ESSENTIAL Science

NNF BOOKS

Primary 3

Teacher's Guide

CAMBRIDGE UNIVERSITY PRESS

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John Wilberforce Essiah

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CONTENTS

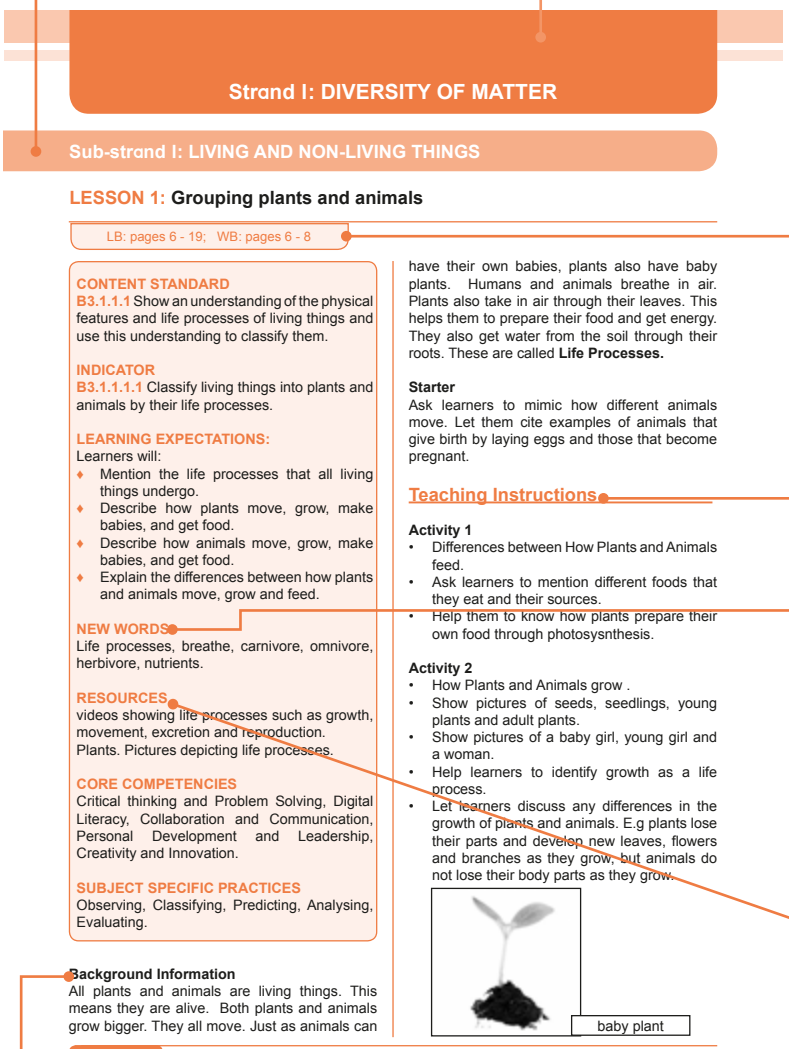
Structure of the Teacher's Guide

The concise Teacher's Guide is organized under the following headings and features.

Sub-Strand
NaCCA, Ministry of Education 2019 curriculum Sub-strand covered.

Strand
The relevant NaCCA, Ministry of Education 2019 curriculum Strand covered is in the top bar.

Page reference
You will find the the Learner's Book and Workbook page references on the top right/left for each lesson.



Strand I: DIVERSITY OF MATTER

Sub-strand I: LIVING AND NON-LIVING THINGS

LESSON 1: **Grouping plants and animals**

LB: pages 6 - 19; WB: pages 6 - 8

CONTENT STANDARD
B3.1.1.1 Show an understanding of the physical features and life processes of living things and use this understanding to classify them.

INDICATOR
B3.1.1.1.1 Classify living things into plants and animals by their life processes.

LEARNING EXPECTATIONS:
Learners will:
- Mention the life processes that all living things undergo.
- Describe how plants move, grow, make babies, and get food.
- Describe how animals move, grow, make babies, and get food.
- Explain the differences between how plants and animals move, grow and feed.

NEW WORDS
Life processes, breathe, carnivore, omnivore, herbivore, nutrients.

RESOURCES
videos showing life processes such as growth, movement, excretion and reproduction.
Plants. Pictures depicting life processes.

CORE COMPETENCIES
Critical thinking and Problem Solving, Digital Literacy, Collaboration and Communication, Personal Development and Leadership, Creativity and Innovation.

SUBJECT SPECIFIC PRACTICES
Observing, Classifying, Predicting, Analysing, Evaluating.

Background Information
All plants and animals are living things. This means they are alive. Both plants and animals grow bigger. They all move. Just as animals can have their own babies, plants also have baby plants. Humans and animals breathe in air. Plants also take in air through their leaves. This helps them to prepare their food and get energy. They also get water from the soil through their roots. These are called **Life Processes.**

Starter
Ask learners to mimic how different animals move. Let them cite examples of animals that give birth by laying eggs and those that become pregnant.

Teaching Instructions

Activity 1
- Differences between How Plants and Animals feed.
- Ask learners to mention different foods that they eat and their sources.
- Help them to know how plants prepare their own food through photosysnthesis.

Activity 2
- How Plants and Animals grow .
- Show pictures of seeds, seedlings, young plants and adult plants.
- Show pictures of a baby girl, young girl and a woman.
- Help learners to identify growth as a life process.
- Let learners discuss any differences in the growth of plants and animals. E.g plants lose their parts and develop new leaves, flowers and branches as they grow, but animals do not lose their body parts as they grow.

baby plant

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New words
Every lesson in the series identifies key words that learners are expected to know and use appropriately. These are relevant to the lesson.

Resources
Helps to aid preparation. The series identifies all the relevant resources necessary to deliver a successful lesson. Resources identified are mostly "NO COST" or "LOW COST" materials that teachers/facilitators can easily acquire to make their lessons more meaningful and enjoyable.

Background information
Refers to the details that identify and describe the significance and historical value of the lesson topic. it is a vital element, as it provides relevant, factual details that are related to a specific topic.

Teaching instructions
You will find all activities you are expected to perform under each lesson here. References are made to the Learner's Book were neccesary.

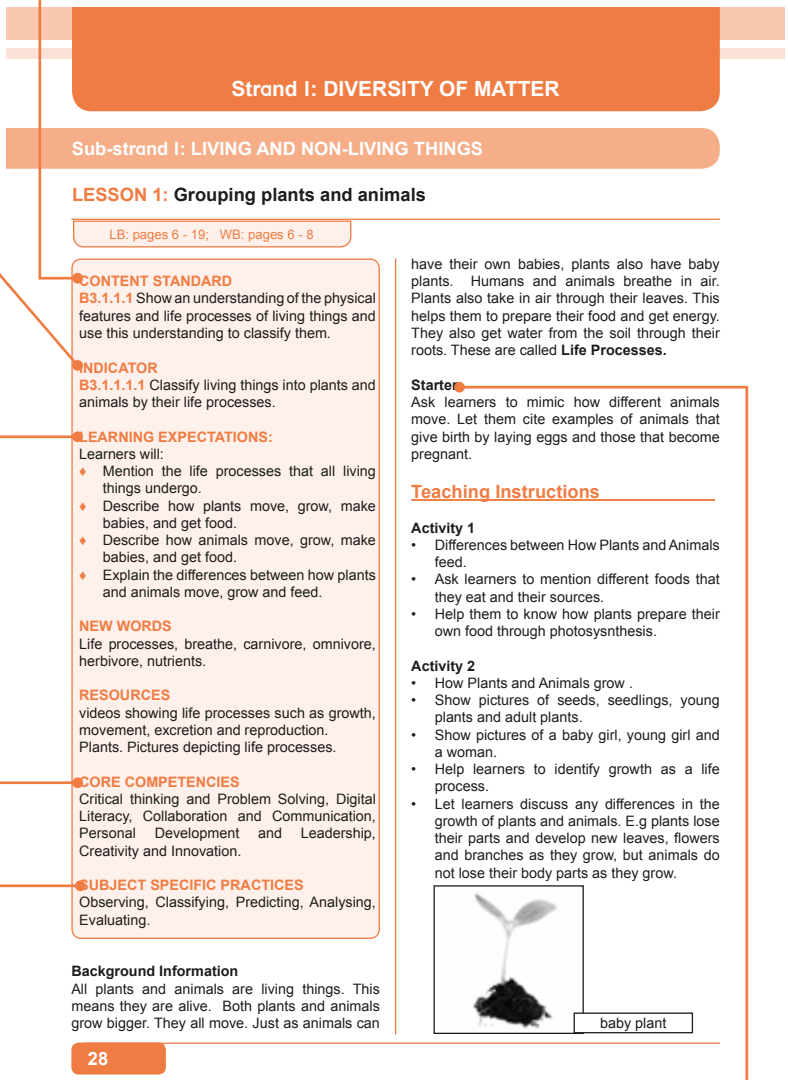
Indicator
This feature indicates the specific things that learners need to know and be able to demonstrate in order to achieve the content standards. Lessons are generated from these indicators.

Content Standard
This feature indicates the broad expectations under the strands that learners are expected to achieve in the course of completing that grade level.

Learning Expectations
are provided to help both teachers/facilitators and learners identify what learners are required to know, understand and do in order to achieve the learning indicator(s).

Core competencies
The universal core competencies as stated under each sub-strand in the curriculum is outlined here.

Subject specific practices
This is the specific methods or practices which are used to teach a particular lesson under the sub-strand.



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baby plant

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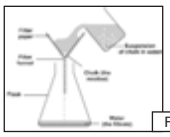
Starter
Starters help in preparing learners for new skills, methods or concepts, reinforcing previous steps necessary for this new learning/ lesson.

Think and do
This section offers the facilitator extra activities to do with learners after the main activities under each sub-strand. It requires deep thinking.

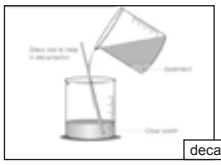
Project for home or school
In every lesson, an exploration of the concepts learned in the classroom is further extended to the home. The series suggests relevant home activities that help learners to ugment and consolidate what has been learnt in the classroom and its real life application where neccesary..

Assesment for learning
The feature directs teachers/ facilitators in checking learners' understanding of the lesson indicator(s) by way of assessing them. References are made to "Exercises" in the Learner's Book and Trials.

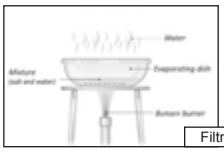
water passes through the filter paper, but the sand is trapped. This is called the residue.



Filtration setup



decantation setup



Filtration setup

Think and do
Put learners in groups of five. Let them discuss the uses of solid-liquid mixtures in everyday life.

Talk about
Let learners work in pairs to discuss this:
- Solid-liquid mixtures are seen in our homes and communities.
- Give some uses of some everyday solid-liquid mixtures?

What I have learnt
Deduce from learners what they have learnt from the lesson. Write some on the board as follows:
1. Solid-liquid mixtures are formed when a solid is mixed with a liquid.
2. Some solids dissolve in liquids when mixed together and other solids do not.
3. Examples of common solid- liquid mixtures are salt and water, sand and water and gari and water.
4. We can separate some everyday solid-liquid mixtures.
5. Evaporation and filtration are common methods used in separating solid-liquid mixtures.

Project for home or school
Pour an amount of salt into a saucepan. Add water and stir till all the salt dissolves.
Put the solution on a source of fire and heat, you can also place it in the hot sun and observe as the water evaporates. It will be observed that the water dries, leaving the salt in the saucepan.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 37 of the Learner,s Book and page 15 - 17 of the Workbook.

Answers to review exercise
Exercise 1
a. sand and gari
b. rice grains and salt
c. sugar and salt
d. corn dough and gari
e. gari and sugar

2. c, f, g
3.
a. false
b. true
c. false
d. true
e. false

Answers to Work Book
Trial 1
1. grain and water
2. rice and water
3. soup and meat
4. frying fish

Trial 2
1. a. filter paper
   b. flask
2. sand and water
3. filtration

Trial 3

Miscible	Immiscible
Water and fruit juice	water and palm oil
Lemon juice and water	Kerosene and palm oil
Water and milk	

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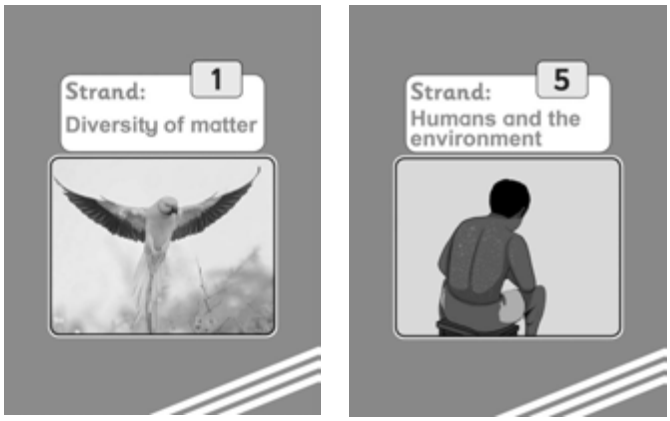
Answers
Expected answers are provided for all exercises under every lesson in the Learner's Book and Trials in the Workbook. Where answers are to vary from one learner to the other, it is mentioned.

Organisation and structure of the Learner's Book

The user-friendly Learner's Book tackles the new standard-based Science curiculum features and criteria with a clear and logical structure that incorporates the following features.

Strand Opener

There are five "strands" in the Learner's Book – one for each of the Science curriculum. This precedes the beginning of contents under each strand.

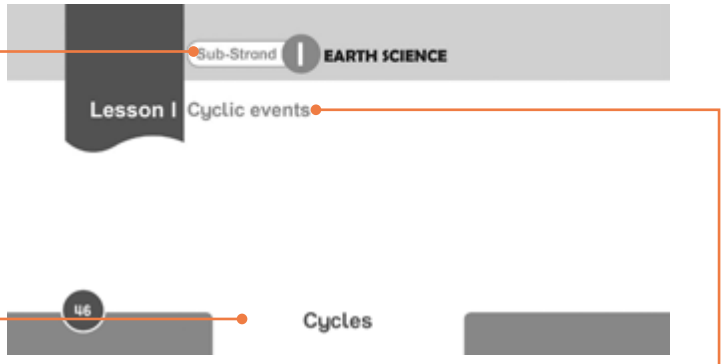


Header and footer labels

Strand: This feature indicates the particular strand from which the lessons are developed.

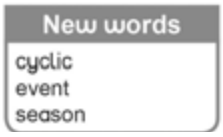
Sub-strand: These are larger groups of related topics to be studied under each strand.

Lesson: This feature specifies the lesson number under a sub-strand. The lessons are derived from the indicators.



New words

- build subject-specific vocabulary gradually, giving learners the confidence to understand it clearly and apply it in context and through different exercises.

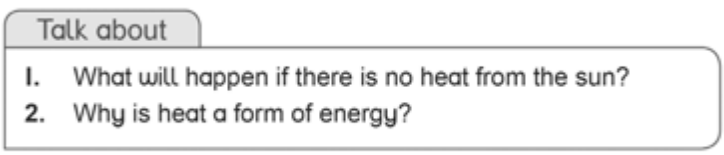


ICT boxes

- include research activities
- emphasise the core competencies

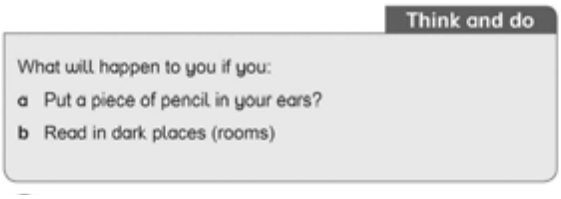
Talk about

- Learners are expected to discuss questions either in groups or in pairs. It is a critical thinking section that also helps their communication and collaborative skills



Think and do

- Learners perform activities and exercise which require deep thinking here.

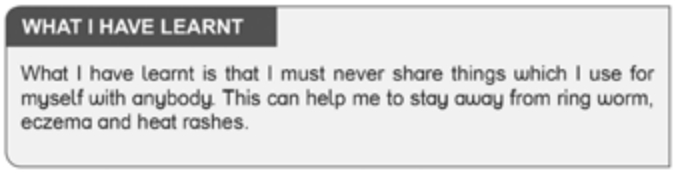


Project for home and school

- It helps consolidate what learners have already learnt in class. You are expected to direct learners on what they are to do either at home or in school

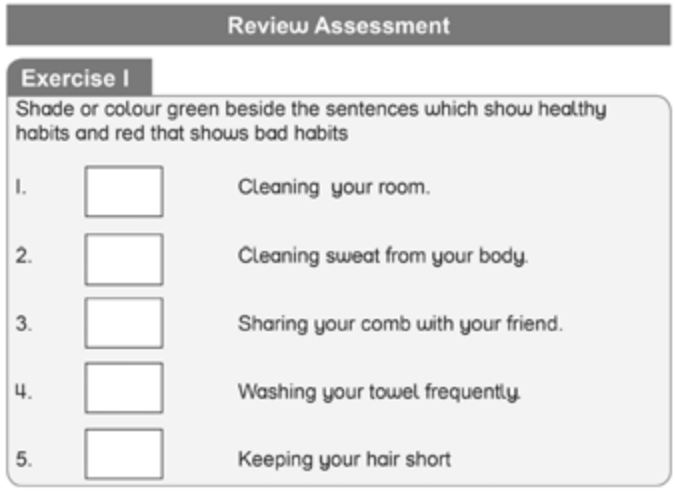
What I have learnt

- helps summarise what have been learnt under each lesson
- through questioning the facilitator assesses what the learners have learnt.



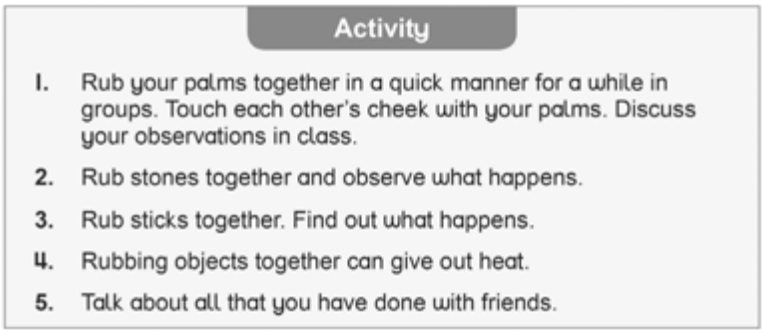
Review Exercise

- learners practice and consolidate what they have been taught. This provides an opportunity for all learners to strengthen their newly acquired knowledge.



Activities

- incorporate accurate and current individual, pair and group work activities that help learners to explore and practise what they have learnt
- incorporate exercises that allow learners to answer questions about what they have learnt and consolidate learning
- address the syllabus content standards and core competencies
- are representative of the indicators and exemplars
- have instructions and text that are consistent and clearly presented to learners
- promote problem-solving and subject understanding



Activity

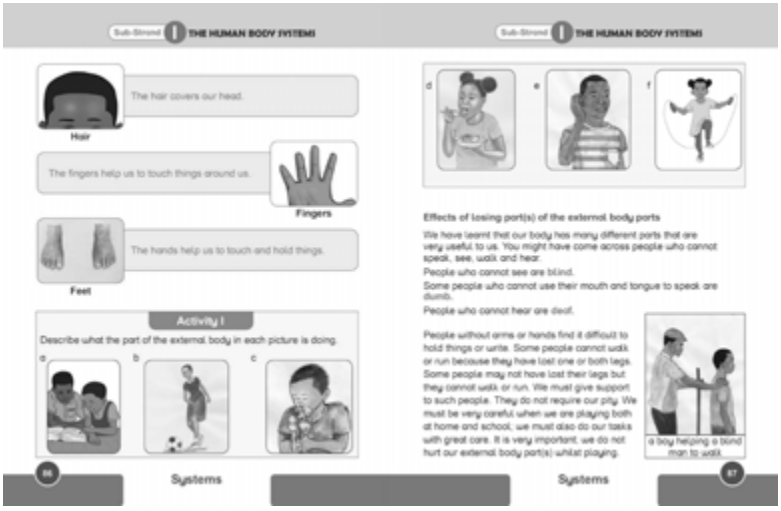
1. Rub your palms together in a quick manner for a while in groups. Touch each other's cheek with your palms. Discuss your observations in class.
2. Rub stones together and observe what happens.
3. Rub sticks together. Find out what happens.
4. Rubbing objects together can give out heat.
5. Talk about all that you have done with friends.

Text and content

- use language that is appropriate to the level, age, knowledge and background of the learners
- are representative of Ghana's diversity
- have a good gender balance and portray no gender stereotypes

Illustrations and photos

- are high-quality and representative of Ghana's diversity
- balance the text on every page and add to learners' understanding of the content
- have captions and labels that are simple, relevant, appropriate, and clear
- reflect a variety of learners (including learners with special needs)
- show no gender stereotypes



Sub-Strand 1 THE HUMAN BODY SYSTEMS

Hair

The hair covers our head.

Fingers

The fingers help us to touch things around us.

Feet

The hands help us to touch and hold things.

Activity 1

Describe what the part of the external body in each picture is doing.

a b c

Systems

Sub-Strand 1 THE HUMAN BODY SYSTEMS

d e f

Effects of losing part(s) of the external body parts

We have learnt that our body has many different parts that are very useful to us. You might have come across people who cannot speak, see, walk and hear.

People who cannot see are blind.

Some people who cannot use their mouth and tongue to speak are dumb.

People who cannot hear are deaf.

People without arms or hands find it difficult to hold things or write. Some people cannot walk or run because they have lost one or both legs. Some people may not have lost their legs but they cannot walk or run. We must give support to such people. They do not require our pity. We must be very careful when we are playing both at home and school, we must also do our tasks with great care. It is very important we do not hurt our external body part(s) whilst playing.

a boy helping a blind man to walk

Systems

INTRODUCTION

Science is such a broad topic that it is broken down into disciplines or branches based on the particular area of study. Learn about the different branches of science from these introductions. Then, get more detailed information about each science.

The objective of this Teacher's Guide is to make teaching and learning more interactive, practical, useful and to bring out the ingenuity of teacher professionalism in the teacher/facilitator to produce well equipped learners for national development.

This Teacher's Guide has been carefully designed to help teachers/facilitators teach effectively using the Learner's Book and its accompanying Workbook.

The Teacher's Guide helps teachers/facilitators to prepare adequately for each lesson by suggesting the following:

- Expected outcomes of the lesson
- The subject specific practices and core competencies to be developed in the lesson
- The pedagogical approaches to be used for the lesson
- The resources to be used in teaching the lesson
- The main points of the lesson
- Ideas or tasks that stimulate critical thinking among learners.

It is expected that after carefully studying the Teachers' Guide, teachers/facilitators will be able to:

1. Know the provisions in the Learner's Book in terms of Aims, Values, Core Competences and School Time Allocations.
2. Know the recommended teaching and Assessment approaches for each lesson.
3. Understand the structure and scope of sequence of the science curriculum.
4. Prepare schemes of learning for a given academic year, term or week.
5. Select and design appropriate assessment tasks for a given lesson.

Ultimately, the Teacher's Guide will contribute tremendously in ensuring the smooth implementation of the new standards-based science curriculum for primary Schools.

Role of the Teacher/Facilitator in the effective use of the Learner's Book

The Curriculum encourages the creation of a learning-centred classroom with the opportunity for learners to engage in meaningful "hands-on" activities that bring home to the learner what they are learning in school and what they know from outside of school.

The teacher/facilitator needs to create a learning environment that supports:

- The creation of learning-centred classrooms through the use of creative approaches to teaching and learning as strategies to ensuring learner empowerment and independent learning.
- The positioning of inclusion and equity at the centre of quality teaching and learning.
- The use of differentiation and scaffolding as teaching and learning strategies for ensuring that no learner is left behind.
- The use of Information and Communications Technology (ICT) as a pedagogical tool.
- The identification of subject specific instructional expectations needed for making learning in the subject relevant to learners.
- The integration of assessment for learning, as learning and of learning into the teaching and learning process and as an accountability strategy.
- Using questioning techniques that promote deeper learning.

Rationale for Primary Science

Science forms an integral part of our everyday activities and it is a universal truth that development is hinged on Science. Science and Technology is the backbone of social, economic, political, and physical development of a country. It is a never-ending creative process, which serves to promote discovery and understanding. It consists of a body of knowledge which attempts to explain and interpret phenomena and experiences. Science has changed our lives and it is vital to Ghana's future development.

To provide quality Science education, teachers/facilitators must facilitate learning in the Science classroom. This will provide the foundations for discovering and understanding the world around us and lay the grounds for Science and Science related studies at higher levels of education. Learners should be encouraged to understand how Science can be used to explain what is occurring, predict how things will behave and analyse causes and origins of things in our environment. The Science curriculum has considered the desired outcomes of education for learners at the basic level. Science is also concerned with the development of attitudes and therefore it is important for all citizens to be scientifically and technologically literate for sustainable development. Science therefore ought to be taught using hands-on and minds-on approaches which learners will find as fun and adopt Science as a culture.

Philosophy

Teaching Philosophy

Ghana believes that an effective Science education which is needed for sustainable development should be inquiry-based. Thus Science education must provide learners with opportunities to expand, change, enhance and modify the ways in which they view the world. It should be pivoted on learner-centred teaching and learning approaches that engage learners physically and cognitively in the knowledge-acquiring process, in a rich and rigorous inquiry-driven environment.

Learning Philosophy

Science Learning is an active contextualized process of constructing knowledge based on learners' experiences rather than acquiring it. Learners are information constructors who operate as researchers. Teachers serve as facilitators by providing the enabling environment that promotes the construction of learners' own knowledge based on their previous experiences. This makes learning more relevant to the learner and leads to the development of critical thinkers and problem solvers.

Instructional Guidelines

1. Guide and facilitate learning by generating discourse among learners and challenging them to accept and share responsibility for their own learning based on their unique individual differences.
2. Select Science content, adapt and plan lessons to meet the interests, knowledge, understanding, abilities, and experiences of learners.
3. Work together as colleagues within and across disciplines and grade levels to develop communities of Science learners who exhibit the skills of scientific inquiry and the attitudes and social values conducive to Science learning.
4. Use multiple methods and systematically gather data about learners' understanding and ability, to guide Science teaching and learning with arrangements to provide feedback to both learners and parents.
5. Design and manage learning environments that provide students with the time, space, and resources needed for learning Science.

Class management

Most teachers/facilitators in Ghana teach large classes. Such classes are in the range of 40 to 100 learners or more. The teachers/facilitators, based on their professional experience over the years have developed skills in classroom methodology. Here are a few reminders about whole class, group, pair and individual work that could be helpful with large classes.

Whole class teaching

Much of your teaching, especially when your class is large, will involve you standing at the front of the class explaining and listening to your learners. You can set out facts and concepts which everyone can understand. However, your class will vary in ability. More able learners should be given additional tasks to stretch their capabilities while those who find understanding more difficult should be given the time and attention they need.

When you introduce a topic make sure you use learners' existing knowledge and build upon it. The basic information for your lesson is in the text. If you are going to ask learners to read for themselves (at home or in class or to read out loud), work out during your lesson planning which words will be difficult for them to understand and explain these first. Make sure that all your learners have understood your explanation and give time to those having difficulty as well as talking and listening you will

find other activities can be very valuable during whole-class teaching, for example:

Group work
Class teaching is large group work but sometimes there are advantages in working in pairs or groups of four to six learners: some children make more progress when working in a group of the same ability. On other occasions more able learners can help those who are not quite so quick at understanding. Groups of friends and groups working on different topics are other possible divisions that you could make.

For group work to be successful some thought must be given to the organization of class furniture. In most of our classrooms we still see rows of desks with several children to each desk. The classrooms are also often crowded so that it not easy to move the desks around. Whatever the situation some kind of group can be organized. At its most basic the group will have to be learners at one desk. It might be possible for those at one desk to turn around to face those at the desk behind.

There are many advantages in allowing a number of children to consider a topic, work jointly and bring their findings back to the whole class: each group will think in a slightly different way and have different experiences to share. Sometimes learners are better able to discuss sensitive areas in same - sex groups. Such work encourages co-operation and mutual support. Individual groups can study a picture together, or write a poem or discuss a topic like pollution in their village. You need to ensure that there is follow-up to group work so that work is not done in isolation but is instead considered by the class as a whole.

Pair work
Learners are often instructed to work in pairs – either with their desk mate, or with a partner. This is an ideal opportunity for learners to assist each other, and for them to assess each other. Working with a desk mate offers the least classroom disturbance. The learners are already seated side-by-side. They ask and answer questions during Picture talk, and they discuss the readings before they write comprehension answers individually.

Working with a partner that you have allocated to the learner means that you can pair a slower learner with a faster learner, so that they can help one another. You may also choose to pair learners of similar abilities together, so that they can proceed more quickly with the work, while you assist the slower pairs.

Learner self-study
There will be times when you want the class to work as individuals to allow them to become familiar with material you have given them and to allow you to work with Learners of different abilities. It is worth bearing in mind that while there is a need for Learners to learn how to read and study on their own; there are also dangers in this approach. It is essential that the material they read is understandable to them, and that your attention is still focused on the class to ensure that all learners are using the time to read and not misbehave. Use additional material at different levels to ensure that some learners do not finish more quickly than others.

Teaching tip
One of the most important skills in classroom management is the ability to ensure your learners are occupied for the whole lesson. If a group has finished its task and has nothing else to do it is likely to become disruptive. Break up your lesson and make sure it has several different parts:

- full class work
- individual work
- practical activities

Pedagogy and Assessment

Creative and Learning - Centred Pedagogies for Science

1. ***Activity-based learning, hands-on, creative, participatory method of learning.***
   - Science teachers/facilitators should device activities to suit the age group and skills of the learners.
   - There should be variety in activities. Sorting of items into groups, creation of posters, hands-on activities. E.g separation samples of given mixtures.
   - Activities should not only help gather knowledge, but apply and evaluate knowledge. E.g. designing and building objects from common materials.

2. ***Demonstrations***
   - The teacher/facilitator retains the formal authority role by showing learners what they need to know. e.g. demonstrating how to construct an electronic circuit.

3. ***Inquiry-based learning***
   - Teachers/facilitators design an investigation toward answering questions. E.g. How is soap produced within the local community?
   - Learners carry out investigation – gather data (by asking their parents, people in the community).
   - Develops information processing and problem-solving skills. (they learn about the steps/processes involved in soap making).
   - Makes use of resources beyond classroom/school (visits to local production sites).

4. ***Group work (think-pair-share, collaborative learning, problem-based learning, team based learning/ discussions)***
   - Collaborative learning highlights the contributions of individual group members, and leads to dialogue and consensus building on topics without a clear right and wrong answer. E.g. placing learners into groups to discuss the physical features that enables various organisms to live in the sea, land or air.

5. ***Project-based learning***
   - Project-based learning is a teaching method in which learners gain knowledge and skills by working for an extended period of time. E.g. Reading and Recording the School/home's electricity consumption over a month.
   - This focuses on investigating and responding to an authentic, engaging and complex question, problem, or challenge. E,g How to solve the problem of poor sanitary conditions in the school.

Other Approaches for Teaching Science Learning

- ICT Based Learning
- Engaging Learners in Meaningful Learning
- Organisation of Field Trips and Nature Walks
- Use of Concept Maps, Mind Maps and Future's Wheel
- Invitation of Professionals to make Class presentations
- Changing the learning setting
- Implementation of a Reward System
- Use of Educational games, songs and ice-breakers

Use of ICT

The use of ICT is firmly incorporated in the Learners Book. During science lessons, learners need to be exposed to the various ICT tools around them.

Some schools in urban areas have access to computers in school or in libraries. Rural areas will become linked in the future. You should learn how to use a computer as soon as you are able. They open up the world as your resource. The internet can provide as much additional material as you will ever need. Once your learners have the chance to use a computer they too will have access to a world of information. This can be done through effective use of the following ICT tools:

- Laptop or desktop computers
- Smartphones
- Tablets
- CD players
- Projectors
- Calculators
- Radios
- Cameras
- Television sets
- Computer and related software, such as Microsoft Office packages (Word, PowerPoint and Excel).

ICTs are a useful communication technology that can by and large be used to enhance the quality of teaching and learning in schools. Internet systems have made the world a globalized one. It is for this that Professor Ali Mazrui describes globalization as "the villagization of the world" hence, the world being a "global village" (Marshall McLuhan and Quentin Fiore, 1968). This means all parts of the world are being brought together by the internet and other electronic communication interconnections. That is more information has become accessible anywhere in the world by way of interconnectedness and interdependency. You can communicate to anybody anywhere in the world from the comfort of your room, car and many more places. In

working towards the rationale of the Science curriculum, there is the urgent need for the teacher/facilitator to display professionalism through effective use of ICTs in teaching and learning.

The teacher/facilitator should try as much as possible use whatever technological resources available such as any of those stated above to assist in teaching and learning. The use of ICTs in teaching and learning activities promotes a paradigm shift to learner-centered environment. Here are some useful ideas on how to go about this:
Integrate ICT's in the learning process, as a key competence and contributing to the acquisition of skills and knowledge;

- Use ICT's in the classroom to work on information processing, authentic communication, and on the learner autonomy, as the builder of his or her own learning process;
- Give ICT's a role to help young people be able to arrange, evaluate, synthesize, analyze and decide on the information that comes to them;
- Challenge students with different types of supports and formats and, therefore, a great variety of activities in which they pass from receivers to makers;
- Attend to the diversity or learning needs of students, using the copious offer of interactie exercises available on the web.

Assessment

Assessment is a process of collecting and evaluating information about learners and using the information to make decisions to improve their learning.

In this curriculum, it is suggested that assessment is used to promote learning. Its purpose is to identify the strengths and weaknesses of learners to enable teachers/facilitators ascertain their learner's response to instruction. Assessment is both formative and summative. Formative assessment is viewed in terms of Assessment ***as*** learning and Assessment ***for*** learning.
Assessment *as* learning: Assessment as learning relates to engaging learners to reflect on the expectations of their learning. Information that learners provide the teacher/facilitator forms the basis for refining teaching-learning strategies. Learners are assisted to play their roles and to take responsibility of their own learning to improve performance. Learners are assisted to set their own goals and monitor their progress.

Assessment *for* learning: It is an approach used to monitor learner's progress and achievement. This occurs throughout the learning process. The teacher employs assessment for learning to seek and interpret evidence which serves as timely feedback to refine their teaching strategies and improve learners' performance. Learners become actively involved in the learning process and gain confidence in what they are expected to learn.

Assessment *of* learning: This is summative assessment. It describes the level learners have attained in the learning and what they know and can do over a period of time. The emphasis is to evaluate the learner's cumulative progress and achievement.

It must be emphasised that all forms of assessment should be based on the domains of learning. In developing assessment procedures, try to select indicators in such a way that you will be able to assess a representative sample from a given strand. Each indicator in the curriculum is considered a criterion to be achieved by the learners. When you develop assessment items or questions that are based on a representative sample of the indicators taught, the assessment is referred to as a "Criterion-Referenced Assessment". In many cases, a teacher/facilitator cannot assess all the indicators taught in a term or year. The assessment procedure you use i.e. class assessments, homework, projects etc. must be developed in such a way that the various procedures complement one another to provide a representative sample of indicators taught over a period.

Designing Assessment Tasks in the New Curriculum

- Puzzles, Fill-ins, Riddles, maze, scrambled words, true or false, Drawing, Spot the difference, Matching, Pick the odd one out, Objectives with options, rearrange, Gallery Walks,

Below is a sample rubric which you can use to assess your learners performance in science. This can be adapted and used for any assessment tool (exam, activity, PowerPoint)

SAMPLE RUBRIC FOR ASSESSING LEARNERS PERFORMANCE

Rubric -Primary School Science	LEVEL 1 With strong prompting from the teacher/ facilitator	LEVEL 2 With some prompting from the teacher/ facilitator	LEVEL 3 With minimal prompting from the teacher/ facilitator	LEVEL 4 Without prompting from the teacher/ facilitator
OBSERVATION	Learners use one of her senses to observe basic information	Learners use at least one of her senses to observe basic information	Learner notices detailed characteristics and phenomena	learners **extend/ apply her observations** to related objects and/or events
INVESTIGATION	learners participate minimally in carrying out the experiment	learners participate in carrying out the experiment	learners participate in carrying out the experiment and asks “how”, “what’, and/or “why”	Learners expresse **strong sense of wondering** and carries out additional experiments
REASONING	Learners draw basic conclusions	Learners draw detailed conclusions	Learners draw connections between ideas and evaluates the choices	Learner ask “what if” and **makes hypotheses** about related objects and/or events
COMMUNICATION	Learners struggle to express what she did	Learners present conclusions partially supported by data	Learners effectively use data to express her conclusions, and uses materials/ role play/other methods of communication to present them	Learners use data to **clearly articulate** her observations, approach and findings with detail, and she uses **creative methods** to present them
UNDERSTANDING	Learners present minimal understanding of the relevant concepts	Learners present weak connection between observation and concept	Learners present evidence of understanding of relevant concepts, theories or principles	Learners present **evidence of in-depth understanding** of relevant concepts, theories or principles

Source: NaCCA, Ministry of Education 2019

Core Competencies

The core competencies describe a body of skills that teachers/facilitators at all levels should seek to develop in their learners. They are ways in which teachers/facilitators and learners engage with the subject matter as they learn the subject. The competencies presented here describe a connected body of core skills that are acquired throughout the processes of teaching and learning.

Critical Thinking and Problem Solving (CP)
This skill develops learners' cognitive and reasoning abilities to enable them analyse and solve problems. Critical thinking and problem solving skill enables learners to draw on their own experiences to analyse situations and choose the most appropriate out of a number of possible solutions. It requires that learners embrace the problem at hand, persevere and take responsibility for their own learning.

Creativity and Innovation (CI)
Creativity and Innovation promotes the development of entrepreneurial skills in learners through their ability to think of new ways of solving problems and developing technologies for addressing the problem at hand. It requires ingenuity of ideas, arts, technology and enterprise. Learners having this skill are also able to think independently and creatively.

Communication and Collaboration (CC)
This competence promotes in learners the skills to make use of languages, symbols and texts to exchange information about themselves and their life experiences. Learners actively participate in sharing their ideas. They engage in dialogue with others by listening to and learning from them. They also respect and value the views of others.

Cultural Identity and Global Citizenship (CG)
This competence involves developing learners to put country and service foremost through an understanding of what it means to be active citizens. This is done by inculcating in learners a strong sense of social and economic awareness. Learners make use of the knowledge, skills, competences and attitudes acquired to contribute effectively towards the socioeconomic development of the country and on the global stage. Learners build skills to critically identify and analyse cultural and global trends that enable them to contribute to the global community.

Personal Development and Leadership (PL)
This competence involves improving self-awareness and building self-esteem. It also entails identifying and developing talents, fulfilling dreams and aspirations. Learners are able to learn from mistakes and failures of the past. They acquire skills to develop other people to meet their needs. It involves recognising the importance of values such as honesty and empathy and seeking the well-being of others. Personal development and leadership enables learners to distinguish between right and wrong. The skill helps them to foster perseverance, resilience and self-confidence. PL helps them acquire the skill of leadership, self-regulation and responsibility necessary for lifelong learning.

Digital Literacy (DL)
Digital Literacy develops learners to discover, acquire knowledge, and communicate through ICT to support their learning. It also makes them use digital media responsibly.

Learning domains (expected learning behaviours)

A central aspect of this curriculum is the concept of three integral learning domains that should be the basis for instruction and assessment. These are:

- Knowledge, Understanding and Application
- Process Skills
- Attitudes and Values

Teachers/facilitators must ensure that daily learning covers all these three important domains through the use of relevant resources, and utilization of appropriate teaching pedagogies and assessment tasks.

KNOWLEDGE, UNDERSTANDING AND APPLICATION
Under this domain, learners acquire knowledge through some learning experiences. They may also show understanding of concepts by comparing, summarising, re-writing etc. in their own words and constructing meaning from instruction. The learner may also apply the knowledge acquired in some new contexts. At a higher level of learning behaviour, the learner

may be required to analyse an issue or a problem.

SKILLS AND PROCESSES
These are specific activities or tasks that indicate performance or proficiency in the learning of Science. They are useful benchmarks for planning lessons, developing exemplars and are the core of inquiry-based learning.

Equipment and apparatus handling
This is the skill of knowing the functions and limitations of various apparatus, and developing the ability to select and handle them appropriately for various tasks.

Observing
This is the skill of using the senses to gather information about objects or events. This also includes the use of instruments to extend the range of our senses.

Classifying
This is the skill of grouping objects or events based on common characteristics.

Comparing
This is the skill of identifying the similarities and differences between two or more objects, concepts or processes.

Communicating/Reporting
This is the skill of transmitting, receiving and presenting information in concise, clear and accurate forms - verbal, written, pictorial, tabular or graphical.

Predicting
This is the skill of assessing the likelihood of an outcome based on prior knowledge of how things usually turn out.

Analysing
This is the skill of identifying the parts of objects, information or processes, and the patterns and relationships between these parts.

Generating possibilities
This is the skill of exploring all the options, possibilities and alternatives beyond the obvious or preferred one.

Evaluating
This is the skill of assessing the reasonableness, accuracy and quality of information, processes or ideas. This is also the skill of assessing the quality and feasibility of objects.

Designing
This is the skill of Visualizing and drawing new objects or gargets from imagination.

Measuring
This is the skill of using measuring instruments and equipment for measuring, reading and making observations.

Interpreting
This is the skill of evaluating data in terms of its worth: good, bad, reliable, unreliable; making inferences and predictions from written or graphical data; extrapolating and deriving conclusions. Interpretation is also referred to as “Information Handling”.

Recording
This is the skill of drawing or making graphical representation boldly and clearly, well labelled and pertinent to the issue at hand.

Generalising
This is the skill of being able to use the conclusions arrived at in an experiment to what could happen in similar situations.

Designing of Experiments
This is the skill of developing hypotheses; planning and designing of experiments; persistence in the execution of experimental activities; modification of experimental activities where necessary in order to reach conclusions.

Values
At the heart of this curriculum is the belief in nurturing honest, creative and responsible citizens. As such, every part of this curriculum, including the related pedagogy, should be consistent with the following set of values.

Respect: This includes respect for the nation of Ghana, its institutions and laws and the culture and respect among its citizens and friends of Ghana.

Diversity: Ghana is a multicultural society in which every citizen enjoys fundamental rights

and responsibilities. Learners must be taught to respect the views of all persons and to see national diversity as a powerful force for national development. The curriculum promotes social cohesion.

Equity: Socio-economic development across the country is uneven. Consequently, it is necessary to ensure an equitable distribution of resources based on the unique needs of learners and schools. Ghana's learners are from diverse backgrounds, and thus which require the provision of equal opportunities to all, and that, all strive to care for each other.

Commitment to achieving excellence: Learners must be taught to appreciate the opportunities provided through the curriculum and persist in doing their best in their fields of endeavour as global citizens. The curriculum encourages innovativeness through creative and critical thinking and the use of contemporary technology.

Teamwork/Collaboration: Learners are encouraged to become committed to team-oriented working and learning environments. This also means that learners should have an attitude of tolerance to be able to live peacefully with all persons.

Truth and Integrity: The curriculum aims to develop learners into individuals who will consistently tell the truth irrespective of the consequences, and be morally upright with an attitude of doing the right thing even when no one is watching Learners are taught. Also, be true to themselves and be willing to live the values of honesty and compassion. Equally important, is the practice of positive values as part of the ethos or culture of the work place, which includes integrity and perseverance. These underpin the competencies learning processes to allow learners to apply skills and competencies in the world of work.

Time allocation

A total of four periods a week, each period consisting of thirty minutes, is allocated to the teaching of Science at the lower basic level **(B1- B3)**. It is recommended that the teaching periods be divided as follows:
Theory: 2 periods per week (30 minutes per period)
Practical: 2 periods per week (one double-period)

Inclusion

Inclusion entails access and learning for all learners, especially, those disadvantaged. All learners are entitled to a broad and balanced curriculum in every school in Ghana. The daily learning activities to which learners are exposed should ensure that the learners' right to equal access to quality education is being met. The curriculum suggests a variety of approaches that address learners' diversity and their special needs in the learning process. These approaches when used in lessons, will contribute to the full development of the learning potential of every learner. Learners have individual needs and different learning styles, learning experiences and different levels of motivation for learning. Planning, delivery and reflection on daily learning episodes should take these differences into consideration. The curriculum therefore promotes:

- learning that is linked to the learner's background and to their prior experiences, interests, potential and capacities;
- learning that is meaningful because it aligns with learners' ability (e.g. learning that is oriented towards developing general capabilities and solving the practical problems of everyday life); and
- the active involvement of the learners in the selection and organisation of learning experiences, making them aware of their importance in the process and also enabling them to assess their own learning outcomes.

Differentiations and scaffolding

This curriculum is to be delivered through the use of creative approaches. Differentiation and Scaffolding are pedagogical approaches to be used within the context of the creative approaches.

Differentiation is a process by which differences among learners (learning styles, interest and readiness to learn etc.) are accommodated so that all learners in a group have their best chance of learning. Differentiation could be by task, support and/or outcome. Differentiation, as a way of ensuring

each learner benefits adequately from the delivery of the curriculum, can be achieved in the classroom through:

- Task
- One-on-one support
- Outcome

Differentiation by task involves teachers/facilitators setting different tasks for learners of different ability e.g. in sketching the plan and shape of their classroom some leaners could be made to sketch with free hand while others would be made to trace the outline of the plan of the classroom.

Differentiation by support involves the teacher/facilitator providing a targeted support to learners who are seen as performing below expected standards or at risk of not reaching the expected level of learning outcome. This support may include a referral to a Guidance and Counselling Officer for academic support.

Differentiation by outcome involves the teacher/facilitator allowing learners to respond at different levels. In this case, identified learners are allowed more time to complete a given task.

Scaffolding in education refers to the use of a variety of instructional techniques aimed at moving learners progressively towards stronger understanding and ultimately greater independence in the learning process.

It involves breaking up the learning episodes, experiences or concepts into smaller parts and then providing learners with the support they need to learn each part. The process may require a teacher/facilitator assigning an excerpt of a longer text to learners to read, engage them to discuss the excerpt to improve comprehension of its rationale, then guiding them through the key words/vocabulary to ensure learners have developed a thorough understanding of the text before engaging them to read the full text.
Common scaffolding strategies available to the teacher/facilitator include:

- giving learners a simplified version of a lesson, assignment, or reading, and then gradually increasing the complexity, difficulty, or sophistication over time;
- describing or illustrating a concept, problem, or process in multiple ways to ensure understanding;
- giving learners an exemplar or model of an assignment, they will be asked to complete;
- giving learners a vocabulary lesson before they read a difficult text;
- clearly describing the purpose of a learning activity, the directions learners need to follow, and the learning goals they are expected to achieve;
- explicitly describing how the new lesson builds on the knowledge and skills learners were taught in a previous lesson.

Organisation of the Curriculum

The science curriculum has been structured into four columns which are Strands, Sub-strands, Content standards, Indicators and exemplars. A unique annotation is used for numbering the learning indicators in the curriculum for the purpose of easy referencing. The annotation is indicated in table 2.

Example: **B3 .2.4.1.2**

ANNOTATION	MEANING/ REPRESENTATION
B3	**Year or Class**
2	Strand Number
4	Sub-Strand Number
1	Content Standard Number
2	Indicator Number

Strands are the broad areas/sections of the Science content to be studied.

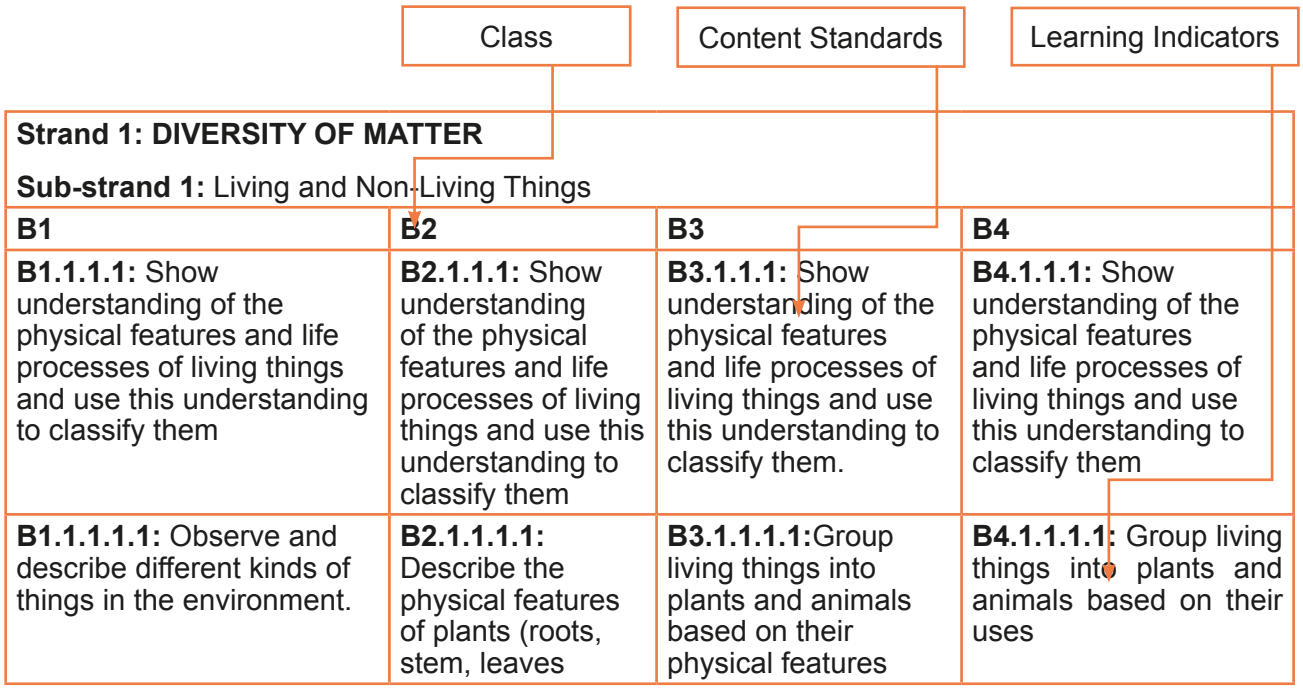
Sub-strands are the topics within each strand under which the content is organised.

Content standard refers to the pre-determined level of knowledge, skill and/or attitude that a learner attains by a set stage of education.

Indicator is a clear outcome or milestone that learners have to exhibit in each year to meet the content standard expectation. The indicators represent the minimum expected standard in a year.

Exemplar: support and guidance which clearly explains the expected outcomes of an indicator and suggests what teaching and learning activities could take, to support the facilitators/teachers/facilitators in the delivery of the curriculum.

ILLUSTRATION OF CURRICULUM STRUCTURE



Strand 1: DIVERSITY OF MATTER **Sub-strand 1:** Living and Non-Living Things			
B1	**B2**	**B3**	**B4**
B1.1.1.1: Show understanding of the physical features and life processes of living things and use this understanding to classify them	**B2.1.1.1:** Show understanding of the physical features and life processes of living things and use this understanding to classify them	**B3.1.1.1:** Show understanding of the physical features and life processes of living things and use this understanding to classify them.	**B4.1.1.1:** Show understanding of the physical features and life processes of living things and use this understanding to classify them
B1.1.1.1.1: Observe and describe different kinds of things in the environment.	**B2.1.1.1.1:** Describe the physical features of plants (roots, stem, leaves	**B3.1.1.1.1:**Group living things into plants and animals based on their physical features	**B4.1.1.1.1:** Group living things into plants and animals based on their uses

Source: NaCCA, Ministry of Education 2019

STRUCTURE OF CURRICULUM

The Science curriculum is structured to cover B1 to B3 under five strands with a number of sub-strands as shown in the table below:

STRAND	B1	B2	B3
	SUB-STRANDS	SUB-STRANDS	SUB-STRANDS
DIVERSITY OF MATTER	1. Living and Non-Living Things 2. Materials	1. Living and Non-Living Things 2. Materials	1. Living and Non-Living Things 2. Materials
CYCLES	1. Earth Science 2. Life Cycles of organisms	1. Earth Science	1. Earth Science 2. Life Cycles of organisms
SYSTEMS	1. The Human Body Systems 2. Ecosystems	1. The Human Body Systems 2. The Solar system	1. The Human Body Systems 2. The Solar system 3. Ecosystems
FORCES AND ENERGY	1. Sources and Forms of Energy 2. Electricity and electronics 3. Forces and Movement	1. Sources and Forms of Energy 2. Electricity and Electronics 3. Forces and Movement	1. Sources and Forms of Energy 2. Electricity and Electronics 3. Forces and Movement
HUMANS AND THE ENVIRONMENT	1. Personal Hygiene and Sanitation 2. Diseases 3. Science and Industry 4. Climate Change	1. Personal Hygiene and Sanitation 2. Diseases 3. Science and Industry 4. Climate Change	1. Personal Hygiene and Sanitation 2. Diseases 3. Science and Industry 4. Climate Change

DIFFERENCE BETWEEN THE TRADITIONAL AND LEARNING-CENTRED CLASSROOM

	TRADITIONAL	LEARNING-CENTRED CLASSROOM
1.	Emphasis is on knowledge acquisition.	Emphasises the acquisition of skills and competencies.
2.	Learning is limited to the four walls of the classroom.	Learning takes place both in and outside the classroom (school compound, community, home, internet, etc.).
3.	Students constantly face the teacher/ facilitator and board.	The classroom is inviting. Desks can be rearranged to promote collaborative as well as independent work.
4.	Teacher/facilitator restricted to provisions in the curriculum.	Gives room for teacher/facilitator innovation.
5.	The teaching and learning tools are limited to pens, pencils, crayons and paper.	The teaching and learning process is enhanced by the use of modern technological gadgets such as smart phones, sound systems, computers, TV sets, smart boards, etc.
6.	The classroom environment is devoid of teacher/facilitator-sponsored TLMs.	The classroom environment is laden with materials for sub-conscious learning.
7.	The teacher/facilitator takes the centre stage and talks more than the learner.	The learner takes active part in the learning process and talks more.
8.	Here, mistakes are sanctioned.	Mistakes are tools for discovery and learning.
9.	Criterion-referenced assessment is emphasised. Learner's progression is based on score in exams.	Relies on different modes of assessment, progression is based on mastery of competency.
10.	Mainly focused on theoretical mode of teaching.	Plethora of learning modes.

Source: NaCCA, Ministry of Education 2019

SCOPE AND SEQUENCE

STRAND	SUB-STRANDS	B3
DIVERSITY OF MATTER	Living and Non-Living Things	✓
	Materials	✓
CYCLES	Earth Science	✓
	Life Cycles of Organisms	✓
SYSTEMS	The Human Body Systems	✓
	The Solar system	✓
	Ecosystems	✓
FORCES AND ENERGY	Sources and Forms of Energy	✓
	Electricity and Electronics	✓
	Forces and Movement	✓
HUMANS AND THE ENVIRONMENT	Personal Hygiene and Sanitation	✓
	Diseases	✓
	Science and Industry	✓
	Climate Change	✓

Source: NaCCA, Ministry of Education 2019

SAMPLE YEARLY SCHEME OF LEARNING – BASIC 3

Weeks	Term 1 (List term 1 Sub Strands)	Term 2 (List term 2 Sub Strands)	Term 3 (List term 3 Sub Strands)
1	Living and non- living things	Earth science	Forces and movement
2	Living and non-living things	Earth science	Forces and movement
3	Living and non-living things	Earth science	Personal hygiene and sanitation
4	Living and non-living things	Life cycles of organism	Personal hygiene and sanitation
5	Materials	Life cycles of organism	Personal hygiene and sanitation
6	Materials	The human body systems	Personal hygiene and sanitation
7	Materials	Ecosystem	Diseases
8	Materials	Sources and forms of energy	Science and industry
9	Earth science	Sources and forms of energy	Science and industry
10	Earth science	Electricity and electronics	Science and industry
11		Electricity and electronics	Climatechange

Source: NaCCA, Ministry of Education 2019

SAMPLE LESSON – BASIC 3

Date: 15/03/2019	**Period:** 3 and 4	**Subject:** Science
Duration: One hour		**Strand:** Diversity of matter
Class: B3	**Class size:** 40	**Sub-strand:** Materials

Content Standard: **B3.1.2.1** Recognise materials as important resources for providing human needs.	**Indicator:** **B3.1.2.1.1** Identify the uses of everyday materials and link the uses to their properties	**Lesson:** 1 of 1 (Based on the demands of the indicator)

Performance Indicator: Learners can identify the uses of everyday materials, link the uses to their properties and design different things from materials.	**Core Competencies/Values:** Critical Thinking and Problem Solving Digital Literacy, Communication and Collaboration, Personal Development and Leadership.

Keywords: Materials, wood, plastics, metals, cotton wool.

Phase/Duration	Learners activities	Resources
Phase1: Starter (preparing the brain for learning) 5 minutes	• Teacher asks learners to look around the classroom and tell the class what they see. • Learners respond: "I see a school bag, a pen, an eraser, a ruler, etc". • Teacher explains that all the items learners have mentioned are all materials, which are found in our environment.	
Phase 2: Main (newlearning including assessment) 20 minutes	• Show learners real samples of wood, plastics, paper, metals, leather and cotton. Learners examine the material samples and make comments. • Show learners pictures and videos of common uses of materials e.g. Wood, plastics, paper, metals, leather, cotton, and more materials. • Learners use think-pair-share to discuss the uses of the materials in the video or pictures. • Brainstorm with learners to come out with the uses of the materials in relation to their properties, e.g. metals are used for making car bodies because they are hard, plastics are used for making bottles, buckets, bowls because they can be moulded into different shapes. • Engage learners in an activity to match some products such as buckets, cups, books, tables with their material sources such as metals, clay, glass, wood, plastics.	Pictures/ flashcards of parts of the human body, an outline drawing of the human body, pencils, crayons, erasers, cello tape, broadsheets of paper.

	• In pairs, learners create some products from a material or a combination of materials and display their products. Combination of materials and display their products.	
Phase 3: Plenary/ Reflections (Learner and teacher) 5 minutes	Give learners opportunity to talk about what they have learnt. Elaborate more on learners ideas writing key points on the board. We have learnt about materials. We now know that materials are important and can be used for other products. Summarise lesson.	

Source: NaCCA, Ministry of Education 2019

1

Strand:

Diversity of matter

LESSON 1: Grouping plants and animals

LB: pages 6 - 19; WB: pages 6 - 8

CONTENT STANDARD
B3.1.1.1 Show an understanding of the physical features and life processes of living things and use this understanding to classify them.

INDICATOR
B3.1.1.1.1 Classify living things into plants and animals by their life processes.

LEARNING EXPECTATIONS:
Learners will:
- Mention the life processes that all living things undergo.
- Describe how plants move, grow, make babies, and get food.
- Describe how animals move, grow, make babies, and get food.
- Explain the differences between how plants and animals move, grow and feed.

NEW WORDS
Life processes, breathe, carnivore, omnivore, herbivore, nutrients.

RESOURCES
videos showing life processes such as growth, movement, excretion and reproduction. Plants. Pictures depicting life processes.

CORE COMPETENCIES
Critical thinking and Problem Solving, Digital Literacy, Collaboration and Communication, Personal Development and Leadership, Creativity and Innovation.

SUBJECT SPECIFIC PRACTICES
Observing, Classifying, Predicting, Analysing, Evaluating.

Background Information
All plants and animals are living things. This means they are alive. Both plants and animals grow bigger. They all move. Just as animals can have their own babies, plants also have baby plants. Humans and animals breathe in air. Plants also take in air through their leaves. This helps them to prepare their food and get energy. They also get water from the soil through their roots. These are called **Life Processes**.

Starter
Ask learners to mimic how different animals move. Let them cite examples of animals that give birth by laying eggs and those that become pregnant.

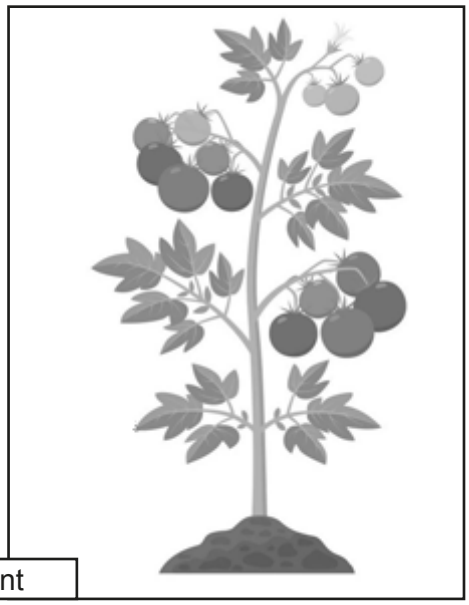
Teaching Instructions

Activity 1
- Differences between How Plants and Animals feed.
- Ask learners to mention different foods that they eat and their sources.
- Help them to know how plants prepare their own food through photosysnthesis.

Activity 2
- How Plants and Animals grow .
- Show pictures of seeds, seedlings, young plants and adult plants.
- Show pictures of a baby girl, young girl and a woman.
- Help learners to identify growth as a life process.
- Let learners discuss any differences in the growth of plants and animals. E.g plants lose their parts and develop new leaves, flowers and branches as they grow, but animals do not lose their body parts as they grow.

baby plant

young plant



adult plant

Activity 3

- How Plants and Animals Move
- Show a video depicting movement in plants
- Assist learners to mimic a flying bird, a swimming fish or a hopping frog.
- Help learners to infer that animals can move the whole body but plants cannot.

Activity 4

- How plants and animals have babies
- Make use of seeds, and vegetative propagative parts to show how plants make new babies
- Use eggs and pictures of pregnant women and animals to show how animals make babies.

Activity 5

- How they respond to external factors
- Guide learners to identify their sense organs such as the eye, nose and ears which are called sense organs.
- Let them compare their sense organs with the structure of plants.
- You can use a potted plant placed under a source of light to show that plants are sensitive to light.

Talk About

Task learners to look at what they have learnt so far.

Let them discuss:

- what they think is the biggest difference between plants and animals?
- what will happen when human beings do not eat for a week?

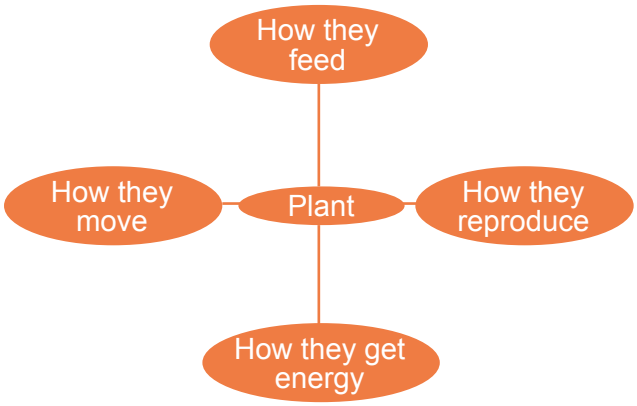
Have learners work in pairs.

What I have learnt

1. Plants and animals are called living things because they can feed, grow, move, take in air and also make their own babies. These processes are called life processes
2. Animals can move their whole body, but plants can move only parts of their bodies.
3. Plants can prepare their own food. Animals get their food from plants and other animals
4. Animals have body parts that help them to see, hear or smell. These are called sense organs. Plants do not have sense organs.
5. Plants make their own babies through their seeds or body parts. Some plants have only one parent, but animals have two parents.

Project for home or school

Complete this concept map on the characteristics of plants



Observe any common animal of your choice in your community. And write about how it does the following processes:
Gets food, get energy, moves, grows, responds to stimuli, makes its own babies.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to pages 16 - 18 of the Learner,s Book and pages 6 - 8 of the Workbook.

Answers to review exercise
Exercise 1
1.
a. Animals
b. Plants
c. Animals
d. Plants
e. Plants

2.
a. seeds
b. moving
c. energy
d. air
e. gills

Exercise 2
1. Learner's provide drawings
2.
a. Nutrition
b. Sensitivity
c. Respiration
d. Movement
e. Reproduction

Answers to Workbook
Trial 1
1. They make babies.
2. They move
3. They grow

Trial 2

	Plants/ Animals	Plants/ Animals
1	Plants	Animals
2	Animals	Plants
3	Plants	Animals
4	Plants	Animals

Trial 3
1. Carnivores
2. Bananas
3. Gills
4. Grow
5. Growth

LESSON 1: Uses of everyday materials

LB: pages 20 - 26; WB: pages 9 - 11

CONTENT STANDARD
B3.1.2.1 Recognise materials as important resources for providing human needs.

INDICATOR
B3.1.2.1.1 Identify the uses of everyday materials and link the uses to their properties.

LESSON EXPECTATIONS
Learners will:
- Identify the uses of common materials such as metals, wood, plastics, straw, fabric and clay.
- Mention the common properties of materials.
- Explain how the properties of materials help us to use them for making certain objects.
- Identify the materials that are used to make common objects.
- Explain why different material are used in making an object.

NEW WORDS
Pottery, Fabric, furniture, carpenter, basketry, cutlery, transparent

RESOURCE
common materials such as clay, wood, fabric, metal, clay, paper

CORE COMPETENCIES
Collaboration and communication, Personal Development and Leadership, Cultural Identity and Global citizenship

SUBJECT SPECIFIC
Communicating, Analysing, Evaluating, Observing

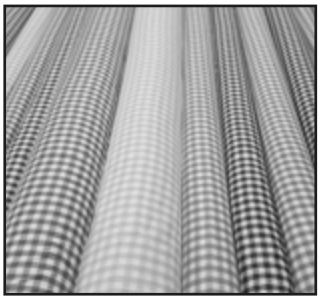
Background Information
The items we use in our homes are made from everyday materials. These materials have properties that help us to use them to make new things. Examples of everyday materials include plastics, glass and metals.

Starter
Let learners match objects with their materials sources.

Teaching Instructions

Activity 1
- Identifying the common uses of materials
- Assist learners to mention examples of objects in the home, school and community
- Guide learners to mention the materials used in making these objects.
- Let learners work in groups to identify the sources of these materials.



Activity 2
- **Objects made from various materials**
- Engage learners in a group activity.
- For each provided material, the group must write as many objects as possible that can be produced from it.

Think and do

Have learners work in pairs to come out with the uses of the material in relation to their properties.

Talk About

Refer learners to page 28 of their learners to discuss the questions there.

What I have learnt

Ask questions for learners to come out with what they have learnt as follows:

6. Materials are useful for making the things we use every day such as clothes, furniture, cutlery, houses and bags.
7. Common materials for making everyday artefacts are clay, metals, wood, straw, plastic and glass.
8. We use materials for making everyday items because of their special properties.
9. Some of the properties of materials is that they can bend easily, are strong, heavy, light, and transparent, float, or do not allow water to pass through them.

Assessment for learning

supervise learners to do the assessment tasks. Refer them to pages 25 - 26 of the Learner's Book and pages 9 - 11 of the Workbook.

Answers to review exercise

Exercise 1

1

A metal
B metal
C. wood
D. plastic
E. metal

2

a. Glass: Windows, cups
b. Metal: car, cutlery
c. Fabric: school uniforms, sports jersey
d. Plastic: cups, bowls
e. Clay: mud house, mud stove

Exercise 2

1. → d
2. → c
3. → e
4. → a
5. → b

Answers to Workbook

Trial 1

1. glass/plastic
2. wood
3. straw
4. clay
5. fabric

Trial 2

Look at Cedrick the crow.

1. water-proof
2. transparent
3. hard
4. bendable
5. hard
6. smooth

Trial 3

a. transparent
b. strong
c. light
d. flexible
e. water-proof

LESSON 2: Using different materials to make objects

LB: pages 27 - 32; WB: pages 12 - 14

CONTENT STANDARD
B3.1.2.1 Recognise materials as important resources for providing human needs

INDICATOR
B3.1.2.1.2 Demonstrate an understanding that an object is made of one or more materials

LESSON EXPECTATION
Learners will:
- Mention different kinds of materials
- Demonstrate the how materials are put together to form an object

NEW WORDS
wardrobe, roof

RESOURCES
pictures of houses, cars, item such as knifes with wooden or plastic handles.

CORE COMPETENCIES
Critical Thinking and Problem Solving, Collaboration and communication, Personal Development and Leadership

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Evaluating

Background Information
Different materials are used together to make the objects used in our homes, schools and communities.

Starter
Teacher asks learners to mention the materials they will use to build their future home and why.

Teaching Instructions

Activity 1
- Identifying the materials in a given object
- Give learners pictures of cars, houses, bicycles and real items
- Learners should observe each picture or item carefullhy to identify the different material used in building it
- Take learners on a field trip around the school.
- Learners identify different objects and the material used in building them
- Task learners to work in groups to identify the uses of each material in a given object. For example, why is the door of the house made of wood, but window made of glass?

Think and do

Have learners work in pairs. They should come out with 2 items that are made up of two/three materials.

Talk about

Ask learners this question:
- Assuming new chairs are to be brought to your school, what material would you like to be used in making those chairs?
- Why would you want that material to be used in making the chair?

Let them work in groups of five.

Project for home or school

Designing objects from different materials
You can do this activity using paper, cardboard and glass, Blu Tack or Clay.
Using any of the materials above, design different objects such as canoes, periscope (using cardboard and glass), tables, chairs, plates, cups, hats, shirts and electronic appliances.
Write the properties of each material that helped you to design or mould it into the various objects.
Classifying materials based on their properties
Gather common materials such as paper, wood, glass, plastic, fabric and pottery/clay.
Group them based on the following properties
Transparent or not transparent
Can float or sink in water
Bendable or not bendable
Light or heavy
Rusts or does not rust
Rough or smooth

What I have learnt

1. Materials are useful for making the things we use every day such as clothes, furniture, cutlery, houses and bags.
2. Common materials for making everyday artefacts are clay, metals, wood, straw, plastic and glass
3. We use materials for making everyday items because of their special properties.
4. Some of the properties of materials are that they can bend easily, are strong, heavy, light, and transparent, float, or do not allow water to pass through them.
5. Many objects are made from two or more different materials
6. The different materials in an object all have uses that help the object to work well.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to pages 29 - 30 of the Learner's Book and pages 12 - 14 of the Workbook.

Answers to review exercise
Exercise 1
1.
a. transparent
b. strong
c. light
d. flexible
e. water proof
2.
a. paper
b. straw
c. glass
d. metal
e. plastic

Exercise 2
1. A. Flexible B. heavy C. strong
D. light E. smooth

2.

X	M	E	T	A	L	A	P
P	T	R	S	L	G	F	A
L	C	L	A	Y	S	C	P
A	E	I	O	L	P	M	E
S	Z	O	S	Z	E	O	R
T	W	O	O	D	I	L	E
I	C	I	A	N	O	E	A
C	N	G	L	A	S	S	M

3. Wood.
- Because it is available in my community
- I can easily nail the pieces of wood together
- Because it is strong
- Because it is not heavy/ it is light
- I can open it easily to take out my money

Answers to Workbook
Trial 1
Materials used:
Wood
Grass
Clay and others

Trial 2
Wood
Nails
Roofing sheet
Wire mesh

Trial 3
Learner's to answer

LESSON 3: Separation of sold-liquid mixtures

LB: pages 33 - 39; WB: pages 15 - 17

CONTENT STANDARD
B3.1.2.2 Understand mixtures, types, formation, uses and ways of separating them into their components.

INDICATOR
B3.1.2.2.1 Describe a solid-liquid mixture and explain how to separate the components

LESSON EXPECTATIONS
Learners will:
- Describe what a solid-liquid mixture is and give examples.
- Form solid-liquid mixtures.
- Describe how to separate some common solid-liquid mixtures.

NEW WORDS
Evaporation, Filtration, dissolve, decant.

RESOURCES
water, sand, gari, oil, sugar, salt and gravels.

CORE COMPETENCIES
Critical thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership, Creativity and Innovation.

SUBJECT SPECIFIC PRACTICES
Observing, Classifying, Predicting, Analysing, Evaluating.

Background Information
When solid salt is put in water, it dissolves to form a mixture. This mixture is called a solid-liquid mixture. As the name suggests it is a mixture formed between a solid substance and a liquid substance. Another common example is a mixture of soil and water.

Starter
Say In our homes, beverage is prepared by dissolving the solid sugar in water. Corn dough, rice or flour is also mixed with water during the preparation of food. Assist learners to identify the states of the substances in each of the mixtures above.

Teaching Instructions

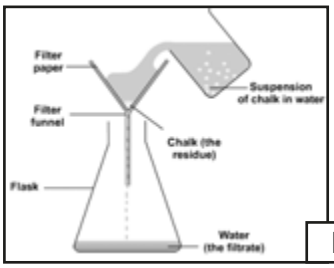
Activity 1
- Forming Solid Liquid Mixtures
- Gather water and different solids such as marbles, chalk, sand, sugar and salt.
- Gather different plastic bottles and put little amounts of each solid substance into different bottles
- Add enough water to each bottle to form different solid-liquid mixtures
- Label each of the bottles e.g. mixture of chalk and water
- Observe your mixture for a while and write all the solids that dissolve in water and those that do not.


salt in water

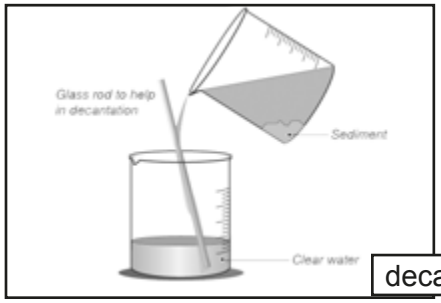

sand in water

Activity 2
- Separating Solid Liquid Mixtures
- Filtration is used to separate a solid-liquid mixture in which the solid does not dissolve in the liquid. An example is a mixture of gari and water.
- We will need a filter paper, funnel, a stirrer and a bowl. We can make our own funnel by cutting the top part of a plastic bottle.
- A piece of cloth or cotton wool can also be used as a filter paper. The bottom part of the bottle can then be used as our collecting bowl.
- Carefully place the filter paper in the funnel. Position the funnel well in the collecting vessel. Pour the mixture of gari and water in the funnel with the filter paper and stir. The

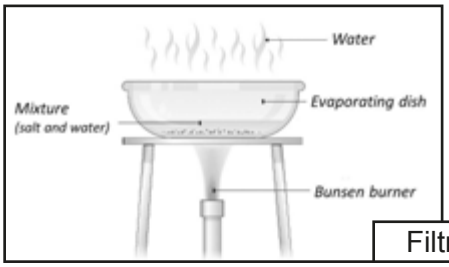
water passes through the filter paper, but the sand is trapped. This is called the residue.



Filtration setup



decantation setup



Filtration setup

Think and do

Put learners in groups of five. Let them discuss the uses of solid-liquid mixtures in everyday life.

Talk about

Let learners work in pairs to discuss this:

- Solid-liquid mixtures are seen in our homes and communities.
- Give some uses of some everyday solid-liquid mixtures?

What I have learnt

Deduce from learners what they have learnt from the lesson. Write some on the board as follows:

1. Solid-liquid mixtures are formed when a solid is mixed with a liquid.
2. Some solids dissolve in liquids when mixed together and other solids do not.
3. Examples of common solid- liquid mixtures are salt and water, sand and water and gari and water.
4. We can separate some everyday solid-liquid mixtures.
5. Evaporation and filtration are common methods used in separating solid-liquid mixtures.

Project for home or school

Pour an amount of salt into a saucepan. Add water and stir till all the salt dissolves.
Put the solution on a source of fire and heat, you can also place it in the hot sun and observe as the water evaporates. It will be observed that the water dries, leaving the salt in the saucepan.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 37 of the Learner,s Book and pages 15 - 17 of the Workbook.

Answers to review exercise
Exercise 1
a. sand and gari
b. rice grains and salt
c. sugar and salt
d. corn dough and gari
e. gari and sugar

2. c, f, g
3. a. false
   b. true
   c. false
   d. true
   e. false

Answers to Workbook
Trial 1
1. grain and water
2. rice and water
3. soup and meat
4. frying fish

Trial 2
1. a. filter paper
   b. flask
2. sand and water
3. filtration

Trial 3

Miscible	Immiscible
Water and fruit juice	water and palm oil
Lemon juice and water	Kerosene and palm oil
Water and milk	

LESSON 4: Change of state of substances

LB: pages 40 - 44; WB: pages 18 - 20

CONTENT STANDARD
B3.1.2.3 Know that substances can exist in different physical state (solid, liquid, gas). Many substances can be changed from one state to another by heating or cooling

INDICATOR
B3.1.2.3.1 Explain how substances change state between solid, liquid and gas

LESSON EXPECTATIONS
Learners will:
- Explain how a substance can change state
- Explain how cooling and heating cause change of state of substances
- Give examples of substances that can change state between solid, liquid and gas
- Demonstrate change of state of some substances

NEW WORDS
Evaporation, condensation, freezing, melting

RESOURCES
iced block, candle

CORE COMPETENCIES
Critical thinking and Problem Solving, Digital Literacy, Personal Development and Leadership

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Evaluating

Background Information
There are three states of matter. These are solid, liquid and gas.

Some substances can change from one state to another. For example, shea butter is solid. When it is put into fire it melts to become a liquid. After sometime the liquid shea butter cools down to become solid again.

In our homes, liquid food is put in the refrigerator or freezer to make it solid. This is called freezing or solidification. The water begins to boil and turns into vapour. Vapour is water in the form of gas. We say it is in the **gaseous** state.

Starter
Provide learners with a list of things such as water, cooking oil, milk, sand, air, wind. Let them work in pairs to classify these as solids, liquids or gases.

Teaching Instructions

Activity 1
- Activities to demonstrate the three states of matter
- Guide learners to observe the change of state of matter involved in each of the processes.

- Light a candle and observe what happens to the wax.
- Put ice blocks into a bottle and observe it as it melts for a while. Place the bottle in the sun for a while for the melted ice to evaporate.

Have learners tell you how substances change state. Let them work in pairs.

Talk About

Remind learners that, they have learnt about how substances change state from solid to liquid and gas. From what they have learnt so far, let them say one thing that is required to be able to change substances from one state to another?

What I have learnt

Deduce from learnerswhat they have learnt and write some on the board as follow:
6. Many substances can change state between solid, liquid and gas states.
7. Substances change state when they are heated or they cool down.We apply heat to melt solid substances into liquids.
8. In our homes the refrigerator is used to cool or freeze liquid substances into the solid state.
9. Water can exist in all the three states namely solid, liquid and gas.

Project for home or school

Look around your home and community and select any two substances:

- that can change from solid to gas.
- that can change from liquid to solid.
- that can change from solid to liquid.
- change from liquid to gas.

Assessment for learning

supervise learners to do the assessment tasks. Refer them to pages 42 - 43 of the Learner's Book and pages 18 - 20 of the Workbook.

Answers to review exercise

Exercise 1

1.

a. heat
b. cool
c. cool
d. cool
e. heat

2.

a. Liquid
b. Solid
c. Liquid
d. Gass

Exercise 2

							S					
							O					
				M			L	I	Q	U	I	D
		F	R	E	E	Z	I	N	G			
				L			D		A			
				T					S			
S	U	B	L	I	M	A	T	I	O	N		
				N								
				G								

Answers to Workbook

Trial 1

1. liquid to gas
2. gas to liquid
3. solid to liquid
4. liquid to solid

Trial 2

					S	o	l	i	d			
					u							
					b							
					l	i	q	u	i	d		
F	r	e	e	z	i	n	G					
					m		A					
					a		S					
					t							
					i							
					o							
C	o	n	d	e	n	s	a	t	i	o	n	

Trial 3

1. Liquid
2. Liquid
3. Solid
4. Liquid
5. Solid
6. Solid
7. Solid
8. Solid
9. Liquid
10. Gas
11. Solid
12. Liquid
13. Solid
14. Gas
15. Liquid
16. Solid

Strand: 2

Cycles

LESSON 1: Cyclic events

LB: pages 46 - 51; WB: pages 22

CONTENT STANDARD
B3.2.1.1. Recognize that some events in our environment occur recurrently

INDICATOR
B3.2.1.1.1 Describe some cyclic events lace day and night, wet and dry seasons and their interval\period

LEARNING EXPECTATIONS
Learners will:
- Describe some cyclic events
- Mention the importance of cyclic events
- Identify activities associated with cyclic events

NEW WORDS
Cyclic, dry season, wet season

RESOURCES
charts/ pictures/video drawing of cyclic events.

CORE COMPETENCIES
Collaboration and Communication, Personal Development and Leadership, Cultural Identity and Global Citizenship, Creativity and Innovation

SUBJECT SPECIFIC
Communicating, Analysing, Evaluating

Background information
Some events in our environment recur. These events are described as cyclic events. They included day and night, dry season and wet season going to school harvesting of crops, birthday celebrations and Independence Day. These cyclic events help in predicting the weather pattern, help in planning activities how crops are cultivated and occurrence of the day and night

Teaching Instructions

Activity 1
- Engage learners to watch a video/picture on cyclic events, e.g. day and night
- Use effective questioning to find out from the learners what cyclic events are.
- Explain terms used in the video eg cyclic events, day and night wet season and dry season.

Activity 2
- Asks the learners to come out with the importance of cyclic events. Take feedback from learners as they give out their answers.

Activity 3
- Engage learners in a collaborative manner to draw any of the cycles eg Day and night, wet and dry season.
- Find out from leaners the activities associated with cyclic events eg cultivations of crops or drying of crops, going to school, the weather becomes very cold, drought frequent bush fires, flooding etc

Talk about

Refer learners to page 48 of the Learner's Book. Let them discuss the talk about questions in pairs. Ensure equal participation of learners to promote communication and critical thinking.

What I have learnt

1. Asks learners to read the text on cyclic events under what I have learn on page 51 of the Learner,s Book
2. Reinforce that cyclic events occur repeatedly.

Project Home or School

Explain to learners how they will do the home learning activity on page 51 of their learners book.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to pages 49 - 50 of the Learner's Book and page 22 of the Workbook.

Answers to Review exercise
Exercise 1
1. → b
2. → a
3. → d
4. → c

Exercise 2
1. Dry season
   Wet season
   Festivals
   Day and Night
2. Accept appropriate pictures of day and night.
3 Cyclic events occur repeatedly.
Cyclic events occur from time to time.

Answers to Workbook
Trial 1
1. Wet season √ Day and night √
   festivals √ Dry season √

2. Is event that happens from time to time.

Trial 2
festivals, Going to school, Birthdays, Day and night

LESSON 2: Importance of sun to the earth

LB: pages 52 - 55; WB: pages 23 - 24

CONTENT STANDARD
B3.2.1.2 Recognise the relationship between earth and the sun

INDICATOR
B3.2.1.2.1 Know the importance of the Sun to the earth

LEARNING EXPECTATIONS
Learners will
- Know the importance of the sun to the earth.
- Know the major uses of the sun to the earth.
- Draw pictures showing benefits of the sun to life on earth.

NEW WORDS
sun, earth, oxygen, immune system, vitamins.

RESOURCES
Models of the sun, earth,
Charts/Pictures showing the sun and the earth

CORE COMPETENCIES
Collaboration and communication, Personal Development and Leadership, Cultural Identity and Global citizenship

SUBJECT SPECIFIC
Communicating, Analysing, Evaluating, Observing

Background information
There is constant relationship between the earth and the sun. The sun provides heat and light on the earth. Without the sun's heat and light, the earth would be lifeless ball.The sun gives energy to the growing plants that provides food and oxygen for human and plant survival on the earth. The sun's ultra violet rays (UV rays) helps in making vitamin D which helps bones, blood cells and the immune system.

Starter
Ask learners this question:
What is the sun?
Do we get sun every day?
Take feedback from learners.

Teaching Instructions

Activities 1
- Use different perspective to find out from learners how the sun benefits the earth
- Engage learners in outdoor activities to illustrate the importance of the sun

Activity 2
- In groups, let learners discuss the major uses of the sun to the earth. Let learners present their ideas in class for discussion.

Activity 3
- Use think-pair-share to engage learners to draw pictures showing the benefits of the sun to life on earth.
- e.g. drying of clothes, drying of plants

Talk about

Let learners discuss the talk about questions on page 54 of the Learner's Book. This is to promote critical thinking in learners. Have them work in pairs.

What I have leant

1. Do class reflection with learners on what they have leant about the lesson. Let them read the text under what I have leant on page 55.
2. Help them to pronounce the new words correctly.

Project for home or school

Ask learners to draw a picture of the sun. Let them write a sentence about the sun.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 54 of the Learner's Book and pages 23 - 24 of the Workbook.

Answers to review exercise
1. Accept correct drawing of benefit of the Sun.
2 a. no life
b. plants cannot make food
c. Animals will not get food. (suggested answers).
d. Sunlight

3. a. True
b. True
c. False
d. True
e. False

Answers to Workbook

Trial 1

1. It gives us heat.
2. it gives us light.

Trial 2

1. The earth will be dark.
2. We can't dry our things.
3. We cannot see

(and many more)

Trial 3

1. I give heat
2. I dry your clothes.
3. I give light (and many more)

LESSON 3: Identifying types of precipitation

LB: pages 56 - 60; WB: pages 25 - 26

CONTENT STANDARD
B3.2.1.3 Show understanding of the roles of condensation, evaporation, transpiration and precipitation in the hydrological (water) cycle.

INDICATOR
B3.2.1.3.1 Identify the types of precipitation (rain, snow, hail, sleet) and describe the differences among them.

LEARNING EXPECTATION
Learners will
- Identify types of precipitation
- Build vocabulary on Precipitation
- Draw a picture showing a rainy day

NEW WORDS
Sleet, Hail, Snow, Precipitation

RESOURCES
Cut-outs showing forms of precipitation
Pictures
Videos

CORE COMPETENCIES
Collaboration and communication, Personal Development and Leadership, Cultural Identity and Global citizenship, Creativity and Innovation

SUBJECT SPECIFIC
Observing, Communicating, Analysing, Evaluating

Background Information
There are different types of precipitation. (rain, snow, hail, and sleet)

They all come from clouds as forms of water from the sky. When water from the clouds falls down under the influence of gravity, it is described as precipitation. Snow is a solid frozen water. Hail is observed during thunderstorms, mostly large pieces of ice.

Provide learners with cut-outs on forms of precipitation (snow, hail, sleet and rain)
Engage learners to observe the cut-outs and come out with their findings.

Help learners to explain the forms of precipitation.

Starter
Use different perspective to find out from learners, the differences between ice and water, ice block and rainfall. Take feedback from learners.
Activities:

Teaching Instructions

Activity 1
Provide learners with cut-outs pictures of other forms of precipitation (e.g. snow, hail, sleet)

Activity 2
- In groups, let learners match pictures showing different forms of precipitation. Encourage learners to do group presentation

Activity 3
- Ask learners what they have leant. Use effective questioning to find out from the learners. Let them watch a video on forms pf precipitation (if available)

Talk about

Engage learners to discuss talk about questions in their text books on page 57. They should work in their groups.

What I have leant

1. Reflect with learners on the lesson by assisting them to read and summarize text under what I have leant on page 60
2. Answers to questions from the text book.

Project for home or school

Refer learners to page 60 of the learner's book. Explain to them how they will do it.

Assessment for learning
Supervise learners to do the assessment tasks. Refer them to pages 58 - 59 of the Learner's Book and pages 25 - 26 of the Workbook.

Answers to review exercise
Exercise 1
1. Accept any appropriate drawing of rainy day.
2. a. snow
   b. sleet
   c. rain
   d. hail
3. Hail stones

Exercise 2
1 → b
2 → a
3 → d
4 → c

Answers to Workbook
Trial 1

1. Hail	d
2. Sleet	c
3. Rain	a
4. Snow	b

Trial 2
1. True
2. True
3. True

Trial 3
1. Rain
2. Snow
3. Hail
4. sleet

LESSON 4: Things that make water impure

LB: pages 61 - 66; WB: pages 27 - 28

CONTENT STANDARD
B3.2.1.4 Recognize water and air as important natural resources

INDICATOR
B3.2.1.4.1 Identify things that make water impure

LEARNING EXPECTATION
Learners will identify thing that makes water impure

NEW WORDS
impure, germs, diarrhea, cholera, pollute, industuial

RESOURCES
pictures of flooding
pictures of flooding, how water is polluted, Pictures, Videos

CORE COMPETENCIES
Collaboration and communication, Personal Development and Leadership, Cultural Identity and Global citizenship

SUBJECT SPECIFIC
Observing, Communicating, Analysing, Evaluating.

Background Information:
Water is important for human and plant survival. It is used almost everyday in homes, schools and at workplaces. When water is impure, it cannot be used for a lot of activities. Leakages, flooding during rainy season which carries waste deposit in water bodies all make water impure.

Starter
Ask learners why we should not drink impure water. Take feedback from learners.

Teaching Instructions

Activity 1
- Engage learners to observe cut-out pictures on how water is polluted. E.g. Flooding, mining, littering and many others.

Activity 2
- In groups, let learners present their ideas on the observed pictures on how water is polluted.

Activity 3
- Take learners on a trip or nature walk to observe littered parts of the community to observe things that make water impure.
- Let them present their findings for discussions.

What I have leant

- Find out from learners what will happen if they drink impure water. Use effective questions to find out what they have leant.
- Read the text with learners to summarize the lesson on page 66 of the Learner's Book.

Talk about

Engage learners to discuss about the questions under talk about on page 64. Let them work in pairs.

Project for home or school

Explain to learners how they will do the assessment task under home learning on page 66 of the Learner's Book.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to pages 64 - 65 of the Learner's Book and pages 27 - 28 of the Workbook.

Answers to review exercise
Exercise 1
Suggested answers

1.	Picture A	-	Polluted water
	Picture B	-	not polluted water

Exercise 2

1. tyhoid
   cholera
2. Ama is vomiting (picture A)
   Baba is having diarrhoea (picture B)
3. Accept any appropriate answer
   I can make people vomit
   I can make people weak

Answers to Workbook

Trial 1

1. Typhoid.
2. Cholera.

Trial 2

A. Not good for drinking
B. Good for drinking.

Trial 3

1. I can boil the water.
2. I can filter the water.

LESSON 5: Properties of air

LB: pages 67 - 73; WB: pages 29

CONTENT STANDARD
B3.2.1.4: Recognize water and air as important resources.

INDICATOR
B3.2.1.4.2 Describe the properties of Air.

LEARNING EXPECTATION
Learners will describe properties of air

NEW WORDS
mixture, air, carbon dioxide, vapour, gases, hydrogen.

RESOURCES
pictures of cars and aeroplans, balloons

CORE COMPETENCIES
Collaboration and communication, Personal Development and Leadership, Cultural Identity and Global citizenship.

SUBJECT SPECIFIC
Observing, Communicating, Analysing, Evaluating.

Background Information
Air is a mixture of gases. These gases are important for human and plant life. Oxygen, Carbon Dioxide, water vapour, rare gases, hydrogen are all part of air. Oxygen is used for respiration. Carbon Dioxide are used by plants during photosynthesis.

Starter:
Ask learners to explain what air is? Take feedback from learners.

Teaching Instructions

Activity 1
- Perform simple activities on properties of air such as inserting a glass jar in water, fanning themselves with a piece of paper e.t.c
- Refer to page 69 of the learner's book.

Activity 2
- Engage learners in groups to make air enter their classrooms. E.g. by opening their windows and doors. Let them present their findings for discussions in class.

Activity 3
- Find out from learners in groups: What happens if there is no air.

Talk about

Engage learners in discussion on talk about questions to promote communication and critical thinking. Refer them to page 71 of the Learner's Book. Let them work in pairs.

What I have leant

1. Help learners to read the text under what I have leant on page 73 of the Learner's Book.

Project for home or school

Explain to learners how they should handle the questions under home learning on page 72 of the learners book

Assessment for learning
supervise learners to do the assessment tasks. Refer them to pages 71 - 72 of the Learner's Book and page 29 of the Workbook.

Answers to review exercise
Exercise 1
1. Supporting burning → c
   Has weight → a
   Occupies space → b

Exercise 2
1. b
(suggested answers)
2. Oxygen, carbon dioxide, nitrogen, water vapour

Answers to Workbook

Trial 1
1. Aeroplane
2. Kite
3. Balloon
4. Bird, cotton, etc.

Trial 2
1. he is breathing
2. air

LESSON 1: Germination of maize and bean seeds

LB: pages 74 - 78; WB: pages 30 - 31

CONTENT STANDARD
B3.2.2.1 Demonstrate understanding of life cycle of a plant

INDICATOR
B3.2. 2.1.2 Observe the germination of maize and bean seeds

LEARNING EXPECTATIONS
Learners will:
- Observe germinations of maize and bean seeds.

NEW WORDS
Germinate, viable seed.

RESOURCES
Cotton wool, different seeds, water, transparent container

CORE COMPETENCIES
Collaboration and Communication.
Critical Thinking and Problem Solving.
Personal Development and Leadership
Creativity and Innovation

SUBJECT SPECIFIC PRACTICES
Observing, Classifying Predicting, Analysing Evaluating

Background information
Seeds germinate when all conditions are favourable. These conditions include water, viable seed, wrmth and air(oxygen)

Starter
Ask learners to mention names of different seeds in their localities.

Teaching Instruction

Activity 1
- Put learners into groups and give them transparent containers, cotton wool, water and bean seed or maize seeds. Label the containers. (A and B)

Activity 2
- Guide learners to pack container A with cotton wool and push one of each of the different seeds through the side of the container but not to touch the bottom.

- Let learners talk about the activity by pouring little water to soak the cotton wool.

Activity 3
- Guide learners to pack container B using the same method in Activity 2 but with dry cotton wool.

- Engage learners to observe the set-up and record their findings

NB:
1. The set-up is to be left for one weak
2. Keep the cotton wool always wet.

Talk About

Refer learners to page 76 of the Learner's Book and discuss the two questions there.

What have I learnt?

Lead learners to read the text under what I have learnt to reinforce vocabulary and understanding of the concepts on maize and bean germination

Assessment for learning
supervise learners to do the assessment tasks. Refer them to pages 76 - 77 of the Learner's Book and page 30 - 31 of the Workbook.

Answers to Review Exercise
A. Accept an appropriate answer for 1, 2 and 3
Exercise 1
1. Picture A – bean seed
Picture B – maize seed

2 Bean seed and wet cotton
maize seed and dry cotton

Exercise 2
Germination of maize and bean seeds
2. Picture A: beans seed will germinate
Picture B: maize seed will not germinate

Exercise 3
Accept approprate drawing of maize or bean seeds.
2. its important because it helps plants to reproduce new ones
3.
A. Nation
B. Name
C. Man
D. to
E. get
F. got
G. go
H. germ
4.
a. water allows the seed to absorb nutrients
b. water makes the seed soft

Answers to Workbook
Trial 1
Learner's to answer

Trial 2
1. No
2. Take learners around this: because the conditions necessary for gemination are present. That is water, air and suitable temperature (warmth)
3. True
4 a. will not geminate
4 b. germinate

3

Strand:

Systems

LESSON 1: Functions of the external parts of human body system

LB: pages 80 - 90; WB: pages 34 - 36

CONTENT STANDARD
B3.3.1.1 Recognise that different parts of the human body work interdependently to perform a specific function

INDICATOR
B3.3.1.1.1 Explain that the external parts of the human body work interdependently to perform a function

LEARNING EXPECTATIONS
Learners will:
- Identify the different external body parts of the human body
- Know the functions of the different external body parts
- Predict what happens when one loses a part(s) of the external body

NEW WORDS
Knees, toes, shoulders, chest, abdomen, barking, escape, danger, sense organs

RESOURCES
Play dough, markers, felt pens, paper, cardboard, scissors, doll, cartoon box glue

CORE COMPETENCIES
Critical thinking and Problem Solving, Collaboration and communication, Personal Development and Leadership

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Evaluating

Background information
There are so many external parts that come together to form the human body system. The human body is a system that is made up of many parts with different functions. We must not play carelessly to lose any part of our body. Learners should avoid using sharp objects to remove wax from their ears and also not to play with small objects, which could be pushed inside their ears and nose.

Starter
A song on the body to motivate learners and prepare them for the lesson.

Song
Show me your nose
This is my nose,
Show me your eyes
These are my eyes,
Show me your mouth
This is my mouth,
Show me your buttocks
This is my buttocks

This lesson helps the learner to be aware of him or herself.

Teaching Instructions

Activity 1
Using groupings, learners perform activities on page 82 of the Learner's Book.

Discussions of learner's exercise.

Activity	Body parts used
Reading	eyes
Smelling	nose
Making phone call	Ear
Writing	hand
Kicking a ball	Foot/leg
Eating	mouth
Skipping	Leg and hand
Running	Leg and whole body

Activity 2
Refer to learner's book.
Draw pictures of learners using;
Both left and right hands to write and observe the words.

Activity 3
How the parts of the body work together

- Assist learners to explain how parts of the body work together to perform the following functions.
  - Play football
  - Study at school
  - Sweep the house
  - Play ampe
- Ensure learners mention the roles of various body parts such as the ear, eyes, hands and feet in performing each of the activities above.
- Summarise lesson by stressing the need to protect all parts of the body since they are equally important.

Talk about

Refer to learner's book page 87.
Possible responses to the task on causes of losing one's external body parts are:
Accident: e.g. car, home, social gathering, school, market.

Diet/food: people are allergic to certain food, when they eat it may cause them to become deaf, dumb and blind.

Medication: some medication can cause blindness and can lead to losing of one's body part.

From birth: due to changes in the womb, or medication, disease.

Disease: some disease can lead to amputation of one's leg, feet and can cause dumbness or blindness.

Suggested responses
The eyes will see the dog; the sound of the dog bark will be heard with the ears.

This makes one know that there is danger and runs with the feet (legs).

What I have leant

Ask learners questions about what they have learnt after the lesson. Write some on the board. Refer them to page 90 of their Learner's Book to read what is there.

Sample
Suggested prevention(s) .

- In class when you are not writing; all sharpened pencils must be given to the class teacher.
- Do not throw a ball to hurt anyone in the class or during playing.
- Avoid fighting that involves slapping of others.
- Do not put sharp objects in your ears.

Project for home or school

Accept different responses from learners and discuss the responses using basketball questioning technique.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to pages 88 - 89 of the Learner,s Book and pages 34 - 36 of the Workbook.

Answers to review exercises
Exercise 1
1 A. A blind man cannot see
A girl using an amputated cannot walk properly on her own.
B. An armless girl:
C. A cripple person:

2.
a. Ear b. True c. False d. False

3.
a. Blind b. Ears c. Ears and mouth

Exercise 2
1. eyes, hands, legs
2. eyes, ears, hand, mouth, legs
3. head, legs, shoulder
4. eyes, ears, hands, legs, shoulders
5. nose, neck, mouth, waist, chin,
6. a. tongue
   b. nose
   c. skin
   d. ear

Answers to Workbook
Trial 1

1. g	5. e
2. n	6. b
3. u	7. c
4. i	8. d

Trial 2
1. see
2. hear
3. run

Trial 3
1. whole body
2. legs
3. whole body
4. legs
5. whole body
6. hands and eyes

Trial 4
1. I want to be healthy
2. I don't want to fall sick
3. I want to grow stronger

LESSON 1: Know the sun, earth and moon as part of the solar system

LB: pages 91 - 95; WB: pages 37 - 40

CONTENT STANDARD
B3.3.2.1 Show understanding of the orderliness of the sun, planets and satellites in the solar system as well as the important role of the sun in the existence of the solar system

INDICATOR
B3.3.2.1.1 Know the sun, earth and moon as parts of the solar system

LEARNING EXPECTATIONS
Learners will
- Explain the solar system
- Know some components of the solar system
- Explain some functions of the sun within the solar system
- Know the difference between the moon and earth

NEW WORDS
Axis, Model, Moon, Reflect, Revolution, Orbit, Rotation, Sphere.

RESOURCES
globe, ball, model of the solar system, video or picture showing the solar system.

CORE COMPETENCIES
Critical Thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership

SUBJECT SPECIFIC PRACTICES
Observing, Classifying, Predicting, Analysing, Evaluating

Background Information
The solar system is made up of the sun and the bodies that move around it. Our earth is one of eight planets that move round the sun. the moon is a satellite of the earth, which means it moves around the earth.

Starter
Engage learners in a recital of the poem, I see the moon and the moon sees or a rhyme song on **OR**
Refer to the song in the curriculum on "I see the moon" on page 55 of the Learner's Book.

Use of ICT

Before the lesson, find videos on the solar system. You can get one on youtube here https://www.youtube.com/watch?v=65qLZLzErug. You will show learners this video during the lesson.

You can begin the lesson by making statements like this:

Teaching Instructions

Put learners in sizable groups and perform activities 1 to 3 below.
Give the necessary resources for learners to perform assigned activities effectively.

Activity 1
Identifying the components of the solar system
- Show pictures, video or model of the solar system
- Assist learners to identify the sun, moon and earth in the pictures.
- Guide learners to recall the uses of the sun as learnt in basic one
- Assist learners to know that the earth moves around the sun, and the moon moves around the earth.

Activity 2
Role playing the solar system.
- Guide learners to role play how the 8 planets move around the sun.
- One learner should stand in the middle of a circle to represent the sun.
- Eight circles should be drawn around the smaller circle.

- Eight learners must be selected to represent each of the planets.
- Each learner must stand on one circle.
- Each learner begins to move in his circle to show how the planets move around the sun.

Activity 3
Observing the position of the sun in the morning, afternoon and evening.
- Guide learners to observe the position of the sun at different times of the day.
- Let learners draw a sketch to show their observations.

Class project

Making a model of the earth, moon and sun, using small rocks, clay or paper.
- Guide learners to make models of the solar system.
- They can use a piece of stick to draw the orbits of the earth around the sun.
- The orbit of the moon around the earth must be shown.
- Learners then use small stones to show the path of the earth around the sun.

Refer to page 93 of the learners book.

Talk About

Discuss what it would be like without the moon!
- Using peer review strategy, learners discuss the question above.
- Learners display their answers on the board for class discussion.
- Encourage more responses from learners and observe any special reasons for class discussions.
- You can also ask learners to tell you what they like most about the sun?

What I have leant

Ask questions to elicit from learners what they have learnt. Write some on the board.
Refer learners to page 95 of the Learner's Book, read through the text with them.

1. The sun, earth and moon are parts of the solar system.
2. The sun is the center of the solar system and the planets move round it.
3. The earth is a plant that moves continuously around the sun.
4. The moon is a satellite which moves around the earth.
5. The sun is the main source of light and warmth on the moon, earth and other planets.

Project for home or school

Observing the full moon
Refer Learners to page 9 of the Learner's Book for assignment. Parents should support them.

Assessment for learning
Supervise learners to do the assessment tasks. Refer them to pages 94 - 95 of the Learner's Book and pages 37 - 40 of the Workbook.

Answers to review exercise

Exercise 1
1. a. The sun is on the left
   b. The moon is in the middle
   c. The earth is on the right

2. a. sun b. earth c. moon
   d. sun e. sun

3. a. false b. true c. false
   d. true e. true

Answers to Workbook
Trial 1
1. moon 2. earth 3. sun

Trial 2
1. It gives light.
   It gives heat.
2. it gives light.
3. Plants grow on earth.

Trial 3
1. moon, night
2. cycle
3. night and day.
4. light

Trial 4
1. us to see in the day.
2. us to see at night.
3. plants to grow.

Trial 5
Learner's to answer

LESSON 1: Habitat of organisms

LB: pages 96 - 105; WB: pages 41 - 47

CONTENT STANDARD
B3.3.3.1 Show understanding and appreciation of the interactions and interdependencies of organisms in an ecosystem

INDICATOR
B3.3.3.1.1 Identify organisms in a habitat and describe why they live in a particular place

LEARNING EXPECTATIONS
Learner's will be able to identify habitat of different animals

NEW WORDS
Ecosystem, habitat, adaptation, camouflage

RESOURCES
pictures of plants and animals, videos on plants and animals in their habitat

CORE COMPETENCIES
Digital Literacy, Cultural Identity and Global Citizenship, Critical Thinking and Problem Solving, Personal Development and Leadership

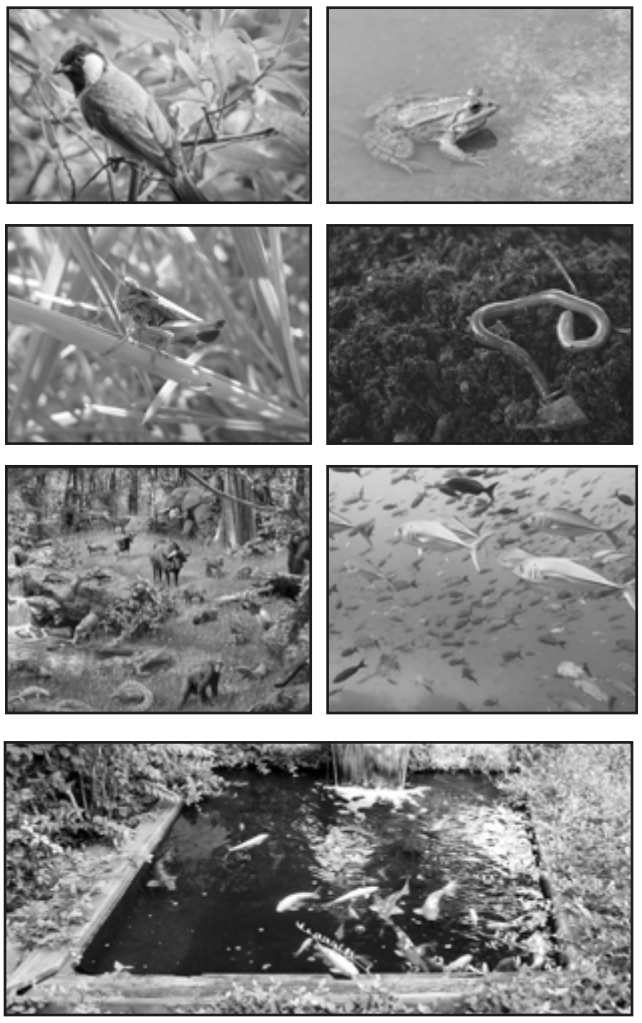
SUBJECT SPECIFIC PRACTICES
Observing, Classifying, Analysing, Evaluating, Generating

Background Information
Every organism has a unique ecosystem within which it lives. This ecosystem is its natural habitat. This is where the basic needs of the organism to survive are met: food, water, shelter from the weather and place to breed its young. All organisms need to adapt to their habitat to be able to survive.

Starter
Take learners on a tour to the school environment to study about some ecosystem.

Find pictures of different animals and their habitat. Examples are shown below.

Show these pictures you have assembled together to the learners.



Refer learners to page 105 and 106 of the Learner's Book. Let them observe the pictures there.

Teaching Instructions

Activity 1

- In groups discuss "Is a frog a fish" give reasons for your answer.

- Using peer review strategy, share your responses with other groups.

Identify any challenging responses.

Activity 2

- Using talking circle as an assessment strategy share ideas with more than a partner in a circle on "why fish cannot live on land".
- Display your responses on the board.
- Read and discuss your peers responses

Draw an aquatic habitat with identification of organisms found in the habitat

Think and do

Put learners into groups of four. Let them discuss the questions in activities 1 and 2 on page 103 of the Learner's Book

They are expected to draw an aquatic habitat with identification of organisms found in the habitat.

Talk About

Refer learners to talk about on page 104 of their Learner's Book.
Let them work in groups of five for the task.

What I Have Learnt

1. Ecosystem is the interaction between living and non-living things and their environment.
2. Natural habitat is formed in ecosystem
3. A habitat is the natural home of organism, where organism survives. They survive because their basic needs are met.
4. Organisms need to adapt to their habitat to be able to survive.
5. Adaptation is a modification or change in organism body or behavior that helps it to survive.
6. Some animals camouflage themselves so they can adapt to their environment.

Project for home or school

Write a poem on adaptation of living organism'
Google: search: Pinterest app. Installed www.
Theclassroombookshelf.com
NB: Parent support is needed.

Design and draw posters showing any two organisms in their natural homes.
Note: Design one for a land habitat and another one for and aquatic habitat.
Parental support is needed.

Assessment for learning

supervise learners to do the assessment tasks. Refer them to page 104 of the Learner,s Book and pages 41 - 46 of the Workbook.

Answers to review exercise

1. a. Ecosystem: is the interaction between living and non living things in their environment.
b. Habitat: the natural home for animals, plantsand other organism
c. adaptation: is a modification or change in the organism's body or behaviour that helps it to survive.

2. is where the basic needs of organism to survive are.

3. a. Bird: wings, eye, beak, legs, feathers
b. Fish: eye, mouth, gill, fins, scales, tail
c. Frog:front leg, hind leg, trunk
d. Grasshopper: wings, eye, feelers, legs, head

Answers to Workbook

Trial 1

1 → e
2 → d
3 → b
4 → a
5 → c

Trial 2

1. 1 → e
   2 → d
   3 → b
   4 → a
   5 → c

2. Learner's to answer

Trial 3

A fish	A bird
1. A fish can swim.	A bird cannot swim.
2. a fish lives in water.	A bird lives on a tree.
Other answers.	

2.
1. They all lay eggs.
2. They all grow.
   Other answers.

3.
No
b. frogs are amphibians and breathe through their lungs whiles fish have gills to extract oxygen from water

Trial 4
It is not its habitat.

Trial 5
Learner's to answer

4

Strand:

Forces and energy

LESSON 1: Light as a form of energy

LB: pages 108 - 111; WB: pages 50 - 53

CONTENT STANDARD
B3.4.1.1 Demonstrate understanding of the concept of energy, its various forms and the ways in which it can be transformed and conserved.

INDICATOR
B3.4.1.1.1 Know that light is a form of energy.

LEARNING EXPECTATIONS
Learners will:
- Know that light is a form of energy.
- Understand where light comes from.
- Explain what happens if there were no light on earth.

NEW WORDS
Light, energy.

RESOURCES
Charts / pictures / drawings of sources of light, flash light, candle.

CORE COMPETENCIES
Personal Development and Leadership, Creativity and Innovation, Critical Thinking and Problem Solving

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Evaluating, Classifying

Background Information
Light is a form of energy that helps vision to be possible. Light is found everywhere around us. Light on earth helps plants to make food on their own. Light on earth maintains the ecosystem and solar system. Rays are paths on which light travels and it does this in a straight line.

Starter
Ask learners where we get light from. Take feedback from learners.

Teaching Instructions

Activity 1
Ask learners to close and open windows and doors of their classroom. Let them talk about their findings in groups / pairs.

Activity 2
Engage learners to create a dark room or identify a dark place eg. Cupboard.
Ask learners to switch on torchlight, lamp, light from the phone to look for an object.
Find out from learners their observations about the activities.

Activity 3
Assist learners to understand that light is a form of energy that helps us to see.
Find out from learners how light helps us to see.

Talk about

Encourage learners to talk about the questions on page 109 of the Learner's Book. Let them work in groups of five.

Take feedback from learners.

Think and do

Ask learners what will happen if there were no light on earth. They should work in pairs and discuss the topic.

Reinforce that light is a form of energy by reading the summarised text with learners.

What I have learn

Elicit from learners what they have learnt from the topic by asking them questions. Refer learners to Learner's Book page 111 to read the "What I have learn" on that page.

Review Exercise
Let learners do the exercise by referring them to the workbook or the learner's book.

Project for home or school

Refer learners to page 111 of their Learner's Book for project and home learning.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 110 of the Learner,s Book and pages 50 - 53 of the Workbook.

Answers to Review Exercise
Exercise 1
1. Accept appropriate drawings
2. a. see, eyes
   b. light, see

3. a. the Sun
   b. flash light
   c. electric bulb

Answers to Workbook
Trial 1

a.	√	b.		c.	√
d.	√	e.	√	e.	√
g.		h.		i.	

Trial 2
Learners to draw

Trial 3
1. False
2. True
3. True
4. True
5. True
6. False
7. False

LESSON 2: Heat as form of energy

LB: pages 112 -115; WB: pages 54 - 56

CONTENT STANDARD
B3.4.1.2 Show an understanding of the concept of heat in terms of its sources, effects, importance and transfer from one medium to another.

INDICATOR
B3.4.1.2.1 Know heat as a form of energy and identify some sources of heat.

LEARNING EXPECTATIONS
Learners will
- Know heat as a form of energy.
- Identify sources of heat.
- Come out with other processes that can generate heat.

NEW WORDS
Heat, Source, Energy.

RESOURCES
Pictures, charts of sources of heat.
LED (bulb) switched on.

CORE COMPETENCIES
Critical thinking and Problem Solving, Personal Development and Leadership

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Communicating.

Background Information
Heat is a form of energy. There are different sources of heat energy. These include, LED or bulb switched on for a long time, lighting of fire, rubbing of palms, charging a laptop or mobile phone, and striking stones together.
Heat is measured in joules (J). The sun provides heat which gives warmth to human.

Starter
Engage learners to rub their palms together for a while. Let them touch their cheeks with their palms. Take feedback from learners.

Teaching Instructions

Activity 1
Show learners pictures of processes that generate heat.

Let learners talk about the pictures.

Activity 2
Ask learners to mention some sources of heat energy in groups or in pairs. Assist learners to make reference to the pictures.

Activity 3
Brainstorm with learners to come out with other processes that generate heat.

Help learners to understand that heat is a form of energy. Ask learners to list sources of heat energy they use at home and school.

Talk about

Elaborate on learners ideas to to talk about the questions to promote critical thinking on page 113.

What I Have Learnt

1. Reflect with learners on the lesson by helping them to read the summarised text and find out what they have learnt on page 115 of the Learner's Book.

Project for home or school

Refer learners to page 115 of the Learner's Book. Get learners to understand how to handle the project.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 114 of the Learner,s Book and pages 54 - 56 of the Workbook.

Answers to Review Exercise
Exercise 1
1. a. Heat energy
   b. The water will not boil or heat up.
2. a. iron
   b. sun
   c. lantern
3. Accept appropriate drawings.

Answers to Workbook
Trial 1
1. a → 2 and 4
2. a → 4 and 3

Trial 2
Learners to draw

Trial 3
1. heat energy
2. heat
3. sources
4. heat
5. sun

LESSON 3: Uses of heat

LB: pages 116 - 120; WB: pages 57 - 59

CONTENT STANDARD
B3.4.1.2 Show an understanding of the concept of heat in terms of its sources, effects, importance and transfer from one medium to another.

INDICATOR
B3.4.1.2.2 Know the everyday uses of heat.

LEARNING EXPECTATIONS
Learners will,
- Know every day uses of heat.
- Understand application of the use of heat energy.
- Explain why farmers need heat energy.

NEW WORDS
Heat, Preservation.

RESOURCES
Pictures of uses and application of heat energy (use pictures from the text book).

CORE COMPETENCIES
Critical Thinking and Problem Solving, Personal Development and Leadership

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Communicating.

Background Information
Uses of heat energy is important in our daily lives. Food preservation, ironing of clothes, heating of water makes use of heat.

The application of the use of heat energy can be observed in sterilising thermometer by a nurse, farmers drying crops, blacksmiths heating metals and many more.

Starter
Ask learners to say or write every day uses of heat at home. Take feedback from learners. Encourage them to do group presentation.

Teaching Instructions

Activity 1
- Show learners pictures on every day uses of heat. Refer them to pictures from the learner's book on page 124.

Let them talk about the pictures.

Activity 2
- Through think-pair-share or in groups, ask learners to mention application of the use of heat energy.

- Engage learners to observe pictures charts/ video of professions that use heat energy. Eg. Farmers, nurses, blacksmiths, tailors and seamstresses.

Let them share their ideas.

Be safe: let learners observe safety whilst dealing with hot substances.

Activity 3
- Assist learners to do group presentation on why farmers need heat.

Talk about

Discuss with learners all the questions under talk about on page 117 of the learners book to improve understanding of concepts. Let them work in groups of five

What I Have Learnt

Lead learners through plenary discussion on the lesson. Ask them questions on what they have learnt. Encourage every learner to talk. Refer them to page 120 of the Learner's Book to read through "what I have learnt".

Project for home or school

Ask learners to make a poster of safety rules when dealings with hot substances. Explain to them how it will be done. Refer learners to page 128 of the Learner's Book.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 119 of the Learner,s Book and pages 57 - 59 of the Workbook.

A**nswers to Review Exercise**
1. a. True
   b. False
   c. True.
2. Heat

Answers to Workbook
Trial 1
Learners to draw

Trial 2
1. For cooking.
2. For boiling water.
3. For keeping us warm.
4. For ironing or pressing clothes.

Trial 3
1. yes
2. yes
3. no
4. yes
5. no

LESSON 1: Sources of electrical energy

LB: pages121 - 124; WB: pages 60 - 62

CONTENT STANDARD
B3.4.2.1 Demonstrate knowledge of generation of electricity, its transmission and transformation into other forms of energy.

INDICATOR
B3.4.2.1.1 Identify different sources of electrical energy.

LEARNING EXPECTATIONS
Learners will:
- Identify different sources of electrical energy.
- Discuss sources of electricity they use at home.
- Create a poster of sources of electricity.

NEW WORDS
Electricity, energy, hydro, solar.

RESOURCES
Pictures / drawings / posters of sources of electricity.

CORE COMPETENCIES
Digital Literacy, Cultural Identity and Global Citizenship, Critical Thinking and Problem Solving

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Predicting

HELPFUL LINKS
https://www.instituteforenergyresearch.org/history-electricity/
https://www.youtube.com/watch?v=8u8W-5TxcAo
https://interestingengineering.com/the-7-basic-sources-of-electricity-you-should-know-about

Background Information
Electricity is a major source of power to homes, schools and industries, Aboadze, Akosombo and hydroelectric plants are sources we get electricity from. Batteries can be used to generate electricity. The use of electricity by the sources mentioned is monitored by Electricity Company of Ghana (ECG) through meters. We need to use electricity wisely to avoid wastage, shortage power fluctuations.

Starter
Engage learners in an activity for them to come out with where they get electricity for their homes and schools. Take responses from learners. Give feedback to learners.

Use of ICT

Before the lesson, download a video from youtube on the history of electricity (the first production of electricity).
Use this links
- https://www.youtube.com/watch?v=6p5WXzrYYiI.
- https://www.youtube.com/watch?v=_rPa_Y1stf8.

Also download or prepare this video on how electricity is generated.
https://www.youtube.com/watch?v=8u8W-5TxcAo.

Show these videos to learners in the cause of this lesoon.

Teaching Instructions

Activity 1
- Show learners pictures of various sources of electricity. You can refer them to page 129 of the Learner's Book.

Let learners talk more about the pictures.

Activity 2
- Encourage learners to listen to a story on how electricity was first produced.
- Encourage learners to repeat some key words or sentences in the story.

Activity 3

- Show learners video/pictures or a poster on how electricity is produced from various sources eg. Solar, hydro and generations. Demonstrate to learners how electricity is produced from batteries to light a torch, lamp, bulb or LED.

Let learners share their observations.

Talk about

Engage learners to discuss sources of electricity they use at home.

Let them work in pairs to find out what will happen if there was no source of electricity.

What I Have Learnt

1. Ask learners to tell you what they have learnt. Assist them to read the summarised text on page 124.

Project for home or school

Refer learners to home learning activity on page 124 of learners' book. Explain to them that they are to write sources of electricity they use at home and school. Encourage them to share their findings in class.

Assessment for learning

supervise learners to do the assessment tasks. Refer them to page 124 of the Learner's Book and pages 60 - 62 of the Workbook.

Answers to Review Exercises

a. True
b. False
c. False
Sources of electricity (Accept appropriate source of electricity).
Energy

Answers to Workbook

Trial 1

1. Aboadze thernal plant
2. Bui hydroelectric power
3. Nuclear source of energy
4. Akosombo dam
5. wind power
6. solar panels

Trial 2

1. at home
2. at school
3. at church
4. at mosque
5. In the market

2b.

a. True
b. false
c. false

Trial 3

Learners to draw

LESSON 1: Effects of force on objects

LB: pages 125 - 129; WB: pages 63 - 66

CONTENT STANDARD
B3.4.3.1 Know that movement is caused by applied forces due to the release of stored energy.

INDICATOR
B3.4.3.1.1 Explain force and demonstrate how it causes movement.

LEARNING EXPECTATIONS
Learners will:
- Explain force.
- Understand how forces cause movements.
- Mention forces they observe in everyday life.

NEW WORDS
Force, movement magnent.

RESOURCES
Realia of magnet, nails/pins, water plastic pens, pieces of papers, stones, bucket or container toy car or table.
Pictures of the activities.

CORE COMPETENCIES
Cultural Identity and Global Citizenship, Critical thinking and Problem Solving, Personal Development and Leadership

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Evaluating

Background Information
Force is a pull or push of an objects. When a force is applied to an object movement is caused. Many different types of forces act upon a lot of structures or objects. We can describe force as pull or push. In everyday life forces such as gravitational (force of gravity) frictional force, compressional force and others are observed.

Starter
Ask learners to pull and push objects in the class. Find out from them why the objects are moving or not moving?
Take feedback.

Teaching Instructions

Activity 1
- Engage learners in rubbing plastic pens in the hair in groups. Let them use the pens to pick pieces of paper. Guide them to discuss their observations.

Activity 2
- In groups ask learners to use magnets to attract nails pins. Find out from learners what they have seen and why?

Activity 3
- Ask learners to push their toy cars if they all have. Or let them drop stones in water in a bucket or containers. Supervise them to get feedback.

Talk about

Guide learners to talk about the questions under talk about on page 128 to promote communication and collaborative learning.

What I Have Learnt

1. Ask learners to write down what they have learnt then refer them to the Learner's Book on page 129. Read the text with them to elaborate their ideas.

Project for home or school

Explain to learners that they will look for forces they observe in everyday life. Encourage them to discuss their findings in class. Refer them to page 129 on the Learner's Book

Assessment for learning
supervise learners to do the assessment tasks. Refer them to pages 128 - 129 of the Learner's Book and pages 63 - 66 of the Workbook.

Answers to Review Exercise
Exercise 1
1. Force is a pull or push on objects.
2. They are attracted by the pen.
3. The table will move.
4. pull, push, attract and movement.

Answers to Workbook

Trial 1
Learners to draw

Trial 2
1. pull 2. push
3. pull 4. push

Trial 3
1. Force is push or pull of an object
2. Nothing will happen to it
3. it will move

Trial 4
a. broom
b. scissors
c. car
d. machine

LESSON 2: Caring for simple machines

LB: pages 130 - 133; WB: pages 67 - 68

CONTENT STANDARD
B3.4.3.2 Recognise some simple machines used for making work easier, analyse their advantages and know their uses eg. Levers, inclined planes and ……

INDICATOR
B3.4.3.2.1 Demonstrate how to maintain and care for simple machines.

LEARNING EXPECTATIONS
Learners will:
- Mention how simple machines and maintained and stored in their homes.
- Demonstrate how to care for simple machines.

NEW WORDS
Simple machines, care.

RESOURCES
Pictures / charts / drawings of simple machines, oil, grease, clean cloth.

CORE COMPETENCIES
Cultural Identity and Global Citizenship, Critical Thinking and Problem Solving, Personal Development and Leadership

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating

Background Information
Simple machines make work easier and faster in our homes, schools and work places. They need to be maintained and stored properly. This will increase their life span. It will also safe cost and damage.

Starter
Engage learners in groups to say, write or draw any simple machine and give its use. Take feedback from learners.

Teaching Instructions

Activity 1
- Display simple machines for learners to observe and identify in groups.

Activity 2
- Show learners pictures / drawings / realia / video of simple machines.
- Engage learners to talk about their uses.

Activity 3
- Assist learners in groups to come out with ways of caring for simple machines. Find out how they do that at homes.
- Let learners undertake basic maintenance practices such as oiling, removing dirt, washing and using them for correct purposes. Learners should share their views about the activities.

Talk about

Discuss with learners the question under talk about on page 131 of the Learner's Book to promote critical thinking and problem solving.

What I Have Learnt

Engage learners to mention how simple machines are maintained in their homes, schools and work places.
Write some of their answers on the board. Then refer them to page 133 of the Learner's Book to read through "What I have learnt" there.

Project for home or school

Encourage learners to present their work for discussion in class.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 132 of the Learner,s Book and pages 67 - 68 of the Workbook.

Answers to Review Exercises
1. Simple machine
2. a and b: Accept appropriate drawing and colouring.

c. Take feedback
d. Simple machines

3. a. accept appropriate answers.
b. To make them last long.
To increase their lifespan
To make them work well
To save cost
To prevent damage

4. Drawing and colouring.
ways of caring for simple machines.
Oiling
Greasing
Removing dirt
Keep it away from water

Answers to Workbook
Trial 1
a, e, f, h, i

Trial 2
Learners to draw

5

Strand:

Humans and the environment

LESSON 1: Keeping the environment clean.

LB: pages 136 - 139 WB: pages 70 - 71

CONTENT STANDARD
B3.5.1.1 Recognise the importance of personal hygiene.

INDICATOR
B3.5.1.1.1 Describe ways of keeping the environment clean.

LEARNING EXPECTATIONS
Learners will:
- Describe varied ways of keeping the environment clean.

NEW WORDS
Clean, environment, scrub, sweep, dust, hoe, wipe, mop, detergent.

RESOURCES
Pictures, videos, cutlass, hoe, detergent, mop, scrubbing brush.

CORE COMPETENCIES
Critical Thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership, Digital Literacy

SUBJECT SPECIFIC PRACTICES
Communicating, Generating, Classifying

Background Information / Scientific background
Our environment must be clean always. To keep the environment clean, we must sweep our compounds, school compounds and the community. We must collect the rubbish and drop them in the dustbin using a dustpan but not our hands. At school, we must dust our tables and chairs and windows, and then mop the floor with detergents to keep the classroom clean. The school compound must be weeded with a cutlass or hoe when it is weedy.

Starter
In a think pair-share activity, ask learners the following questions.
Which places in your school can you scrub?
Which places in your home can you scrub?
Collect responses from learners and write key ideas on the board.

Teaching Instructions

Main Activities
- Have learners observe all the pictures in the learners book and talk about it in a think-pair-share activity.
- Find out their observations and write key ideas on the board.
- Explain to learners why it is important to sweep the school compound every day as well as the classrooms.
- Present samples of common cleaning items to learners and have them identify them and talk about the use of those materials.
- Re-inforce the learning by showing a video or personally demonstrating the use of the cleaning items to learners.
- Now allow learners to also demonstrate ways of keeping the environment clean.

Think and do

Engage learners to brainstorm in groups to come out with different ways of keeping the home and the school clean.

Talk about

What will happen if you do not know about the importance of personal hygiene.
Have learners work in pairs and discuss the topic.

What I Have Learnt / Reflection

1. Have learners talk about what they have learnt. Then they write down what they have learnt individually.

2. Summarise the key concept and let learners copy in their books. To keep the environment clean, we can use the broom, scrubbing brush and all the cleaning items to clean our environment. Refer to page 138 of the Learner's Book

Project for home or school

Have learners design a poster to be used for a science fair to show some items that can be used to keep a clean environment.

ICT

Have learners find out using the internet for new ways of keeping the environment clean.

Let them print out some pictures.
Then have them glue their work on a manila card.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 138 of the Learner,s Book and pages 70 - 71 of the Workbook.

Answers to Review Exercise
Keeping the environment clean
Exercise 1
1. False
2. a broom
   b. water
   c. cutlass
   d. dustbin
   e. hoe
3. a. By sweeping the compound
   b. By collecting all the dust with a dust pan after sweeping.
   c. By weeing bushy areas
   d. by scrubbing dirty floors
   Accept other learners answers

Answers to Workbook
Trail 1
1. Sweep the environment
2. put rubbish into dustbin
3. we must weed bushy areas in the environment

Trial 2
Learners to draw

Trial 3
1. sweeps
2. broom
3. scrubbing

Trial 4
Learners to draw

LESSON 1: Prevention of common skin diseases

LB: pages 140 - 142; WB: pages 72 - 73

CONTENT STANDARD
B3.5.2.1 Know common diseases of humans, causes, symptoms, effects and prevention

INDICATOR
B3.5.2.1.1 Know how common skin diseases can be prevented

LEARNING EXPECTATIONS
Learners are expected to
- Know some common air-borne diseases
- Know how to prevent them from spreading

RESOURCES
Pictures of people suffering from common skin diseases, videos.

NEW WORDS
Skin, rashes, ring worms, prevent, comb heat rashes

CORE COMPETENCIES
Critical Thinking and Problem Solving
Collaboration and Communication.
Personal Development and Leadership
Digital literacy

SUBJECT SPECIFIC PRACTICES
Observation, Communicating, Generating, Classifying, Planning, Analysing, Evaluating

Background Information
Skin diseases can affect us when the weather is warm. Heat rashes, eczema can affect us all.

Starter
- Find out from learners what they see on their skin when the weather is warm.
- Take learners respondes and write key words on the board.

Teaching Instructions

Main Activities
Activity 1
- Ask Learners to act how they bath and talk about how regular bathing can prevent skin disease.
- Let learners watch pictures and videos on common skin disesases and their prevention.

Activity 2
- Let learners discuss and name some common skin diseases of rashes, eczema and ring worms.
- Let learners share their personal experience or stories on getting skin infections.

Actvity 3
- Let learners discuss how the skin diseases can be prevented. Let them present their answers for discussion.
- Re-shape learners' ideas stressing thait it is good to seek medical attention to stop the spread of skin diseases.

Think and do

Ask learners, what will happen if they do not have an idea of how to prevent common skin diseases.

Talk About

Learners discuss how common diseases can be prevented. Let learners present their answers to the class.
Have learners work in pairs.

What I have learnt

Allow learners to talk about what they have learnt by writng it pieces of on papers to read or display in class.

Summarize the key learning concepts to learners and have them write them in their books.

Have learners say or write brief sentences on what they have learnt. Write some on the board as follows. There are a lot of diseases we get in the air. Some of them are measles, chicken pox and rashes

Project for home or school

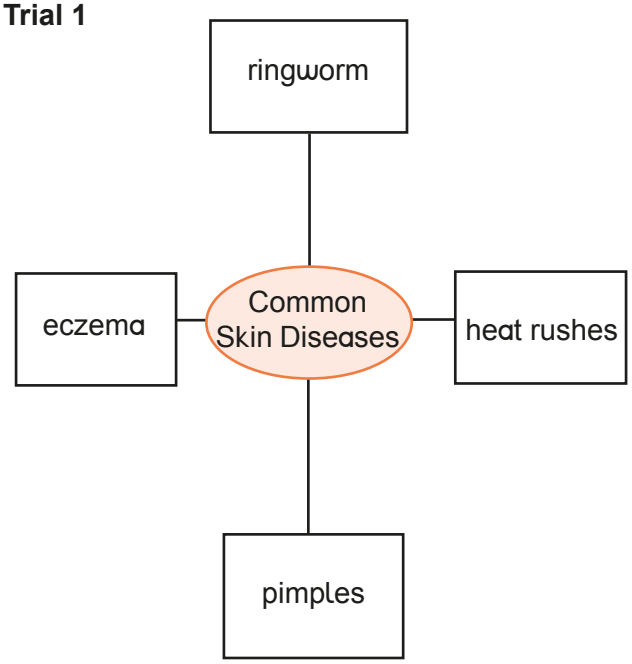
Learners should use the internet to look for pictures on common skin diseases (heat rashes, eczema and ring worm) and make an album of it.

Refer them to page 149 for another home project.

Assessment for learning
Supervise learners to do the assessment tasks. Refer them to page 142 of the Learner' s Book and pages 72 - 73 of the Workbook.

Answers to Review Exercise
Learners are expected to colour:
1, 2, 4 and 5 - green, and 3 - red.

Answers to Workbook
Trial 1



Trial 2
1. bathe regularly
2. avoid sharing personal items like towel
3. keeping our towels clean

Trial 3
1. it can give us eczema
2. it can give us ringworm
3. you will be attacked by diseases

Trial 4
Learners to draw

LESSON 2: Air-borne diseases.

LB: pages 143 - 149; WB: pages 74 - 77

CONTENT STANDARD
B3.5.2.1 Know common diseases of humans, causes, symptoms, effects and prevention.

INDICATOR
B3.5.2.1.1 Explain the term air-borne diseases and give examples.

LEARNING EXPECTATIONS
Learners will:
- Know how common air-borne diseases and know how to prevent air-borne diseases.

RESOURCES
Pictures of people suffering from coughs, measles, chicken pox and rashes. Videos.

NEW WORDS
Air-borne disease, cold, cough, measles, chicken pox, rashes, germs, skin, virus, infection.

CORE COMPETENCIES
Critical Thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership, Digital literacy

SUBJECT SPECIFIC PRACTICES
Observation, Communicating, Generating, Classifying, Planning, Analysing, Evaluating

Background Information
The air we breathe in contains dust particles which we sometimes do not see. Again, when people cough without covering their mouths with a handkerchief, germs enter into the air we breathe and we can also get the germs.

Diseases which are spread through the air or in the air, are called air-borne diseases. Some of these air-borne diseases are colds, coughs, measles, chicken pox and rashes.

Starter
Find out from learners how they bath their bodies at home by letting learners demonstrate in class.
Tell the others to observe and talk about it to find out if their friends bath properly.

Teaching Instructions

Main Activities

Activity 1
Identifying Common Air-borne diseases
- Show video on common air-borne diseases such as common cold, chicken pox and measles.

Activity 2
Visit to a Health Centre
- Take learners on a visit to a nearby clinic or health centre.
- The health officer should give a talk on air-borne diseases and how they can be prevented.
- Or the school SHEP coordinator can give a talk to your class on how to prevent getting infected with air-borne diseases.
- The talk should focus on diseases such as Common Cold, Cough, Chicken Pox and measles.

Activity 2
Sharing Ideas on Air-borne diseases
- Do this activity in groups of four.
- Ask learners to share previous experiences on air-borne diseases.
- Each group must share their answers with the rest of the class.

Activity 3
Demonstration of how to prevent air-borne diseases.
- Guide learners to act out different things that can be done to prevent air-borne diseases such as.
- Washing hands with running water, soap and hand sanitizers.
- Avoiding contact with infected persons.

- Avoiding the practice of sharing personal belongings with people suffering from air-borne diseases.

Talk about

What will happen if you do not know how to prevent common air borne diseases.
Have learners talk about it in pairs.

Also refer learners to page 146 of the Learner's Book to answer the question below.

1. Predict what can happen to you if you sit in a bus near someone who is coughing and has not covered his mouth.
2. What must I do when I see a friend suffering from cough or common cold in the classroom?

Project for home or school

Refer learners to page 149 of the learner's book. Task them to work in groups of four to tackle the first project.

Direct them on what is expected of them on the other projects listed on the page.

What I have learnt

Discuss with learners to tell you what they have learnt during the lesson.

Refer learners to page 149 of the Learner's Book. Let them read out loud.

Assessment for learning
Supervise learners to do the assessment tasks. Refer them to pages 147 - 148 of the Learner's Book and pages 74 - 77 of the Workbook.

Answers to Review Exercise
Exercise 1
a. Chicken pox
b. common cold
c. cough
d. measles

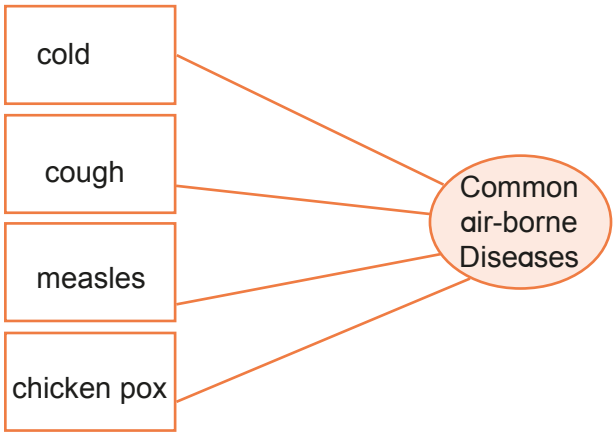
Exercise 2
1. a Chicken pox
   b By coming into contact with an infected person
   By using personal belongings with an infected person.
   c. Stay indoors till he recovers/ Avoid contact with others
   Report to the health centre with his parents
   Avoid using personal belongings with other people

Exercise 3
a. False
b. True
c. True
d. False
e. True

Exercise 4
1. Air-borne
2. coughs without covering his or her mouth.
3. germs
4. reddish

Answers to Workbook
Trial 1
1. a
2. a
3. b

Trial 2



Trial 3
1. you start coughing
2. you get cold
3. you skin becomes reddish

Trial 4
1. sleep in an airy place
2. avoid contact with infected person.
3. avoid sharing towels with infected people

LESSON 1: Ways foods get spoilt

LB: pages 150 - 153; WB: pages 78 - 80

CONTENT STANDARD
B3.5.3.2 Exhibit knowledge of food processing and preservation.

INDICATOR
B3.5.3.2.1 Describe the ways food get spoiled.

LEARNING EXPECTATIONS
Learners will:
- Describe ways through which food can get spoilt.

RESOURCES
Food samples such as bread, tomatoes, kenkey, yam, rice, pictures and videos.

NEW WORDS
Moldy, cooked yam, moldy fish and bread, vegetables, preserve.

CORE COMPETENCIES
Thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership, Digital Literacy, Creativity and Innovation

SUBJECT SPECIFIC PRACTICES
Observing Communicating, Generating, Analysing, Evaluating

Background Information
Food in the kitchen should be kept under the right temperature. Foods that are cooked can be kept in the fridge to prevent it from spoiling. We cannot eat spoilt food.

Starter
Have learners to think-pair-share and discuss if they have ever seen food that has gone bad or gotten spoilt before.

Allow learners to respond and write key ideas on the board.

Teaching Instructions

Main Activities
- Show real food samples such as bread, kenkey and boiled yam that has gone bad to learners to observe. Allow learners to talk about their observations.
- In groups, allow learners to discuss ways by which food get spoilt.
  Write their responses on the board, especially the major ones.
- Have learners talk about what will happen if they eat food that is spoilt.
  Ensure that learners brainstorm to give correct responses.

Think and do

Engage learners to perform an activity in the learners book.
Refer them to page 155.

Talk about

Ask learners what will happen if they do not know the ways through which food gets spoilt?

Refer them to page 152 to discuss the question under talk about.

What I Have Learnt / Reflection

Have learners write on what they have learnt and discuss in groups of four, write summary on the board. Refer learners to page 152 of the Learner's Book and let them read through "What I have learnt" there.

Project for home or school

1. Learners are to draw and colour bread that is moldy. They need to observe a sample of moldy bread and draw.
2. Learners are to make a poster to show why it is important to keep foods in the fridge. They must display their work in class.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 152 of the Learner's Book and pages 78 - 80 of the Workbook.

Answers to Review Exercise
1. Germs
2. Heat
3. Dust
4. Spoilt

Answers to Workbook
Trial 1
Learners to draw.

Trial 2

	Food	How you will know
1.	Fish	it gives bad smell
2.	Bread	you will find mold on it
3.	Tomatoes	it becomes soft and watery

Trial 3
1. Bread which is spoilt
   I will fall sick or
   My stomach will pain me or
   I will vomit

2. Fish which is spoilt
   I will fall sick or
   My stomach will pain me or
   I will vomit

LESSON 1: Human activities that pollute the atmosphere

LB: pages 154 - 156; WB: pages 81 - 82

CONTENT STANDARD
B3.5.4.1: Know that climate change is one of the most important environmental issues facing the world today and is a long-term change in the pattern of a average weather of a specific regime of the earth.

INDICATOR
B3.5.4.1.1 Identify human activities that pollute the atmosphere.

LEARNING EXPECTATIONS
Learners will:
Know the human activities that pollute the atmosphere.

NEW WORDS
Climate, Air, Dust, Burn, Charcoal, Exhaust.

RESOURCES
Pictures and videos of human activities that pollute the atmosphere. Excursions and nature walk in the environment or community.

CORE COMPETENCIES
Critical Thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership, Digital Literacy

SUBJECT SPECIFIC PRACTICES
Observing, Predicting, Analysing, Planning, Evaluating

Background Information / Scientific Background
Activities of many people destroys and pollute the atmosphere. When this continues for a long time it can destroy the climate pattern. These activities are fossile fuel burning, rubbish burning, farm lands burning, burning from factories, and even heat that comes out of the plastics that people throw around.

Starter
Have learners talk about what they see in the environment when they are going home especially things they see that can destroy our environment and cause the climate to change. Have learner's think-pair-share and write their responses, especially the relevant responses on the board.

Teaching Instructions

Main Activities

- Have learners watch pictures or videos of human activities that pollute the atmosphere.
- In groups task learners to write down some of the activities they observed in the pictures and videos and display their observations.
- Teacher explains to learners that the atmosphere refers to the air around us.
- Allow learners to talk about how the atmosphere get polluted in our communities by observing what local industries like kenkey, gari and other industries who use firewood.
- Have learners in groups discuss this issue very well and come out with solutions to stop polluting the atmosphere.
- Task learners to talk about what will happen if burning cases increase in their communities.

Think and do

Refer learners to activity on page 115.

.

Talk about

What will happen if you do not know about the human activities that pollute the atmosphere?

Learners work in pairs.
Refer learners to page 115 of the Learner's Book to discuss the question under talk about.

What I Have Learnt/Reflection

Allow learners to write and share what they have learnt with their friends in class. Then write key concepts on the board for learners to copy in their books.

Project for home or school

Have learners draw and colour an environment which is free from pollution.

Have learners design a poster to talk about good behaviours to protect their communities from climate change.

Assessment for learning
supervise learners to do the assessment tasks. Refer them to page 156 of the Learner,s Book and pages 81 - 82 of the Workbook.

Answers to Review Exercise
These are critical thinking questions, so teacher/ facilitator should read learners' suggestions very well.

Answers to Workbook
Trial 1
1. smoke from cars
2. bush burning
3. smoke from firewood
4. smoke from mosquito coils

Trial 2
1. stop using old cars that produce smoke
2. stop bush burning
3. stop using fire wood for cooking

Trial 3
1. Leaners to answer
2. Learners to answer

ESSENTIAL Science

Primary 3

Teacher's Guide

The **ESSENTIAL Science** series is written to meet the full requirements of the current New Standards-based curriculum by the National Council for Curriculum and Assessment **(NaCCA)** with a critical thinking approach to learning Science.

The series consists of a Learner's Book, Workbook and Teacher's Guide.
ESSENTIAL Science Primary 3 is well crafted to ensure that the core values (core competencies) of the Standards-based curriculum are imbued in learners.

The Teacher's Guide offers:

- Clear directives on activities and lesson plans.
- Additional recommended activities for better transfer of knowledge.
- Helpful links have been provided to help the teacher find and acquire additional knowledge to help the learners.
- Answers to all assessments.

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