of magnets.
- Not all metals are attracted to magnets.

Guided Lesson

Lesson **No.92**

Strand 2 : Physical Science

Unit 1: Energy

Lesson title: Magnetic and non-magnetic materials

Content standard: **3.2.3** Investigate and explore the characteristics and functions of magnets.

Objective: By the end of the lesson the student can be able to differentiate between magnetic and non-magnetic materials.

Key concepts:

- Not all metals are attracted to the magnet.

Knowledge	Skills	Attitudes
• Materials that are attracted to a magnet are called magnetic materials. • Materials that are not attracted to a magnet are called non-magnetic materials.	• Identify and classify materials into magnetic and non-magnetic materials. • Make a magnet by the "Stroke" method.	• Participate actively in the activity. • Show curiosity in learning about magnetic and non-magnetic materials.

Materials: Exercise book, paper clips, pencil, eraser, ruler, coke cans, 5 toea & 2 toea coins, scissors, wood nail, tin can (meat, fish), glass bottle and mirror.

- Do not drop the magnet because it might lose its strength.

Teacher's Notes:

In the previous lesson the students learnt that not all materials are attracted to the magnets. Things that are attracted to a magnet in any way are called **magnetic materials.** These means that a magnet **attracts** or **pulls** these things. Things that are not **attracted** to a magnet in any way are called **non- magnetic materials.**

The teacher should ensure that the predictions are prior to them doing the experiment. After the predictions, students should discuss on their prediction. Finally confirm the predictions by testing them using the magnets.

Teaching and Learning Activities

1. Draw a table like the one shown below in your exercise book.
2. List the things listed on the table.
3. Predict whether each object listed will attract or not.
4. Ask the students to share ideas with reasons for their predictions.
5. Use the magnet to confirm the predictions.

Materials	Predictions	Results
1. Exercise books 2. Paper Clips 3. Pencil 4. Ruler 5. Coke can 6. 5^{toea} coin	No	

Testing magnetic attraction with distance.
1. Let's check if magnet works even some space are in between. 2. Let's check if magnet works even some object (paper or thin plastic) in between.

Summary

- An object attracted to a magnet is called a magnetic material.
- An object that is not attracted to a magnet is called a non-magnetic material.
- Non-magnetic materials are made from paper, plastic, glass or wood.

Guided Lesson

Lesson **No. 94**

Strand 2 : Physical Science

Unit 1: Energy

Lesson title: Effects of magnet

Content standard: **3.2.3** Investigate and explore the characteristics and functions of magnets.

Objective: By the end of the lesson the student will be able to:
- describe the effects of the magnet when two ***like*** poles are faced to each other
- describe the effects of the magnet when two ***unlike*** poles are faced to each other.

Key concepts:
- Unlike poles of a magnet attract.
- Like poles of a magnet repel or push away from each other.

Knowledge	Skills	Attitudes
• Magnets attract each when North pole and South pole are faced to each other. • Magnets repel or push away from each other when North and North or South and South pole are faced to each other .	• Identify the North and South poles of a magnet. • Demonstrate attraction and repulsion of magnets.	• Actively participate in the activity.

Materials: paper clip, masking tape, 3 different magnets.

- Do not drop the magnet because it might lose its strength

Teacher's Notes:

The south pole of a magnet will repel or push away the south pole of another magnet (like poles repel).
The south pole of one magnet will be attracted to the north pole of another magnet (unlike poles attract).

Teaching and Learning Activities

Test	Prediction	Results
North pole and North pole		
North pole and South pole		
South pole and south pole		
South pole and north pole		

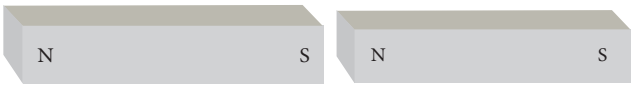
Activity A: Do all the magnets have the same strength?

1. Stick a bit of masking tape on each magnet and label each magnet.
2. Hold the magnet on each end. Let the magnet pull one paper clip Add more paper clips until the magnet can no longer pull them.
3. Record you findings.

Guided Lesson

Activity B: Circle the magnets that will pull each other

a)

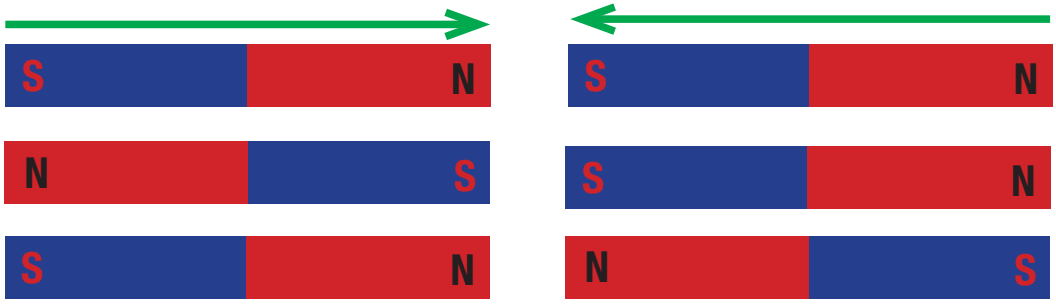


b)

c)

Summary

- All magnets attract or repel each other.
- Unlike poles of the magnet attract each other.
- Like poles of the magnet repel.



Guided Lesson

Lesson **No. 95**

Strand 2 : Physical Science

Unit 1: Energy

Lesson title: Strong and weak points of a magnet

Content standard: **3.2.3** Investigate and explore the characteristics and functions of magnets.

Objective: By the end of the lesson the student can be able to identify which parts of the magnets attracts iron.

Key concepts:

- Nearly all the parts of the magnets attract iron, however the end of the magnets attract more than the center of the magnet.

Knowledge	Skills	Attitudes
• The end points of a magnet are strong and therefore will attract more paper clips. • The centre of the magnet is weak and therefore does not attract a lot of paper.	• Identify the strong and weak points of a magnet. • Use the given materials to find the strong and weak points.	• Participate actively in the activity. • Show curiosity in learning about magnets.

Materials: magnets, paper clips

- Do not drop the magnet.
- Do not scratch the board with the magnet.
- Do not place magnets close to laptops or bank cards.

Teacher's Notes:

A magnet has two poles called the North Pole which is normally labelled with N. the other pole is the South Pole which is labelled with a S. This poles have forces which attracts the magnetic objects towards them.

Teaching and Learning Activities

1. In pairs or groups of three predict which part of a magnet will attract iron?
2. Share ideas with reasons to their predictions with other groups.
3. Discuss with friends how to test the prediction.
4. Obtain magnets and paper clips or iron filings from the teacher, and confirm the predictions.
5. Observe and record the result into your exercise books.

How to test	Predictions		Results
Feel the pull on paper clip at magnet parts	center	A strong pull	
	middle		
	ends		
Count the number of paper clips on magnet parts	center	5 paper clips	
	middle		
	ends		

6. Share findings with the class.

Knowledge Skills Attitudes and Values

B: Knowledge Skills Attitudes and Values for the lessons to be written by teachers

Strand	Content Standard	Performance Standard	Lesson title /Lesson #	Knowledge	Skills and Processes	Attitudes
Life	**3.1.4**	c) Classify things in the environment into living and non-living in the environment	Classifying living things **Lesson # 6**	• Different types of living things	• Investigate the characteristics of living things • Classify living things into plants and animals	Appreciate the living things and their environment
Life	**3.1.4**	d) Describe the relationship between living things and non-living things	Relationship between living and non-living things **Lesson # 8**	Relationships between the living and non-living things	Identify and investigate the relationship between living and non-living things	Caring for the environment
Life	**3.1.4**	d) Identify places where plants and animals live	Where do plants grow? **Lesson # 9**	Places where plants grow	Classify plants according to the environment that they grow in	Appreciate and care for the plants and the environment they grow in
Life	**3.1.4**	f) Explain how living things depend on the environment	Living things depend on the Environment **Lesson # 11**	Living things depend on the environment	Identify the living things and the type of environment to which they depend on.	Appreciate the natural environment
Physical Science	**3.2.5**	d) Measure the weight of matter by changing its conditions in terms of shape and volume	Let's measure the weight of the object by changing its shape and volume **Lesson # 17**	• Changing the shape or volume of matter changes its weight	• Investigate if changing the shape or volume of matter changes its weight	Acknowledge and appreciate the fact that any changes in shape or volume of matter will have an effect on its weight
Physical Science	**3.2.6**	b) state example of mixtures in daily life	Daily Mixtures **Lesson # 19**	• Examples of mixtures used at home.	• Identify and list some mixtures used every day.	Appreciate the fact that mixtures are dealt with on a daily basis.

Knowledge Skills Attitudes and Values

Strand	Content Standard	Performance Standard	Lesson title /Lesson #	Knowledge	Skills and Processes	Attitudes
Physical Science	**3.2.6**	c) define and explain mixtures and substances	Mixtures & Substances **Lesson # 20**	• Mixtures are made from different substances.	• Distinguish and state the major differences between a mixture and a substance	Acknowledge and accept the difference between mixtures and substances.
Physical Science	**3.2.6**	c) define and explain mixtures and substances	Properties of mixtures **Lesson # 21**	• A mixture is made up of two or more substances	• Restate properties that differentiate mixtures from substances.	Appreciate the fact that mixtures have different properties in comparison to substances
Physical Science	**3.2.6**	d) demonstrate and understand the different ways of separating mixtures	Separating mixtures -filtration **Lesson # 22**	• The properties of each substance in a mixture does not change • Some mixtures can be separated by filtering.	• Identify and list mixtures that can be filtered. • Use a strainer to filter mixtures	Acknowledge and accept the fact that not all mixtures can be filtered.
Physical Science	**3.2.6**	d) demonstrate and understand the different ways of separating mixtures	Separating mixtures – sieving **Lesson # 23**	• The properties of each substance in a mixture does not change • Some mixtures can be separated by sieved.	• Identify and list mixtures that can be sieved.	Acknowledge and accept the fact that not all mixtures can be sieved.
Life	**3.1.2**	b) Describe how animals use their body parts to move and feed.	Classifying animals on how they move Lesson No. 45	• Animals move in different ways depending on their body structure- swim, fly, walk/run, crawl, jump	• Classify animals based on how they move • Explain why animals move in that manner.	Appreciate that animals have different ways to move to meet their needs

Knowledge Skills Attitudes and Values

Strand	Content Standard	Performance Standard	Lesson title /Lesson #	Knowledge	Skills and Processes	Attitudes
Life	**3.1.2**	c) Identify the basic needs of animals in order to stay alive.	Basic needs of animals **Lesson # 46**	• Animals need food, water, air and shelter in order to survive	• Identify basic needs of animals	Show curiosity in learning if basic needs are not met.
Earth & Space	**3.3.5**	a) Explain what the Sun is and identify the types of energy that comes from it	What is the Sun? **Lesson # 48**	• The sun provides light and heat energy	• Identify and name the types of energy that is produced by the sun	Acknowledge and appreciate that the sun radiates light, solar energy
Earth & Space	**3.3.5**	b) Describe how the Sun is important for living things.	Importance of the sun to living things **Lesson # 49**	• The sun provides light and heat energy for all living things on earth	• Identify the importance of the sun and its sustainability on us • Communicate to others the importance of the sun in the lives of living things on earth	Appreciate that the Sun is the major source of light and energy we receive every day.
Earth & Space	**3.3.5**	c) Relate the movement of the position of shadow with the movement of the Sun	Observing shadows **Lesson # 50**	• shadows created by the sun change position and size	• Relate the movement of the sun with the shape and size of the shadow	Accept the fact that shadows seen during the day are created by the sun.
Earth & Space	**3.3.5**	c) Relate the movement of the position of shadow with the movement of the Sun	Movement of the sun and the position of the shadow **Lesson # 51**	• shadows appear at different positions in the mornings, midday and afternoons	• state approximately which time of the day it is from the size and position of a shadow	Acknowledge and relate the difference in size and direction of shadows to position of the sun
Earth & Space	**3.3.5**	D) Explain why the Sun seems to move from East to West.	Movement of the Sun **Lesson # 52**	• the sun moves in an east to west direction • the shadow move from the west to east	•Relate the movement of the sun with the movement of the shadow. • The shadow moves on the opposite direction of the sun.	Accept that the east is the direction from which the sun rises.

Knowledge Skills Attitudes and Values

Strand	Content Standard	Performance Standard	Lesson title /Lesson #	Knowledge	Skills and Processes	Attitudes
Earth & Space	**3.3.5**	e) Identify which parts of the Earth is day or night by using a model of the Earth	Day & Night **Lesson # 53**	• Part of the earth has daylight while the other half is night. • The sun does not move, it is the earth that spins on its axis	• Explain that the half of our world is in light like what we are experiencing while the other part of our world is experiencing darkness.	Accept that the earth spins around the sun in 24 hours of which 12 hours are day light while the other 12 hours are night fall.
Physical Science	**3.2.1**	a)Describe the way energy is changed from one form to another	Properties of energy **Lesson #: 55**	• Energy is never created or destroyed • Energy changes from one form to another • Energy can be transferred from one object to another	•Differentiate between energy changing from one form to another and energy transferred from one object to another	Accept and appreciate that energy is important in everyday life.
Physical Science	**3.2.2**	d)Explain why we can see objects	How can you see an object? **Lesson #: 61**	• When light enters our eyes, we see objects • If light strikes an object, it usually reflected off the object into our eyes	• Demonstrate the reflection of light using a torch.	Appreciate and accept the fact that light is needed in order to see.
Physical Science	**3.2.4**	a)Investigate and explain the properties of force	Function of force **Lesson #: 66**	• Force can start or stop an object from moving move • Force can change the direction of a moving object • Force can change the shape of an object	• Identify the functions of force • Demonstrate the function of force.	Show curiosity towards learning about force

Knowledge Skills Attitudes and Values

Physical Science	**3.2.4**	d) Compare and describe different types of machines used in daily life	Daily use of simple machines **Lesson # 71**	• Simple machines make work easier to do. • We use simple machines in our daily activities	Identify uses of simple machines Name the parts of the simple machine Compare the different types of simple machines	Appreciate the use of simple machines
Earth & Space	**3.3.1**	a) Identify and explain natural resources	What is Earth made up of? **Lesson # 73**	• The surface of the earth consist of land and water • The land and water contain alot of natural resources	• Explain that ¾ is water and ¼ land. • Identify natural resources found on the land and in water.	Appreciate and care for all natural resources
Earth & Space	**3.3.1**	b) Classify different types of natural resources on the Earth	Types of Natural resources **Lesson # 74**	• Natural resources can be classified into renew-able and non-renewa-ble resources.	• classify the different types of natural resources into renewable and non-renewa-ble resources	Appreciate and care for all natural resources
Earth & Space	**3.3.1**	c) Describe how human beings use natural resources in daily life	Uses of natural resources **Lesson # 75**	• State the uses of land resources.	• Identify the uses of different natural resources	Appreciate and care for all natural resources
Earth & Space	**3.3.1**	c) Describe how human beings use natural resources in daily life	Uses of trees to humans **Lesson #: 76**	• State how tree products are used by humans	• Identify and state the uses of tree prod-ucts	Appreciate and care for all types of trees

Knowledge Skills Attitudes and Values

Strand	Content Standard	Performance Standard	Lesson title /Lesson #	Knowledge	Skills and Processes	Attitudes
Earth & Space	**3.3.3**	d) Discuss importance of soil for living things	Uses of soil to humans **Lesson # 77**	• Importance of soil to human beings	• Identify the different types of soil and their state their uses	Appreciate and care for the soil
Earth & Space	**3.3.1**	c) Describe how human beings use natural resources in daily life	Sea resource **Lesson# :76**	• Identify resources that are found in the sea. • Sea products are some of the expensive products	• State examples of sea resources. • Name some products that are made from sea resources.	Value the importance of natural resources Care for natural our natural resources
Earth & Space	**3.3.2**	d) Classify different types of rocks	Types of rocks and minerals **Lesson # 82**	types of rocks and minerals	Classifying different types of rocks and minerals	Value the different type of rocks
Earth & Space	**3.3.3**	d) Discuss importance of soil for living things	Importance of soil for plants **Lesson # 88**	Importance of soil for plants	Identify the important things in soil for plants	Appreciate and care for soil organisms
Earth & Space	**3.3.3**	d) Discuss importance of soil for living things	Importance of soil for animals **Lesson # 89**	importance of soil for animals	Identify the important things in soil for animals	Appreciate and care for soil organisms
Physical Science	**3.2.3**	b) Investigate the properties of magnets	Properties of magnets **Lesson # 93**	• Characteristics of magnets. - magnets can be made of iron or steel	• Compare magnets, non-magnets and magnetic materials. • Make a magnet by the “Stroke” method and the electrical method.	• Show curiosity in exploring uses of magnets in everyday life and question what they find.
Physical Science	**3.2.3**	e) Explore and understand that the Earth acts like a big magnet	Earth – a big magnet **Lesson # 96**	North/south pole of the earth act as two end of the magnet	Differentiate the northern hemisphere from the southern hemisphere	Appreciate that the north/south pole act as two end of a magnet

Knowledge Skills Attitudes and Values

Strand	Content Standard	Performance Standard	Lesson title /Lesson #	Knowledge	Skills and Processes	Attitudes
Physical Science	**3.2.3**	c)Investigate the effects of a magnet	Effects of magnets **Lesson # 97**	- Magnets have two poles. A freely suspended bar magnet comes to rest pointing in a North-South direction	Use a simple compass to demonstrate that the pointed end of the needle will always rest pointing to the North	Appreciate that the north and south pole of the earth are magnetic
Physical Science	**3.2.3**	g) Apply the knowledge about magnets to daily life.	Making toys **Lesson # 98**	• Uses of magnets in everyday life	• Make toys using the effects of magnets Appreciate that magnets can be useful in constructing useful applicants	Appreciate that magnets can be useful in constructing useful applicants

Assessment , Recording and Reporting

Assessment and reporting is an integral part of the curriculum. Assessment is the process of identifying, gathering and interpreting information about students' learning. It is administered to provide information on student's achievement and progress. It directs teachers on their way of teaching and the how students learn.

In standard based curriculum, assessment is viewed not only as a final product (summative), but more importantly as a continual process (formative) that provides pupil performance data to teachers and students regarding their progress towards achieving the intended standards.

What is Assessment?

The term "assessment" is generally used to refer to all activities teachers use to help students learn and to monitor and measure student progress. It is an ongoing process.

Purpose of Assessment

The purpose of assessment is to inform:

- Students about their progress and achievements in their learning
- Teachers of the progress of students learning in order to adjust teaching and planning to improve
  students' learning.
- Parents and Guardians, about their children's progress and achievements.
- Schools, province and NDOE to make decisions about how to improve the quality of teaching and learning in the education system.
- Other educational institutions and the communities about the standards of teaching and learning
  strategies, curriculum and resource allocation that may affect students' learning.

Overall assessment is seen as an integral part of the learning and teaching program rather than a separate process.

Types of Assessments

There are three types of assessments in the Standard based curriculum. These are;

- ***Assessment as*** or ***in;***
- ***Assessment for*** and
- ***Assessment of***

Assessment **as** and *assessment* ***for*** are also known as Formative Assessments and Assessment ***of*** is also known as Summative Assessment.

Assessment *as or in* learning

Assessment ***as*** or ***in*** learning is the use of a task or an activity by the teacher in his/her everyday teaching to allow students the opportunity to use assessment to further their own learning. Self and peer assessments allow students to reflect on their own learning and identify areas of strength and weakness. These tasks offer students the chance to set their own personal goals and advocate for their own learning.

Assessment , Recording and Reporting

Assessment *for* Learning

Assessment ***for*** Learning, also known as classroom assessment, is different. It is an ongoing process that arises out of the interaction between teaching and learning. It is not used to evaluate learning but to help learners learn better. It does so by helping both students and teachers to see:

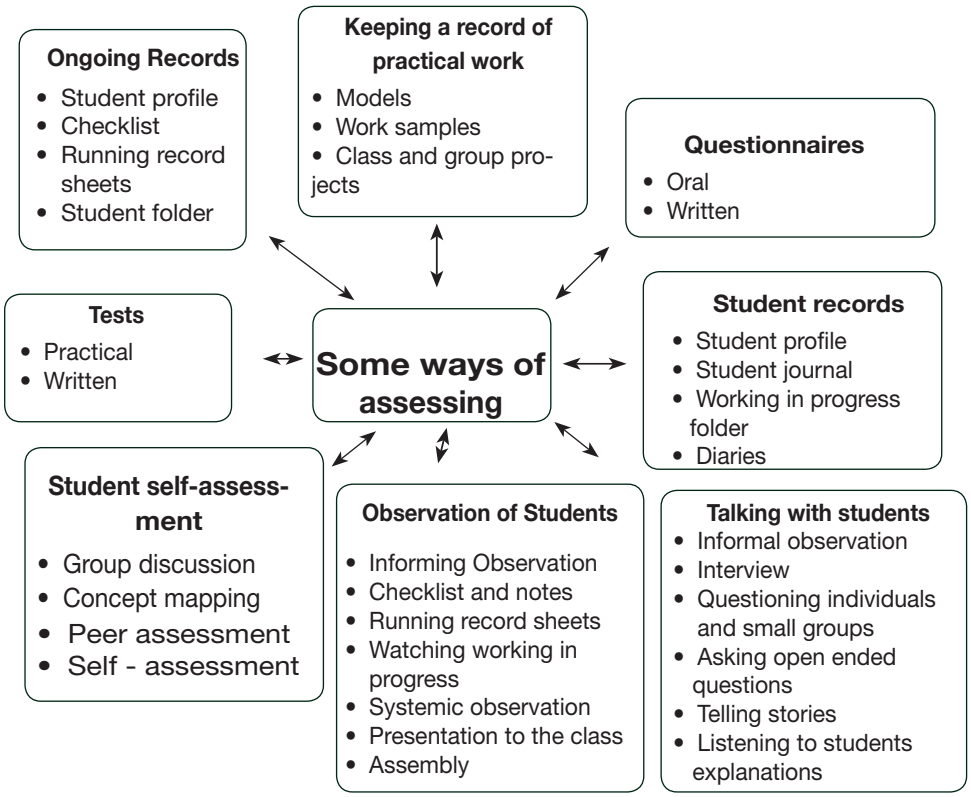
- the learning goals and criteria
- where each learner is in relation to the goals
- where they need to go next
- and ways to get there.

Assessment *of* Learning

Assessment ***of*** Learning is the use of a task or an activity to measure, record and report on a student's level of achievement in regards to specific learning expectations such as unit tests and end of term or year exams.

Methods of Assessment

Assessment is an integral part of students learning and can be done using different methods. Below are some of these methods.



Assessment Tasks Overview

The Assessment Tasks overview is organised by weeks, strands, units, content standards and performance standards to show the linkage, when the assessment tasks should be conducted, and where the assessment tasks are extracted from which performance standards.

Week	Strand	Unit	Content Standard	Performance Standard	Assessment Task
TERM 1					
	LIFE	Interactions and relationships in the environment	**3.1.3**	e. Identify places where plants and animals live	1. Name and match the animals with the environment in which they live
				c. Classify living and non-living things in the environment.	5. Select a living or non-living thing and describe how and why it lives in the particular environment.
				d. Describe the relationship between living and non-living things.	6. Draw a picture of a man, plant and soil give a brief description of their relationship
		Plant	**3.1.1**	b. Identify the basic needs of plants	2. Draw pictures of the things plants need - name them and - say why they need them.
				c. State the functions of each part of a plant ,e.g. leaf	3. Describe the functions of each part
		Animals	**3.1.2**	a. Explain and identify the body parts of animals including insects, fish, amphibians, reptiles, birds and mammals.	1. Label animal body parts and state their functions
				c. Describe how animals use their body parts to move and feed	4. Group animals according to how they move and feed

Assessment , Recording and Reporting

Week	Strand	Unit	Content Standard	Performance Standard	Assessment Task
TERM 1					
	PHYSICAL SCIENCE	**Matter**	**3.2.5**	b. Classify different types of matter on the basis of physical properties.	1. Write two sentences about their understanding of matter.
				d. Measure the weight of matter by changing its conditions in terms of its shape and volume.	1. Draw the experiment on how you can measure the weight of selected matter.
		Matter	**3.2.6**	c. Define and explain mixtures and substances.	1 State some examples of mixtures in daily life
				d. Demonstrate and understand the different ways of separating mixtures.	1 Describe how salt is separated from water.
TERM 2					
	EARTH AND SPACE	**Space**	**3.3.4**	e. Relate the movement of the position of the shadow with the movement of the sun.	1. Record the lengths of shadows at different times of the day
				g. Identify which part of the Earth is day or night by using a model of the Earth.	2. Draw a picture of the Earth and plot on the picture : - 2 axis - arrows for direction of spin.
TERM 3					
	PHYSICAL SCIENCE	**Energy**	**3.2.1**	b. Investigate the properties of energy through experiments	1. Draw an experiment of heat energy.
		Energy	**3.2.2**	b. Describe the properties of light	What are the 3 sources of natural light
				c. Classify materials as stopping all, some or allowing light to pass through	Name 3 objects that light will pass through

Assessment , Recording and Reporting

Week	Strand	Unit	Content Standard	Performance Standard	Assessment Task
Term 3					
	PHYSICAL SCIENCE	**Force and motion**	**3.2.4**	a. Identify different types of forces-push-ing, pulling	1. Draw two pictures showing the difference between pull and push forces.
				b. Define the functions of simple machines-levers ramps and pulleys.	2. Choose a simple machine and present a picture talk on how it works.
Term 4					
	EARTH AND SPACE	**Our Earth**	**3.3.1**	a. Identify and explain natural resources.	1. List down the uses of natural resources.
				b. Describe how human beings use natural resources in daily life.	2. List down the uses of natural resources.
		Our Earth	**3.3.2**	a. Define and explain the differences between rocks and minerals b. Observe and describe different types of rocks and minerals through experiments	1. Describe the differences between rocks and minerals .
		Our Earth	**3.3.3**	b. Compare the characteristics of sandy soil, clay soil, loam soil in terms of physical properties and water drainage	2. Display three types of soil and describe them.
				c. Classify materials as stopping all, some or allowing light to pass through	Name three objects that light will pass through.
	PHYSICAL SCIENCE	**Energy**	**3.2.3.**	b. Examine the strong and weak points of a bar magnet c. Observe that like poles repel and that unlike poles attract	1. Describe why more things stick to certain places on the magnet.
				e. Group materials into two groups magnetic and nonmagnetic.	1. Identify and circle in the worksheets objects that are attracted by or to a magnet.

Assessment Task Samples

Assessment Task sample: 1

Strand: Life **Reference:** Primary Science Syllabus.

Unit:	Interaction and relationship in the environment
Content Standard	**3.1.4**
Performance Standards	a. Identify and describe components of different environments. b. Identify places where plants and animals live
Assessment Task	Identify animals and plants match or draw them in the environment or habitat they live or are found in. **Act 1.** Match the name of the animal to the correct environment it lives in. **Act 2.** Draw a plant in the habitat named in the concept map ***Note:*** Teacher must read the instructions for the activities before the students attempt them.
Assessment Criteria	Here is a suggested criteria for the task given. 1. The arrow from the animal to the correct environment 2. The correct plant that grows in the in the habitat the named. 3. Neat and tidy work
Assessment Method	**Work Sample**
Recording & Reporting Method	**Checklist** Teacher must draw up a class check list to record the students' achievements of the three criteria. • See example given.

Assessment , Recording and Reporting

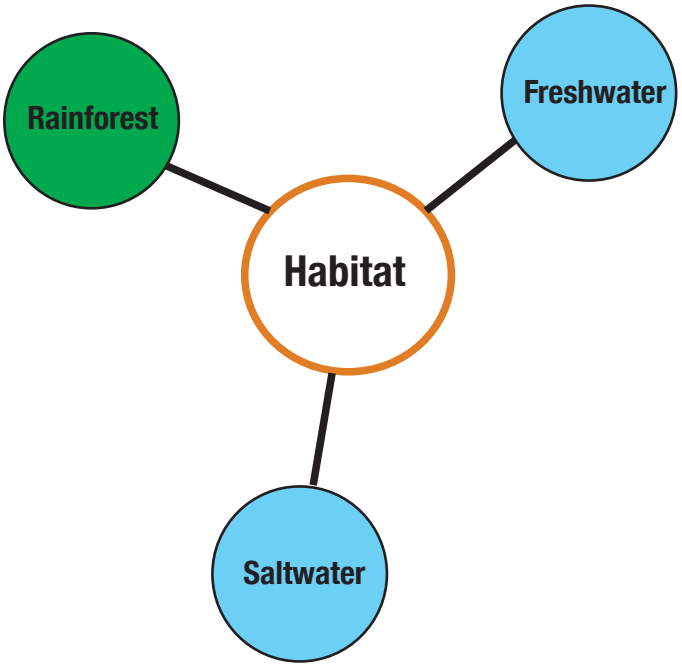
Class Checklist sample for Assessment Task 1.

Assessment Task 1.	**Marking Code Keys :** *A : Achieved* *PA: Partly Achieved* *NA: Not achieved*		
Class List (Total number of students on roll)	**C1: Draw arrow from the animal to the correct environment**	**C2. Draw the correct plant that grows in the named habitat.**	**C3. Neat and tidy work**
1. Claudia			
2. Druscilla			
3. Emilia			
4. Timothy			
5. Vandarweg			

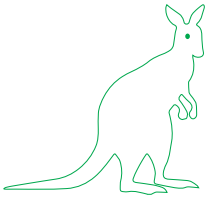
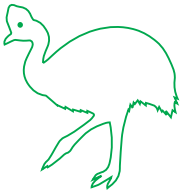
Assessment Task 1 Worksheet

Assessment Task 1:
Unit: Interaction and relationship in the environment **Worksheet. 1**

Activity 1:
Draw one plant that grows in the habitat named.



Activity 2:
Draw a line to match the animal name to the correct type of environment.

Name of animal	Type of Environment
 1. Wallaby	1. Seashore
 2. Crab	2. Rainforest
 3. Cassowary	3. Grassland

Assessment Task Samples

Assessment Task sample: 2
Strand: **Physical Science** **Reference: Primary Science Syllabus.**

Unit:	**Force and Motion**
Content Standard	**3.2.4**
Performance Standards	a. Investigate and explain the properties of force. b. Identify different types of forces-pushing, pulling and friction c. interpret how force works on objects –moving an object by changing direction
Assessment Task	Students draw two pictures showing how push and pull forces are applied and write the words pull and push under the correct picture and write a sentence saying how the forces are different. **What to do:** **Instruction**. Give students a sheet of paper to: 1: draw picture of Push force experiment conducted 2: draw picture of Pull force experiment conducted 3. write the words push or pull under the correct picture 4. write a simple description of own understanding of the difference between pull and push forces. Teacher, take the class through the 4 things above. See if they completed or not any of them. Allow time to complete before collecting the worksheets.
Assessment Criteria	Description must have : 1. word **Pull** is written under the correct drawing 2. word **Push** written under the correct drawing 3. description about forces says 1 or 2 differences between the pull and push forces.
Assessment Method	**Work Sample**
Recording & Reporting Method	**Checklist** Anecdotal Notes (Class grid to record student responses)

Anecdotal Notes sample: Class Grid 3 A

Record the dates of assessment tasks write comments on the performance observed as per the criteria given.

One box is for a student. This same grid can be used for a term depending on the type number of assessment tasks prepared.

Tai 5/04/17 Needs more effort on C3. 3/5/17	**Mai** 5/04/16 Needs more effort on C3. 3/5/17	**Sai** 5/04/16 Needs more effort on C 3. 3/5/17	**Lai** 5/04/16 Needs more effort on C 3. 3/5/17
Kai 5/04/16 Needs more effort on C 1&3. 3/5/17	**Rai** 5/04/16 Needs more effort on C3. 3/5/17	**Bai** 5/04/16 Needs more effort on C3. 3/5/17	**Vai** 5/04/16 Needs more effort on C1 & 2. 3/5/17
Sila	**Kila**	**Mila**	**Lila**
Fila	**Dila**	**Aila**	**Bila**
Mimi	**Bibi**	**Cidi**	**Civi**
Esai	**Emay**	**Jaem**	**Esti**

Assessment Task Samples

Assessment Task sample: 3
Strand: **Physical Science** Reference: **Primary Grades 3,4 & 5 Science Syllabus.**

Unit:	**Physical Science**
Content Standard	**3.2.2**
Performance Standards	c. Classify materials as stopping all, some or allowing light to pass through. d. Explain how we can see objects. e. Explain how shadow is formed and why the shape of shadow is similar to objects.
Assessment Task	Identify 3 objects that allow light to pass through them **Instruction:** Teacher prepares passage on the worksheet and read through before the students complete them. **Activity 1-** Cloze Exercise-Use the missing word to fill the gaps correctly- body, glass, water. **Passage:** Light passes through some objects. One object is ____. Then there is _____ in the rivers and seas. Light also passes through the human ____.
Assessment Criteria	1. Correct word to filled in the blank space. 2. All words are put in the correct blank space.
Assessment Method	**Work Sample**
Recording & Reporting Method	**Checklist** Anecdotal Notes (Class grid to record student responses)

Assessment Task Samples

Worksheet
Activity 1: Cloze Exercise

Use the missing words to fill the gaps correctly:
body, glass, and water, smooth.

Passage: Light passes through some objects.

Light is everywhere. Light passes through some objects.

One object is the a) _____. It has very b) _____ surface so light goes through. Then there is the c) _____ in the rivers, lakes and seas. Light helps us to see in the water. Light also passes through the human d) ____. The light in our eyes make us see different colors.

Student Name: _____
Grade: _____
Date: _____/_____/_____

Teacher's Comments _____
_____
_____
_____
_____

Class Checklist sample for Assessment Task 1.

Assessment Task 3.			**Marking Code Keys :** *C :* Competent *PC :* Partly Competent *NC :* Not Competent
Class List (Total number of students on roll)	**C1. Correct name in the missing space**	**C2. Correct spelling of the object**	**C3. Sentence has meaning.**
1. Claudia			
2. Drusalla			
3. Timothy			
4. Tau			

Assessment Task Samples

Assessment Task sample: 4
Strand: **Earth and Space** **Reference: Primary Science Syllabus.**

Unit:	**Space**
Content Standard	**3.3.5**
Performance Standards	f. Explain why the sun seems to move from east to west. g. Identify which part of the Earth is day or night by using a model of the Earth.
Assessment Task	Draw a picture of the Earth and plot on it the 2 axis, indicate the direction of the movement and say why it moves in the opposite direction of the suns movement. **Instruction:** Draw poster on A3 size paper the picture as described in the task. Ask these questions to each student in turns: 1. What is the earth shaped like? 2. How does the earth move? 3. What does the earth spin on? 4. How many axis has the earth and where are they? 5. Which direction does the earth spin?
Assessment Criteria	Drawing: Point to the 1. Correct shape of the earth 2. Correct positions of the earth's axis 3. Correct spin direction shown by the arrows.
Assessment Method	**Interview**
Recording & Reporting Method	**Checklist**

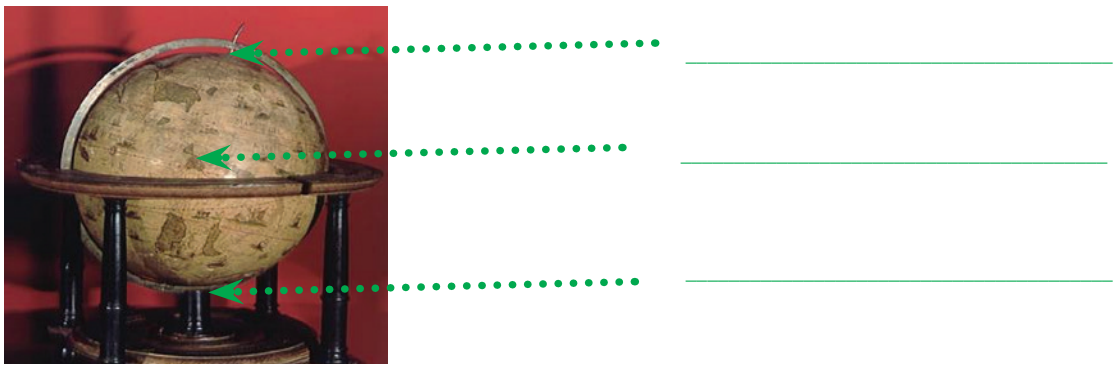
Assessment Task 4

Activity 1:
Drawing of Earth on axis in an angle position leaning to the right. Large and clear enough for students to see.

Alternative picture of the globe to be used as how the shape of the earth is like and students mark out the axis and the direction of the movement of the earth.

Artist's view of described poster drawing of Earth on axis in an angle position leaning to the right and arrow showing the direction it moves.

Drawing of Earth, on axis in an angle position leaning to the right. Large and clear enough for students to see.



Activity 2:
Fill in the missing words to complete the passage

Passage: **The movement of the Sun**

Missing Words: ***around, west, Earth, from, axis, east, Sun,***

The Sun does not move around the Earth. The Earth moves or spins around the _____ on its axis. It starts to move around _____ the west to the east. So, when the _____ spins from the _____the sun rises up from the _____ in the morning. It sets in the _____ at the end of the day.

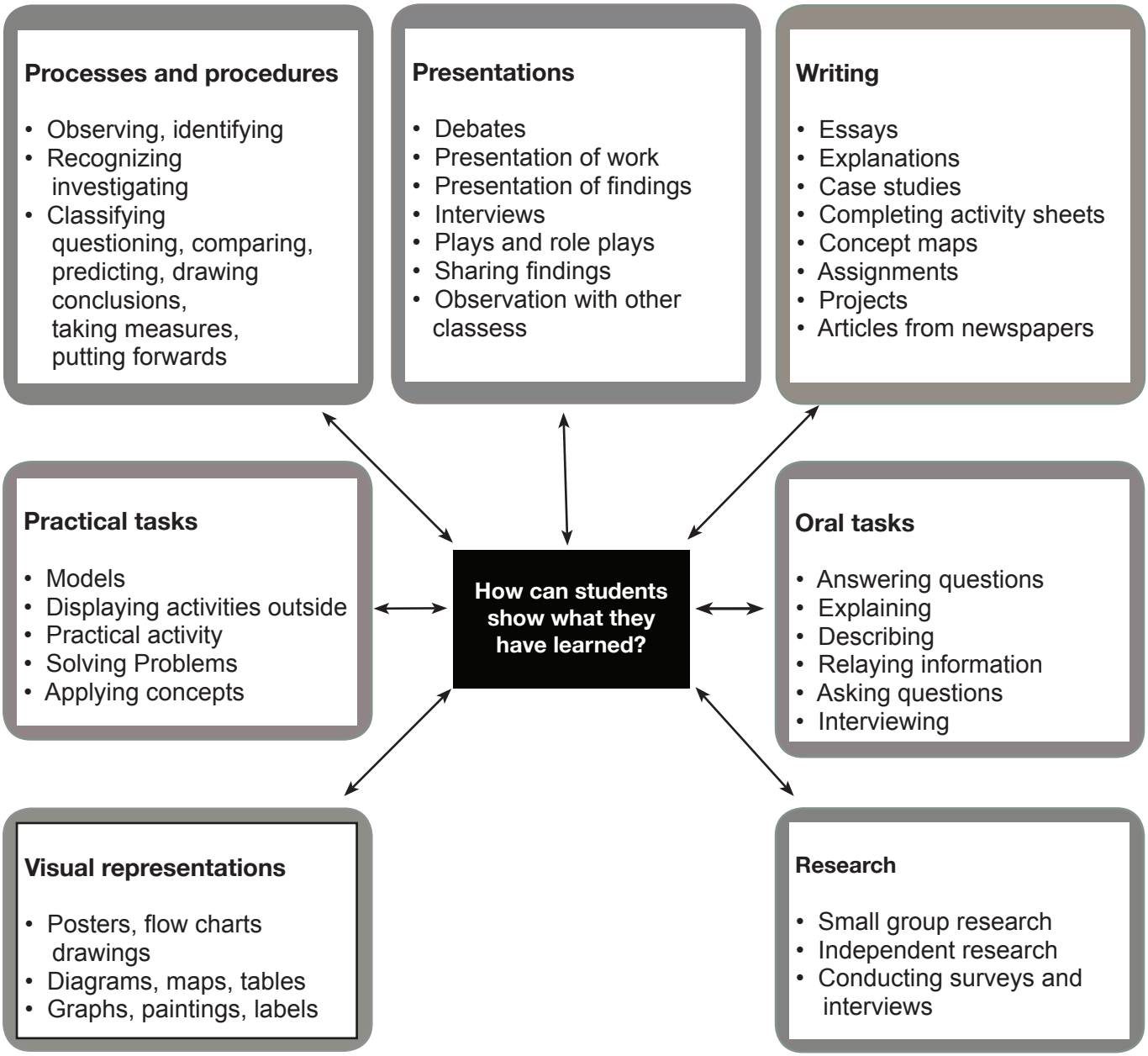
Sample checklist for an individual student

Assessment Task 4.		**Marking Code Keys :** A: Achieved PA: Partly Achieved NA: Not Achieved		**Criteria:** 1. Correct shape of the earth 2. Correct positions of the earth's axis 3. Correct movement of the earth and direction shown by the arrows.		
Name of Student	**Date conducted**	**1. What is the earth shaped like?**	**2. How does the earth move?**	**3. What does the earth spin on?**	**4. How many axis has the earth and where are they?**	**5. Which direc-tion does the earth spin?**
1. Gere Martin	17/03/16					

Assessment , Recording and Reporting

Recording, reporting and evaluating

Assessment is an integral part of students learning and can be demonstrated in many ways. Below are some of these ways.



Resources

Strand: **Life**		
No	**Teacher Resources**	**Student Resources**
1.		Chart with the picture of a plant with the main parts labelled
2.		Chart with pictures of common plants in Papua New Guinea
3.		Chart with pictures of mammals, birds, fish, amphibians and reptiles.
4.		Chart with picture of an insects and its main body parts labelled
5.		Chart containing pictures of the different components of the environment
6.		Chart containing pictures of living things and non-living things

Strand: **Physical Science**		
No	**Teacher Resources**	**Student Resources**
1.		Chart containing pictures of six (6) main types of energy with their examples
2.		Charts with pictures of transparent, translucent and opaque objects with their examples
3.		Chart with pictures/diagram of concave and convex lens
4.		Chart with diagrams of how light is reflected and refracted with descriptions
5.		Chart with picture of horse shoe magnets, U-magnets and bar magnets
6.		Chart with different pictures of uses of magnets in daily life such as magnets used in fridges
7.		Charts with different situations where force is applied to change position of an object, change shape and direction of an object and objects at rest
8.		Chart with examples of pulley, lever and inclined plane and their descriptions/functions
9.		Chart of different matter according to their shapes, colours and sizes
10.		Chart with diagrams of sieving method and filtration method of separating mixtures

Resources

Strand: **Earth and Space**		
No	**Teacher Resources**	**Student Resources**
1.		Chart containing pictures natural resources
2.		Chart with pictures of renewable and non-renewable resources
3.		Chart containing the pictures of minerals and rocks and their characteristics descriptions
4.		Chart with pictures of the five (5) components of soil (rock, sand, silt, clay and humus) and their descriptions
5.		Chart with pictures of the three (3) types of soil and their descriptions
6.		Chart with the diagrams showing the movement of the Sun.

Glossary

Words	Definitions
Characteristics	Distinctive mark, feature or attribute of an individual or thing.
Classify	To group things based on common characteristics
Clay	Very hard when dry, holds water well; it is sticky and can be shaped when it is wet.
Compare	To identify similarities and differences between objects, concepts or processes
Concave lens	A concave lens is thinner in the middle and thicker at the edges. A concave lens is also called diverging lens. A concave lens will disperse light and make an image.
Construct	To put a set of components together, based on a given plan
Convex lens	A convex lens is thicker in the middle and thinner at the edges. A convex lens is called a converging lens. A convex lens will focus light and make an image.
Describe	To state in words (using diagrams where appropriate) the main points of a topic
Differentiate	To identify the differences between objects, concepts or process
Discuss	To reflect on and explore a topic in speech or writing
Earth	A sphere, or ball, which spins round and round as it travels around the Sun.
Energy	The energy of an object is how much work the object can do on some other object. The ability to do work
Environment	Physical surroundings on Earth
Filtration	A method used to separate mixtures composed of solids and liquids which solids are taken out of liquid.
Flowers	Often brightly coloured, that usually lasts a short time, and from which the seed or fruit develops.
Force	Push or pull on an object. A force can cause an object to accelerate, slow down, remain in place, or change.
Humus	Made of leaves, twigs, small animals, or other decayed substances. Humus adds many nutrients to the soil and is in the topsoil.
Identify	To select and /or name the object, event, concept or processes
Inclined plane	A tool that has a flat surface that is raised so that one end is higher than other.
Infer	To draw conclusions based on observations
Insect	A very small animal with a hard covering over its body. Most insects have three pairs of legs and one or two pairs of wings.
Investigate	To find out by carrying out experiments
Leaves	One of the usually flat green parts that grow from a plant stem.
Lens	A lens is a piece of transparent material.
Lever	A tool that has a stiff bar that moves about on a fixed point (fulcrum).
List	To give a number of points or items without elaboration
Living Things	Things which can grow, move, breathe and reproduce.
Magnet	A piece of material (such as iron or steel) that is able to attract certain metals.
Manipulate	To control an object in order to explore and discover its behaviour
Matter	Anything that has mass and takes up space.
Measure	To obtain a reading from a suitable measuring instrument

Glossary

Words	Definitions
Minerals	Minerals are not made by people, they are naturally occurring substances.
Mixtures	When two or more substances are combined, but each substance keeps its physical properties. A mixture can be separated after being combined.
Natural Resources	Anything that people can use which comes from nature.
Non-Living things	Things which cannot grow, move, breathe and reproduce.
Non-renewable resources	Resources that cannot be replaced once consumed such as coal, gas or oil.
Observe	To obtain information through the use of senses
Opaque	Not capable of having light to pass through. Opaque Objects allow no light to pass through them.
Pulley	A tool used to lift heavy objects by changing the direction or amount of force.
Ramp	A sloping or plane such as a sloping floor, walk, or road way leading from one level to another. Ramp is an example of inclined plane.
Recognise	To identify facts, characteristics or concepts that are critical to the understanding of a situation, event, process or phenomenon
Reflection	Reflection occurs when light ray hits a surface and bounces off.
Refraction	Refraction is the bending of light as it passes from one substance to another.
Relate	To identify and explain the relationships between objects, concepts or process
Renewable resources	Resources that can be totally replaced or is always available naturally.
Rocks	Rocks are made of minerals.
Root	Part of a plant that is usually hidden underground.
Sand	Made up of tiny grains of worn down rock. It doesn't hold water and has few nutrients.
Sieving	A method used to separate solids of different sizes.
Silt	Very small, broken pieces of rock. It is larger than clay, but smaller than sand. It is powdery when dry.
Simple machine	Tools that make work easier.
Soil	Loose upper layer of the Earth surface where plants grow.
State	To give a concise answer with little or no supporting argument
Stem	The main stalk of the plant that develops buds and shoots and usually grow above ground.
Substance	Pure substance is a matter that has the same composition and properties throughout is called a substance.
Sun	The star round which the earth orbits.
Translucent	Allowing the passage of light. Translucent objects allow partial light to pass through.
Transparent	Able to be seen through. Transparent objects allow all the light to pass through them.

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Appendix

1. GUIDED LESSON TEMPLATE

Strand: _____ **Unit:** _____ **Topic:** _____
Content Standard: _____
Lesson Title: _____

Objective: By the end the lesson the student will be able to:
- _____

Key concepts
- _____
- _____
- _____

Knowledge, Skills, Attitudes and Values (KSAV)

Knowledge	Skills	Attitudes & Values

Materials/Reference:

Teachers Notes:
Introduction:

_____

_____

Body:

_____

_____

Teachers Activities

_____

_____

Students Activities

_____

_____

Conclusion:

_____

Evaluation: