NNF BOOKS

ESSENTIAL Science

Primary 4

Teacher's Guide

CAMBRIDGE UNIVERSITY PRESS

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John Wilberforce Essiah

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Structure of the Teacher's Guide

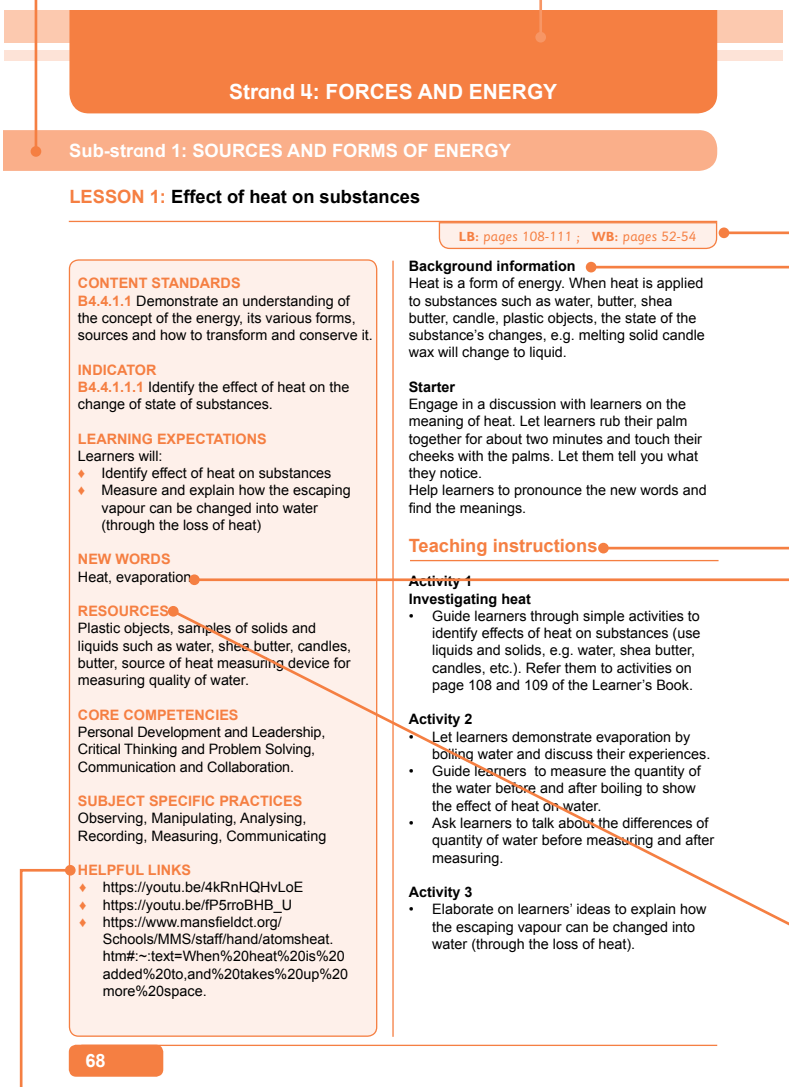
The concise Teacher's Guide is organized under the following headings and features.

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.



Strand 4: FORCES AND ENERGY

Sub-strand 1: SOURCES AND FORMS OF ENERGY

LESSON 1: **Effect of heat on substances**

LB: pages 108-111 ; WB: pages 52-54

CONTENT STANDARDS
B4.4.1.1 Demonstrate an understanding of the concept of the energy, its various forms, sources and how to transform and conserve it.

INDICATOR
B4.4.1.1.1 Identify the effect of heat on the change of state of substances.

LEARNING EXPECTATIONS
Learners will:
- Identify effect of heat on substances
- Measure and explain how the escaping vapour can be changed into water (through the loss of heat)

NEW WORDS
Heat, evaporation

RESOURCES
Plastic objects, samples of solids and liquids such as water, shea butter, candles, butter, source of heat measuring device for measuring quality of water.

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

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Recording, Measuring, Communicating

HELPFUL LINKS
- https://youtu.be/4kRnHQHvLoE
- https://youtu.be/fP5rroBHB_U
- https://www.mansfieldct.org/Schools/MMS/staff/hand/atomsheat.htm#:~:text=When%20heat%20is%20added%20to,and%20takes%20up%20more%20space.

Background information
Heat is a form of energy. When heat is applied to substances such as water, butter, shea butter, candle, plastic objects, the state of the substance's changes, e.g. melting solid candle wax will change to liquid.

Starter
Engage in a discussion with learners on the meaning of heat. Let learners rub their palm together for about two minutes and touch their cheeks with the palms. Let them tell you what they notice.
Help learners to pronounce the new words and find the meanings.

Teaching instructions

Activity 1
Investigating heat
- Guide learners through simple activities to identify effects of heat on substances (use liquids and solids, e.g. water, shea butter, candles, etc.). Refer them to activities on page 108 and 109 of the Learner's Book.

Activity 2
- Let learners demonstrate evaporation by boiling water and discuss their experiences.
- Guide learners to measure the quantity of the water before and after boiling to show the effect of heat on water.
- Ask learners to talk about the differences of quantity of water before measuring and after measuring.

Activity 3
- Elaborate on learners' ideas to explain how the escaping vapour can be changed into water (through the loss of heat).

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Page reference

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

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.

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.

Helpful links

Comprehensive site of helpful links for educational or teaching tips and ideas are provided under some lessons. These are internet links to text, pictures and videos that you will use during the lessons. Download them ahead of the lesson.

Teaching instructions

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

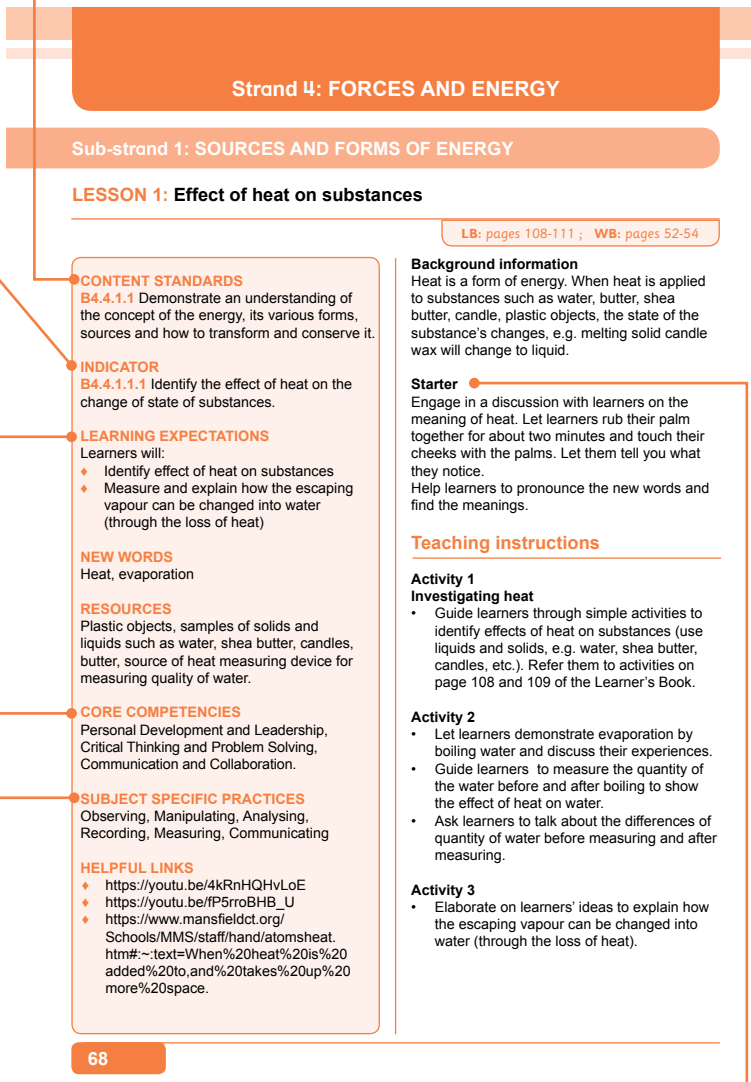
Indicator
This feature indicates the specific things that learners need to know and be able to demonstrate in order to achieve the content standards. Lessons are generated from these indicators.

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

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.

Activity 2

- In groups of four, task learners to narrate any scenario they have seen in a story form about burning and where they saw the smoke enter.
- Allow group presentations and gallery presentations and provide feedback.
- Record all learners' responses on the board and provide further explanation on effects of burning on our climate.

Activity 3

- Refer learners to page 144 and 145 of the Learner's Book to do the activity prescribed.

Talk about

Engage learners on the "Talk about" questions on page 144 of the Learner's Book.

What I have learnt

Ask learners to talk about what they have learnt and summarize in few sentences on papers for display.
Refer learners to page 146 of the Learner's Book.

Project for home or school

Refer learner's to page 146 of the Learner's Book.

They are to look out for and describe some activities in their homes that can result in increasing climate change effect and present it for feedback.

After that, they are also to design a poster for a science fair and write about what some communities are doing to reduce climate. Encourage them to use the internet.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 145 of the Learner's Book and pages 78-80 of the Workbook.

Answers to review exercise

1. Burning electronic waste
   Burning fossil fuels
   Cutting down trees
   Smoke from the exhaust of cars

2. Answers in this task will vary.
   When a lot of carbon dioxide gets into the atmosphere, the "greenhouse effect" occurs and it is felt.

3. Because climate change affects our way of life in the following ways:
   - how food will be available,
   - how the weather patterns will be affected, regarding severe heat and too much flooding,
   - less rainfall, etc.

Answers to Workbook
Trial 1

1. The main cause is burning fossil fuels (dead plants and animals) and burning coal and firewood.

2. a. True
   b. True

3. a. There will be more carbon monoxide released into the atmosphere which will results in climate change.
   There can be severe floods, more warm weather conditions and dry weather patterns which could lead to drought and shortage of food.

Trial 2

1. yes
2. no
3. no
4. no
5. no
6. a.
7. b.

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 in the Workbook.

Project for home or school

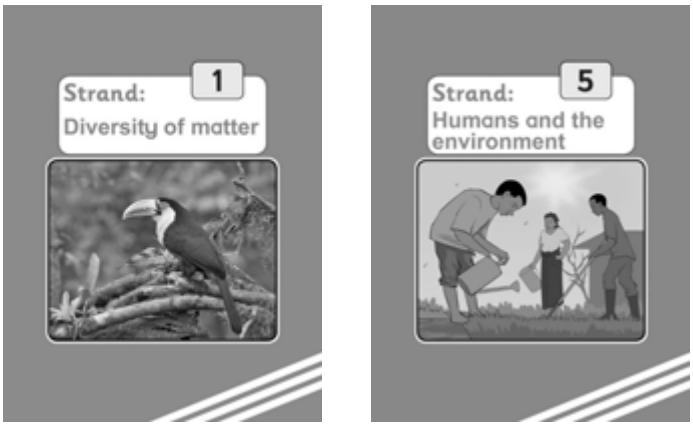
In every lesson, an exploration of the concepts learnt in the classroom is further extended to the home. The series suggests relevant home activities that help learners to augment and consolidate what has been learnt in the classroom and its real life application where neccesary.

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 science 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.

New words

amphibians
reptiles
mammals
cold blooded
classification

ICT boxes

- include research activities
- emphasise the core competencies.

ICT

Go on the internet and read more on the parts of plants.

Talk about

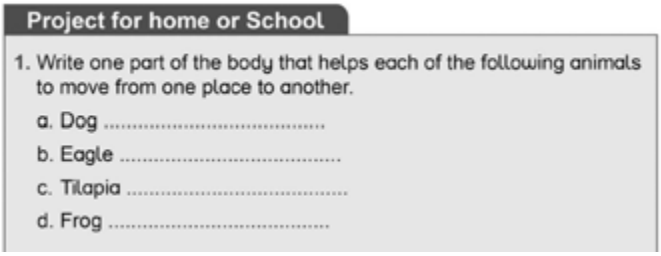
- Learners are expected to discuss questions either in groups or in pairs. It is a critical thinking section that also helps their communication and collaborative skills.

Talk about

Do trees, herbs, shrubs and climbers also grow in the sea and other water bodies?

Project for home or 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.

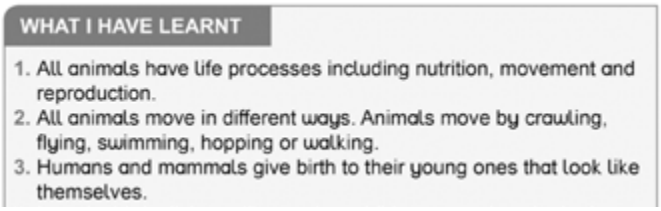


Project for home or School

1. Write one part of the body that helps each of the following animals to move from one place to another.
   a. Dog .....
   b. Eagle .....
   c. Tilapia .....
   d. Frog .....

What I have learnt

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

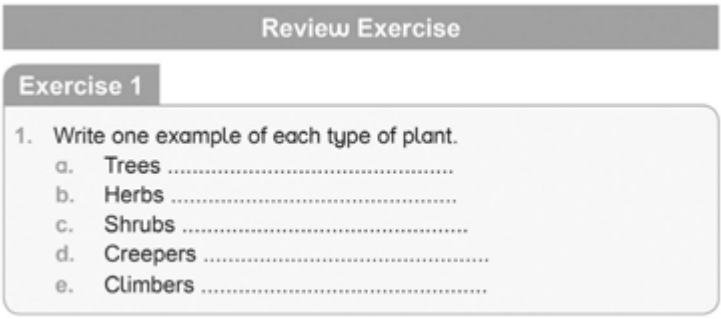


WHAT I HAVE LEARNT

1. All animals have life processes including nutrition, movement and reproduction.
2. All animals move in different ways. Animals move by crawling, flying, swimming, hopping or walking.
3. Humans and mammals give birth to their young ones that look like themselves.

Review Exercise

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



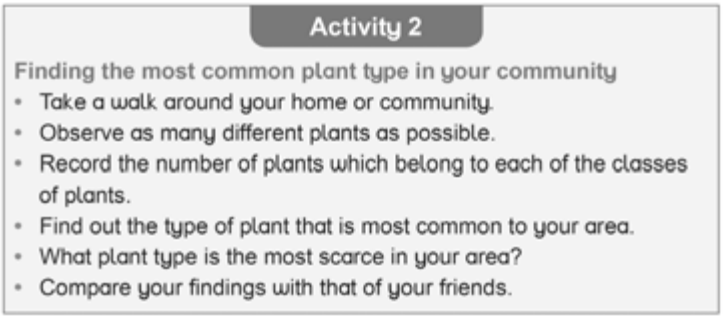
Review Exercise

Exercise 1

1. Write one example of each type of plant.
   a. Trees .....
   b. Herbs .....
   c. Shrubs .....
   d. Creepers .....
   e. Climbers .....

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 2

Finding the most common plant type in your community

- Take a walk around your home or community.
- Observe as many different plants as possible.
- Record the number of plants which belong to each of the classes of plants.
- Find out the type of plant that is most common to your area.
- What plant type is the most scarce in your area?
- Compare your findings with that of your 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.

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 as a 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/facilitators 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 by 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 is 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 devise 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. separating 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 an investigation – gather data (by asking their parents, people in the community).
   - Develops information processing and problem-solving skills, e.g. learning about the steps/processes involved in soap making).
   - Makes use of resources beyond classroom/school, e.g. visiting 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 Learner's 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 to do so. 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 to 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 a 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 contribute 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 learners 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 interactive 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 to ascertain their learners' 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 for 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 learners' progress and achievement. This occurs throughout the learning process. The teacher/facilitators 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 learners' cumulative progress and achievement.

It must be emphasized 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 their senses to observe basic information	Learners use at least one of their senses to observe basic information	Learners notice detailed characteristics and phenomena	Learners **extend/ apply their 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 carry out additional experiments
REASONING	Learners draw basic conclusions	Learners draw detailed conclusions	Learners draw connections between ideas and evaluates the choices	LearnerS ask "what if" and **make hypotheses** about related objects and/or events
COMMUNICATION	Learners struggle to express what they did	Learners present conclusions partially supported by data	Learners effectively use data to express their conclusions, and use materials/ role play/other methods of communication to present them	Learners use data to **clearly articulate their** observations, approach and findings with detail, and they use **creative methods** to present them
UNDERSTANDING	Learners present minimal understanding of the relevant concepts	Learners present weak connectionS 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 to analyse and solve problems. Critical thinking and problem-solving skill enable 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 socioe-conomic 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, rewriting 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 gadgets 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 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 also taught to, 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 **(B4–B6)**. 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 learners' 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/facilitators 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 outcomes. 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.

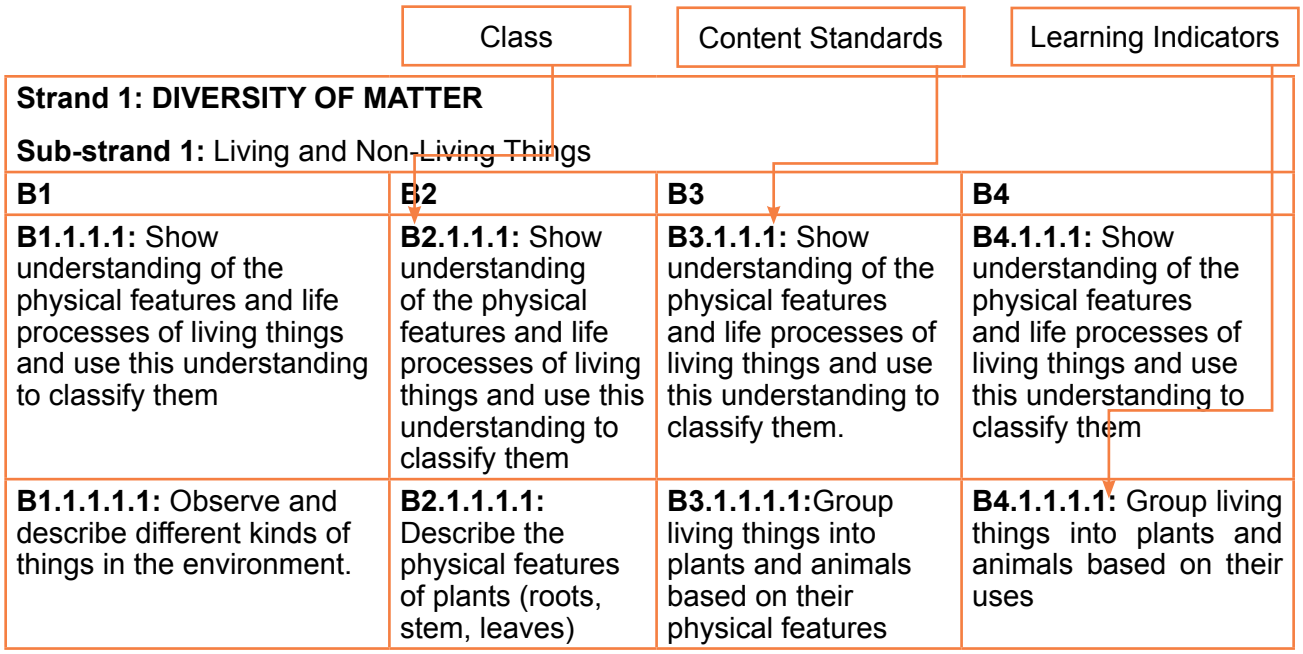
Sub-strands are the topics within each strand under which the content is organized.

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 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 B4 to B6 under five strands with a number of sub-strands as shown in the table below:

STRAND	B4	B5	B6
	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 2. Life Cycles of Organisms	1. Earth Science 2. Life Cycles of Organisms
SYSTEMS	1. The Human Body Systems 2. The Solar System 3. Ecosystems	1. The Human Body Systems 2. The Solar System 3. Ecosystems	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. 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.	Emphasis is on 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. Learners' progression is based on score in exams.	Relies on different modes of assessment and 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	B4
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 4

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	Electricity and electronics
2	Living and non-living things	Earth science	Electricity and electronics
3	Living and non-living things	Earth science	Forces and movement
4	Living and non-living things	Life cycles of organism	Forces and movement
5	Materials	Life cycles of organism	Personal hygiene and sanitation
6	Materials	The human body systems	Personal hygiene and sanitation
7	Materials	The solar system	Personal hygiene and sanitation
8	Materials	The solar system	Personal hygiene and sanitation
9	Earth science	Ecosystem	Diseases
10	Earth science	Sources and forms of energy	Climatechange
11		Sources and forms of energy	Climatechange

Source: NaCCA, Ministry of Education 2019

SAMPLE LESSON – BASIC 4

Date: 14/03/2019	**Period:** Single period	**Subject:** Science
Duration: One hour		**Strand:** Energy and Forces
Class: B4	**Class size:** 50	**Sub-strand:** Electricity and Electronics

Content Standard: **B4.4.2.1** Demonstrate knowledge of generation of electricity, its transmission and transformation into other forms.	**Indicator:** **B4. 4.2.1.2** Describe ways of conserving electricity.	**Lesson:** 1 of 1 (Based on the number of the indicator)

Performance Indicator: Learners can demonstrate ways of conserving electricity in the home.	**Core Competencies/Values:** Personal Development and Leadership; Digital Literacy; Critical Thinking and Problem Solving; Creativity and Innovation; Cultural Identity and Global Citizenship.

Keywords: appliance, gadget

Phase/Duration	Learners' activities	Resources
Phase1: Starter (preparing the brain for learning) 5 minutes	If there is light or an electrical appliance in the classroom or compound, have learners turn it on and explain why it would not be good to leave it on. Teacher asks learners the following question: What makes the fridges and televisions in the home work? Which appliances in the home consume more electricity? How can we reduce electricity consumption in the home?	Pictures of some home appliances Lights or appliances in the room
Phase 2: Main (new learning including assessment) 20 minutes	**Activity** • Ask learners to explain why their parents put off lights, televisions and other electrical appliances when leaving the house. • Discuss with learners what happens when electrical gadgets such as heaters and pressing irons are left on when leaving the house. • Learners work in groups to discuss activities that contribute to wastage of electricity. • Learners present their ideas to class for discussion. **Assessment** 1. What appliances use the most energy in the home? 2. What are some ways you can conserve energy in your home? 3. What are some examples of energy-conscious products?	Pictures of some home appliances Lights or appliances in the room

	Project: Monitoring electricity consumption in the home. • Learners record the amount of electricity they consume in their homes per month for three (3) months and report on their findings. • Which month did they consumed most electricity and why? • Bottle tops straws, sticks, shells and any other material that can be used for counting in the environment.	
Phase 3: Plenary/ Reflections (Learner and teacher) 5 minutes	Teacher facilitates the group discussions by chipping in from time to time since this topic will seem a bit abstract to most learners. Teacher sums up the learning outcomes.	

Source: NaCCA, Ministry of Education 2019

1

Strand:

Diversity of matter

LESSON 1: Classification of living organisms

LB: pages 6-13; WB: pages 6-7

CONTENT STANDARDS
B4.1.1.1 Understand the physical features and life processes of living things and use this understanding to classify them.

INDICATOR
B4.1.1.1.1 Classify animals into insects, birds, mammals and reptiles.

LEARNING EXPECTATIONS
Learners will:
- State different groups into which animals are classified.
- Describe characteristics of each group: insects, birds, reptiles, mammals, amphibians and fish.
- List and name some common examples of each class of the animals within the local community.

NEW WORDS
Amphibians, reptiles, mammals, cold-blooded, classification.

RESOURCES
Pictures or videos of birds, insects, fish, mammals, reptiles and amphibians, cardboard, pencil and colour pencils.

CORE COMPETENCIES
Digital Literacy, Personal development and leadership, Critical Thinking and Problem Solving, Communication and Collaboration Creativity and Innovation.

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Classifying, Generalising

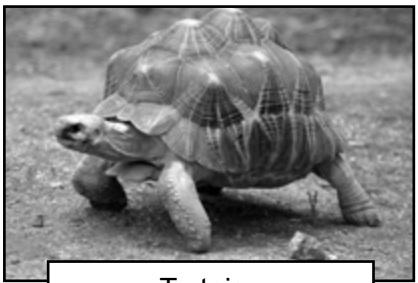
HELPFUL LINKS
- https://www.biologyjunction.com/classification-of-living-things
- https://youtu.be/vqxomJIBGcY

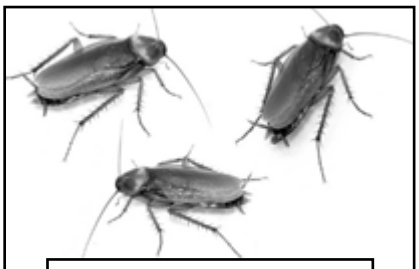
Background information
Learners already know the names of some animals around them. Examples: goats, cats, cockroaches, ants, etc.

Animals are around us. Some animals such as goats, cats, etc. live with us in our homes. Other animals like elephants, lions, etc. live in the bush.

There are similarities and differences between animals. Animals can be put into six different groups. These are insects, birds, reptiles, mammals, amphibians and fish. This method of putting animals in groups is called classification.


Lizard


Tortoise


Cockroaches

Starter
Try and identify the learners' relevant previous knowledge and quiz them to ascertain whether they are ready for the lesson. Ask learners to mention some animals they can see at home, in water and in the bush or forest. Let them classify them into different groups such as birds, insects, fish, mammals, reptiles and amphibians.

Help learners to pronounce and find meanings of the new words.

Teaching Instructions

Activity 1
Classification of animals
Do this activity in groups of six.

- Under the supervision of the teacher, embark on a nature's walk around the school or community.
  Let them observe and write down the names of all the different animals that they see around.
- This should include both small and big animals that you see on plants, trees, in ponds and in the grass.
- Learners work in pairs and place each animal into their right class.
- Each pair shares their answers with the rest of the group.
  Explain why each animal was placed into a given class.

Activity 2
Classes of animals
Materials required: cardboard, pencil and colours.

- Draw one example each of reptile, mammal, amphibian, insect, bird and fish on the cardboard or look for cut-out pictures of one animal which falls into the six classes above.
- Label each animal on the cardboard and write down the class to which it belongs.

Talk about

Discuss with learners the question under Talk about on page 11 of Learner's Book

What I have learnt

Write the following on the chalk board as summary or refer learners to page 13 of Learner's Book to read.

1. Animals are placed under six (6) main groups namely insects, birds, reptiles, mammals, amphibians and fish.
2. Animals are grouped into different classes based on their structure.
3. Most mammals have hairs on their skin. They feed their babies with milk.
4. Birds are animals with feathers as body coverings. They also have beaks and wings.
5. The body of insects is divided into three parts, the head, the thorax and the abdomen.
6. Fish live in water and have fins, scales and gills to help them swim and breathe in water.
7. Reptiles are cold-blooded animals.
8. Amphibians spend part of their lives in water and on the land.

Project for home or school

Refer learners to page 12 of the Learner's Book.

- With the assistance of their parents, let learners watch videos and pictures of different animals on the internet. They should find out the class of animals that has the most members.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 11-12 of the Learner's Book and pages 6-7 of the Workbook.

Answers to Review Exercise

Exercise 1
1. a. Crocodile, whale
   b. Goat, horse, dove, elephant/bear
   c. Frog
   d. Bear/elephant, horse, whale, goat
   e. Dove, crocodile, frog

2. Donkey – Mammal
   Toad – Amphibian
   Dragonfly – Insect
   Sparrow – Bird
   Lizard – Reptile
   Salmon – Fish

3. a. **Mammals**
   - Mammals are animals that give birth to their young ones alive.
   - With the exception of bats, mammals do not have wings to fly.
   - They have hairs on their bodies.
   - They breastfeed their young ones.

b. **Insects**
- Insects have a single pair of antennae on the head.
- They often have wings and can fly.
- The body of insects is divided into three parts, the head, thorax and abdomen.
- They have 3 pairs of legs. Bees, ants, butterflies and cockroaches are examples of insects.

c. **Reptiles**
- Their bodies are covered by scales.
- They are cold-blooded animals which means their body temperature increases or decreases based on the temperature in their environment.
- They lay eggs.

4. Complete these sentences on classes of animals. Fill in the blank spaces with the correct words.

Animals and humans are placed into six different groups/classes. Humans are placed into the class known as mammals. Other animals in the same class as humans are dogs and goats/sheep/mice/cats/lions (any other mammal).

The housefly you see in the home is an example of an/a insect Birds are animals that mostly live in the air because they have wings for flying.

Answers to Workbook

Trial 1
1. Tilapia
2. Rat and eagle
3. Eagle
4. Frog
5. Rat
6. Frog, eagle, tilapia

Trial 2

	ANIMAL	GROUP IT BELONGS
1	Toad	Amphibian
2	Sparrow	Bird
3	Crocodile	Reptile
4	Elephant	Mammal
5	Butterfly	Insect

2. a. **Mammals**
- Mammals are animals that give birth to their young ones alive.
- With the exception of bats, mammals do not have wings to fly.
- They have hairs on their bodies.
- They breastfeed their young ones.

b. **Insects**
- Insects have a single pair of antennae on the head.
- They often have wings and can fly.
- The body of insects is divided into three parts, the head, thorax and abdomen.
- They have three pairs of legs. Bees, ants, butterflies and cockroaches are examples of insects.

c. **Reptiles**
- Their bodies are covered by scales.
- They are cold-blooded animals which means their body temperature increases or decreases based on the temperature in their environment.
- They give birth through eggs.
- They move by crawling.

d. **Birds**
- Their bodies are covered with feathers
- They have wings for flying
- They have beaks
- They give birth by laying eggs

e. **Amphibians**
They live in both water and land.

LESSON 2: Life processes of animals

LB: pages 14-20; WB: pages 8-10

CONTENT STANDARDS
B4.1.1.1 Understand the physical features and life processes of living things and use this understanding to classify them.

INDICATOR
B4.1.1.1.2 Know life processes of animals (movement, nutrition and reproduction).

LEARNING EXPECTATIONS
Learners' will:
- Identify various animals (birds, reptiles, insects, mammals).
- Identify various life processes of animals (movement, nutrition and reproduction).
- State the importance of life processes to the animals.
- Demonstrate various life processes.

NEW WORDS
Movement, reproduction, nutrition

RESOURCES
Teacher should get some videos or pictures of living organisms undergoing movement, reproduction and nutrition.

CORE COMPETENCIES
Digital Literacy, Personal development and leadership, Critical Thinking and Problem Solving, Communication and Collaboration Creativity and Innovation.

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Classifying, Generalising

HELPFUL LINKS
- https://youtu.be/3Pv_NCRzQlk
- https://youtu.be/L_zaTnh8LXo
- https://www.toppr.com/guides/biology/life-processes/

Background information
All living organisms can move from one place to another, they can eat different kinds of foods. Animals can increase in their number by giving birth to their young ones.

A lion eating a carcas

These activities that all living things do are called life processes.

Starter
Try and identify the leaners' relevant previous knowledge and quiz them to ascertain whether they are ready for the lesson.

Ask learners to explain how some animals they know give birth, feed and move. Let learners state the main sources of food for animals.

Drill learners on the correct pronunciation and meanings of the new words.

Teaching instructions

Activity 1
How animals move (Role play)
Note: The teacher should demonstrate with a learner for the class to see and do same.
- Let learners do this activity in pairs.
- One mentions the name of any animal he/she knows and the other partner mentions the parts of the animal that helps it to move. Together let them mimic how the animal moves.
- In turns, let the learner mention the name of a different animal, then the other partner mentions the part of the animal that helps it to move.
  Together, let them mimic the way the animal moves.

Activity 2
The favourite food of animals

- Put learners into groups of six. Let them select a leader.
- Task each learner to observe one animal at home. He/she should identify the foods the animal eats and describe the animal as a carnivore, omnivore or herbivore.
- Let them share their findings with the rest of the group the next day.

Activity 3
How animals reproduce

- Show videos on different animals to the learners.
- Let them write how each animal they saw in the video give birth. Either they give birth alive or lay eggs.

Talk about

Refer learners to talk about questions for discussion on page 17 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary or learners can refer to page 20 of the Learner's Book.

1. All animals undergo life processes including nutrition, movement and reproduction.
2. Different animals move by crawling, flying, swimming, hopping or walking.
3. Humans and mammals give birth to their young ones alive, whilst insects, birds and other classes of animals reproduce by laying eggs.
4. Based on how they feed, animals are classified as omnivores, herbivores and carnivores.

Project for home or school

Refer learners to page 20 of the Learner's Book. Task them to answer the questions there and present their work to class during the next lesson.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages18-19 of the Learner's Book and pages 8-10 of the Workbook.

Answers to Review Exercise
Exercise 1

1. Movement, reproduction, growth, respiration, excretion, nutrition.

2. Dog – gives birth
   Donkey – gives birth
   Pigeon – lays eggs
   Grasshopper – lays eggs
   Salmon – lays eggs
   Crocodile – lays eggs
   Lizard – lays eggs
   Lion – gives birth
   Toad – lays eggs
   Herring – lays eggs

3. a. Dog, cat – Omnivores
   b. Goat, cow – Herbivores
   c. Lion, tiger – Carnivores

4.

ANIMAL	FOOD IT EATS
Dog	Bone
Elephant	Grass
Frog	Insects
Monkey	Banana
Crocodile	Fish

5. a. flies
   b. swim
   c. swing
   d. hop
   e. crawl

Home Learning

1. a. Dog (feet) b. Eagle (wings)
   c. Tilapia (fins/) d. Frog (webbed feet or feet)

Answers to Workbook
Trial 1

1. Reproduction
2. Growth
3. Movement
4. Reproduction
5. Movement

Trial 2

1. a. Flying- swallow, eagle, Vulture, (any 2 birds or insects that fly)
   b. Swimming (salmon, tilapia, lobster, turtle or any fish)
   c. Crawling (snakes, ants, lizards, wall gecko, crocodile or any reptile or crawling insect)
   d. Hopping (frog, toad)

2. a. Plants and animals - omnivores
   b. Plants only - herbivores
   c. Animals only - carnivores

Trial 3

Dog	matches with	bone
Elephant	matches with	leaves
Frog	matches with	insects
Monkey	matches with	banana
Crocodile	matches with	fish

2. a. Dog (feet)
   b. Eagle (wings)
   c. Tilapia (fins/)
   d. Frog (webbed feet or feet)

LESSON 3: Plants and their physical appearance

LB: *pages 21-28;* **WB:** *pages 11-12*

CONTENT STANDARDS
B4.1.1.2 Understand the differences between living things and things which have never been alive.

INDICATOR
B4.1.1.2.2 Describe the physical appearance of different types of plants (trees, shrubs, climbing, creeping).

LEARNING EXPECTATIONS
Learners will:
- Identify the parts that are common to all plants.
- Group plants into shrubs, herbs, climbing plants and trees.
- Identify the differences between different types of plants.

NEW WORDS
Trees, shrubs, climbing, creeping, root, flower, leaves, stem.

RESOURCES
Plants showing roots, flowers, leaves, stem, a book and sellotape.

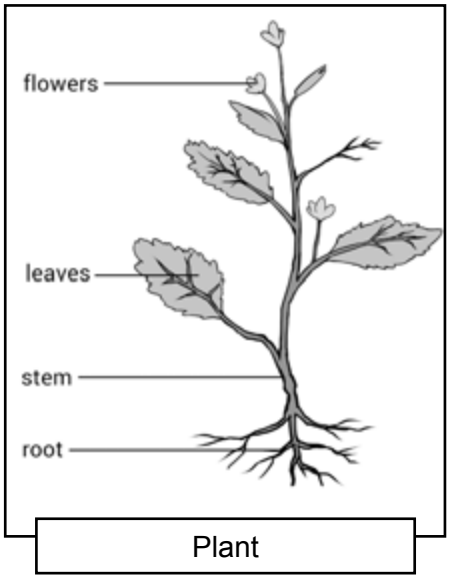
CORE COMPETENCIES
Digital Literacy, Creativity and Innovation, Personal Development and Leadership, Communication and Collaboration, Critical Thinking and Problem Solving.

SUBJECT SPECIFIC PRACTICES
Observing, Communicating
Manipulating, Creating

HELPFUL LINKS
- https://youtu.be/sip0nbImXJ8
- https://examples.yourdictionary.com/examples-of-physical-characteristics.html
- https://en.wikipedia.org/wiki/Human_physical_appearance

Background information
Plants are all around us. They are very useful to us. They serve as source of food to humans and animals. They are also used to make clothes, furniture and build homes.

When we look at the plants around us, we see that some are short and others are tall. Some produce flowers and others do not produce any flower at all. All plants have some parts in common. We learnt about these parts in basic two. These are the roots, the stem and the leaves.



Plant

Starter
Try and identify the leaners' relevant previous knowledge and quiz them to ascertain whether they are ready for the lesson. Ask the learners to mention some plants they know.

Let them put the plants into groups such as trees, shrubs, climbing, creeping. Ask them to mention the main parts of the plant and what they do to the plant.

Drill learners on the correct pronunciation and meanings of new words.

Teaching instructions

Activity 1
Different types of plants
Materials required: a book, sellotape

- In pairs let learners look around their school compound or their immediate environment and observe different plants that are trees, herbs, climbers, shrubs or creeping.
- Let them pluck some leaves of each plant and fix them into their books.
  Task them to label the leaves as tree leaves, shrub leaves, herb leaves, etc .

Activity 2
The most common plant type in your community

- Ask learners to walk around their home or community. Let them observe as many different plants as possible and record the number of plants which belong to each of the classes.
- Let them find out:
  a. the type of plant that is most common in their area.
  b. the type of plant which is the most scarce in the area?
- Let them compare their findings with that of their friends.

Talk about

Engage learners to discuss talk about question on page 25 of the Learner's Book

What I have learnt

You may write the following on the chalk board as summary or refer learners to page 28 of the Learner's Book for learners to read.

1. All plants have some parts in common namely, the roots, stem and leaves.
2. Based on their similarities and differences plants are classified into trees, shrubs, climbing, creeping.
3. Each of these types of plants have some parts in common.

Project for home or school

Refer learners to page 28 of the Learner's Book. Explain the project to them and ask them to present their findings in class.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 25-27 of the Learner's Book and pages 11-12 of the Workbook.

Answers to Review Exercise
Exercise 1

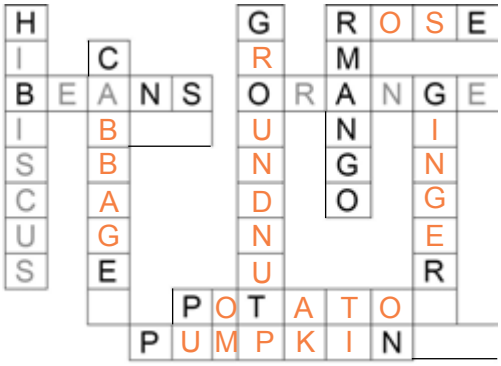
1. a. Trees: mango, orange, timber, etc.
   b. Herbs : spinach, ginger, mint, coriander, and rosemary.
   c. Shrubs: rose, hibiscus, Sun flower, oleander, milk bush
   d. Creepers: potatoes, watermelon and pumpkin
   e. Climbers: groundnut, yam

2. Root, stem, leaves

3 . a. Climber
   b. Tree
   c. Shrub
   d. Creeper

4. Learners answer

5. a.



b. i. Trees : mango, orange
   ii. Herbs: ginger, cabbage
   iii. Shrubs: hibiscus, rose
   iv. Climbers: potato, pumpkin
   v. Creepers: groundnut, beans

Answers to Workbook
Trial 1

1. a. Trees (mango)
   b. Herbs (spinach)
   c. Shrubs (Sun flower)
   d. Creepers (water melon)
   e. Climbers (yam)

2. Root, stem, leave

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

Trial 2

D	S	H	R	U	B	L	C
F	T	E	R	L	M	O	L
H	T	R	E	E	G	I	I
F	Y	B	V	P	D	U	M
N	T	S	N	P	E	G	B
M	H	H	E	R	B	S	E
	M	Q	E	R	S	U	R
C	R	E	E	P	E	R	S

LESSON 4: Animals and their physical features

LB: pages 29-37; WB: pages 13-15

CONTENT STANDARDS
B4.1.1.2 Understand the differences between living things and things which have never been alive.

INDICATOR
B4.1.1.2.3 Describe the physical features of mammals, reptiles, insects and amphibians.

LESSON EXPECTATION
Learners will:
- Classify animals into reptiles, insects, mammals and amphibians.
- Describe the physical features of different classes of animals such as shape, body covering, limbs, size, how they move and where they live.
- Identify the differences between the physical features of different classes of animals.

NEW WORDS
Mammals, reptiles, insects, amphibians

RESOURCES
Teacher should get some pictures or videos showing deer, toad, cobra, dragonfly, peacock, mackerel, grasshopper, butterfly.

CORE COMPETENCIES
Digital Literacy, Communication and Collaboration.

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Comminucating, Classifying

Background information
There are different types of animals in the world. These animals can be grouped based on their structure, and where they live.

We can also group them based on their body covering. We use flesh of animals as food – meat or fish. Animals can be placed into different groups namely mammals, amphibians, reptiles, insects, birds and fish.

Starter
Try and identify the leaners' relevant previous knowledge and quiz them to ascertain whether they are ready for the lesson.

Ask learners to mention their favourite animals and where they live? Let them mention the class that their favourite animal belongs to.
Ask them to mention some features of their favourite animals.

Help learners to pronounce the new words.

Teaching instructions

Activity 1
Insects in the environment
- Task learners to observe the common insects in their school or home and write the names of any two insects that fly and any two insects that crawl or walk.
- Let them write one difference that they saw between the structure of the insect that flies and the insect that crawls.
- Let them also write one thing that is common to the structure of both the flying and crawling insects .

Activity 2
The class that common animals belong to
- Have learners work in pairs.
- Let them go on a natures walk to study five different animals around the school and home.
- Let them write the class or group each animal belongs to.
- Let them talk about the body covering on each of them.
- Ask learners to write the names of any 2 animals that are in the same class as the animal they have identified.
- Refer them to page 33 of the Learner's Book to complete the table.

Activity 3
Making your own zoo

- Ask learners to draw a zoo showing different animals on a cardboard. Their picture must show at least one reptile, mammal, insect, amphibian and bird.
- Task them to colour the picture beautifully and give a name to their zoo.

Activity 4
Common features of Animals

Let learners work in pairs.

- Let them brainstorm to find-out the common characteristics that animals which live in water have in common.
  Let learners, observe different animals that live on the land and write down their common characteristics.
- Ask them to observe the animals that fly or live in the air and identify their common characteristics
  Let them write down their observations and share with the whole class.

Talk about

Help learners to give response to talk about questions on page 34 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as summary or refer to page 37 of the Learner's Book to read.

1. Animals in our environment look differently.
2. Some have feathers, scales, and hair.
3. Other animals also have mouths and others have beaks.
4. Some can fly, swim or walk or run.
5. Some animals live on the land, in air and others live in water.
6. They are classified into six large groups namely mammals, insects, birds, amphibians, reptiles and fish.

Project for home or school

Refer learners to page 37 of the Learner's Book.

Assessment for learning

Supervise learners to do the assessment task. Refer them to pages 35-37 of the Learner's Book and pages 13-15 of the Workbook.

Answers to Review Exercise
Exercise 1

1. Reptiles – lizard, python
Mammals – rabbit, cat
Fish – salmon
Anphibians – frog
Insects – bee
Birds – ostrich, weaver bird

2. Birds – have wings
Insects – don't have back bones
Mammals – are warm blooded
Reptiles – are cold bloded
Fish – have fins

3. Animals are grouped into different - classes. Those that breastfeed their babies are called mammals. Fish are animals with fins and scales that live in water bodies. They also have gills to help them breathe in water. Some class of animals called amphibians can live in both water and on the land. An example of such an animals is the toad.
The class of animals with feathers and wings to fly are called birds.
Some insects also have wings to fly. However animals such as the snake and lizard that are reptiles either walk with two feet or crawl on their bellies.

4. a. frog
   b. pigeon
   c. pigeon
   d. tortoise
   e. tilapia

5. a. A fowl is a bird. All the others are mammals.
   b. An eel is a fish. The rest are reptiles.
   c. A dolphin is a mammal. The others are fish.
   d. A bat is a mammal. The others are birds.
   e. A swallow is a bird. The others are insects.

Answers to Workbook

Trial 1

1. Birds
2. insects
3. mammals
4. Reptiles
5. Fish

Trial 2

Animals are grouped into different classes
Those which breastfeed their babies are called mammals. Fish are animals with fins and scales that live in water bodies.
They also have gills to help them breathe in water.

A class of animals called amphibians can live in both water and on land.
Examples of such animals are the toads.
The class of animals with feathers and wings to fly are called birds.

Some insects also have wings to fly. However animals such as the snake and lizard that belong to the class reptiles either walk with two feet or crawl on their bellies.

Trial 3

1. Gills – fish
2. Feathers – bird
3. Thorax – insect
4. Webbed feet – reptiles
5. Hairs or fur on their bodies – mammals

LESSON 1: Liquid-liquid mixtures

LB: pages 38-45; WB: pages 16-19

CONTENT STANDARDS
B4.1.2.2 Understand mixtures, their types, formation, uses and ways of separating them into their components.

INDICATOR
B4.1.2.2.1 Identify a liquid-liquid mixture and describe how to separate its components.

LEARNER EXPECTATIONS
Learners will:
- Explain liquid-liquid mixture.
- Distinguish between the types of liquid-liquid mixtures.
- Prepare some common examples of liquid-liquid mixtures.
- Describe how to separate some liquid-liquid mixtures.

NEW WORDS
Mixtures, liquid-liquid mixtures, miscible

RESOURCES
Bottles containing water, cooking oil, juice and kerosene.

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

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Manipulating

HELPFUL LINKS
- https://youtu.be/C4UICEMlo9k
- https://en.wikipedia.org/wiki/Material
- https://dictionary.cambridge.org/dictionary/english/material

Background information
All substances exist as solids, liquids or gases.

When you add two or more different substances together a new mixture is formed? When we add water to orange juice, a mixture of water and juice is formed.

When water and milk are mixed. They are uniformly mixed together. This is because water and milk are miscible liquids.

Liquid-liquid mixtures are formed when two different liquids are added together.

Mixture of palm oil and water

Starter
Try and identify the leaners' relevant previous knowledge and quiz them to ascertain whether they are ready for the new lesson.

Ask learners to mention some mixtures they formed in their homes when they added two or more substances together. Ask them what happens when they add tea and milk together. Ask learners what happen when we add water and bowl of oil.

Drill learners on the correct pronunciation of the new words.

Teaching instructions

Activity 1
Preparing liquid-liquid mixtures
Put learners into groups of five learners.

- Task learners to mix any two of the different substances they have gathered and write the name of the mixture formed.
  Let them find out the way it can be separated.
- Task them to mix different substances to form different mixtures and complete the table on page 40.

S/N	Name of Mixture	Substanes used in forming it	How it can be separated
1			
2			
3			
4			
5			

Activity 2
Separation of immiscible liquids using separating funnel

- Guide learners to pour palm oil and water into separating funnel and allow it to settle.
  Let learners tell you their findings.
  (The palm oil which is lighter, moves to the top of the container and water which is heavier moves to the bottom of the container.)
- Task them to open the tap slowly. (The water comes out first and is collected in a container and palm oil remains in the funnel.)

Activity 3
Separating 2 immiscible liquids at home
Materials needed: transparent plastic bottle, water, cooking oil.
Put learners into group of four. Let them follow this process:

- Pour water into a bowl.
  Pour a little amount of cooking oil into the bowl containing the water.
  Let the mixture of water and oil settle for about 5 minutes.
- Using a nail, create a small hole in the lid of the empty bottle.
- Carefully pour the mixture of oil and water into the empty bottle and cover the bottle with it lid and invert it. (turn the bottle so that the bottom faces up).
- Squeeze the bottle softly, the palm oil begins to come out drop by drop.

(Eventually all the palm oil is drained out, leaving the water in the bottle)

Talk about

Help learners to give responses to talk about questions on page 42 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as summary or refer learners to page 45 of the Learner's Book for them to read.

1. When two different liquids are mixed, a liquid-liquid mixture is formed.
2. Examples of liquid-liquid mixtures are water and kerosene, water and ethanol, milk and water, honey and water, cooking oil and water.
3. Liquid-liquid mixtures are classified as miscible or immiscible. Immiscible liquids are separated using a separating funnel.
4. Miscible liquids are separated through distillation.

Project for home or school

Refer to page 44 of the Learner's Book.
Direct learners to form four different liquid-liquid mixtures from the substances provided.

Assessment for learning
Supervise learners to do the assessment task.
Refer them to pages 42-44 of the Learner's Book and pages 16-19 of the Workbook.

Answers to Review Exercise
Exercise 1

1. Water and palm oil
   Water and kerosene
   Water and liquid milk
   Liquid milk and palm oil
   Vinegar and water (any other liquid liquid mixture)

2. a. Miscible liquids: two or more liquids which can be mixed together to give one colour.
   b. Immiscible liquids: two liquids that when added together do not mix to give one common colour.
   c. Liquid-liquid mixture: a mixture formed by adding two liquids together or by mixing two liquids.

3. a) Palm kernel oil and water – with a separating funnel
   b) Petrol and kerosene – distillation
   c) Water and kerosene – with a separating funnel
   d) Palm wine and water – distillation
   e) Crude oil – distillation

4. a. filtration
   b. A. oil, B. tap C. stand
   c. It holds the set-up in place.
   d. Water and kerosene, water and petrol, water and palm kernel oil
   e. No, because water and alcohol are miscible liquids. The set up in the Learner's Book can also be used to separate immiscible liquids.

5. a. Mixtures are formed when two or more substances are put together physically).
   b. An example of a liquid-liquid mixture is water and petrol.
   c. Alcohol and water are immiscible liquids.
   d. Two miscible liquids may be separated through distillation.
   e. The separating funnel is used to separate two immiscible liquids.

Answers to Workbook

Trial 1

1. a. Miscible liquids - liquids that mix to form one colour when added together
   b. Immiscible liquids - liquids that do not mix to form one colour when added together

2. a. Water and fanta mixture, water and liquid milk mixture, petrol and kerosene mixture.
   b. Water and palm oil mixture, water and kerosene, water and petrol

Trial 2

1. Palm kernel oil and water - immiscible
2. Petrol and kerosene - miscible
3. Water and kerosene - immiscible
4. Palm wine and water - miscible
5. Crude oil - immiscible

Trial 3

1. Filtration
2. A. oil, B. water. C. cornical flask, D. stand
3. It holds the set-up in place
4. Kerosene and water
5. No
6. Acohol and water are miscible liquids and can be seperated through distillation but to filtration.

Strand: 2

Cycles

LESSON 1: Cyclic movements in the environment

LB: pages 48-52; WB: pages 22-23

CONTENT STANDARDS
B4:2.1.1 Recognise that some events in our environment occur recurrently.

INDICATOR
B4.2.1.1.1 Demonstrate understanding of cyclic movements in the environment.

LEARNING EXPECTATIONS
Learners will:
- Describe cyclic movements.
- Explain the importance of cyclic movements.

NEW WORDS
Cyclic, reoccur, regular, recurrently

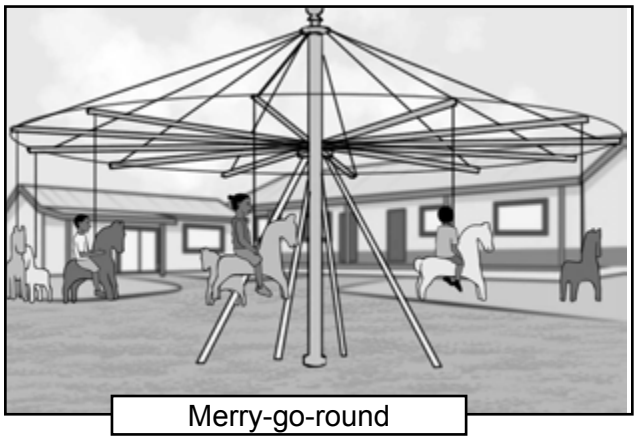
RESOURCES
Pendulum, a video of merry-go-round, analogue clock, globe, ball and string.

CORE COMPETENCIES
Critical Thinking and Problem Solving, Communication and Collaboration.

SUBJECT SPECIFIC PRACTICES
Observing, Generalising, Analysing, Communicating, Reporting

Background information
A cyclic movement is one in which a series of events happens again and again in the same order. Examples of cyclic movement is the movement of the hands of the analogue clock, rotation of the Earth to bring about day and night, movement of merry-go-around.

Cyclic movement helps living things to prepare and perform the various life processes both in plants and animals. It determines the weather patterns.



Merry-go-round

Starter
Try and identify the leaners' relevant previous knowledge and quiz them to ascertain whether they are ready for the lesson. Guide learners to mention some events that repeat itself.

Help learners to pronounce the new words and find meanings.

Teaching instructions

Activity 1
Engage learners in groups of four to observe the following movements:
- The seconds hand on an analogue clock.
- Merry-go-round.
- A swinging pendulum.
- Movement of their limbs during walking.
- Assist learners to come out with one thing that is common to all the movements.

Activity 2
- Guide learners to build a pendulum (a ball hanging on a string) and let them observe the swinging motion. Encourage them to talk about the activity.Refer them to page 50 of the Learner's Book.

Talk About

Engage learners to discuss talk about question on page 50 of the Learner's Book.

What I have learnt

Refer learners to page 52 of the Learner's Book to read "What I have learnt".

Project for home or school

Refer learners to page 52 of the Learner's Book for their project.

1. Let them investigate the life cycle of maize plant and report on their findings in class for discussion.

Explain to learners how to go about the assignment ithe Learner's Book or Workbook. Collect, mark and give feedback.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 51 of the Learner's Book and page 22-23 of the Workbook.

Answers to Review Exercise
Exercise 1
1. Events that occur repeatedly and expectedly
2. They all occur repeatedly.
3. The movement occurs over and over again.
4. a. cyclic movement
   b. It should be pushed to help it move around.
   c. learners' own answers

Answers to Workbook
Trial 1
a. Picture A - Swinging pendulum
   Picture B - Seconds on analogue clock
b. They all occur repeatedly.

Trial 2
1. Movements that occur in a repeated manner.
2. Day and night.
3. Football. This is because it does not occur in a repeated manner.
4 a. Circle movements provide harvesting time.
   b. Circle movements provide day and night.
   c. Circle movements provide planting time of crops.

LESSON 2: Objects in the day and night skies

LB: *pages 53-56;* **WB:** *pages 24-25*

CONTENT STANDARDS
B4.2.1.2 Recognise the relationship between the Earth and the Sun.

INDICATOR
B4.2.1.2.1 Identify objects in the sky during day and night.

LEARNING EXPECTATIONS
Learners will:
- Identify some objects found in the day and night sky.
- Draw some objects found in the day and night sky.
- Identify similarities and differences in the day and night sky.

NEW WORDS
Venn diagram

RESOURCES
Pictures, charts or videos of the night and day skies.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Evaluating, Generalising

HELPFUL LINKS
- https://youtu.be/Wr-CRKsTYGs
- https://www.cpalms.org/Public/PreviewResourceLesson/Preview/29487
- https://youtu.be/l64YwNl1wr0

Background Information
Day and night are cyclic events, meaning they occur repeatedly in an orderly manner. The Sun, clouds and birds are some things found in the day sky.

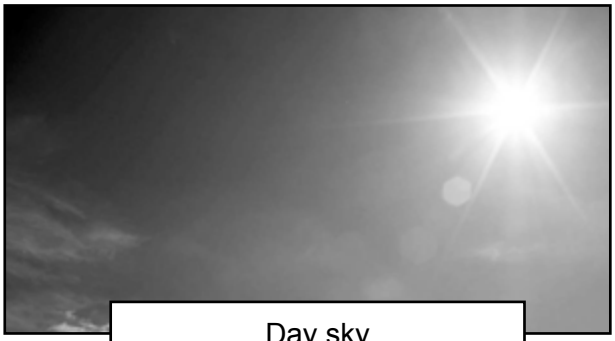
The moon, stars, clouds are also some objects found in the night sky. Each of these objects comes with its importance to living and non-living things.

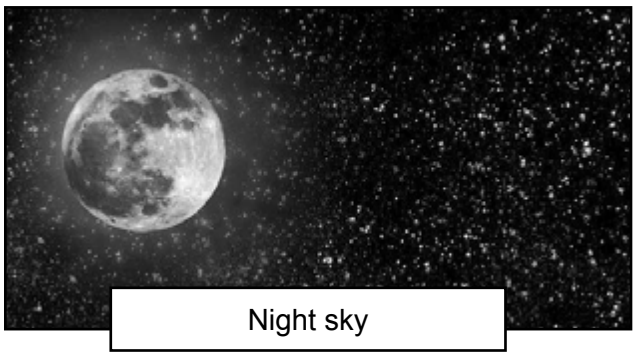
Starter
Try and identify the leaners' relevant previous knowledge and quiz them to ascertain whether they are ready for the lesson.
Let learners write some activities done in the day and night. Example playing and sleeping.

Drill learners on the correct pronunciation of new words and their meanings.

Teaching instructions

Activities 1
Ask learners to go outside the classroom and:
- Observe and name the objects in the daytime sky.
- Task them to Identify objects in the night-time sky at home.
- Let them identify the differences and similarities in the day and night sky.
- Ask them this question: what happens to the sky in a 24-hour cycle?


Day sky


Night sky

Activity 2
Refer learners to page 54 of the Learner's Book. Guide learners to follow the procedure to do the activity.

Activities 3
- After learners have gone through the activities in the Learner's Book, let them draw a Venn diagram (2 circles with one overlapping the other) and put in them the things they see in the night sky, day sky and in both skies. Display their work on the classroom walls for appreciation.

Talk about

Refer learners to the "Talk About" questions for discussion on page 55 of the Learner's Book.

What I have learnt

Help learners to recall "what they have learnt" by asking them questions. Assist learners to summarise the lesson. Refer them to page 56 of the Learner's Book.

Project for home or school

Let learners know what is expected of them so that they do not deviate but work correctly. Give feedback to learners after marking the assignment.

Assessment for learning
Direct learners to pages 55-56 of the Learner's Book and ask them to answer questions there and on pages 24-25 of the Workbook.
Go around and supervise learners to work correctly.

Answers to Review Exercise
Exercise 1
1. East
2. West
3. a. The moon gives light during the night. It is part of the night sky.
   b. The Sun is a star that is nearest the Earth. It provides the Earth with energy in the form of light and heat. It is part of the day's sky.
   c. Clouds can lead to formation of rain. They are part of both the day and the night sky. Clouds can be light and heavy.
4. Clouds
5. They help in formation of rain. They give light and warmth.

Answers to Workbook
Trial 1
1. Learners are to draw
2. Learners are to draw
3. Learners are to draw

Trial 2
1. b. Clouds
2. b. Sun
3. c. Birds

LESSON 3: Evapotranspiration

LB: *pages 57-59;* **WB:** *pages 26-27*

CONTENT STANDARDS
B4.2.1.3 Show an understanding of the roles of condensation, evaporation, transpiration and precipitation in the hydrological (water) cycle.

INDICATOR
B4.2.1.3.1 Demonstrate the processes of evaporation.

LEARNING EXPECTATIONS
Learners will:
- Explain evapotranspiration.
- Explain the importance of evapotranspiration.

NEW WORDS
Evaporation, transparent, respire, condensation, precipitation, hydrological cycle, humidity, temperature

RESOURCES
A potted plant, transparent sheets, plastic wrap bag, rubber band and objects

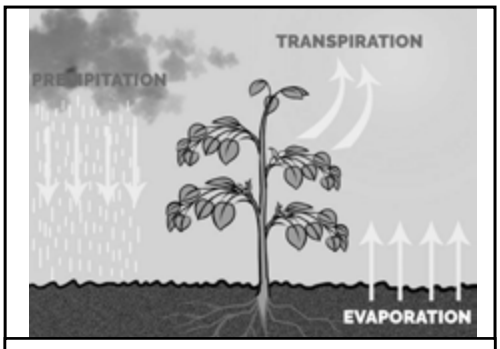
CORE COMPETENCIES
Personal Development and Leadership
Communication and Collaboration

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Communicating

HELPFUL LINKS
- http://www.fao.org/3/x0490e/x0490e04.htm
- https://en.wikipedia.org/wiki/Evapotranspiration

Background information
Evapotranspiration is the process by which water is transferred from land to the atmosphere by evaporating from the soil and other surfaces and by transpiration from plants. These processes help plants to maintain turgidity.

Evapotranspiration is an important part of the hydrological (water) cycle. Evapotranspiration is caused by the movement of wind and air across an area.



Evapotranspiration in plants

Starter
Try and identify the leaners' relevant previous knowledge and quiz them to ascertain wether they are ready for the lesson.

Take them through the new words and their meanings.

Teaching instructions

Activity 1
What evapotranspiration is and how it occurs
- Guide learners to breathe out or blow air onto a transparent surface e.g. a glass or plastic bottle and share their observations.

Activity 2
- Put learners into groups of five.
- Give each group a young potted plant, plastic wrap bag and a rubber band to undertake the following activities:
- Let learners examine the surface of the leaves of the plant and mop off any water droplets on the leaves.
- Tie the plastic wrap around the plant up to the stem and leave it for an hour.
- Observe both plants and plastic wrap surfaces.
- Let learners report on what happens.

Talk About

Engage learners to discuss “Talk about” questions on page 58 of the Learner’s Book.

What I have learnt

Reflect with learners on “What I have learnt” on the lesson. Refer them to page 59 of the Learner’s Book.

Project for home or school

Brief learners on the assignment. Refer them to page 59 of the Learner’s Book.

Assessment for learning
Direct learners to page 59 of the Learner’s Book and ask them to answer questions there and on pages 26-27 of the Workbook.

Go around and supervise learners to work correctly.

Answers to Review Exercise
Exercise 1
1. Learners to draw.
2. Evaporation and transpiration.

Answers to Workbook
Trial 1
1. c. Liquids and plants
2. b. Water vapour
3. b. Transpiration
4. Learners to explain in their own words.

Trial 2
transport, port, pot, ratio, nation, station, tint, rate, transition, transparent, train, tone, stone, paint

LESSON 4: Ways of making water safe for use

LB: *pages 60-64;* **WB:** *pages 28-29*

CONTENT STANDARDS
B4 2.1.5 Recognise water and air as important natural resources.

INDICATOR
B4 2.1.5.1 Demonstrate ways of making water safe for use.

LEARNING EXPECTATIONS
Learners will:
- Identify sources of water.
- Demonstrate ways of making water safe for use.
- Describe the qualities of good drinking water.

NEW WORDS
Filtering, chlorine, alum

RESOURCES
Samples of water from different sources, pictures or drawings of sources of water.

CORE COMPETENCIES
Personal development and leadership, Critical Thinking and Problem Solving, Communication and Collaboration.

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Manipulating, Communicating

Background information
Water is a compound made up of the chemical elements hydrogen and oxygen. Water plays vital roles in the daily activities of plants and animals. We need good water for drinking and other uses.

Ways of making water safe and good for use are filtering, boiling, use of chlorine, etc. Drinking unsafe water can lead to dangerous diseases such diarrhoea, cholera, typhoid and skin infections.

Starter
Find out from learners in groups how they get water for use at home and school, take feedback from learners and further ask what the water looks like in terms of colour, smell and usage.

Help learners to pronounce the new words and find their meanings.

Teaching instructions

Activities 1
- Take a walk with learners to some of sources of water in the community.
- Let them take samples of water from the sources they found. Example rivers, wells, lagoons, boreholes, ponds, standpipe, etc.
- Engage learners to brainstorm on how to make water safe for use when you come back to the classroom.
- In groups of three, demonstrate the different ways of making water safe, for example filtering, boiling, use of chlorine, use of water filters, adding alum, etc.
- Ask learners to discuss the qualities of good drinking water.

Talk about

Help learners to give responses to the “Talk about” questions on page 62 of the Learner’s Book.

What I have learnt

Refer learners to “What I have learnt” on page 64 of the Learner’s Book to read.

Project for home or school

Explain to learners how they will do the home activity on page 64 of the Learner’s Book.

Assessment for learning
Direct learners to page 63 of the Learner's Book and ask them to answer questions there and on pages 28-29 of the Workbook.
Walk around and supervise learners to work correctly.

Answers to Review Exercise
Exercise 1
1. a. well b. rain c. river
2. a. Learners to answer
   b. Sea, well.
   c. Water is a colourless liquid used to quench thirst.
   d. A. Filtration B. Boiling

Answers to Workbook
Trial 1
1. a. True
2. a. Colourless
3. b. Rain

4. Water is a colourless liquid used to quench thirst.

5. Boiling, filtration, addition of alum, iodine tablets, and chlorine to water are some of the ways of making water safe to drink.

Trial 2
Learners to draw.

LESSON 1: Parts of a plant

LB: pages 65-69 ; WB: pages 30-31

CONTENT STANDARDS
B4.2.2.1 Demonstrate understanding of the life cycle of plants

INDICATOR
B4.2.2.1.1 Observe, identify and give the functions of the parts of a plant.

LEARNING EXPECTATIONS
Learners will
- Identify parts of a plant
- Give functions of parts of a plant
- Draw annotated diagrams of the plants and talk about them.

NEW WORDS
Plant, leaves, roots, stem

RESOURCES
Samples of uprooted young plants, drawings/ pictures/ video/ charts of plants.

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

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

HELPFUL LINKS
- http://www.biologyreference.com/La-Ma/Life-Cycles.html#:~:text=A%20life%20cycle%20describes%20the,they%20produce%20their%20own%20offspring.

Background information
Plants undergo life cycle because they are living organisms. Plants have various parts such as roots, stem, leaves and flowers. Each part has a specific function, e.g. roots absorb water from the soil to all parts of the plants, leaves prepare food through photosynthesis by absorbing energy from the Sun. The stem moves materials from the root to the leaves and vice-versa.

Starter
Engage learners in an activity to sing a song or recite a poem on parts of a plant e.g.
I am a plant
I am a plant
Roots, leaves, stem and flowers are part of me.
All the parts have specific functions to do to help me become strong and healthy.
I am a plant
I am a plant.

Drill learners on the correct pronouciation of new words and find their meanings.

Teaching instructions

Activity 1
- Learners, in groups of six, carefully remove a few young plants from the school surroundings for class activity.
- Learners observe, identify and tell the functions of parts of the plants (roots, stem, leaves and flower).

Talk About

Help learners to give response to the “Talk about” questions on page 68 of the Learner’s Book.

What I have learnt

Assist learners to revise what they have learnt. Refer learners to Learner’s Book page 69 to read “What I have learnt”.

Project for home or school

Encourage learners to do their home activity by explaining it to them.

Let them do a group presentation.

Assessment for learning
Direct learners to page 68 of the Learner's Book. Ask them to answer the questions. Also refer them to pages 30-31 of the Workbook for additional questions.
Go around and supervise learners to work correctly.

Answers to Review Exercise

1. a. Roots absorb water from the soil to the the other part of the plants.
   b. Flowers are responsible for reproduction and production of fruits.
   c. Leaves prepare food for plants through the use of Sunlight.
2. a. Leaves
   b. Roots
   c. Flowers
3. Mango, banana ,cassava, yam, cocoyam.
4. A plant is a living thing that has roots, stem, leaves and flowers and grows in the soil

Answers to Workbook
Trial 1
1. b. Root

2. a. Mango plant

3. Leaves –make food for the plant
   Flowers – production of fruits
   Stem – supports plants above the ground
   Roots – absorbs water.

Trial 2
1. Learners to draw
2. a. Production of fruits
   b. Serves as medicine

LESSON 2: Seeds and how they germinate

LB: *pages 70-73;* **WB:** *pages 32-35*

CONTENT STANDARDS
B4.2.2.1 Demonstrate understanding of the life cycle of plants.

INDICATOR
B4.2.2.1.2 Examine some common seeds and how they germinate.

LEARNING EXPECTATIONS
Learners will:
- Identify some common seeds.
- Examine how seeds germinate.

NEW WORDS
Seeds, germinate

RESOURCES
Samples of different seeds, pictures/videos of seeds germinating.

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

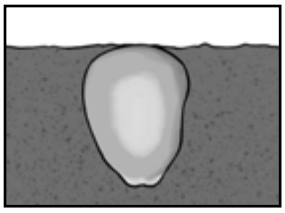
SUBJECT SPECIFIC PRACTICES
Manipulating, Observing, Analysing, Evaluating, Recording

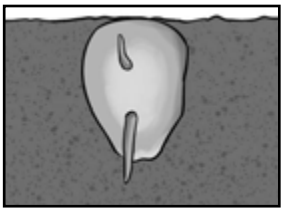
HELPFUL LINKS
- https://study.com/academy/lesson/what-is-seed-germination-definition-process-steps-factors.html#:~:text=Seed%20germination%20starts%20with%20imbibition,harvest%20energy%20from%20the%20Sun.

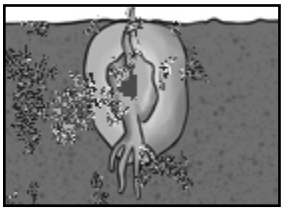
Background information
Germination is the sprouting of seeds to form seedlings or young plants. Seeds can germinate with or without soil. Seeds such as beans or maize absorb water and swell rapturing the seed coat. Next is sprouting of the root, sprouting of the stem and the seed leaves.

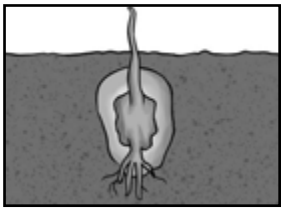
Stater
Ask learners to mention names of some seeds they know.

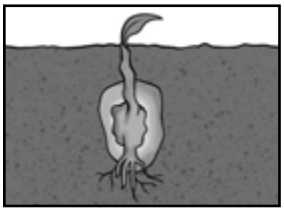
The maize seed germination

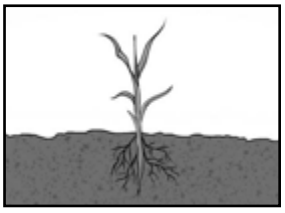

Seed in a soil


Rapturing of seed coat


Sprouting of roots


Sprouting of stem


Sprouting of leaves


Elongation of roots and stem

Teaching instructions

Activity 1
How a maize seed germinates
Refer learners to page 71 of the Learner's Book.
- Let them observe the various stages of germination of maize seeds. You can draw labelled diagrams of each stage on the board.
- Learners first observe the dry seed coat. They then observe it again when it absorbs water to swell and the rapturing of the seed coat, the sprouting of the root, the sprouting of the stem and leaves, and the elongation of the root.

Activity 2

- Engage learners in a discussion about germination of seeds e.g. beans or maize seeds.
- Learners follow the process and write reports on the stages of germination they noticed.

Talk About

Refer learners to “Talk about” questions on page 72 of the Learner’s Book.

What I have learnt

Revise the lesson with learners by helping them to read the text under “What I have learnt” on page 73 of the Learner’s Book.

Project for home or school

Refer learners to page 73 of the Learner’s Book for their home project.

Assessment for learning

Direct learners to pages 72-73 of the Learner’s Book and ask them to answer questions.and on Refer them to page 32-35 of the Workbook. Go around and supervise learners to work correctly.

Answers to Review Exercise

Exercise 1

1. A. Bean seed
   B. Maize seed
   C. Okro seed
   D. Orange seed
2. A seed is a part of a plant capable of growing into another plant given the right conditions in its environment.
3. Water, suitable warmth, viable seed, air(oxygen).

Answers to Workbook

Trial 1

1. a. Mango plant
2. a. Water
3. A seed is a part of the plant which grows to become another plant.
4. a. Not suitable temperature
   b. The seed was not viable.
   c. No water
   d. No air

Any two.

Trail 2

Learners to draw

Trial 3

1. Seed in soil
2. Rapturing of seed coat
3. Sprouting of roots
4. Sprouting of stem
5. Sprouting of leaves
6. Elongation of roots and stem

Trial 4

One seed: mango, pear, palm nut, cashew
Multiple seeds: apple, watermelon, pawpaw, orange, tomato, cocoa, grapes, guava, pepper
No seeds: pineapple, banana

3

Strand:

Systems

LESSON 1: Organs of the digestive system and their functions

LB: pages 76-87; WB: pages 38-41

CONTENT STANDARDS
B4.3.1.1 Recognize that different parts of the human body work interdependently to perform a specific function

INDICATOR
B4.3.1.1 Know the organs of the digestive system and their functions

LEARNING EXEPECTATIONS
Learners will:
- Recognize and identify the parts of the digestive system
- Explain the functions of the parts of the digestive system
- Draw and label correctly the digestive system

NEW WORDS
Tongue, oesophagus (gullet), pancreas, liver, ileum, (small intestine), duodenum, large intestine, caecum, appendix, rectum, anus, stomach.

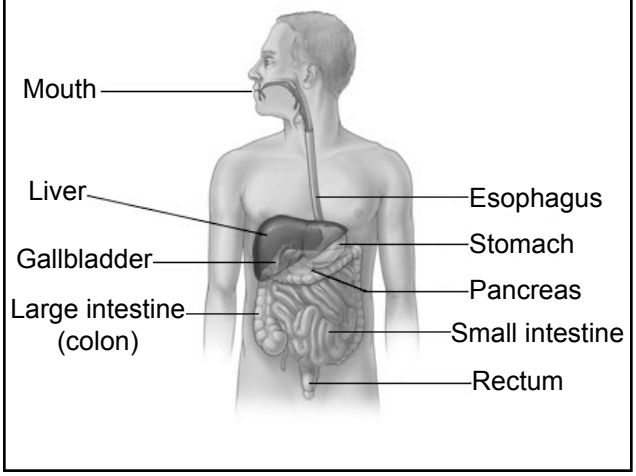
RESOURCES
Picture of digestive system, cardboard, toffee, wrappers, transparent rubber tubes, strings and word cards.

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

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Communicating, Generalising

HELPFUL LINKS
- https://my.clevelandclinic.org/health/articles/7041-the-structure-and-function-of-the-digestive-system#:~:text=The%20main%20organs%20that%20make,together%20in%20your%20digestive%20system.

Background information
Digestion begins in the mouth, before food reaches the stomach. When we see, smell, taste, or even imagine a tasty meal our salivary gland in front of the ear, under the tongue and near the lower jaw begins to make saliva (spit). The teeth tear and chop the food, spit moistens it for easy swallowing. Food is our fuel, and its nutrients give our body cells the energy and substance they need to work. But before food can do that it must be digested into small pieces that the body can absorb and use.



The undigested parts of the food that the body cannot use leave the body as faeces. Stomach ache is pain inside the stomach. (One would feel the pain, so you would know it is there?). Pain is the body's way of signaling that something is going wrong.

Causes of stomach pains are numerous. Some of the things that cause stomach pains include: Infection (bacteria/virus attack) gets into a person's digestive system. The body reacts by trying to rid itself of the infection, often through vomiting or diarrhoea. Bacterial infection causes "food Poisoning". Bacteria are also responsible for: pneumonia, urinary tract infections and sexually transmitted diseases (STDs).

To prevent food poisoning or infections, wash hands regularly. Washing hands also prevents the spread of germs.

We should always wash our hands with soap and water:

- Before eating and cooking.
- After using the bathroom.
- After cleaning around the house.
- After touching pets and other animals.
- Before and after visiting or taking care of sick person.
- After blowing your nose, coughing or sneezing
- After being outside.

Starters

Begin the lesson with a song on digestive system. Make sure learners know the new words in the song.

Help learners to pronounce the new words and their meanings.

Teaching instructions

Activity 1

- Let learners observe the picture of the digestive system on page 77 of the Learner's Book. They are to use words in the box provided to label the digestive system correctly and give one function each of the labeled parts.
- In groups of four, allow learners to compare their answers by writing them on the board (using gallery walk approach). Ensure a whole class discussion.

Activity 2

- In sizeable groups supply learners with materials such as cardboard, toffee wrappers, transparent rubber tubes and strings to design and make a model of the digestive system. Using unguided inquiry approach.
- Guide learners to make a good observation of pictures of the digestive system from the Learner's Book on page 79 or from charts to make a model. Learners display their models for exhibition.

Activity 3

- In pairs, guide learners to examine cooked yam and draw. Instruct a partner from each pair to put a piece of yam into the mouth without chewing.
  Allow learners to observe the piece of yam in a mirror without chewing. Find out from learners how the yam feels in the mouth.

Talk about

Let learners brainstorm using group discussions to answer the "Talk about" questions on page 83 of the Learner's Book. Accept multiple responses.

Possible answers:

1. For breaking down into simpler form for easy absorbtion.
2. For rapid production of energy.

What I have learnt

You may write the reflections mentioned on the chalk board as summary or refer learners to page 87 of the Learner's Book.

1. The digestive system is a system in the body that helps the body to digest food and convert it into energy.
2. The digestive system is made up of organs and each organ performs a specific function which all come together to make our eaten food digest.
3. Although the digestive system digests our food, we should only eat healthy foods and have a balanced diet. "Healthy" foods keep you healthy. They help your body grow and give you energy. Eating just one kind of food will not give your body everything it needs. You should eat different kinds of foods every day.

Project for home or school

Refer learners to page 83 of the Learner's Book to do the activity.

Encourage them to use ICT.

Assessment for learning

Direct learners to pages 84-86 of the Learner's Book and ask them to answer questions there and on pages 38-41 of the Workbook.

Go around and supervise learners to work correctly.

Review exercises

Exercise 2

1. D
2. A
3. C
4. C
5. E
6. A
7. B
8. E
9. C
10. C

Exercise 3

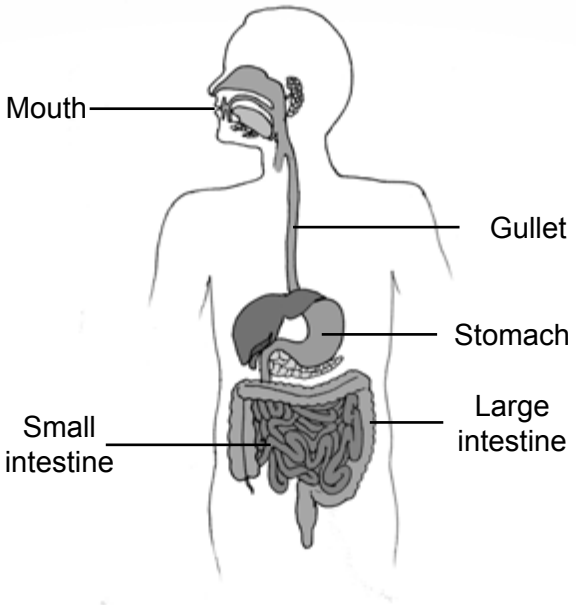
Word puzzle

E	S	N	I	E	T	O	R	P	R	E	V	I	L	P
C	M	I	N	E	R	A	L	S	H	T	U	O	M	A
A	G	U	X	N	Y	R	A	H	P	V	N	X	S	N
R	B	I	L	E	U	M	D	S	E	G	K	E	U	C
B	S	S	I	S	L	A	T	S	R	I	E	P	G	R
O	E	U	N	K	I	O	J	T	K	D	V	R	A	E
H	S	S	N	U	M	F	U	E	U	Z	E	Z	H	A
Y	N	X	R	A	T	D	I	O	J	T	U	C	P	S
D	I	S	C	E	I	R	D	C	C	U	E	E	O	A
R	M	H	D	N	V	E	I	N	A	T	N	C	S	M
A	A	V	A	I	N	S	I	E	S	T	H	U	E	Y
T	T	L	I	U	P	H	N	A	N	Y	I	M	M	L
E	I	U	M	L	P	I	W	A	M	T	V	O	V	A
S	V	V	L	S	L	R	L	E	R	C	S	X	N	S
I	N	T	E	S	T	I	N	E	H	T	E	E	T	E

Answers to Workbook

Trial 1

1. a.



b. i. Stomach - The stomach secretes acid and powerful enzymes that continue the process of breaking down the food.

ii. Small intestine - The small intestine continues the process of breaking down food by using enzymes released by the pancreas and bile from the liver.

iii Mouth - Chewing breaks the food into pieces that are more easily digested, while saliva mixes with food to begin the process of breaking it down into a form your body can absorb and use.

Trial 2

1. False
2. False
3. True
4. (b) faeces
5. (b) glucose

b. i. Enzyme in the stomach break down food like protein for the body to use or the stomach contains an acid which kills bad bacteria so that we do not get sick.

ii Complete digestion of food occurs in the small intestine for absorption into the blood stream.

iii. For chewing and breaking down of food substance into small pieces for easy digestion and swallowing

Trial 3

L	O	P	L	I	P	O	P	A	R	T	S
A	N	U	S	B	W	A	B	V	E	O	M
R	C	Z	R	X	I	D	N	E	C	P	A
G	D	R	X	G	M	S	V	I	T	T	L
E	E	T	S	N	O	A	U	R	U	E	L
I	U	E	O	F	U	G	H	I	M	L	I
N	L	O	Z	P	T	U	M	T	J	K	N
T	T	M	R	G	H	L	B	I	J	L	I
E	O	U	V	O	F	L	R	A	R	I	E
S	M	T	E	Q	S	E	E	T	K	A	S
T	H	C	Q	R	N	T	V	L	M	L	T
I	A	P	P	E	N	D	I	X	A	R	I
N	A	R	C	J	T	E	L	L	U	G	N
E	O	E	S	O	P	H	A	G	U	S	E

LESSON 1: The Sun, the centre of the solar system

LB: pages 88-96; WB: pages 42-45

CONTENT STANDARDS
B4.3.2.1 Show an 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
B4.3.2.1.1 Explain that the Sun is at the centre of the solar system.

LEARNING EXPECTATIONS
Learners will:
- Explain the term solar system
- Draw the solar system to illustrate the different bodies
- Identify the Sun as being at the centre of the solar system
- Describe how the Sun benefits life on Earth
- Mould the solar system using resources from the environment

NEW WORDS
Axis, Earth, gravity, orbit, planet, solar system, space, sphere, stars, Mars, Jupiter, Saturn, Uranus, Neptune, Ceres, Pluto, Eris.

RESOURCES
Samples of carefully removed young plants, drawings/pictures/video /charts of plants.

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

SUBJECT SPECIFIC PRACTICES
Designing Experiment, Observing, Analysing, Recording, Planning

Background information
The solar system includes the Sun and all the objects that orbits around it due to its gravity. This includes things such as planets, comets, asteroids, meteoroids and moons. The solar system was formed around 4.6 billion years ago. There are eight planets in the solar system.

Scientists believe that the solar system was formed when a cloud of gas and dust in space was disturbed, maybe by the explosion of a nearby star called a supernova.

The solar system consists of the Sun and everything that orbits or travels around the Sun. This includes the eight planets and their moons, dwarf planets and countless asteroids, comets and other small icy. However, even with all these things, most of the solar system is empty space. It was formed by gravity in a large molecular cloud.

The Sun is full of energy. Solar energy comes from the Sunlight that reaches Earth. The amount of Sunlight that reaches the Earth varies depending on location, time of the day, time of the year and weather conditions. The Sun has produced energy for billions of years. The solar energy has been used by people for hundreds of years to cook food, keep warm and to dry clothes.

Electricity is also created by solar cells that convert the light from the Sun into electricity. Solar cells are also called photo voltaic cells. “Photo” in Latin means light and voltaic means makes electricity.

Starter
Begin the lesson with a song about the solar system. You can refer to https://youtu.be/7t099KIWVVs for a song.

Help learners to pronounce the new words and find their meanings.

Teaching instructions

Activity 1
The solar system - Role play
Learner's role play the solar system. One group selects one person as the Sun, and the other learners as the planets and they move around the "Sun" at different distances.
Learners are given copies of sheet A, B and C and in groups they answer questions on what do you know by using clues from the sheet provided about the solar system. Example, what does the Sun provide? (It provides the Earth with energy in the form of light and heat).
Encourage learners to have presentations

Answers to Activity 1 in Learner's Book
1. Earth
2. Planets
3. Orbit
4. Moon
5. Space
6. Axis
7. Moon
8. Star
9. Gravity

Activity 2
Put learner's into groups of four.
Refer them to page 92 of the Learner's Book to do the activity outlined there.

Answers to Activity 2 in Learner's book
1. Gravity - force that makes two object moves towards each other.
2. Planet - Large object that moves around the Sun.
3. Moon - small heavenly body that orbits the Earth.
4. Orbit - path that is taken by a smaller heavenly body as it travels around the larger body
5. Axis - an imaginary line through the middle of an object that seems to spin around
6. Earth - the planet we live on.
7. Star - Hot ball of gas, such as the Sun.
8. Sphere - the hot ball of gas such as the Sun.
9. Space -The whole of the universe, outside the Earth
10. Solar system - A star with planets that move around it.

Talk about

In pairs learners share with their partners what the Sun provides and again answer the question "Do planets have day and night"?

Accept multiple responses.

Possible answers.
1. Light and heat.
2. Yes! All the planets in our solar system spin on their axes (so does our Sun!) and so they have day and night cycles. There are differences, however, in the length of day and night — the cycles are made even more complex by the tilt of a planet's axis and its rate of orbit.

What I have learnt

You may write the following on the chalk board as a summary or learners can refer to page 96 of the Learner's Book.
1. The solar system is made up of the Sun, eight planets, asteroids, moon and other celestial bodies.
2. The Sun is the center of the solar system and all the eight planets revolve around it.
3. The Sun provides light and heat to the Earth.

Project for home or school

Encourage learners to make a model of the solar system using play dough, balloons, black polythene bags, tooth picks and cardboard. This is an unguarded enquiry by observing a sample from the internet, resource book on the solar system

Assessment for learning
Ask learners to do their class work from their Workbooks pages 42-45 and pages 94-96 of the Learner's Book.
Supervise their work and assist the struggling learners.

Answers to Review Exercises
Exercise 1
a. Star
b. Earth
c. 8
d. 28
e. Solar system
f. Jupiter
g. Mercury
h. Temperature
i. Axis
j. Space
k. 24
l. 88
m. 3651/4
n. Orbits
o. 28days
p. Gravity

Exercise 2

S	A	T	E	L	I	T	E	S	P	A	C	E
U	V	W	A	X	Z	G	R	A	V	I	T	Y
V	A	C	X	B	C	E	R	E	S	U	R	P
H	E	L	I	O	C	E	N	T	R	I	C	L
D	G	F	S	E	O	R	B	I	T	H	I	U
E	L	L	I	P	T	I	C	A	L	J	K	T
S	Y	S	T	E	M	S	A	T	U	R	N	O

Answers to Workbook
Trial 1
1. a. orbit
2. d. Earth
3. a. galaxy
4. a. star
5. a. Pluto
6. b. 8
7. b. Jupiter
8. b. reflects
9. c. Jupiter
10. c. luminous bodies

Trial 2
1. Sun, planets, Moon

2. Luminous bodies are objects that emit light on their own.

3.

Luminous	Non-luminous
Firefly Light bulb	Moon Water Stones

Trial 3

O	R	B	I	T	S	B	E	S	P	W
G	Y	D	N	C	A	G	F	Y	L	E
A	B	U	H	I	T	J	Y	S	A	N
I	S	K	J	L	E	I	R	T	N	U
N	A	M	S	O	L	A	U	E	E	T
Z	C	R	J	U	I	H	C	M	T	P
G	D	N	Q	M	T	K	E	S	S	E
Y	E	S	O	V	E	L	M	P	Q	N
K	G	O	A	X	S	O	L	A	R	R
I	N	T	W	Y	N	M	Y	U	T	S
L	F	U	V	Z	O	H	T	R	A	E

2.
i. Moon
ii. Sun

Sub-strand 3: ECOSYSTEM

LESSON 1: The concept of an ecosystem

LB: *pages 97-105;* **WB:** *pages 46-49*

CONTENT STARNDARDS
B4.3.3.1 Show an understanding and appreciation of the interactions and interdependencies of organisms in an ecosystem.

INDICATOR
B4.3.3.1.1 Explain the concept of ecosystem.

LEARNING EXPECTATIONS
Learners will:
- Explain the term ecosystem.
- Discuss the important role every organism plays in an ecosystem.
- Explain the effect of felling of trees in an ecosystem.

NEW WORDS
Ecosystem, population, community, energy, organisms, healthy, environment, survive, photosynthesis.

RESOURCES
Samples of ecosystem, drawings/ pictures/ video/charts of ecosystem.

CORE COMPETENCIES
Cultural identity and Global Citizenship, Personal Development and Leadership, Critical Thinking and Problem Solving, Creativity and Innovation.

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Predicting, Analysing, Generalising, Communicating

HELPFUL LINKS
- https://youtu.be/SNF8b7KKJ2I
- https://youtu.be/bJEToQ49Yjc
- https://www.generationgenius.com/ecosystems-for-kids/#:~:text=An%20ecosystem%20is%20a%20community,like%20soil%2C%20water%20and%20air.

Background information
An ecosystem is made up of all living and non-living things in an area. This include all the plants and animals and other living things that make up the community of life in an area.

An ecosystem also includes non-living materials for examples, air, water, rock, soil, sand . Examples of an ecosystem are: aquatic ecosystem, agro ecosystem, coral ecosystem, desert ecosystem, forest ecosystem, human ecosystem , literal zone, marine ecosystem, rainforest ecosystem, savannah ecosystem, taiga ecosystem, prairie ecosystem, tundra ecosystem, urban ecosystem.

Basically, the study of the exchange of energy and nutrients in the food chain in a demarcated place is called the ecosystem of the place. These exchanges sustain plant and animal life in the place. The decomposition of organic matter and the production of biomass are inclusive.

Ecosystems are communities of organisms that interact together with the non-living matter of the area. Ecosystems are important because some places or environments can exist independently. A damage or imbalance in an ecosystem can cause many problems.

Starter
Ask learners to mention any two living and non-living things they know.

Let them also tell you where birds live and what they eat.

Teaching instructions

Activity 1

- Pay a visit to a crop farm or animal farm with learners. Ask learners to observe the environment. Encourage them to make thorough observation of what is going on between living things in that environment.

Activity 2

- Encourage learners to observe a school garden. Let them identify the animals/insects found in the garden and describe or explain what the insects and animals are doing in the soil or on the flowers, etc.
- Use think-pair-share strategy.

Activity 3

- Ask learners to mention the number of things they saw in the crop/animal farm and the school garden.
- Let them group the items into living and non-living things.

Activity 4

- Learners look at the photos of the forest and pond ecosystems in the Learner's Book on page 98-99.
- Guide learners to work in groups of five to compare the forest and a fresh water ecosystem (pond).
- Learners list the types of living organisms found in both forest and pond ecosystem and draw the two ecosystems individually.
- Ask learners to compare in groups using gallery walk approach.

Talk about

Refer learners to "Talk about" on page 102 of the Learner's Book. Accept multiple responses.

Possible answers

1. Rainforests get a lot of rain.
   They have many different kinds of plants, tall trees and animals.
   They allow different plants to grow.
   They provide lot of oxygen that human and animals breath.
2. An ecosystem has no limit. It starts from ones yard or compound. It has no particular size; it can be as large as a desert or continent or as small as a tree.

What I have learnt

You may write the following on the chalk board as a summary or learners can refer to page 105 of the Learner's Book.

1. Ecosystems often contain many living things and can be as small as your backyard or as large as the ocean.
2. All organisms have needs, such as food, water, and air. If the needs of the organisms in the ecosystem are not met, they cannot survive.
3. There are many examples or types of ecosystems
   Flowers in a garden provide nectar for birds, bees and other insects. Birds and insects transfer pollen between plants, helping the plants reproduce and survive.
4. Trees provide shelter and nesting areas for animals like squirrels.
5. Even small puddles in gardens are ecosystems! They contain algae, worms and insects.

Project for home or school

Ask learners what are some examples of good and bad ways humans can impact on the forest ecosystem. Refer them to page 105 of the Learner's Book.

Possible responses:

- Not going to farm on some special days of the week.
- By practicing afforestation.
- Avoid felling timber indiscriminately.
- Avoid bush burning.

Assessment for learning

Ask learners to do their class work from their Learner's Book pages 103-104 and Workbook pages 46-49.

Supervise their work and assist the struggling learners.

Answers for Review Exercise

Exercise 1

1. a. Habitat
   b. Environment
   c. Ecosystem
   d. Interdependent
   e. Community

2. Trees, shrubs, grasses, animals (wild animals) herbivores, carnivores.
   All the animals depend on plants for food. Some animals have shelter from trees, some carnivorous animals feed on other small animals for food. Herbivorous animals feed directly on grasses and other leaves and stems of some plants. Snails, ants and Earthworms get food from the soil.
3. Flower plants, insects, smaller plants, birds, chickens, lizards, snakes, ants, Earthworms, and human beings.
   All the animals including human beings depend on plants for energy. However, herbivores feed directly on the plants and grass (primary consumer). Animals that feed directly on primary consumers are called secondary consumers, tertiary consumers again feed on secondary consumers; these are normally carnivorous. Other organisms protect and provides shelter to others.
4. Any changes in the climate of an area can affect the life of plants and animals, as well as the entire makeup of the entire ecosystem.During hot conditions some animal species move to cooler places. [plant species don't move Climate change also changes the life cycle of plants and animals.

Exercise 2

WORD PUZZLE

C	O	M	M	U	N	I	T	Y	X	Y	E	H	T
O	R	G	A	N	I	S	M	S	H	Z	N	E	W
E	C	O	S	Y	S	T	E	M	A	C	E	A	L
E	N	V	I	R	O	N	M	E	N	T	R	L	U
V	S	U	R	V	I	V	E	Q	R	S	G	T	T
P	O	P	U	L	A	T	I	O	N	P	Y	H	O
P	H	O	T	O	S	Y	N	T	H	E	S	I	S
S	Q	A	C	B	T	E	E	I	S	H	K	M	I

Answers to Workbook

Trial 1

1. a. Habitat
2. c. Sunlight
3. b. Pond
4. c. Ecosystem
5. c. Only plants
6. b. Only meat
7. c. Omnivores
8. a. Food chain
   b. Parasite
   c. Herbivores
   d. Omnivores
. e. Host
   f. Carnivores
   g. Ecosystem

Trial 2

1. Sea, river, garden, rain forest, desert

2.It is a dwelling place where living organism are enable to survive successfully.

3. pond, sea, rain forest, mountains, desert.

4. Invasive speaches, fertilizer and insectiside spray and indutralisation

Trial 3

O	R	D	S	G	P	W	F	R	O	G	E	A	F
H	P	E	L	E	L	X	E	D	P	I	X	Q	O
A	E	Q	T	C	A	B	W	T	X	M	E	U	O
B	D	R	R	O	N	V	X	A	I	A	C	A	D
I	S	T	A	S	T	U	O	H	S	I	F	T	C
T	J	H	P	Y	E	O	T	G	Y	R	U	I	H
A	U	E	N	S	H	Z	L	Q	W	L	D	C	A
I	N	S	E	T	S	R	A	D	N	N	S	Z	I
J	G	L	P	E	Q	D	A	E	A	L	E	Q	N
X	J	G	I	M	F	N	V	L	O	S	M	A	O
A	N	D	H	A	B	I	T	A	T	F	O	G	F

4

Strand:

Forces and energy

LESSON 1: Effect of heat on substances

LB: pages 108-111 ; WB: pages 52-54

CONTENT STANDARDS
B4.4.1.1 Demonstrate an understanding of the concept of the energy, its various forms, sources and how to transform and conserve it.

INDICATOR
B4.4.1.1.1 Identify the effect of heat on the change of state of substances.

LEARNING EXPECTATIONS
Learners will:
- Identify effect of heat on substances
- Measure and explain how the escaping vapour can be changed into water (through the loss of heat)

NEW WORDS
Heat, evaporation

RESOURCES
Plastic objects, samples of solids and liquids such as water, shea butter, candles, butter, source of heat measuring device for measuring quality of water.

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

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Recording, Measuring, Communicating

HELPFUL LINKS
- https://youtu.be/4kRnHQHvLoE
- https://youtu.be/fP5rroBHB_U
- https://www.mansfieldct.org/Schools/MMS/staff/hand/atomsheat.htm#:~:text=When%20heat%20is%20added%20to,and%20takes%20up%20more%20space.

Background information
Heat is a form of energy. When heat is applied to substances such as water, butter, shea butter, candle, plastic objects, the state of the substance's changes, e.g. melting solid candle wax will change to liquid.

Starter
Engage in a discussion with learners on the meaning of heat. Let learners rub their palm together for about two minutes and touch their cheeks with the palms. Let them tell you what they notice.
Help learners to pronounce the new words and find the meanings.

Teaching instructions

Activity 1
Investigating heat
- Guide learners through simple activities to identify effects of heat on substances (use liquids and solids, e.g. water, shea butter, candles, etc.). Refer them to activities on page 108 and 109 of the Learner's Book.

Activity 2
- Let learners demonstrate evaporation by boiling water and discuss their experiences.
- Guide learners to measure the quantity of the water before and after boiling to show the effect of heat on water.
- Ask learners to talk about the differences of quantity of water before measuring and after measuring.

Activity 3
- Elaborate on learners' ideas to explain how the escaping vapour can be changed into water (through the loss of heat).

Talk about

Refer learners to talk about questions on page 110 of the Learner's Book.

What I have learnt

Read the text under "What I have learnt" with learners on page 111 of the Learner's Book.

Project for home or school

Explain to learners to use ICT to help with the home activity. Refer them to page 111 of the Learner's Book.

Assessment for learning
Refer learners to pages 110-111 of the Learner's Book and pages 52-54 of the Workbook for class assessment task.

Answers to Review Exercise
Exercise 1
1. Heat can melt an object, change the shape of an object, cause evaporation of a liquid, like water, and increase the temperature of an object.

2. a. Vapour
   b. Liquid
   c. True
   d. Liquid

3. a. Heating, freezing
   b. Heating
   c. Heating

Answers to Workbook
Trial 1
1. The water evaporates or moves into the atmosphere.
2. Shea butter, candle wax, butter
3. a. The lighted candle will melt because of the heat applied and the one not lighted will not melt because there is no heat applied.
   b. Heat energy

Trial 2
1. Evaporation
2. The level of water will decrease.
3. Heat
4. Source of heat.

Trial 3
The shea butter will melt because of the heat from the hot water.

LESSON 1: Uses of electricity

LB: pages 112-114 ; WB: pages 55-56

CONTENT STANDARDS
B4.4.2.1 Demonstrate knowledge of generation of electricity, its transmission and transformation into other forms.

INDICATOR
B4.4.1.1.1 Identify the uses of electricity

LEARNING EXPECTATIONS
Learners will:
- Mention electric appliances
- Identify some uses of electricity
- Draw some electric appliance in the home

NEW WORDS
Appliances, electrica gadget, electricity

RESOURCES
Electrical appliances like iron, radio, phone, or videos and pictures of some electrical appliances.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Evaluating, Communicating, Generalising, Interpreting, Manipulating, Recording

HELPFUL LINKS
- https://www.ducksters.com/science/electricity_uses.php
- https://youtu.be/Uf76pThNXZc
- https://byjus.com/physics/uses-of-electricity/

Background information
There are many things in our environment that work with electricity while others don't. These things that need electricity to work are called electrical appliances.
Electricity is a form of energy. It makes electrical appliances work. Electricity has so many uses. Assist learners to find out some of these uses.

Starter
Let learners mention two things that work without electricity and two things that need electricity to work.

Drill learners on the correct pronunciation of the new words and their meanings.

Teaching instructions

Activity 1
- Begin by asking learners what they use to iron their school uniforms and other clothes.
- Engage learners in simple activities to demonstrate uses of electricity, (e.g. providing light, powering TVs, mobile phones, cooking, heating water, etc.)

Activity 2
- Put learners in groups of four to draw things in the home and at school that use electricity.
- Let learners display their drawings in class for discussion.
- Provide feedback as learners present their work.

Activity 3
- Engage learners to come out with vocations that use electricity in their operations.
- Ask learners to present their findings in class for discussion.

Talk about

Help learners to give responses to talk about questions on page 113 of the Learner's Book.

What I have learnt

Guide learners to reflect or recall what they have learnt in the lesson by asking them questions. Refer them to page 114 of the Learner's Book to "What I have learnt".

Project for home or school

Refer learners to page 114 of the Learner's Book.

With the help of the internet and parents, learners' are to explore some ways of generating and share their ideas in class.

Assessment for learning
Refer learners to pages 113-114 of the Learner's Book and pages 55-56 of the Workbook for class assessment task.

Answers to Review Exercise
Exercise 1

1. For ironing clothes, heating water, cooking food, washing clothes in a washing machine, charging mobile phones, etc.

2. d. Computer.
   e. Rice cooker.
   f. Electric fan.
   g. Pressing iron.

3. Electricity is the movement of electric charges through a conductor like wire.

Answers to Workbook
Trial 1

1. a. computer.
   b. rice cooker.
   c. electric fan.
   d. pressing iron.
   e. washing machine.
2. Electricity is the movement of electric charges through a conductor like wire.
3. For ironing clothes, heating water, cooking food, washing clothes in a washing machine, charging mobile phones, etc.

Accept any two.

4. Electricity helps our electrical gadgets to work well. It provides light in our homes, schools and communities.

Trial 2
a. electric, elect, city, citric, trice,
b. Electricity
c. Electricity makes work easier.

Trial 3
1.Electricity is a form of energy. It is electrical energy that helps electrical gadgets to work.

2. Leaners to draw.

LESSON 2: Ways of conserving electricity

LB: pages 115-117 ; WB: pages 57-58

CONTENT STANDARDS
B4.4.2.1 Demonstrate knowledge of generation of electricity, its transmission and transformation into other forms.

INDICATOR
B4.4.2.1 Describe ways of conserving electricity.

LEARNING EXPECTATIONS
Learners will:
- Describe ways of conserving electricity.
- Explain the effects of leaving electrical appliances on when not in use.

NEW WORDS
Wastage, conserve

RESOURCES
Electrical appliances like iron, radio, phone, or pictures/videos, drawing/charts of electrical appliances.

CORE COMPETENCIES
Personal Development and Leadership, Cultural identity and Global citizenship, Critical Thinking and Problem-Solving, Communication and Collaboration.

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Evaluating, Communicating, Generalising, Interpreting, Measuring, Recording

HELPFUL LINKS
- https://www.bchydro.com/powersmart/residential/savings-and-rebates/everyday-electricity-saving-tips.html?WT.mc_id=rd_21tips
- https://youtu.be/23XQ-hQoR7A

Background information
Electricity is needed at home, school and at work places. It serves a lot of people in various ways, e.g. cooking, ironing of clothes, charging mobile phones and computers, heating of water, provision of light, etc.

There is the need to use electricity wisely where ever we find ourselves. Ensuring all electrical appliances are off when not in use will help reduce wastage of electricity.

Starter
Ask learners why their parents put off the lights, television and others when they are leaving the house, take feedback from your learners.

Drill learners on the correct pronunciation of the new words and their meanings.

Teaching instructions

Activity 1
- Let learners discuss what happens when electrical gadgets such as heaters and pressing irons are left on when leaving the house.

Activity 2
- Let learners work in groups of six to discuss activities that contribute to wastage of electricicity.
- Ask learners to present their ideas to the class for discussion.

Activity 3
- Using think-pair-share strategy, let learners discuss ways of conserving electricity.
- Ask learners to reflect on how they use electricity at home to help them come out with ways of conserving electricity.
- Tell learners to present their ideas using concept maps, charts and diagrams in class for discussion.

Talk about

Refer learners to talk about questions on page 116 of the Learner's Book.

What I have learnt

Refer learners to page 117 of the Learner's Book. Reflect with learners all that they have learnt about the lesson. Use effective questioning and feedback.

Project for home or school

1. Ask learners to monitor electricity consumption in the home and at school. Learners record the amount of electricity consumed in their homes or at school over a period of three (3) months and report on their findings.
2. Ask learners to use ICT to help them do the home activity on page 116 of the Learner's Book.

Assessment for learning

Ask learners to open to page 116 of the Learner's Book and Workbook pages 57-58 for their assessment task.

Answers to Review Exercise

Exercise 1

1. It is the use of electricity in a judicious manner
2. a. Not ironing clothes in bulk.
   b. Leaving electrical gadgets on when not in use.
   c. Leaving electrical bulbs on when not in use.
3. Electricity helps our electrical gadgets to work well. It provides light in our homes, schools and communities.
4. a. Ironing clothes in bulk.
   b. Not leaving lights on when not in use.
   c. Not plugging too many electrical gadgets when not in use.

Answers to Workbook

Trial 1

1. To promote the life span of our electrical gadgets and to reduce light bills.
2. Pressing iron, refrigerator, electric heater.
3. The energy saving bulbs help reduce the high consumption of electricity. They have long life span and do not get damaged easily.

Trial 2

1. a. Ironing clothes in bulk.
   b. Not leaving lights on when not in use.
   c. Not plugging too many electrical gadgets when not in use.
2. a. Electricity gadgets can be turn off when not in use.
   b. All light should be switch off when not needed.

Trial 3

1. a. Leaving electronic gadgets on.
   b. Leaving the lights on when not in use.
   c. Using high consumption light bulbs.
   d. Over loading of sockets.
   e. Not ironing in bulk.
2. To avoid fires and to save electricity.
3. Computer, radeo, TV

LESSON 3: Basic components of electric circuits

LB: pages 118-121; WB: pages 59-62

CONTENT STANDARDS
B4.4.2.2 Know the functions and assemblage of basic electronics components

INDICATOR
B4.4.2.2.1 Identify the basic components of electronic circuits.

LEARNING EXPECTATIONS
Learners will:
- Identify the LED, wire, switch and battery in circuit.
- Now the uses of basic electronic components.
- Draw circuits they have connected.

NEW WORDS
Light emmiting diode (LED), switch, battery, connects wire.

RESOURCES
Electric circuits, pictures/videos, drawing/ charts of electrical electric circuits, connecting wires, batteries (dry cells), switches and LED's.

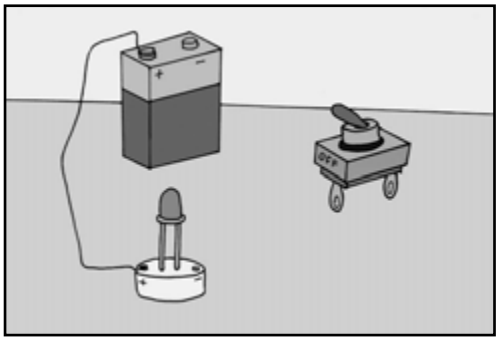
CORE COMPETENCIES
Digital Literacy, Personal Development and Leadership, Critical Thinking and Problem-Solving, Communication and Collaboration Creativity and Innovation.

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Classifying, Generalising

HELPFUL LINKS
- https://blog.mide.com/how-electronic-components-work#:~:text=It%20comprises%20several%20different%20components,same%20point%2C%20forming%20a%20loop.

Background information
Electric circuits comprise of the connection of electronic components. These components are connected together to form a functional unit called electronic circuit.

The electronic components work together in circuits and electronic devices. Electronic devices such as radio, TV, mobile phones, computers, sound systems, remote control and wrist watches, Light emitting diode (LED) has different colours e.g. green, yellow white, etc. It gives light when current flows through it. Batteries, switches and connecting wires in addition to LEDs are all electronic components.



Starter
Ask learners to mention electronic gadgets they use at home e.g. radio, TV, sound system, DVD player etc. Take feedback from learners and write their responses on the board for reinforcement.

Help learners to pronounce the new words and the meanings.

Teaching instructions

Activity 1
- Learners are put into groups of three. Provide each group with connecting wires, batteries (dry cells), switches and LED's (different colours).
- Assist learners to identify the various components provided.
- Demonstrate on how to connect the component to light the LED for learners to observe. Refer them to page 120 of the Learner's Book.

Activity 2

- Guide learners to connect the components to make the LED produce light.
- Engage learners to discuss how each component helps the LED to produce light.
- Ask learners to draw the circuits they have connected.

Activity 3

- Task learners to suggest other materials that can be used in the absence of connecting wires.
- Guide learners to act as electrons flowing in a circuit through the classroom.
- Guide learners to act out the role of various components (resistor, cofactor, etc.) in the circuit.

Talk about

Refer learners to “Talk about” questions on page 120 of the Learner’s Book.

What I have learnt

Refer learners to page 121 of the Learner’s Book for them to read the text under what I have learnt to as a summry on the lesson.

Project for home or school

Explain to learners how they will do the home activity. Encourage them to present their ideas in class.

Assessment for learning

Ask learners to open to page 121 of the Learner’s Book and Workbook pages 59-62 for their assessment task.

Answers to Review Exercise

1. Learners to draw
2. a. Switch opens and closes a circuit
   b. The connecting wires serve as a path for the flow of current.
3. No flow of current OR The LED will not produce light.

Answers to Workbook

Trial 1

1. a. i. Bulb
      ii. Connecting wire
      iii. Switch,
      iv. Battery

b. The bulb will light.

c. Learners draw the parts.

Trial 2

1. Learners to draw connecting wire, LED, switch

Trial 3

1. A. Switch opens and closes electric circuit.
   B. Bulb produces light when current flows through it.
   C. Diode allows flow of current in only one direction.
2. Electronic circuits allow the flow of electric currents which provide light and make electrical appliances work properly.
3. e. Mobile phone

LESSON 1: Elastic and compressional forces

LB: pages 122-125 ; WB: pages 63-65

CONTENT STANDARDS
B4.4.3.1 Know the functions and assemblage of basic electronics components.

INDICATOR
B4.4.3.1.1 Demonstrate understanding of elastic and compressional forces and their energy application.

LEARNING EXPECTATIONS
Learners will:
- Explain elastic and compressing forces.
- Describe some applications of elastic and compressional forces in everyday life.

NEW WORDS
Application, compressional, elastic, force

RESOURCES
A catapult, rubber bands, springs, bicycle pumps, ball, table, paper, toy and a video to show some application or process that involves the application of elastic and compressional forces.

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

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Predicting, Analysing, Communicating, Generalising

HELPFUL LINKS
- http://www.classzone.com/vpg_ebooks/ml_sci_gr8/accessibility/ml_sci_gr8/page_81.pdf
- https://youtu.be/YKpvYF0hVDE

Background information
A force is a pull or push on an object. Even though it may have negative effects on humans, it also had positive effects. Elastic force is the force that occurs when a deformed object tries to return to its original shape. Compressional force is the application of power on an object that causes it to become squeezed or compacted.

Starter
Ask learners to display the resources, mention their names and tell you their uses.
Help learners to pronounce the new words and their meanings.

Teaching instructions

Activity 1
- Display materials such as catapults, rubber bands, springs and bicycle pumps to class.




- Let learners brainstorm/talk about the materials displayed.

Activity 2
- Guide learners to demonstrate different effects of forces, e.g. by kicking a ball in different directions, pushing a table, crumpling a piece of paper or stopping a moving toy.

- Engage learners in activities to demonstrate elastic and compression forces using the materials brought to class.

Activity 3
- Let learners discuss how elastic and compressional forces are applied in everyday life.
- Ask learners to mention vocations that use the principles of elastic and compressional forces.
- Let learners present their ideas in class for discussion

Talk About

Engage learners to discuss “Talk about” questions on page 123 of the Learner’s Book.

What I have learnt

Refer learners to page 125 to read “What I have learnt”. You may write the reflections mentioned on the chalk board as summary.

Project for home or school

Refer learners to page 125 of t he Learner’s Book for “Home project”.

Assessment for learning
Ask learners to open to page 124 of the Learner’s Book and Workbook pages 63-64 for their assessment task.

Answers to Review Exercise
Exercise 1
1. d. Compressional and elastic forces.
2. c. Rubber band

3. Elasticity is the property that allows elastic material to return to its original shape after being stretched.
4. Bed springs, toy spring, rubber band.

5. a. Compressional force
   b. It reduces in size.

Answers to Workbook
Trial 1
1. These objects increase or reduce in size.
2. Compressional force and elastic force.
3. Wristband, bed springs
4. Elasticity

Trial 2
1. Rubber band, catapult
2. When the elastic waist band is stretched
3. Compressional force. This is because he applied pressure against the the bicycle pump which made it compressed to allow air into the bicycle tyre.

Trial 3
camp, palm, main, press, son, raise, rise, ran, mop, name, plan, misson, personal, person, compress

Strand: 5

Humans and the environment

LESSON 1: Knowing how to care for yourself and the environment

LB: pages 128-130; WB: pages 68-70

CONTENT STANDARDS
B4.5.1.1 Recognise the importance of personnel hygiene

INDICATORS
B4.5.1.1.1 Know how to care for one's self and the environment.

LEARNING EXPECTATION
Learners will:
- Understand how to care for themselves and their environment.

NEW WORDS
Comb, hair brush, nail, cutter, body spray, lemon, roll-on, towel, handkerchief

RESOURCES
Comb, hair brush, nail cutters, body, spray, roll-on, handkerchief, towel, card boards, pictures of how to keep the body clean.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Predicting, Evaluating

Background
Personal hygiene practices are very important. It enables us to stay healthy all the time. Because we always move around every day and do other activities, it is important to know how to take good care of ourselves and our environment.

Bathing regularly and keeping ourselves neat is very important. We can do this by bathing with a clean water twice a day and soap and by keeping all the parts of our bodies clean.

Starter
Find out from learners' the number of times they bath in a day. This is a whole class activity.

Drill learners on the correct pronunciation of the new words and their meanings.

Teaching instructions

Activity 1
- Ask learners to talk about what they do to maintain personal hygiene.
- In groups of three have leaners write their ideas on card board and share with the other group members.
- Write major ideas on the board.

Activity 2
- Show pictures of how to keep the body clean at home to learners
- In a think-pair-share activity, have them talk about it.
- Write major ideas on the board.

Activity 3
- Have learners watch videos and talk about their observations in class on how to keep their bodies clean. Also stress on why it is important to use a handkerchief during the day.
- Ask learners to design a poster of items used in keeping their bodies clean.
- Then have learners display their work in class for feedback from their friends.

Talk about

Refer learners to talk about questions for discussion on page 129 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary or learners can refer to page 130 of the Learner's Book.

1. Have learners say and write what they have learnt about the indicator in groups and then share with other groups.
2. Summarize important ideas on the board for leaners.

Project for home or school

Ask learners to make a poster on five reasons of keeping their bodies clean. Refer them to page 130 of the Learner's Book.

Assessment for learning
Ask learners to open to page 129 of the Learner's Book and Workbook pages 68-70 for their assessment task.

Answers to review exercise:
Exercise 1

1. There might be general answers to this particular question. These are some possible answers:
   Clean their sweat with a handkerchief.
   Bath properly when they finally go home.
   Ensure to comb hair after baths.
   Ensure to keep a dry hair.
   Ensure to wear dry and clean clothes.
   Both with clean water and soap.
2. To help us clean sweat
3. They need to clean their face with their handkerchiefs.

Answers to Workbook
Trial 1

1. Four practices we can engage in to take care of our school environment are as follows:
   a. By sweeping our classroom environment every day before the morning class begins.
   b. Dusting tables and chairs to keep them clean.
   c. Sweeping our school environment regularly.
   d. Stop throwing papers and items on the floor in our classrooms and on the school compound.

2. We must cut our finger nails regularly so that dirt and germs will not get into our nails to cause us to be sick.

3. We can take good care of our hair if we do the following:
   a. Wash our hair properly when we take our bath.
   b. Dry our hair properly after bathing.
   c. Pomade and comb our hair properly and regularly after bathing.
   d. Keep our hair always free from bad odour.
   e. Clean our comb regularly with soap and water and wipe it dry before we use it to comb our hair.

Trial 2

1. a) Taking care of your body and bathing yourself
2. c. after a shower and in the morning
3. d. before eating in the morning
4. b. Take a bath
5. d. Wash it

LESSON 2: Sustaining the environment through waste management

LB: *pages 131-134* ; **WB:** *pages 71-73*

CONTENT STANDARD
B4.5.1.1. Recognise the importance of personnel hygiene.

INDICATOR
B4 .5.1.2 Describe ways of sustaining the environment through waste management.

LEARNING EXPECTATION
Learners will:
- Describe how to sustain the environment through waste management.

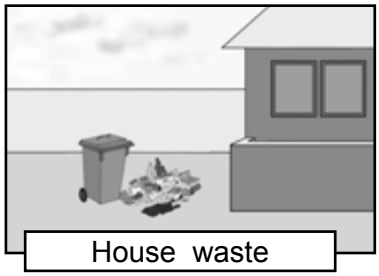
NEW WORDS
Dustbins, waste, rubbish, house waste, management, grass, plastics

RESOURCES
Videos, pictures, dustbins, cartons, small dustbins containers.

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

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Designing experiment, Generating, Generalising

Background
People generate waste at home, schools and within communities every day. These wastes are either food peels, bottles and plastics. Other more waste are cans and e-waste. All these waste can be managed well so that we sort, collect, re-cycle and re-use most of them.


House waste

Starter
Task learners to talk about how they manage waste at home.
Write learners responses on the board.

Help learners to pronounce the new words and their meanings.

Teaching instructions

Activity 1
- Show videos to learners on ways of sustaining the environment through waste management.
- Have learners in groups of five discuss and share their observations with the whole class.
- Write major ideas on the board.

Activity 2
- In groups of five, task learners to talk about how they will minimise the waste they generate in their classroom.
- Have learners present their ideas to the class. Explain more and write major ideas from the group presentations on the board.

Activity 3
- Have learners do the activity on pages 132 - 133 in the Learner's Book and provide feedback.
- Have learners individually write down four practical ways of sustaining the environment.
- Provide feedback and write major ideas on the board.
- Have learners use cartons to provide labelled waste bins.

Talk about

Engage learners on 'Talk about" questions' on page 132 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary or learners can refer to page 134 of the Learner's Book.

1. We need to manage properly the waste we generate in order to maintain a healthy environment.
2. Economically we need to use some of our waste again or recycle it.
3. We need to separate the waste we collect so that it can easily be managed and recycled.

Project for home or school

Task learners to write down three reasons why we should manage our waste and present their work for feedback.

Have learners design a colourful poster to describe two reasons why we must separate food waste from other kitchen waste.

Assessment for learning

Ask learners to open to page 133 of the Learner's Book and Workbook pages 71-73 for their assessment task.

Answers to Review Exercise

1. Paper, rubbers, empty cans, plastic bottles from coldrinks, etc. More can be added to this list depending on what learners eat at lunch and snack breaks.

2. Sorting food particles from peels and cans, etc.
   Make a soil fertilizer or compost out of food remains.
   Rinse other plastic containers and package the other waste, and arrange for waste collectors to come and collect them.

Answers to Workbook

Trial 1

1. We can manage the waste from our classroom if we do the following:
   a. Identify and name the types of waste we make in the classroom (e.g. paper waste, water sachet waste, biscuit rapper waste, paper juice waste, plastic bottle waste, glass bottle waste, pencil waste when we sharpen our pencils in class and finally food waste).
   b. Look for containers to keep all the different waste that we produce in class.
   c. Label the containers or waste bins clearly.
   d. Drop our waste in the containers or waste bins to manage the waste we produce in class.
2. It is important to sustain our environment through waste management so that:
   a. We keep our environment clean all the time.
   b. We will not be affected by any disease due to poor environmental waste management practices.
3. a. Food waste from peels of plantain, banana, cassava, food left overs,
   b. Can waste such as milk, milo, soft drinks, etc.

Trial 2

1. d
2. a
3. c
4. d
5. c

LESSON 1: Causes, symptoms and prevention of measles

LB: pages 135-138; WB: pages 74-75

CONTENT STANDARD
B4. 5.2.1 Known common diseases of humans, causes, symptoms, effects and prevention.

INDICATOR
B4. 5.2.1.1 Identify causes, symptoms and prevention of measles.

LEARNING EXPECTATION
Learners will:
- Identify the causes, symptoms and prevention of measles.

NEW WORDS
Measles, fever, rashes, virus, rubella

RESOURCES
Pictures and videos on measles.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Predicting, Evaluating

HELPFUL LINKS
- https://www.medicalnewstoday.com/articles/37135#:~:text=Causes,4%20to%205%20days%20after.
- https://www.healthline.com/health/measles
- https://youtu.be/N6oQXyb69dk

Background
Measles is an infections skin disease that affect people mostly in crowded places. It is caused by a virus and makes the skin itch a lot. The virus is called the rubella virus.

Starter
Tell learners to use think-pair-share strategy to find out from their classmates if they have had measles before.
Have learners share their experience to the whole class. Write major ideas on the board.

Drill learners on the correct pronouciation of the new words and their meanings.

Teaching instructions

Activity 1
- Have learners watch a video on the measles disease.
- In groups of six have learners discuss their observations. Each group should present their findings to the class.
- Write major ideas from each group on the board.

Activity 2
- In their previous groups task learners to critically think and respond to the following questions.
  a. What causes measles?
  b. What are the symptoms of measles?
  c. What should be done if someone has measles?
  d. What are the ways of preventing the spread of measles?
- Give each group a question and have learners use the internet to search for more information.
- Task learners to develop concept maps to show causes, symptoms and prevention of measles and display through a gallery walk.
- Refer learners to do the activity on pages 136-137 of the Learner's Book and provide feedback to leaners.
- Write major ideas from learners' activities on the board.
- Invite a health personnel if possible, to talk about the disease with learners.

Talk about

Engage learners to discuss the talk about question on page 136 of the Learner's Book.

What I have learnt

Refer learners to page 138 of the Learner's Book to read on "What I Have Learnt.".

Project for home or school

Task learners to find out from their home whether members in their homes have ever had the measles disease. and then present their responses.

Ask learners to suggest ways they can use to prevent themselves from getting measles and then design a colourful poster for a science fair.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 137 of the Learner's Book and pages 74-75 of the Workbook.

Answers to Review Exercise
1. Rubella virus.
2. The person will have the following symptoms:
   Coughs.
   Catarrh/phlegm.
   Watery nose.
   Red eyes.
   Itchy skin.

Answers to Workbook
Trial 1
1. a. False
   b. True
   c. True

2. Symptoms:
   a. Coughs
   b. Catarrh
   c. Watery nose with red eyes
   d. Itchy skin and body

3. Highly infectious and one can infect a whole number of friends and family members. Severe cases of the measles can cause death.

Trial 2
1. Surged
2. Out
3. Cases
4. Eradicated
5. Worldwide
6. Mostly
7. Virus
8. Vaccinate

LESSON 2: Causes, symptoms and prevention of food-borne diseases

LB: *pages 139-142* ; **WB:** *pages 76-77*

CONTENT STANDARD
B 4.5.2.1. Know common diseases of humans, causes, symptoms, effects and prevention.

INDICATOR
B 4.5.2.1.2. Demonstrate an understanding of the causes, symptoms and prevention of food-borne diseases

LEARNING EXPECTATION
Learners will:
- Tell the causes, symptoms and prevention of food-borne diseases.

NEW WORDS
Fruits, bacteria, virus, chemicals, poisonous

RESOURCES
Fruits, food, videos, pictures, colour pencils

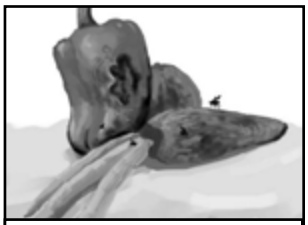
CORE COMPETENCIES
Digital Literacy, Personal Development and Leadership, Critical Thinking and Problem Solving, Communication and Collaboration

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Evaluating, Generating

HELPFUL LINKS
- https://youtu.be/pNnWgs9zxxk
- https://www.health.state.mn.us/diseases/foodborne/basics.html
- https://www.who.int/topics/food_safety/flyer_keys_en.pdf

Background
Food-borne diseases are caused by food-poisoning from infected food by flies, bacteria and spoilt fruits, etc. We must keep our foods clean and fresh before we eat it. We must also eat foods that is warm to prevent us from contracting food-borne diseases.


Spoilt fruits


Spoilt vegetables

Starter
Task learners to talk about the food they ate in the morning or afternoon or the previous night. Did they buy it or was it prepared at home? They should do a think-pair-share activity. Have learners share their ideas in a whole class discussion and write major ideas on the board.

Help learners to pronounce the new words and their meanings.

Teaching instructions

Activity 1
- Have learners watch a video that shows the causes, symptoms and prevention of food-borne diseases.
- In groups of seven have learners discuss their observations.
- Write major ideas from each group on the board.

Activity 2
- In their previous groups have leaners observe real fruits and discuss what can happen if they eat foods and fruits that are not fresh?
- Have learners think critically to answer the following questions:
  a) What causes food-borne diseases?
  b) What are the symptoms of food-borne diseases?
  c) What should be done if someone contracts food-borne diseases? Each group should present their findings to the class.
- Write all major learning ideas from learners on the board.

Activity 3

- Task learners to refer to the Learner's Book and do the activity on page 141. Provide feedback to learners.
- Write major ideas from learners' activities on the board and give proper feedback.

Talk about

Help learners to give responses to the "Talk about" questions on page 140 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary or learners can refer to page 142 of the Learner's Book to read what is there.

1. Stomach ache, diarrhoea, vomiting, nausea are symptoms of food borne diseases.
2. Eating uncooked and not properly washed fruits and vegetables can cause illnesses.
3. We need to wash our hands well and ensure foods we eat are clean, properly kept and not contaminated.
4. We may take in bad bacteria or other toxic materials if we eat contaminated food.

Project for home or school

Refer to Learner's Book page 141. Task learners to observe their mother's kitchen at home and find out how vegetables look like when they are not stored well.

Task learners to design a poster for a school science fair programme and create awareness or write about the causes of food-borne diseases.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 141 of the Learner's Book and pages 76-77 of the Workbook.

Answer to review exercise

1. Rice and Stew, gari and beans, etc. Different answers will be given.
2. a. Should keep flies off the food and sell warm food.
   b. Never sell left over food to people.
   c. Use fresh vegetables to prepare food.
   d. Wash hands properly when serving food.

This also demands varied answers.

Answers to Workbook

Trial 1

1. a. Learn to cover all cooked food to prevent flies from entering our cooked foods before we eat.
   b. Know the causes of these food-borne disease and then prevent it.
   c. Know the importance of keeping a clean kitchen.
   d. Never eat contaminated food or expired food.

2. a. Poor hygiene in the kitchen.
   b. Eating leftover food that is cold.
   c. Eating food already contaminated with flies.
3. a. Cover our foods when we are not ready to eat.
   b. Keep a healthy kitchen to prevent bacteria from acting on left over foods and dirty pans.
   c. Wash raw food like vegetables, fruits very well before eating.

Trial 2

1. c. food-borne disease
2. d. stomach ache
3. True
4. True
5. False

LESSON 1: Burning as a cause of climate change

LB: pages 143-146 ; WB: pages 78-80

CONTENT STANDARD
B 4. 5 4.1 Know that climate change is one of the most important environmental issues facing the world today

INDICATOR
B4. 5. 4. 1.1 Explain that burning is one of the causes of climate change

LEARNING EXPECTATION
Learners will:
- Explain that burning causes climate change.

NEW WORDS
Burn, climate change, fossil fuels, nutrients, atmosphere, smoke, fumes.

RESOURCES
Videos and pictures on burning waste, car fumes, etc.

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

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

HELPFUL LINKS
- https://acetforafrica.org/media/acet-in-the-news/feature-whats-the-business-case-for-climate-focused-urban-development-in-africa/?gclid=EAIaIQobChMIhtjqtcj36QIVgobVCh3-CwjAEAAYASAAEgIeu_D_BwE
- https://youtu.be/G4H1N_yXBiA

Background
In our communities, most people like sweeping leaves that fall from trees and burn them. Farmlands are also burnt to prepare the land for farming. All these activities cause our climate to change.

Burning releases smoke into the atmosphere which contains carbon dioxide. A lot of the carbon dioxide produces more heat in the atmosphere.

Starter
Ask learners to tell you if they have seen someone burning rubbish before. Let them tell you what they saw.

Drill learners on the correct pronunciation of the new words and their meanings.

Teaching instructions

Activity 1
- Have learners watch a video on burning and its causes on our climate.
- In groups of six, have learners discuss their observations and present their findings to the class.
- Write major ideas from each group on the board and explain further to learners.

Activity 2

- In groups of four, task learners to narrate any scenario they have seen in a story form about burning and where they saw the smoke enter.
- Allow group presentations and gallery presentations and provide feedback.
- Record all learners' responses on the board and provide further explanation on effects of burning on our climate.

Activity 3

- Refer learners to page 144 and 145 of the Learner's Book to do the activity prescribed.

Talk about

Engage learners on the "Talk about" questions on page 144 of the Learner's Book.

What I have learnt

Ask learners to talk about what they have learnt and summarize in few sentences on papers for display.
Refer learners to page 146 of the Learner's Book.

Project for home or school

Refer learner's to page 146 of the Learner's Book.

They are to look out for and describe some activities in their homes that can result in increasing climate change effect and present it for feedback.

After that, they are also to design a poster for a science fair and write about what some communities are doing to reduce climate. Encourage them to use the internet.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 145 of the Learner's Book and pages 78-80 of the Workbook.

Answers to review exercise

1. Burning electronic waste
   Burning fossil fuels
   Cutting down trees
   Smoke from the exhaust of cars

2. Answers in this task will vary.
   When a lot of carbon dioxide gets into the atmosphere, the "greenhouse effect" occurs and it is felt.

3. Because climate change affects our way of life in the following ways:
   - how food will be available,
   - how the weather patterns will be affected, regarding severe heat and too much flooding,
   - less rainfall, etc.

Answers to Workbook
Trial 1

1. The main cause is burning fossil fuels (dead plants and animals) and burning coal and firewood.

2. a. True
   b. True

3. a. There will be more carbon monoxide released into the atmosphere which will results in climate change.
   There can be severe floods, more warm weather conditions and dry weather patterns which could lead to drought and shortage of food.

Trial 2

1. yes
2. no
3. no
4. no
5. no
6. a.
7. b.

ESSENTIAL Science

Primary 4

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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.

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