ESSENTIAL

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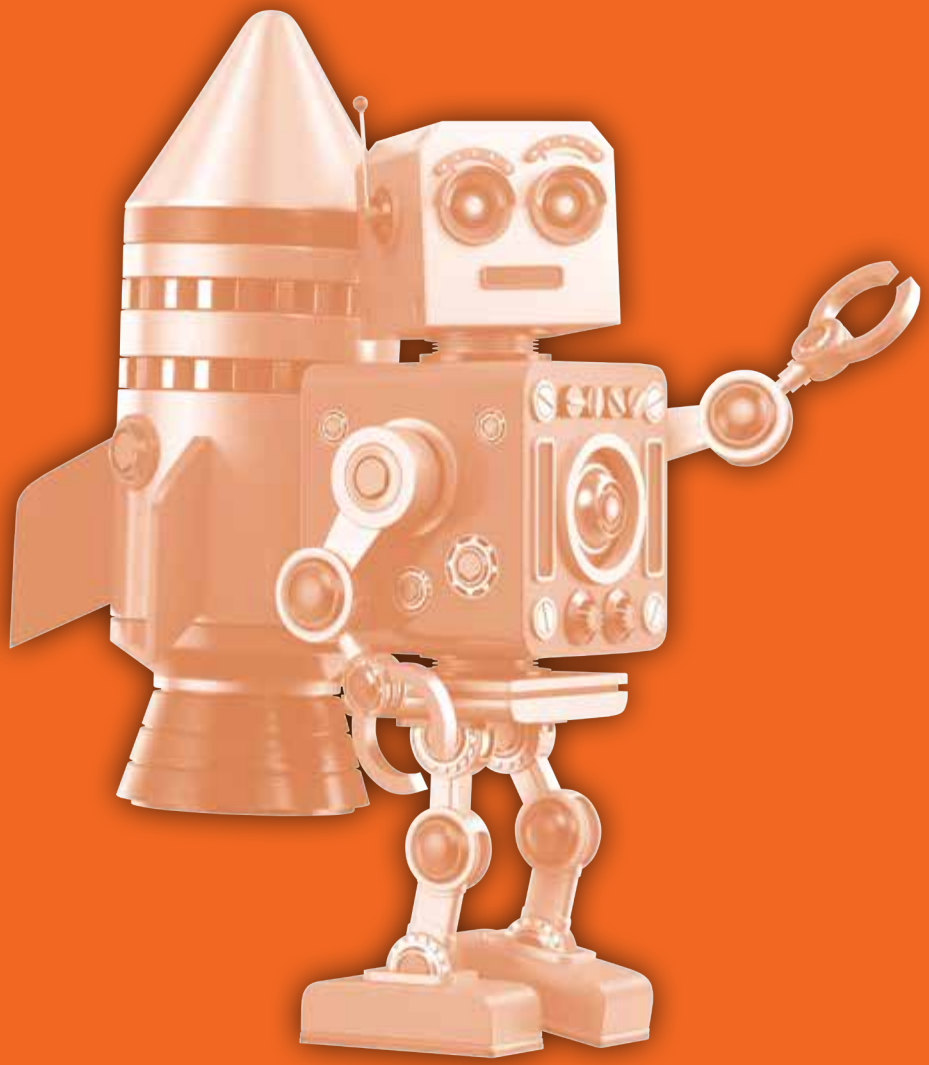
Science

Primary 5

Teacher's Guide



CAMBRIDGE UNIVERSITY PRESS

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Primary 5

Teacher's Guide

John Wilberforce Essiah

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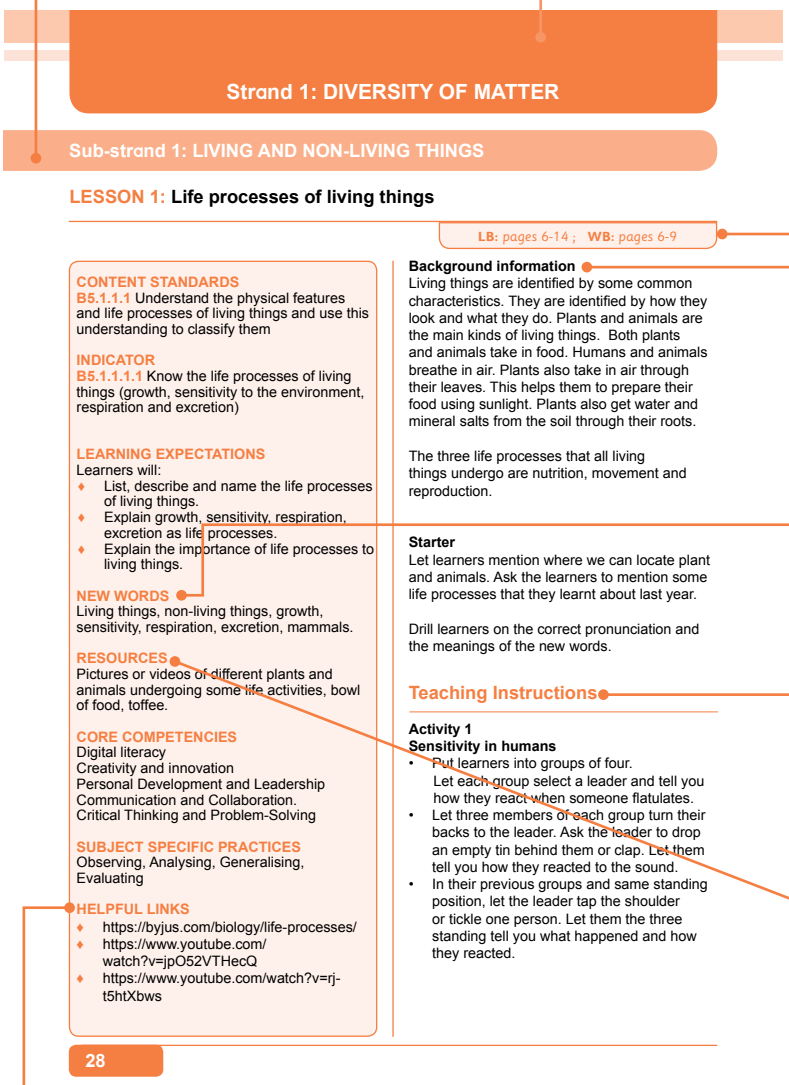
CONTENTS

Structure of the Teacher's Guide

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

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

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



Strand 1: DIVERSITY OF MATTER

Sub-strand 1: LIVING AND NON-LIVING THINGS

LESSON 1: **Life processes of living things**

LB: pages 6-14 ; WB: pages 6-9

CONTENT STANDARDS
B5.1.1.1 Understand the physical features and life processes of living things and use this understanding to classify them

INDICATOR
B5.1.1.1.1 Know the life processes of living things (growth, sensitivity to the environment, respiration and excretion)

LEARNING EXPECTATIONS
Learners will:
- List, describe and name the life processes of living things.
- Explain growth, sensitivity, respiration, excretion as life processes.
- Explain the importance of life processes to living things.

NEW WORDS
Living things, non-living things, growth, sensitivity, respiration, excretion, mammals.

RESOURCES
Pictures or videos of different plants and animals undergoing some life activities, bowl of food, toffee.

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

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Generalising, Evaluating

HELPFUL LINKS
- https://byjus.com/biology/life-processes/
- https://www.youtube.com/watch?v=jpO52VTHecQ
- https://www.youtube.com/watch?v=rj-t5htXbws

Background information
Living things are identified by some common characteristics. They are identified by how they look and what they do. Plants and animals are the main kinds of living things. Both plants and animals take in food. Humans and animals breathe in air. Plants also take in air through their leaves. This helps them to prepare their food using sunlight. Plants also get water and mineral salts from the soil through their roots.

The three life processes that all living things undergo are nutrition, movement and reproduction.

Starter
Let learners mention where we can locate plant and animals. Ask the learners to mention some life processes that they learnt about last year.

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

Teaching Instructions

Activity 1
Sensitivity in humans
- Put learners into groups of four. Let each group select a leader and tell you how they react when someone flatulates.
- Let three members of each group turn their backs to the leader. Ask the leader to drop an empty tin behind them or clap. Let them tell you how they reacted to the sound.
- In their previous groups and same standing position, let the leader tap the shoulder or tickle one person. Let them the three standing tell you what happened and how they reacted.

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Page reference
You will find the 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.

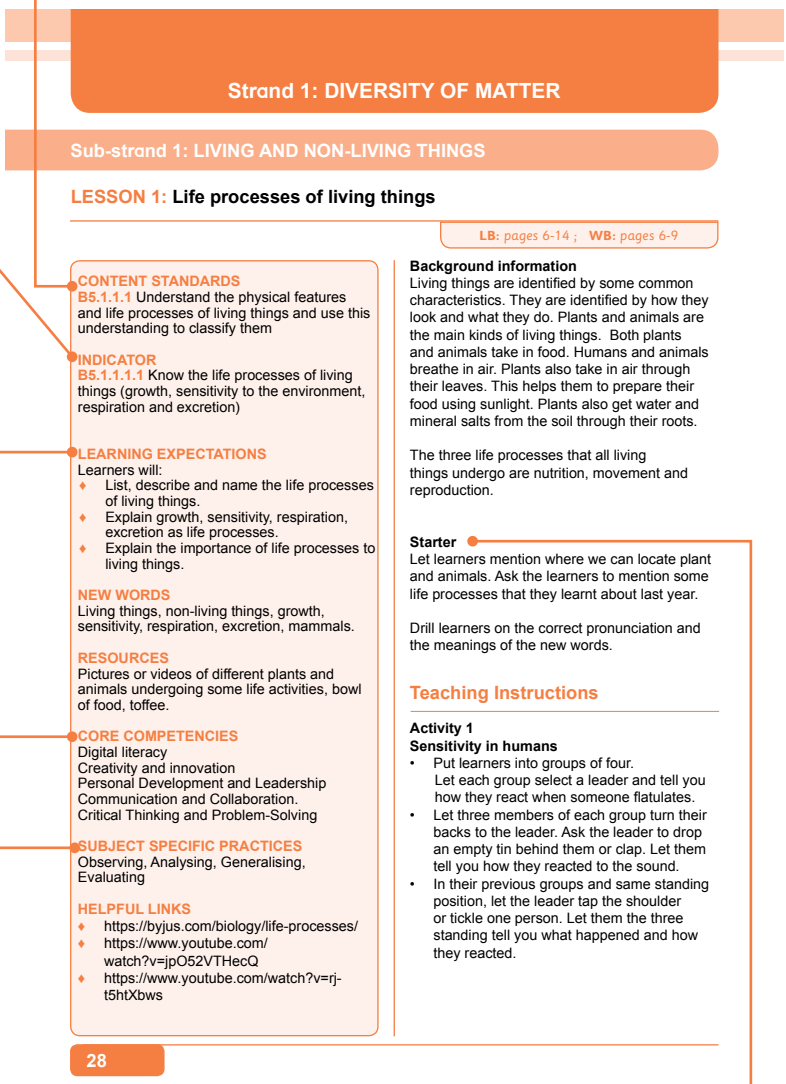
Resources
Helps to aid preparation. The series identifies all the relevant resources necessary to deliver a successful lesson. Resources identified are mostly "NO COST" or "LOW COST" materials that teachers/facilitators can easily acquire to make their lessons more meaningful and enjoyable.

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.



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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.

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

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.

What I have learnt

You may write the following on the chalk board as a summary or refer learners to page 21 of the Learner's Book to read.

1. Living things are things that undergo life processes. Examples are the plants and animals that we see every day.
2. Non-living things do not undergo life processes. Examples of non-living things are sand, stone, water and a mountain.
3. Dead things are things that were once alive but are no longer living. Firewood, carcass of animals, wooden items and leather are examples of dead things These are called organic materials.

Project for home or school

Refer learners to page 20 of the learners book. Direct them to three things in their environment in order to complete the table.

After completing the table, let them state if they are living, non-living or a dead thing.

Assessment for learning

Supervise learners to do the review exercise. Refer them to page 19 of the Learner's Book and pages 10-12 of the Workbook.

Answers to Review Exercises

Exercise 1

1. **Living things -** cat, worm.
   Non-living things - table, bag, water, ball, stone
   Dead - dead bird, firewood.

2 a. dead thing
b. dead thing
c. non-living thing
d. living thing
e. living thing
f. non-living thing

3.

Living things	Non-living things
They grow	They do not grow
They can move on their own	They cannot move on their own
They can produce young ones	They cannot produce young ones
They are sensitive to their environment	They are not sensitive to their environment
They excrete	They do not excrete

Answers to Workbook

Trial 1

1. Living things : these are things that undergo life processes (or they are things that have life in them)
2. Non-living things: these are things that do not undergo life processes (or they are things that do not have life in them)
3. Dead things: these are things that were once alive, but are no longer alive).

Trial 2

1. All things in the world are classified as living things, non-living things and **dead** things. **Living things** undergo life processes, but **non-living** things cannot. **Dead** things are living things that were once **alive**.
2. a. **Living things:** dog, cat, man, bird, etc.
   b. **Non-living things:** water, ball, mountain, a marble, etc.
   c. **Dead things:** firewood, leather, wooden table (any wooden item)

Trial 3

1. living things
2. dead things
3. living things
4. Non-living things
5. dead things

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Answers

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

Project for home or school

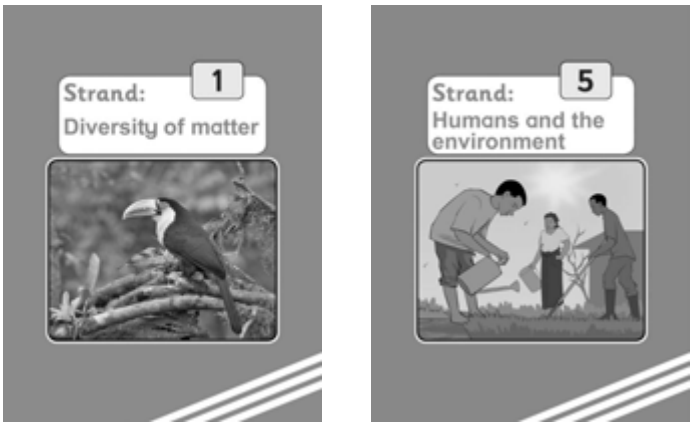
In every lesson, an exploration of the concepts learnt in the classroom is further extended to the home. The series suggests relevant home activities that help learners to augment and consolidate what has been learnt in the classroom and its real life application where neccesary.

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.

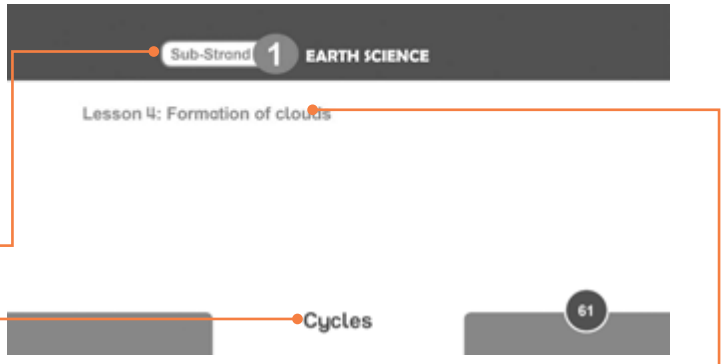


Header and footer labels

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

Watch internet videos about the solar system. https://youtu.be/libKVRa01L8

Talk about

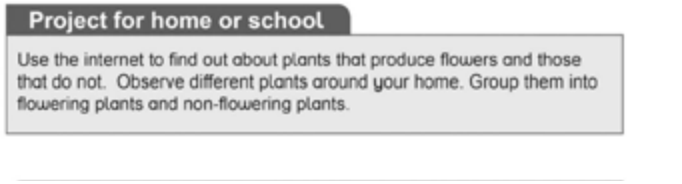
- Learners are expected to discuss questions either in groups or in pairs. It is a critical thinking section that also helps their communication and collaborative skills.

Talk about

Mr Manu wants to make a basket. What materials would you suggest he use?

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.

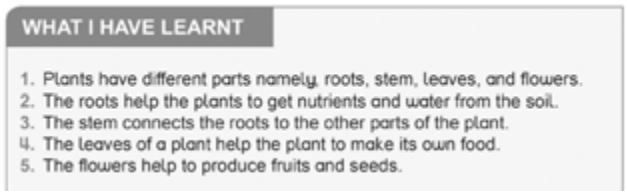


Project for home or school

Use the internet to find out about plants that produce flowers and those that do not. Observe different plants around your home. Group them into flowering plants and non-flowering plants.

What I have learnt

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

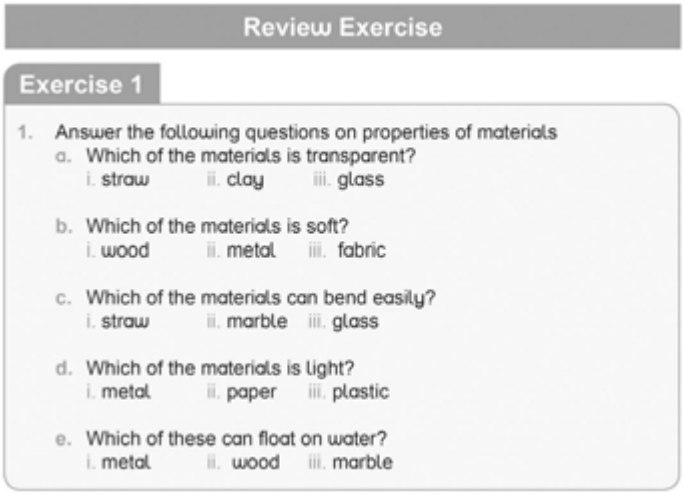


WHAT I HAVE LEARNT

1. Plants have different parts namely, roots, stem, leaves, and flowers.
2. The roots help the plants to get nutrients and water from the soil.
3. The stem connects the roots to the other parts of the plant.
4. The leaves of a plant help the plant to make its own food.
5. The flowers help to produce fruits and seeds.

Review Exercise

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



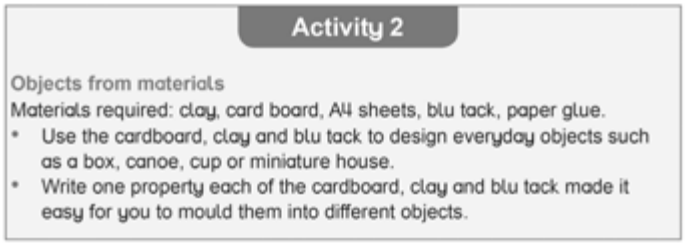
Review Exercise

Exercise 1

1. Answer the following questions on properties of materials
   a. Which of the materials is transparent?
      i. straw ii. clay iii. glass
   b. Which of the materials is soft?
      i. wood ii. metal iii. fabric
   c. Which of the materials can bend easily?
      i. straw ii. marble iii. glass
   d. Which of the materials is light?
      i. metal ii. paper iii. plastic
   e. Which of these can float on water?
      i. metal ii. wood iii. marble

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

Objects from materials

Materials required: clay, card board, A4 sheets, blu tack, paper glue.

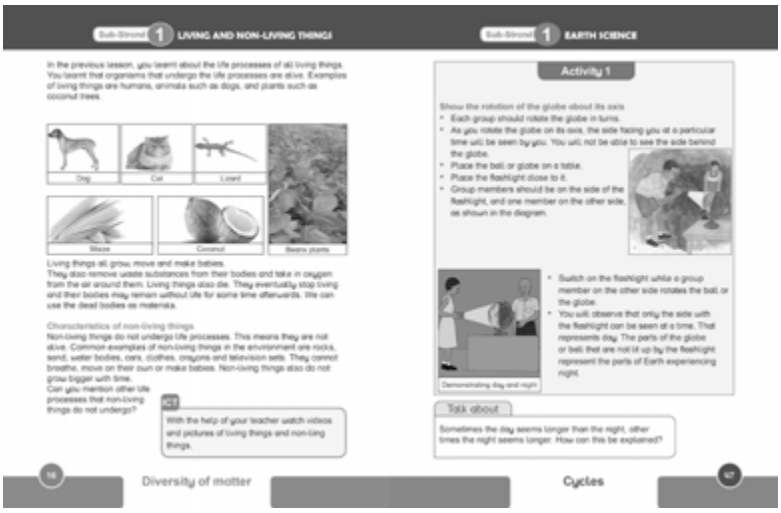
- Use the cardboard, clay and blu tack to design everyday objects such as a box, canoe, cup or miniature house.
- Write one property each of the cardboard, clay and blu tack made it easy for you to mould them into different objects.

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.

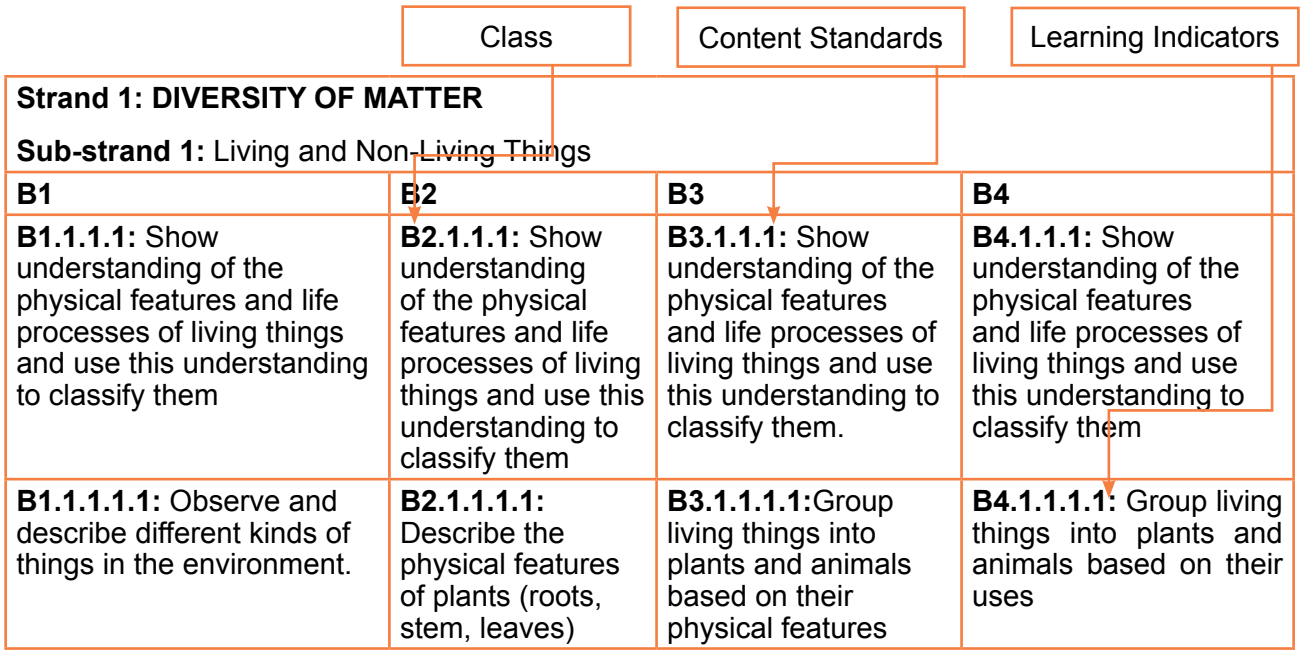
Sub-strands are the topics within each strand under which the content is organized.

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	B5
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	✓
HUMANSAND THE ENVIRONMENT	Personal Hygiene and Sanitation	✓
	Diseases	✓
	Science and Industry	✓
	Climate Change	✓

Source: NaCCA, Ministry of Education 2019

SAMPLE YEARLY SCHEME OF LEARNING – BASIC 5

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: Life processes of living things

LB: pages 6-14 ; WB: pages 6-9

CONTENT STANDARDS
B5.1.1.1 Understand the physical features and life processes of living things and use this understanding to classify them

INDICATOR
B5.1.1.1.1 Know the life processes of living things (growth, sensitivity to the environment, respiration and excretion)

LEARNING EXPECTATIONS
Learners will:
- List, describe and name the life processes of living things.
- Explain growth, sensitivity, respiration, excretion as life processes.
- Explain the importance of life processes to living things.

NEW WORDS
Living things, non-living things, growth, sensitivity, respiration, excretion, mammals.

RESOURCES
Pictures or videos of different plants and animals undergoing some life activities, bowl of food, toffee.

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

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Generalising, Evaluating

HELPFUL LINKS
- https://byjus.com/biology/life-processes/
- https://www.youtube.com/watch?v=jpO52VTHecQ
- https://www.youtube.com/watch?v=rj-t5htXbws

Background information
Living things are identified by some common characteristics. They are identified by how they look and what they do. Plants and animals are the main kinds of living things. Both plants and animals take in food. Humans and animals breathe in air. Plants also take in air through their leaves. This helps them to prepare their food using sunlight. Plants also get water and mineral salts from the soil through their roots.

The three life processes that all living things undergo are nutrition, movement and reproduction.

Starter
Let learners mention where we can locate plant and animals. Ask the learners to mention some life processes that they learnt about last year.

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

Teaching Instructions

Activity 1
Sensitivity in humans
- Put learners into groups of four. Let each group select a leader and tell you how they react when someone flatulates.
- Let three members of each group turn their backs to the leader. Ask the leader to drop an empty tin behind them or clap. Let them tell you how they reacted to the sound.
- In their previous groups and same standing position, let the leader tap the shoulder or tickle one person. Let them the three standing tell you what happened and how they reacted.

Activity 2
Sensitivity in plants

- In a whole class activity, let learners place a pot of plant under a source of light. Make sure the source of light is available day and night for one week.
- Ask them to place another potted plant in a dark place (under a table.)
- Let them observe the two potted plants after a week and write about how plants respond to light.

Activity 3
Plant Growth

- Learners are to form groups of not more six learners.
- Each groups will plant maize seeds.
- Observe the seed daily.
- Record what happens on each day.
- Record daily for a week.
- Compare your report with your friends in other groups.

Activity 4
Comparing plants and animals

- Have learners work in pairs.
- Let them find the differences between how plant and animals undergo each of the following processes:

a. How they Grow

- Ask learners to compare pictures of themselves taken when they were in basic one and now .
- Let them tell you what they see.
- Let them tell you what they observe in activity 3 above on how plants grow.

b. Respond to stimuli

- **Plants:** have learners touch a mimosa plant leaf and observe how it reacts.
- **Human:** Ask learners to tickle a friend and observe how he/she reacts. Make a loud sound, either by playing a drum or clapping your hands and observe how the earners react. Do this when learners are unaware.

c. How they breathe

- **Plants:** Take learners through the following experiment:

What you will need: Fresh leaves, bowl (preferable clear plastic or glass to make it easier to see)

- **Step 1:** Fill the bowl with lukewarm water. You can use a glass or plastic bowl (glass bowls are better as you'll be able to see the experiment from all angles)
- **Step 2:** Place the leaf in the bowl of water and put a small stone on top of it so it is FULLY submerged under the water. Then put the bowl on the sun.
- **Step 4:** Wait for some few hours. Whilst you wait, you can go on with another activity -- maybe you can set the experiment up before lunch or break time.
- **Step 5:** After a few hours, observe and see what is happening. (You should be seeing small bubbles that form around the leaf and the edges of the bowl.)
- You can also show them a video on this experiment. Visit https://youtu.be/MQ8belaTVGo

Animals: Have learners watch a video on breathing in animals. Visit https://youtu.be/cPOl1CYvNKo.
Ask learners to run outside the classroom. Let them observe and tell you how they breathe.
Have learners hold their nose and close their mouth for some seconds. Let them tell you what happened.

Talk about

Engage learners to discuss the 'Talk about' questions on page 11 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 14 of the Learner's Book.

1. All living things undergo some basic life processes. These include growth, excretion, respiration and sensitivity.
2. Animals have special excretory and sense organs.
3. Growth in animals is regular and definite but growth in plants is indefinite.

Project for home or school

Refer learners to page 14 of the Learner's Book. They are to watch videos and pictures of different living and non-living things on the internet and write about the characteristics that make them different from each other.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 12-13 of the Learner's Book and pages 6-9 of the Workbook.

Answers to Review Exercises
Exercise 1
1 . a. iii
b. v
c. i
d. ii
e. iv

2 a. ear
b. sensitive
c. grown
d. waste substance
e. energy

3. Animals: carbon dioxide, urine, sweat
Plants: resins, gum, oxygen

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

5.

Life process	Plants	Animals
Sensitivity	Plants have no sense organs. Plants respond to stimuli slowly.	Animals have sense organs. Animals respond to stimuli quickly.
Growth	Growth in plants is irregular. Plants grow new body parts with time.	Growth in animals is regular. Animals usually do not grow new body parts.
Excretion	Plants have no excretory organs.	Animals have excretory organs.
Respiration	Plants release oxygen into the air.	Animals release carbon dioxide into the air.

Answers to Workbook
Trial 1
1. a. growth
b. oxygen
c. nose
d. excretion
e. sap

2 a. Lung: Carbon dioixide
b. Kidney: Urine
c. Skin: Sweat
d. Liver: Bile

Trial 2
1. a. eye
b. ear
c. nose
d. tongue
e. skin

2. a. Eye: for seeing
b. Ear: for hearing
c. Nose: for smelling
d. Tongue: for tasting
e. Skin: helps us to feel the sense of touch

Trial 3
1. Respiration: the process through which living things get energy from food and air.
2. Sensitivity: the process through which living things respond to changes in their environment.
3. Excretion: the removal of waste substances from the body of living organisms.
4. Growth: an increase in the size of living things.

Trial 4
1. Excretion
2. Respiration
3. Sensitivity
4. Growth
5. Sensitivity

LESSON 2: Differences between living things, non-living things, organic and inorganic materials

LB: pages 15-21; WB: pages 10-12

CONTENT STANDARD
B5.1.1.2 Demonstrate understanding of the differences between living things, non-living things, and things which have never been alive.

INDICATOR
B5.1.1.2.1 Compare the differences among things that are living, dead and things that have never been alive.

LEARNING EXPECTATIONS
Learners will:
- Distinguish things that have never lived from things that have lived.
- Explain what are living and non-living things.
- Identify the differences between living things, things that never lived and non-living things.

NEW WORDS
Living things, dead, non-living things, organic matter, inorganic matter.

RESOURCES
Stone, wooden table, cardboard, pictures of dog, cat, water body, animated videos of some animals and plants.

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

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Generalising, Evaluating

HELPFUL LINKS
- https://www.youtube.com/watch?v=LwkFoy1k2pI

Background information
When we look around our environment, we can see different things. We can see animals, plants, stones, tables, etc.

Organism that undergo the life processes are alive. Examples of living things are humans, animals such as dogs, ants, cats and birds. Plants such as coconut tree, maize and beans plants are also living things. Living things die. They expire. Their bodies however remain for some time after the life processes have stopped.

Starter
Ask learners to go round the school compound and write the name of living and non- living things they see. These should include dead materials.

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

Teaching instructions

Activity 1
Take a walk with your learners around your school or community.
- Ask learners to collect five things that are alive and five things that are non-living. Ask them to collect at least two things that are dead, but which were once alive.
- Back in the class, ask learners to paste the things they collected on a cardboard and write the name of each item under it .
- Task learners to write two things that we can do to prevent trees from dying.

Talk about

Engage learners to discuss the 'Talk about' questions on page 20.

Discuss in class the properties of things that are dead, things that are non-living and things that have never lived (inorganic materials).

What I have learnt

You may write the following on the chalk board as a summary or refer learners to page 21 of the Learner's Book to read.

1. Living things are things that undergo life processes. Examples are the plants and animals that we see every day.
2. Non-living things do not undergo life processes. Examples of non-living things are sand, stone, water and a mountain.
3. Dead things are things that were once alive but are no longer living. Firewood, carcass of animals, wooden items and leather are examples of dead things These are called organic materials.

Project for home or school

Refer learners to page 20 of the learners book. Direct them to three things in their environment in order to complete the table.

After completing the table, let them state if they are living, non-living or a dead thing.

Assessment for learning
Supervise learners to do the review exercise. Refer them to page 19 of the Learner's Book and pages 10-12 of the Workbook.

Answers to Review Exercises
Exercise 1

1. **Living things -** cat, worm.
   Non-living things - table, bag, water, ball, stone
   Dead - dead bird, firewood.

2 a. dead thing
b. dead thing
c. non-living thing
d. living thing
e. living thing
f. non-living thing

3.

Living things	Non-living things
They grow	They do not grow
They can move on their own	They cannot move on their own
They can produce young ones	They cannot produce young ones
They are sensitive to their environment	They are not sensitive to their environment
They excrete	They do not excrete

Answers to Workbook

Trial 1

1. Living things : these are things that undergo life processes (or they are things that have life in them)
2. Non-living things: these are things that do not undergo life processes (or they are things that do not have life in them)
3. Dead things: these are things that were once alive, but are no longer alive).

Trial 2

1. All things in the world are classified as living things, non-living things and **dead** things. **Living things** undergo life processes, but **non-living** things cannot. **Dead** things are living things that were once **alive**.
2. a. **Living things:** dog, cat, man, bird, etc.
   b. **Non-living things:** water, ball, mountain, a marble, etc.
   c. **Dead things:** firewood, leather, wooden table (any wooden item)

Trial 3

1. living things
2. dead things
3. living things
4. Non-living things
5. dead things

LESSON 1: Classification of materials

LB: pages 22-29 ; WB: pages13-15

CONTENT STANDARDS
B5.1.2.1 Recognise materials as important resources for providing human needs.

INDICATOR
B5.1.2.1.1 Classify everyday materials based on their properties (soft, hard, rough, smooth, opaque, transparent and bendable).

LEARNING EXPECTATIONS
Learners will:
- Describe some common properties of materials in the environment.
- Classify and describe some properties of materials as (soft, hard, rough, smooth, opaque, transparent and bendable).
- Explain how the properties of materials help us to use them for making certain objects.

NEW WORDS
Material, Classification, soft, hard, rough, smooth, opaque, transparent and bendable.

RESOURCES
Metal sheets, straw, fabrics, paper, wood, ceramic artefacts, vessels, glass, clay, gravel, A4 sheets, blu tack, paper glue and pictures of these items.

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

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

HELPFUL LINKS
- https://www.youtube.com/watch?v=XnkQcP-RHCw
- https://www.youtube.com/watch?v=pGbc10bk-Tc

Background information
Everything that we see around us is made up of matter and materials. Clothes are made from fabric. Chairs are made from plastic, metal or wood.

Other materials such as metal, straw or paper are also used in making different objects. Shirts are made of fabrics, cloth made from cotton, nylon, polyester but not wood. Buckets are made of plastic or metal sheets.

These items are made up of what we call materials. Materials have different properties. Some materials are hard, soft, rough, smooth, opaque, transparent or bendable. Some materials have two or more properties. Example, some metals can be hard, smooth and shiny at the same time

Starter
Ask learners to mention some household items and the materials/substances used to make them. Let them state the reason why they think those materials were chosen to make those particular items.

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

Teaching Instructions

Activity 1
Properties of different materials
- Put learners into groups of five and give them these materials. Paper, a piece of wood, gravel, fabric, metal, grass straw and clay.
- Task each group to write two properties of each of the items you gave them and record their work in a table form.

Activity 2
Objects made from materials
Provide the following materials to learners: clay, card board, A4 sheets, blu tack and paper glue. Let them work in pairs.

- Let them use the cardboard, clay or blu tack to design everyday objects such as a box, canoe, cup or a miniature house.
- Let them write one property that helped them to mould the materials into different objects.

Talk about

Engage learners to discuss the 'Talk about' questions on page 27.

What I have learnt

You may write the following on the chalk board as summary, or refer learners to page 29 of the Learner's Book to read.

1. We can describe common materials such as paper, wood, metal and fabrics based on their various properties.
2. The properties of a given material enable us to use them for doing various activities.

Project for home or school

Refer learners to page 29 of the Learners Book. Ask them to select different objects in their home. They should observe each by touching, rubbing, lifting, putting it in water and bending in order to answer the questions.

Encourage parents assistance.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 27-28 of the Learner's Book and pages 13-15 of the Workbook.

Answers to Review Exercises
Exercise 1

1. a. iii. glass
   b. iii. fabric
   c. i. straw
   d. ii. paper
   e. ii. wood

2.

Materials	Properties
Wood	Rigid, heavy, hard, opaque
Clay	Soft, opaque
Stone	Light, bendable
Glass	Transparent, heavy
Rocks	Rough

3. a. strong
   b. transparen
   c. it is flexible
   d. float on water
   e. do not allow water to pass thgrough them.

4. a. **Wood:** floats on water, strong, does not rust, not transparent, rigid.
   b. **Metal:** strong, heavy, not transparent, rigid.
   c. **Plastic:** light, does not allow water to pass through it.
   d. **Paper:** flexible, light

Answers to Workbook
Trial 1

Materials	Describtion
Wood	heavy, rigid, opaque, rough
Metal	heavy, rigid, opaque
Plastic	light, rigid, smooth
Straw	flexible, light, opaque, smooth
Glass	transparent, smooth, rigid)

Trial 2

1 Wood: heavy, rigid, opaque,
Metal: strong, heavy, rigid
Straw: flexible, light, opaque,
Glass: transparent, smooth
Clay: smooth, opaque, sticky

2.

	Materials	Properties	
a.	paper- light, metal- heavy	heavy	light
b.	straw - smooth, wood - rough	rough	smooth
c.	glass - transparent, fabric - opaque	transparent	opaque
d.	straw - flexible, metal - rigid	rigid	flexible

Trial 3

1. strong
2. transparent
3. it is flexible
4. float on water
5. do not allow water to pas through them.

LESSON 2: Reversible and irreversible changes

LB: pages 30-34. **WB:** pages 16-17

CONTENT STANDARDS
B5.1.2.2 Know that substances can exist in different physical states (solid, liquid, gas). Many substances can be changed from one state to another by heating or cooling.

INDICATOR
B5.1.2.2.1 Know that some changes are reversible, while others cannot be reversed.

LEARNING EXPECTATIONS
Learners will:
- Explain a reversible change.
- Explain an irreversible change.
- Give examples of reversible and irreversible changes.
- Distinguish between reversible and irreversible changes.

NEW WORDS
States of matter, change of state of matter, heating, cooling, freezing, melting, evaporation, condensation.

RESOURCES
Chalk, wax, water in a bowl, ice block, paper, source of heat, iron nails, egg and candle.

CORE COMPETENCIES
Personal Development and Leadership
Communication and Collaboration.

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

HELPFUL LINKS
- https://www.youtube.com/watch?v=wdHo7wiuCOs
- https://www.youtube.com/watch?v=U6cxHOnEBo4

Background information
What do steam, water, and ice have in common? They are all different forms of water. This is because water and some other substances are able to change states. They can become solids, liquids, or gases.

Matter usually changes state when heat is either added or taken away from it.

Sometimes when a substance is changed, it can be changed back to its original form. This kind of change is called reversible change. An example is shea butter. At other times it cannot be changed back to its previous state. An example is boiling of yam. Such a change is called an irreversible change. The opposite of an irreversible change is a reversible change.

Starter
Ask learners to mention some substances that melt when heated and some substances that burn when heated.

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

Teaching Instructions

Activity 1
Reversible and irreversible changes
Materials required: Candle, ice block, piece of paper, source of heat, water, iron nail
- Learners must work in groups of five and demonstrate some processes, such as boiling of water, burning of paper, melting of candle wax, boiling of an egg.
- Ask them to observe the changes that take place in each process and classify the changes as reversible or irreversible.

Activity 2
Processes that involve reversible and irreversible changes
- Learners work in pairs to identify processes that take place in our homes and communities, such as pounding of food, grinding of vegetables, preparation of soup.

- Learners must classify them as either reversible or irreversible changes in a whole class discussion.

Talk about

Engage learners to discuss the 'Talk about' questions on page 32.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 34 of the Learner's Book to read.

1. There are two main forms of changes, namely reversible and irreversible changes.
2. A reversible change is one in which no new substance is formed.
3. An irreversible change is one which leads to the formation of a new substance.
4. Examples of reversible changes include melting of candle wax, freezing of ice and grinding of chalk into powder.
5. Rusting of metals, burning of paper and cooking of rice are all examples of irreversible changes.

Project for home or school

Direct learners on what is expected of them. They should find out the activities in their homes that involve reversible and irreversible changes, and report back.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 33 of the Learner's Book and pages 16-17 of the Workbook.

Answers to Review Exercises
Exercise 1

1 a. **Reversible Change:** a change that leads to the formation of a new substance.
b. **Irreversible Change**: a change that does not lead to the formation of a new substance
2 a. **Reversible changes:** melting of candle, melting of ice, melting of shea butter, freezing of water, evaporation of water, grinding chalk into powder.
b. **Irreversible changes:** cooking of food, burning of paper or any materials, rusting of a metal

3. **Reversible changes**
I. Melting of shea butter
ii. Grinding of chalk into powder

Irreversible changes
i . Burning of wood
ii. Boiling of yam
iii. Frying of fish in a frying pan

4.

Reversible	Irreversible
Does not lead to the formation of a new thing	Leads to the formation of a new thing
The change can always be overturned	The change cannot be overturned

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

Answers to Workbook
Trial 1

1. A reversible change is a change that usually does not lead to the formation of a new substance. An irreversible change leads to the formation of a new substance

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

Trial 2

1.In **irreversible** changes a new substance is formed. Processes that involve burning are often times irreversible. On the other hand, freezing is a good example of a **reversible** change. In this case, the substance retains its **properties** so it can easily be **reversed**.

2. a. Reversible
b. Reversible
c. Irreversible
d. Irreversible
3. Irreversible

LESSON 3: Formation and separation of mixtures

LB: *pages 35-43.* **WB:** *pages 18-21*

CONTENT STANDARDS
B5.1.2.3 Understand mixtures, the types, formation, uses and ways of separating them into their components.

INDICATOR
B5.1.2.3.1 Demonstrate formation and separation of mixtures (solid-liquid and liquid-liquid mixtures).

LEARNING EXPECTATIONS
Learners will:
- Describe a solid-liquid mixture and give examples.
- Describe a liquid-liquid mixture and give examples.
- Describe how to form solid-liquid and liquid-liquid mixtures from two or more substances.
- Describe how to separate solid-liquid and liquid-liquid into their individual components.

NEW WORDS
Mixtures, evaporation, distillation, dissolve, decant, filtration, residue, filtrate.

RESOURCES
Water, sugar, kerosene, cooking oil, gari, palm oil, milk, filter paper, funnel, a stirrer and a bowl.

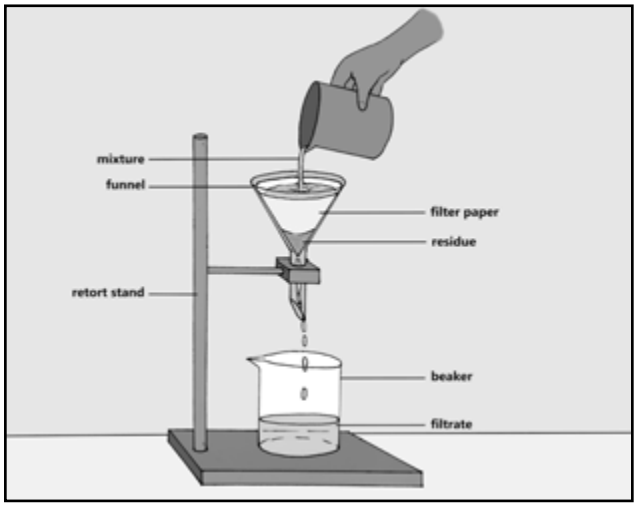
CORE COMPETENCIES
Personal Development and Leadership
Communication and Collaboration
Critical Thinking and Problem-Solving

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Generating, Reporting

HELPFUL LINKS
- https://www.edusmart.com/K-5_TeacherResources/Grade4/TG-G4-SeparatingMixtures.pdf
- https://www.youtube.com/watch?v=4DAxYArKOOA

Background information
When you put sugar into a bowl of water, it dissolves in the water to form a mixture. This mixture is called a solid-liquid mixture. As the name suggests it is a mixture formed between a solid substance and a liquid substance.
In many households, a common beverage is prepared by dissolving the solid sugar in water. Corn dough, rice or flour is also mixed with water during the preparation of food.

Some mixtures can be separated, others can not. Some ways mixtures can be separated are filtration, evaporation, decantation. Filtration is used to separate a solid-liquid mixture in which the solid does not dissolve in the liquid. An example is a mixture of gari and water.



Starter
Ask learners to mention some types of mixtures they know. Let them explain how they are formed.

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

Teaching Instructions

Activity 1
Solid-liquid and liquid-liquid mixtures
- Put learners into groups of five and give them the following materials, water, sugar, kerosene, cooking oil, gari, milk.

- Ask learners in each group to mix any two of the different substances they have and write the name of the mixture formed.
- Task them to indicate whether it is a liquid-liquid or solid-liquid mixture.
- Ask each group to mix different substances from the previous one to form different mixtures.
- Let them use the table below to report on the mixtures they have formed.

S/N	Name of mixture	Type of mixture
1		
2		
3		
4		
5		

Activity 2
Separating solid-liquid mixtures (Filtration)
Look for the following materials for this activity. filter paper, funnel, a stirrer and a bowl. (you can make your own funnel by cutting the top part of a plastic bottle. A piece of cloth or cotton wool can also be used as a filter paper. The bottom part of the bottle can also be used as the collecting bowl)

- Ask learners to place the filter paper in the funnel. They should position the funnel well in the collecting vessel.
- Ask them to make a mixture of gari and water. They should pour the mixture into the funnel with the filter paper and stir.
- Let them observe what happens to the gari and water mixture. (The water passes through the filter paper, but the gari is trapped). Let them know that the gari is the residue and the water is the filtrate.

Activity 3
Separating a mixture of salt and water by evaporation

- Put learners into group of three or four.
- Give each group the following materials, salt, bowl of water, saucepan and source of heat.
- Direct them to perform the experiment using the following instructions.
  - Pour two tablespoons of salt into a bowl of water.
  - Stir until all the salt dissolves in the water.
  - Put the mixture in a metallic saucepan.
  - Heat the saucepan and observe what happens. (The water will evaporate, leaving the salt in the pan.)

Activity 4
Separating two immiscible liquids

- Put learners into groups of five and give each group the following materials; transparent plastic bottle, water, cooking oil.
- Direct them to perform an experiment using the following instructions.
  - Pour water into a bowl and add a little amount of cooking oil.
  - Let the mixture of water and oil settle for about five minutes.
  - Using a nail, create a very small hole in the lid of the empty bottle.
  - Carefully pour the mixture of oil and water into the empty bottle.
  - Cover the bottle with its lid and invert it (turn the bottle upside-down, so that the bottom faces up).
  - Squeeze the bottle gently and observe what will happen. (the water begins to come out drop by drop.)

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

Talk about

Engage learners to discuss the 'Talk about' question on page 39.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 43 of the Learner's Book to read.

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

Examples of liquid-liquid mixtures are orange juice and water, tea and milk. Some liquids are miscible and others immiscible.

Project for home or school

Refer learners to page 42 of the Learner's Book to follow the instruction to the activity. Encourage parental inclusion.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 41-42 of the Learner's Book and pages 18-21 of the Workbook.

Answers to Review Exercise
Exercise 1

2. a. Filtration
   b. i. muddy water ii. filter paper cone iii. clear water
   c. used for separating solids from liquids
   d. sand and water, gari and water, chalk and water.

2. Filtration and evaporation

3. a. Use of a separating funnel: palm oil and water, kerosene and water
   b. Filtration: gari and water, sand and water, chalk and water
   c. Evaporation: salt and water, sugar and water

4. a. A mixture of two miscible liquids: water and milk, water and alchohol
   b. A mixture of two immiscible liquids: palm oil and water, kerosene and water.

5. a. Water and sand, water and gari, water and salt, water and sugar.
   b. Water and kerosene, water and milk, water and palm oil.

Answers to Workbook
Trial 1

1. Water and palm oil
   Water and milk
   Water and kerosene
   Kerosene and petrol
   Petrol and water
2. Water and sand
   Kerosene and sand
   Water and gari
   Sugar and water
   Salt and water

Trial 2

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

Trial 3
The salt remains in the saucepan.
The mixture is put in a saucepan.
The water turns to vapour and escapes.
The saucepan is placed on a source of heat.

Trial 4

1. Evaporation: salt and water, sugar and water
2. Use of a separation funnel: palm oil and water, kerosene and water
3. Sedimentation: sand and water
4. Filtration: chalk and water, gari and water, muddy water.

Strand: 2

CYCLES

LESSON 1: Formation of day and night

LB: pages 46-49 ; WB: pages 24-26

CONTENT STANDARDS
B5.2.1.1 Recognise that some events in our environment occur recurrently.

INDICATOR
B5.2.1.1.1 Know how day and night are formed.

LEARNING EXPECTATIONS
Learners will:
- Explain that the Earth is constantly moving around the sun.
- Explain that the Earth is always rotating on its axis.
- Describe how the rotation of the Earth causes day and night.

NEW WORDS
Rotation, axis, sun, Earth, day, night.

RESOURCES
Pictures or videos showing darkness and day, globe, ball, flash light.

CORE COMPETENCIES
Creativity and Innovation
Cultural Identity and Global Citizenship
Personal development and leadership
Communication and Collaboration.

SUBJECT SPECIFIC PRACTICES
Observing, Designing Experiment, Manipulating, Analysing, Representing

HELPFUL LINKS
- https://www.youtube.com/watch?v=8q_78ba6ixE
- http://www.primaryhomeworkhelp.co.uk/time/index.html

Background information
The Earth is spherical. It is imagined to have a line through its centre called the **axis** around which it rotates. The rotation of the Earth about its axis causes day and night. The Earth rotates round on its axis in 24 hours. The sun is fixed at a distance from the Earth. The sun produces light and heat.

Starter
Ask learners to mention what they do when they see the sun and what they do when they see the stars and the moon.

What has these got to do with the cyclic movements?

For how long do you see the sun in the sky during the day?

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

Teaching Instructions

Activity 1
Rotation of the globe about its axis
- Put learners into groups of four.
  Give each group the following materials; globe/ball, flash light.
- Guide them to perform the activity using the following instructions.
  a. Rotate the globe/ball in turns.
  b. As they rotate the globe/ball on its axis, let them tell you what they notice. (The side facing them at a particular time will be seen. The side behind the globe cannot be seen.

Activity 2
- In their previous groups, let a member swith on the flashlight onto the globe whilst another group member rotates the globe/ball.

- Ask learners to observe and tell you what they see. (Only the side with the flashlight can be seen at a time. That represents day. The parts of the globe or ball that are not lit up by the flashlight represent the parts of Earth experiencing night.)

Talk about

Engage learners to discuss the 'Talk about' question on page 47.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 49 of the Learner's Book to read.

1. The Earth rotates round an imaginary line through its centre called the axis. The Earth completes one rotation around its axis in 24 hours.
2. Day and night occur due to the rotation of the Earth on its axis. The light from the sun shines on the Earth. The side of the earth facing the sun has day, and the other side night.

Project for home or school

Refer learners to page 49 of the Learners Book. Ask learners are to present their findings in class during the next lesson for discussion.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 48 of the Learner's Book and pages 24-26 of the Workbook.

Answers to Review Exercises
Exercise 1

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

2. a. Earth
   b. 24 hours
   c. Formation of day and night
   d. The sun

Answers to Workbook
Trial 1

1. (b) earth
2. (c) light
3. (b) sun
4. (b) day and night
5. (c) 24

Trial 2

1. a. axis
   b. night
   c. day
   d. the globe will move around the flashlight

Trial 3

- The Earth is a sphere that spins round and round as it travels round the sun.
- At any given time, one side of the Earth faces the sun while the other side faces away from the sun into space.
- The side facing the sun receives light and heat.
- We have daylight on the side of Earth on which the sun is shining and night on the other part where the sun is not shining.
- The other side is cooler and darker and experiences night.

LESSON 2: Importance of the sun

LB: pages 50-55; WB: pages 27-28

CONTENT STANDARDS
B5.2.1.2 Recognise the relationship between the Earth and the sun.

INDICATOR
B5.2.1.2.1 Describe the benefits of the sun to the Earth.

LEARNING EXPECTATIONS
Learners will:
- Identify the importance of the sun to humans.
- Explain the benefits of the sun to plants and animals.

NEW WORDS
Solar, photosynthesis

RESOURCES
Picture or video of the sun, pepper seeds, loamy soil.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Evaluating, Communicating, Designing, Experiment

HELPFUL LINKS
- https://www.online-sciences.com/earth-and-motion/what-is-the-importance-of-the-sun-solar-energy/
- https://www.youtube.com/watch?v=88QwqQYTKBI

Background information
The earth moves round in a circle with the sun as the centre. The earth orbits the sun because it is the main source of light and heat.

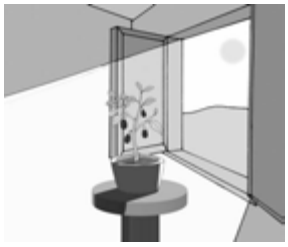
Starter
Let learners go outside the classroom and look at the sky. Ask them to describe what they see and how they feel.

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

Teaching Instructions

Activity 1
Benefits of the sun to humans
- Put learners into groups of four. Each group should select a leader and discus and write the benefits of the Sun to living things.
- Ask each group to share their ideas with the whole class. (Sun helps us to dry or clothes and the sun also helps plants in making their food)

Activity 2
Importance of sunlight to the growth of plants
- Put the class into two groups, A and B. Make sure there is gender balance.
- Group A should plant pepper seeds in a loamy soil and place it at a position where it will be exposed to Sunlight, example: window.
- Group B should plant pepper seeds in the loamy soil and place it under a table or a cupboard.
- They should water them daily and share what happen after one week.
- Let each group compare their plant with the other groups and tell any differences they observe. (a. The plant placed at the window develops well. The stem and leaves remain dark green. b. The plant placed in a dark cupboard grows thin and yellow. The leaves become just a little pale green and the stem is dry and thin.)



Talk about

Engage learners to discuss the 'Talk about' questions on page 54.

"What is the most important benefit of the sun to you?"

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 55 of the Learner's Book to read.

1. The sun is the source of all energy on Earth.
2. It provides the world with light and heat.
3. The sun is important for processes such as photosynthesis and the formation of rain
4. The sun also helps to form day and night and different seasons on the Earth.

Project for home or school

Refer learners to page 55 of the Learner's Book. They are to design and make a sun with glue, cardboad and paper.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 54 of the Learner's Book and pages 27-28 of the Workbook.

Answers to Review Exercises
Exercise 1

1. a. It gets energy from the sun to help it prepare its own food.
   b. It does not get energy from the sun for preparing food.
   c. plant A looks fresh but plant B looks dead.
2. a. The sun is the main source of **energy** in the form of light and **heat.**
   b. Plants use sunlight to produce **food** through the process of **photosynthesis**.
   c. The sun also contributes to the formation of rain through the **water cycle.**
3. a. **Farmers:** helps crops to make their own food through photosynthesis
   b. **Laundries:** helps in drying of washed clothes and other items.
   c. **Tanneries:** the tanned clothes or materials are dried in the sun.

Answers to Workbook
Trial 1

1. a. True
   b. False
   c. True
   d. False
   e. True
2. Helps us to see in the daytime
   Helps to dry our clothes
   Keeps us warm
   Used to preserve cassava, fish and other food substances
   Helps us to have the dry season and the rainy season

Trial 2
Learners to draw.

LESSON 3: Evaporation and condensation as processes of water cycle

LB: pages 56-60; WB: pages 29-31

CONTENT STANDARDS
B5.2.1.3 Show understanding of the roles of condensation, evaporation, transpiration and precipitation in the hydrological (water) cycle.

INDICATOR
B5.2.1.3.1 Demonstrate evaporation and condensation as important processes of the hydrological (water) cycle.

LEARNING EXPECTATIONS
Learners will:
- Describe how the water cycle occurs.
- Identify some key stages within the water cycle.
- Distinguish between evaporation and condensation within the water cycle.

NEW WORDS
Evaporation, transpiration, condensation, hydrological, precipitation.

RESOURCES
Videos or pictures showing the stages of water cycle, saucepan, containers.

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

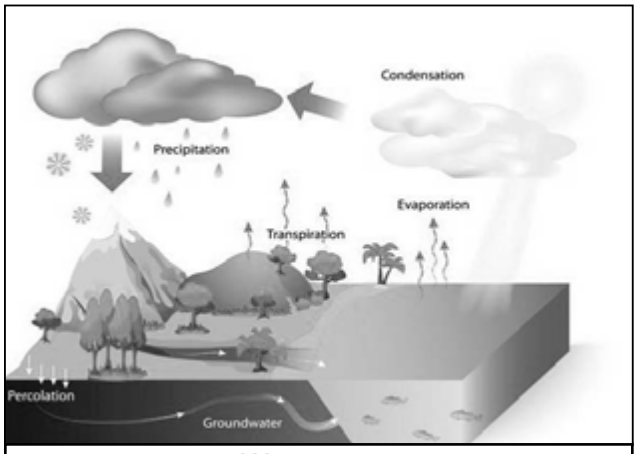
SUBJECT SPECIFIC PRACTICES
Observing, Experimenting,
Recording, Generalising

HELPFUL LINKS
- https://www.theschoolrun.com/what-is-the-water-cycle
- https://www.kidzone.ws/water/

Background information
Water is very important to humans and other living things. Water from different sources such as rivers, streams and lakes evaporate into the sky and fall back to the Earth's surface in a continuous cycle called the water cycle.
Trees lose water to the atmosphere through their leaves in a process called transpiration.

Water from the sea, rivers, lakes and other sources evaporates into the atmosphere. Evaporation is when the liquid water changes to gas and moves into the atmosphere.
When the water vapour gets into the sky, it cools down and changes into water droplets in a process called condensation.

These tiny droplets combine together to become bigger droplets. As the size of the droplets increases, they become so heavy that they can no longer be suspended in the air. They therefore fall to the ground as rain or other forms of precipitation such as snow, hail or sleet. This water fills rivers, wells, lakes and other water sources. Eventually some of the water evaporates into the sky to continue the water cycle.



Water cycle

Starter
Ask learners to explain what happens when they heat water. Let them explain what happens when they cover it.

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

Teaching instructions

Activity 1
Evaporation of water by the sun

- Put learners into groups of four or five. Let them pour water into a transparent bowl.
- Mark the level of water in the bowl with a marker or charcoal and place it in the sun.
- After two hours, let them observe the water in the bowl and mark the level again.
- Let each group tell the class their findings. (They will observe that the amount water has reduced. This is because the heat from the sun will cause the water to evaporate.

Activity 2
Evaporation and condensation of water

- Prepare the following: a source of heat a sauscepan with a transparent glass cover.
- Demonstrate for learners to observe using the following process.
  a. Pour an amount of water into the container. Put it on fire to boil without a cover.
  b. Ask learners to observe what happens as the water begins to boil. (They will observe that water vapour goes up)
  c. Cover the saucepan with its transparent cover.
  d. Have learners carefully observe the water in the saucepan.
  (They will observe that water droplets begin to appear)

Talk about

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

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 60 of the Learner's Book to read.

1. The water cycle is a process through which water from the Earth moves to the clouds and eventually falls back to the Earth.
2. Through evaporation, water from various sources condenses into vapour and moves up the sky into the clouds.
3. Condensation is the process through which the water vapour is turned back into liquid water droplets. This liquid water eventually falls back as rain.

Project for home or school

Refer to page 60 of the Learner's Book.
Learners are to draw a picture showing the water cycle.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 59-60 of the Learner's Book and pages 29-31 of the Workbook.

Answers to Review Exercises
Exercise 1

1. A. condensation
   B. precipitation
   C. evaporation

2. a. liquid, gas
   b. condense
   c. clouds
   d. transpiration

3. • As the rice was on fire, the heat of the fire causes the water to evaporate (turn into gas).
   • As the water vapour gets to the lid of the saucepan, it is cooled down and turns back into liquid water.

4. i. Evapulation
   When the sun shines on the surfaces like "sea, rivers, lakes and the soil" water evapurates into the atmosphere in form of gas.

   ii. Condensation
   The water vapour that gets into the autnosphere cools down and chages into water droplets. The droplets combine to become clouds. These falls on the ground as rain when they can no longer suspend in the air.

Answers to Workbook

Trial 1

1. Learners to draw.

Trial 2

1. Precipitation: this is the falling down of water from the clouds in the form of rain, ice, snow or sleet.
2. Evaporation: this is the change of water from liquid to gas or water vapour. This happens when the water is heated.
3. Condensation: this is the process of water changing from vapour to liquid water.

Trial 3

- Water from different sources evaporates into the atmosphere.
- Trees also lose water through transpiration.
- The water vapour gets into the sky and cools into tiny water droplets through condensation.
- These tiny droplets combine together to become bigger droplets.
- These droplets eventually fall to the ground as rain or precipitation.

LESSON 4: Formation of clouds

LB: pages 61-65; WB: pages 32-33

CONTENT STANDARDS
B5.2.1.3 Show understanding of the roles of condensation, evaporation, transpiration and precipitation in the hydrological (water) cycle.

INDICATOR
B5.2.1.3.2 Know how clouds are formed.

LEARNING EXPECTATIONS
Learners will:
- Describe how clouds are formed.
- Demonstrate the formation of clouds.
- Explain why clouds are formed far away from the Earth's surface.

NEW WORDS
Cirrus, Cumullus, Strattus, Nimbus, Rainbow

RESOURCES
Picture or video illustrating the formation of clouds, plastic bottle, warm water, matches.

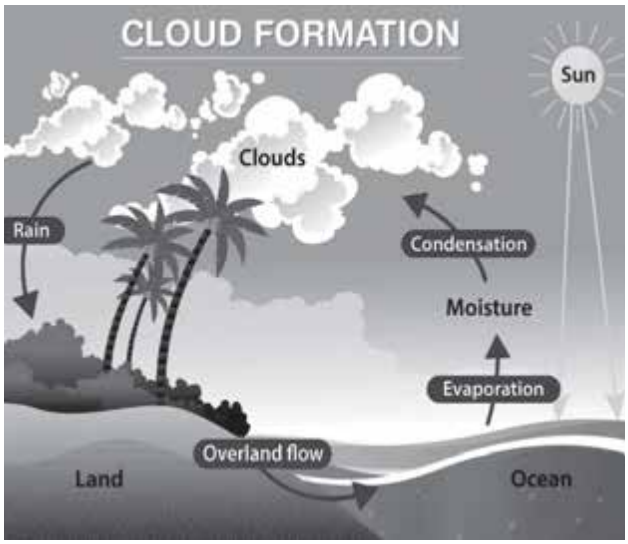
CORE COMPETENCIES
Creativity and innovation
Personal development and leadership
Communication and Collaboration.
Critical Thinking and Problem-Solving

SUBJECT SPECIFIC PRACTICES
Manipulating, Analysing, Evaluating, Communicating.

HELPFUL LINKS
- https://www.youtube.com/watch?v=yod3wMbFHUY
- https://scied.ucar.edu/learning-zone/clouds/how-clouds-form
- https://scienceexplorers.com/teaching-children-about-how-clouds-form/

Background information
A cloud is a large collection of very tiny droplets of water or ice crystals. They are formed from water that evaporates from the earth and moves to the sky in the form of vapour.Transpiration is loss of water through the leaves of plants.

When the water vapour reaches the clouds, they condense unto tiny pieces of dust. The condensed water appears as water droplets around the tiny dust pieces. Thousands of water droplets finally gather together to become a visible cloud.



Starter
Ask learners to go out and observe the clouds in the sky. Let them explain what they have observed.

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

Teaching Instructions

Activity 1
Types of clouds in the sky
- Take learners out of the class to observe the clouds in the sky. Let them take along a sheet of paper.
  a. Have them look carefully to observe the type of cloud they see in the sky.
  b. Ask each learner to write his/her answer on a sheet of paper.
- Back in the class, let each learner compare what they wrote with that of their friends.
- Invite five learners at random to tell the class what they wrote and why they chose that answer.

Activity 2
Formation of clouds (using a bottle)
Materials needed: A Plastic water bottle with a sports cap, Warm water, Matches

- Put learners into groups of five. Give each group a plastic bottle with a sprouts cap, warm water and matches.
- Ask each group to carry out the experiment by following the steps below:
  a. Pour small amount of warm water into the plastic bottle. Put the cap on but don't close it.
  b. Light the match; blow it out so that it smokes.
  c. Quickly suck the smoke into bottle by squeezing the bottle gentle a few times and close the cap.
  d. Squeeze the bottle and release it. Let learners repeat several times and tell you what they see. (When they squeeze the bottle, there is no cloud but when they release the bottle, a cloud appears).

Talk about

Engage learners in a critical thinking session to tell you the type of clouds they are likely to observe in the sky during the rainy season? Refer learners to page 64 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 65 of the Learner's Book to read.

1. A cloud is a large collection of very tiny droplets of water or ice crystals.
2. They are formed when water vapour from the earth condenses around tiny drops of dust in the sky. These droplets of water combine to form huge clouds.
3. There are four main types of clouds namely, stratus, nimbus, cumulus and cirrus.

Project for home or school

Ask learners to watch videos on cloud formation using the internet and find out the types of clouds that are commonly seen in Ghana.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 65 of the Learner's Book and pages 32-33 of the Workbook.

Answers to Review Exercises
Exercise 1

1. • Air contains water, but the water is in the form of a gas called water vapour.
   • When warm air rises, it expands and cools.
   • Cool air cannot hold as much water vapour as warm air, so some of the vapour condenses onto tiny pieces of dust that are floating in the air and forms a tiny droplet around each dust particle.
   • When billions of these droplets come together they become a visible cloud.
2. • The amount of water vapour in the air.
   • The temperature.
   • wind.
3. a. Stratus clouds look like a huge thick blanket covering the sky.
   Cumulus clouds is white or grey.
   b. Nimbus clouds are dark and are seen during a thunderstorm.
   Cirrus cloudeS are made of ie crystals instead of water drops.
4. a. Stratus clouds
   b. Snow was about yo fall
   c. raining weather or snowing weather

Answers to Workbook

Trial 1

- Water evaporates from water bodies, the sweat and urine of humans as well as transpiration.
- The water vapour moves up till they finally reach the clouds.
- Within the clouds they condense unto tiny pieces of dust.
- The condensed water appears as water droplets around the tiny dust pieces. (4)
- ousands of water droplets finally gather together to become a visible cloud.

Trial 2

1. • Temperature
   • The amount of water vapour in the clouds
   • The wind
2. a. ii
   b. iv
   c. i
   d. iii

LESSON 5: The effect of carbon dioxide

LB: pages 66-70; WB: pages 34-35

CONTENT STANDARDS
B5.2.1.4 Demonstrate understanding of how carbon and nitrogen are cycled in nature.

INDICATOR
B5.2.1.4.1 Describe the uses of carbon dioxide and its effects on humans and life on Earth.

LEARNING EXPECTATIONS
Learners will:
- Identify human activities that produce carbon dioxide.
- Identify the importance of carbon dioxide gas.
- Explain the harmful effects of carbon dioxide.

NEW WORDS
Atmosphere, extinguisher, global warming

RESOURCES
Picture or videos of human breathing out, cars releasing carbon dioxide through the exhaust pipe, candle, vinegar, baking soda, funnel,

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

SUBJECT SPECIFIC PRACTICES
Analysing, Evaluating, Communication

HELPFUL LINKS
- https://study.com/academy/lesson/carbon-dioxide-lesson-for-kids-definition-facts.html
- https://www.youtube.com/watch?v=xFE9o-c_pKg

Background information
Carbon dioxide is a very well-known gas. It is the component of air that we breathe out. It is a gas that has no taste, colour or smell.
When you breathe out air, carbon dioxide produced in the body comes out.

Just like humans, animals breathe out carbon dioxide. However, dangerous levels of carbon dioxide are released mainly through the engines of vehicles and other machines that use petroleum fuels. Carbon dioxide is also released through bushfires and the activities of factories that produce smoke. It is absorbed by plants when we breathe it out to prepare their own food.

Starter
Ask learners to breathe out. Let them explain what they experience.

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

Teaching Instructions

Activity 1
Sources, uses and effects of carbon dioxide
- Put learners into group of four or five. Refer them to activity 1 on page 66 of the Learners Book.
- Direct each group to read the notes under the three sub-headings on pages 66-68.
- Engage in a class discussion with learners to answer the questions in the activity.
- Let them know that;

1. a. The air humans and animals breathe out releases some carbon dioxide into the environment.
   b. When things are burnt, carbon dioxide is released.
   c. When engines of vehicles and often machines burn fuel as they operate, carbon dioxide is released in the form of smoke into the atmosphere.
2. a. Carbon dioxide helps plants make their food.
   b. Carbon dioxide gas is also used in making fire extinguishers which are used in putting out fires.
   c. Carbon dioxide prevents the earth from becoming too cold when the gas trap some of the heat from leaving the surface of the air.
   d. Carbon dioxide is used in making soft drinks like Fanta and coke.

3. Yes, too much carbon dioxide produced can cause the world to be warmer. This leads to excessive rains that cause flood. Too much of carbon dioxide in the atmosphere also leads to sweating and difficulty in breathing.

Activity 2
Producing carbon dioxide on your own

- Put learners into pairs. Give each pair a funnel, bottle, baking soda, vinegar and candle.
- Ask them to pour a little amount of vinegar into a bottle of soda with the funnel.
- Ask learners to tell you what they observed. (they are expected to see a gas coming out of the bottle. That gas is carbon dioxide).
- Let them light a candle and bring it near the opening of the bottle. (help you them). Ask them to observe what happens. (The flame of the candle will go off immediately.) Let them tell you why the flame went off. (This is because carbon dioxide does not support burning. This explains why it is used in making fire extinguishers).

Talk about

Engage learners to discuss the 'Talk about' questions on page 68.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 70 of the Learner's Book.

1. Carbon dioxide is the component of air that we breathe out.
2. Carbon dioxide helps to keep the world from getting too cold.
3. It also helps plants to produce their own food and is used to make soft drinks and fire extinguishers.
4. Activities of humans such as bush burning, deforestation and burning of fossil fuels increase the amount of carbon dioxide in the atmosphere.
5. Too much carbon dioxide in the atmosphere results in global warming, which leads to flooding and drought on the Earth's surface.

Project for home or school

Learners are to search the internet to read about carbon dioxide and the greenhouse effect. Ask them to submit a typed and printed report on their findings.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 69 of the Learner's Book and pages 34-35 of the Workbook.

Answers to Review Exercises
Exercise 1

1. • Green plants use carbon dioxide to prepare their food through a process called photosynthesis.
   - It is used for making soft drinks.
   - Carbon dioxide is also used for making fire extinguishers because it does not support burning.
   - Solid carbon dioxide, which is called dry ice, is also used for refrigeration.
   - Sometimes it is used in making fertiliser, plastic and rubber.

2. We need to avoid cutting trees.
   We must also plant more trees.
   We also have to avoid indiscriminate burning.

3. • Increasing levels of carbon dioxide in the atmosphere has caused changes to weather patterns across the world.
   - an increase in the amount of carbon dioxide creates traps additional heat. This trapped heat leads to melting ice caps and rising ocean levels, which cause flooding.
   - It has caused changes in the weather all over the world.

4. • Soft drink producers
   - Fire services/Fire department/ Companies that produce fire extinguishers.
   - Fertiliser producers.
   - Industries that produce freezers and refrigerators.

5. Carbon dioxide gas is a component of **air**. It has uses for humans and **plants**. It is needed to produce food through the process of **photosynthesis**. However, too much of this gas makes the Earth **warmer**. We can reduce the amount of carbon dioxide in the Earth's atmosphere by slowing the rate of **deforestation**.

Answers to Workbook

Trial 1

1. • Green plants use carbon dioxide to prepare their food through a process called photosynthesis.
   • It is used for making soft drinks.
   • Carbon dioxide is also used for making fire extinguishers.
   • Solid carbon dioxide is used for refrigeration.
   • Sometimes it is used in making fertliser, plastic and rubber.

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

Trial 2

1. Increasing levels of carbon dioxide in the atmosphere has caused changes to weather patterns across the world. An increase in the amount of carbon dioxide creates traps additional heat. This trapped heat leads to melting ice caps and rising ocean levels, which cause flooding.

2. • We need to slow down the rate of deforestation.
   • We must also plant more trees.
   • We must avoid indiscriminate burning.

LESSON 6: How water becomes polluted

LB: pages 71-77; WB: pages 36-37

CONTENT STANDARDS
B5.2.1.5 Recognise water and air as important natural resources.

INDICATOR
B5.2.1.5.1 Identify human activities that make water unsuitable for human use.

LEARNING EXPECTATIONS
Learners will:
- Identify the qualities of safe drinking water.
- Explain the human activities that pollute water.
- Explain how to prevent contamination of water.

NEW WORDS
Pollution, sewage, contamination

RESOURCES
Picture or video showing various sources of water, containers, gloves, plastic bottles.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Predicting, Analysing, Evaluating, Communicating

HELPFUL LINKS
- https://www.youtube.com/watch?v=Om42Lppkd9w\
- https://study.com/academy/lesson/types-of-water-pollution-lesson-for-kids.html

Background information
Water is one of the most important needs of all living things. We use it to perform various activities such as drinking, washing, bathing and preparation of food. This means we need to take good care of water.

The water that we use must be tasteless and odourless (it should not smell). It must not have any colour nor particles suspended in it.

Causes of water pollution

Starter
Ask learners to mention some sources of water. Ask them the type of water they drink. Let them explain what they observe when people throw rubbish into our water bodies. Ask the learners to mention what will happen to them if they drink bad water.

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

Teaching Instructions

Activity 1
Quality of water within the local community
Prepare for thsi activity in advance.
- Tell learners to bring small plastic bottles (transparent and some containers to class or get them yourself.
- Put learners into groups of four or five. Take learners out to collect small amounts of water from different sources such as streams, rivers, lagoons, pipe born and well within the school vicinity or community. Note: Always fetch the water yourself. You should wear hand gloves.

- Back in the classroom, assist learners to pour the different water collected into plastic bottles. Ask them to label them appropriately. Let them do this in their groups.
- Still in their groups, task them to observe each bottle by checking the cooling of the water, the pressure of the particles or if the water has any foul smell or not. (be careful not to expose learners to bad smell, especially those with special health conditions).
- Ask each group to write down the properties for each source of water. (make sure no one tastes or drinks the water.

Activity 2
Safe and unsafe water sources within the community
Put learners into groups of four.
- Task each group to list as many different sources of water in the community as possible. (should include streams, rivers, wells, bore holes, wells, pipe borne water).
- Each group should put the sources under safe and unsafe.
- Have each group select a leader who leads a discussing to finalize and come out with a list of sources of water that are safe within the community.
- Finally, ask each group to discuss the activities of humans that make the water from their sources unsafe. (Call each group leader to share their answers with the class.

Talk about

Engage learners to discuss the 'Talk about' questions on page 76.

"What do you think will happen to you if you drink unclean water?"

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 77 of the Learner's Book to read.
1. We must take good care of the water bodies around us.
2. Contaminated water is harmful to our health.
3. Human activities such as improper sewage disposal, deforestation, mining, littering and bad agricultural practices cause water to become polluted.

Project for home or school

Refer learners to page 76 of the learner's Book for their project.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 76 of the Learner's Book and pages 36-37 of the Workbook.

Answers to Review Exercises
Exercise 1
1. • It must be free from chemicals.
   - It must be free from germs.
   - It must be free from leaves, mud and rubbish
   - it must be odourless.

2. • The water may contain germs.
   - The water may contain harmful chemicals.
   - The water may contain sewage, rubbish and other household or industrial waste
   - The water may have an odour.

3. • Pouring rubbish into rivers and other sources of water.
   - Some people put waste from industries and hospitals into rivers.
   - Some people defecate into streams and rivers.
   - Fertilisers used in farms can also be washed into sources of water by rain or wind.
   - Cutting of trees near streams, lakes and lagoons.

4. a. Humans: it can cause humans to fall sick or die.
   b. Animals: animals can die or fall sick when they drink polluted water.
   c. Plants: some plants do not grow well in polluted water.
   d. Fish: polluted water kills fish.

Answers to Workbook

Trial 1

1. • Sewage from homes and communities are released directly into water bodies, or through pipes and gutters that flow into rivers.
   • Sometimes chemicals such as fertilisers and pesticides, which are applied on farms. get washed into water bodies by rain. In some communities people throw garbage in the form of plastic, paper, aluminium, food, glass, or rubber into the sea and other water bodies.
   • Some people defecate into water bodies.
   • Washing of dirty clothes directly into water bodies also contaminates the water.
   • People mine for gold in the water. This leads to the pollution of the water

2. • They must avoid cutting trees that grow near water bodies.
   • They have to stop throwing rubbish into rivers and streams.
   • Washing of clothes in rivers must also be avoided.
   • Waste from industries and homes must be well disposed.
   • People who defecate into streams, lagoons and other water bodies must put an end to that practice.
   • The use of dangerous chemicals for fishing must also be stopped.
   • Mining around water bodies must be banned. Offenders should be reported and prosecuted to serve as a deterrent to others.

Trial 2

1. • water from deep wells
   • boreholes
   • pipe-borne water
   • mineral water

2. • water from rivers
   • lagoons
   • streams and other open sources.

LESSON 7: Keeping the air we breathe clean

LB: *pages 78-81;* **WB:** *pages 38-39*

CONTENT STANDARDS
B5.2.1.5 Recognise water and air as important natural resources.

INDICATOR
B5.2.1.5.2 Know how to make and keep air clean in our environment.

LEARNING EXPECTATIONS
Learners will:
- Identify the causes of air pollution.
- Explain how air pollution can be prevented.

NEW WORDS
Exhaust, polluted, odourless

RESOURCES
Pictures and videos showing air pollution.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Predicting, Analysing, Evaluating, Communicating

HELPFUL LINKS
- https://study.com/academy/lesson/air-pollution-lesson-for-kids-definition-facts.html
- https://www.youtube.com/watch?v=t7Q7y_xjR5E

Background information
The Earth is surrounded by air. Humans breathe in air, at all times. In order to remain in good health, the air we breath must be clean. Air has no colour. It is also odourless, which means it has no smell.

The substances that make air unclean are called pollutants of air. Human activities like smoking, burning of waste, bush fire, smoke from factories and vehicles pollutes the air.

Starter
Ask learners to breath in air and tell you what they smell.

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

Teaching instructions

Activity 1
Identifying the causes of air pollution
- Put learners into groups of three. Ask each group to discuss and identify the human activities that release dust and smoke into the air or outmosphere.
- In another discussion session, have each group brainstorm on how to prevent or control the human activities that make air unclean.

Activity 2
Design a concept map on air pollution
Put learners into groups of four or five.
- Each group should list all the causes of air pollution they know of.
- They should also write some effects of air pollution they know of.
- Finally, ask each group to list some ways that air pollution can be prevented.
- With the information each group has provided, assist them to design a concept map of air pollution.

Talk about

Engage learners to discuss the 'Talk about' questions on page 80.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 81 of the Learner's Book to read.
1. The air we breathe in must be clean at all times.
2. Smoke from cigarettes, factories, car exhausts, bush burning and dust can make air unclean.

3. Inhaling polluted air can cause air-borne diseases such as asthma, coughing and lung cancer.

Project for home or school

Refer learners to page 81 of the Learner's Book. With the acquired knowledge on air pollution and prevention, ask them to design posters on the need to keep the air clean.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 81 of the Learner's Book and pages 38-39 of the Workbook.

Answers to Review Exercises
Exercise 1
1. • Smoke from bush burning.
   • Dust .
   • Smoke from cigarettes
   • Smoke from industries and factories

2. • Exhaust from car fumes release smoke into the atmosphere.
   • Bush fires also introduce a lot of smoke into the air.
   • Some factories and industries also release a lot of smoke into the air.
   • Dust from untarred roads also reduce the quality of the air we breathe

3. Lung cancer, coughing, sneezing, inabilty to breathe, asthma.

4. • Air is colourless.
   • Air has no taste.
   • Air has no smell.

Answers to Workbook
Trial 1
1. • Smoke from the exhaust of cars and other vehicles contribute a lot to air pollution.
   • Many industries also contribute to air pollution through the smoke that they produce.
   • Bush burning is another activity that leads to the release of smoke into the air. This reduces.
   • Dust from untarred roads and construction sites also pollute the air.
2. • Avoid cutting down trees.
   • Plant more trees.
   • Site companies away from the town.
   • Grass must be planted on bare lands.

Trial 2
1. • Some pollutants generated by factories are dangerous because they can penetrate the lungs and bloodstream and even cause heart attacks or death.
   • Smoke can irritate our eyes and throat and also damage the lungs.
   • Polluted air is especially dangerous to people who suffer from asthma.
   • Smoke in the air also makes it difficult for us to see things from far.
   • Some air pollutants can also cause diseases such as cancer.
   • A pollutant such as lead can damage children's brain and kidneys.

2. **Cause 1:** indiscriminate burning,
   Effect: asthma
   Prevention: avoiding burning of trees.

   Cause 2: smoke from factories
   Effect: lack of visibility in the sky
   Prevention: site industries away from communities.

LESSON 1: Parts of plant and their functions

LB: *pages 82-85;* **WB:** *pages 40-42*

CONTENT STANDARDS
B5.2.2.1 Demonstrate understanding of life cycle of a plant.

INDICATOR
B5.2.2.1.1 Relate structure of the parts of a plant (leaves, stem, root, flower) to the functions they perform.

LEARNING EXPECTATIONS
Learners will:
- Identify the basic parts of a plant.
- Explain the function of each part of the plant.

NEW WORDS
Stem, Roots, Leaves, flowers.

RESOURCES
Picture or video showing plant and its parts, young plants.

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

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

HELPFUL LINKS
- https://www.youtube.com/watch?v=TD60-3rqPXg
- https://www.youtube.com/watch?v=X6TLFZUC9gI

Background information
Trees and plants grow. This is because plants have parts that contribute to their life and growth. Without these parts, plants life will be cut short.

The four main parts of a plant are the root, stem, leaves and flowers.
The roots of the plant grow in the ground and are responsible for pulling both water and minerals to the plant. They also anchor the plant into the ground for stability. The plants stem transports the nutreints and minerals through the stem up the leaves.
The leaves collect energy from the sun and make food for the plant, using a process called photosynthesis.
The flower is the bright and beautiful part of the plant. The role they play is to help in making food. Producing the food and seed. Not all plants produce flowers.

Starter
Ask learners to mention their favourite plants. Let them mention some parts they know.

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

Parts of a plant

Teaching Instructions

Activity 1
Observing parts of plant
- Put learners into group of six. Take them out on a walk around the school community to uproot some young plants.

- Back in the class, ask each group to place their plants on the desk and identify their parts. They should identify parts that different plants have in common.
- Ask them to group the plants into those that make flowers and those that do not.
- Lead them to brainstorm in a group discussion to find out the functions of each part of the plant.
- Tell them to look on the plants they have uprooted and draw, colour and label it parts.

Talk about

Engage learners to discuss the 'Talk about' question on page 84.

"Some plants have very beautiful flowers that smell nice. What are the functions of the beautiful flowers to the plant?"

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 85 of the Learner's Book to read.

1. Plants have different parts namely, roots, stem, leaves, and flowers.
2. The roots help the plants to get nutrient and water from the soil.
3. The stem connects the roots to the other parts of the plant.
4. The leaves of a plant help the plant to make its own food.
5. The flowers help to produce fruits and seeds.

Project for home or school

Refer learners to page 85 of the Learner's book. They are to:

- Go on the internet to find out about plants that produce flowers and those that do not.
- Observe different plants around your home. Group them into flowering plants and non-flowering plants.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 84 of the Learner's Book and pages 40-42 of the Workbook.

Answers to Review Exercises
Exercise 1

1. a. Leaves: The leaf captures energy from the sun for photosynthesis.

   b. Root: The root helps the plant to stand strong without breaking. The root also helps the plant to get water from the soil.

   c. Flower: It gives nectar. Some flowers have very sweet smells that attract insects and birds.

   d. Stem: It supports the plant, and hold the leaves. Stems also carry water and nutrients from the roots to the other parts.

2. a. iii
   b. iv
   c. i
   d. iv

3. a. flower
   b. root
   c. stem
   d. leaf

Answers to Workbook
Trial 1

1. A - leaf
   B - flowers
   C - fruits
   D - stem
   E - roots
2. root
3. leaf

Trial 2

1. flower
2. root
3. stem
4. leaves
5. fruit

Trial 3
Learners to draw and label.

LESSON 2: Germination of seeds

LB: *pages 86-89;* **WB:** *pages 43-44*

CONTENT STANDARDS
B5.2.2.1 Demonstrate understanding of life cycle of a plant.

INDICATOR
B5.2. 2.1.2 Compare the differences in germination of bean and maize seeds.

LEARNING EXPECTATIONS
Learners will:
- Explain what germination is.
- State the conditions necessary for germinate.
- Describe the germination of bean seed and maize seed.

NEW WORDS
Viable seed, germination

RESOURCES
Videos or pictures of maize and bean seeds undergoing germination from the soil, beans and maize seeds, loamy soil, transparent plastic bottle.

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

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

HELPFUL LINKS
- https://www.youtube.com/watch?v=TE6xptjgNR0
- https://study.com/academy/lesson/germination-of-seeds-lesson-for-kids.html

Background information
The seeds only germinate under favourable conditions including water, sunlight, moderate tempreture, good soil and quality seed

Germination is the process by which a plant grows from a seed or similar structure. It includes all the changes that take place from the time when a dry, viable seed starts to grow and when placed under suitable conditions of germination to the time when the seedling is able to survive on its own in the soil.

Maize seed germinating

Beans seed germinating

Starter
Ask learners to mention some seeds they know. Let them explain what will happen to a seed when it is planted.

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

Teaching instructions

Activity 1
Stages of seed germination

- Put learners into groups of five. Give each group some beans and maize seeds, transparent plastic bottle and loamy soil.
- Ask each group to plant the seeds in seperate bottles. They should water the seed and observe daily the stages of the seed germination till the stem and seed leaves develop.
- Tell learners to find out where the seeds (cotyledons) remain, either inside the soil or above the soil.
- Task each group to identify and write down the difference between how maize and beans seed germinate. They should share their observations they made with the whole class.

Observation: As the seed germinate, the maize will have only one seed leaf whilst the beans have two seed leaves.

Talk about

Engage learners to discuss the 'Talk about' question on page 88.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 89 of the Learner's Book.

1. The conditions for germination of seed are viability of seed (the seed must mature), air, water or moisture and a suitable temperature.
2. Maize seeds have one seed leaf, but bean seeds have two.

Project for home or school

Learners are to grow maize and beans plants at home. Water them daily and observe the changes that takes place every day.
Ask them to report what they see.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 88 of the Learner's Book and pages 43-44 of the Workbook.

Answers to Review Exercises
Exercise 1

1. Factors:
   Presence of air.
   Presence of water.
   There must be a good temperature.
   The seeds must be matured or viable.

2. Germination is the process through which **seeds** mature into baby plants called **seedlings**.There are **two** types of germination. Before a seed germinates conditions such as **water** and suitable **temperature** must be provided.

3. • When corn seedlings emerge only a single seed leaf emerges through the soil. But in bean plants, two seed leaves are produced.
   • Maize germinates in three days, beans germinate in seven days.

Answers to Workbook
Trial 1

1. • The seeds were not mature.
   • The seeds did not get any water.
   • There was no air in the bottle.
   • The seeds were damaged.

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

Trial 2
When conditions are right the seed starts to take in water.
As water is taken in, the seed swells bigger and bigger until the coat splits apart.

A tiny root grows downwards whereas a shoot begins to grow upwards.
The shoot develops and reaches toward the light while the root system develops deep in the soil.

The cotyledons become the first leaves of the seedling when the seed germinates.
Air can then get to the seed. So, the oxygen in the air helps the baby plant get energy and food. As a result, the baby plant uses the energy to grow.

3

Strand:

Systems

LESSON 1: Parts of the respiratory system in humans

LB: pages 92-102; WB: pages 46-49

CONTENT STANDARD
B5.3.1.1 Recognise that different parts of the human body work interdependently to perform a specific function.

INDICATOR
B5.3.1.1.1 Know the parts of the respiratory system in humans.

LEARNING EXEPECTATIONS
Learners will:
- Demonstrate the process of breathing in and out.
- Identify the parts of the respiratory system.
- Write the function of the parts of the respiratory system.
- Draw and label correctly the parts of the respiratory system.
- Design and make a model of the respiratory system.
- Describe the disease and lifestyle that affect the respiratory system respectively.

NEW WORDS
Alveoli, respiratory, system, molecule, oxygen, nose, water, gas, pharynx, breathe, diaphragm, bronchi, trachea, larynx, organ

RESOURCES
Empty drinking bottle (transparent)
Balloons, Drinking straw, Sticky tape, Masking tape, Playdough

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

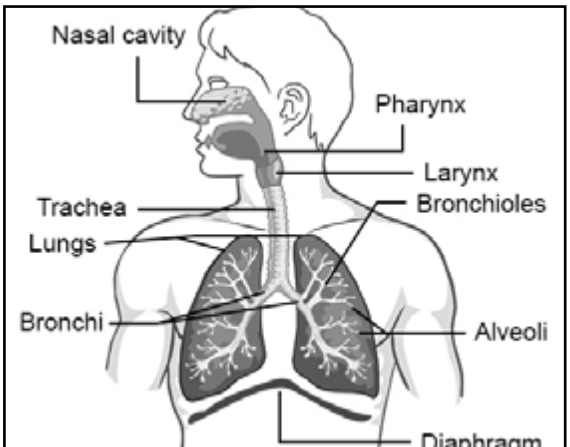
SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Classifying, Communicating, Designing, Interpreting

HELPFUL LINKS
- http://www.healthline.com/human-body-maps/respiratory-system#1
- https://www.britannica.com/science/human-respiratory-system
- https://www.instructorweb.com/lesson/respiratorysystem.asp

BACKGROUND INFORMATION
The respiratory system consists of all the organs involved in breathing. These include the nose, pharynx, larynx, trachea, bronchi and lungs.

The respiratory system does two very important things. It brings oxygen into our bodies, which we need for our cells to live and function properly. It helps us get rid of carbon dioxide, which is a waste product of cellular function. The nose, pharynx, larynx, trachea and bronchi all work like a system of pipes through which the air is funnelled down into our lungs.

There, in very small air sacs called alveoli, oxygen is brought into the bloodstream and carbon dioxide is pushed from the blood out into the air. When something goes wrong with part of the respiratory system, such as an infection like pneumonia, it makes it harder for us to get the oxygen we need and to get rid of the waste product carbon dioxide. Common respiratory symptoms include breathlessness, cough, and chest pain.



Respiratory system

Starter
In pairs allow learners to perform activities on breathing in and out.

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

Teaching instructions

Activity 1
- Put learners in pairs. Give them a paper cup with the bottom cut out.
- Ask one partner to listen to the heartbeat of his/her partner by placing the cup on the partners chest and putting his/her ears in the cut buttom. Ask them to take turns.

Activity 2
- With the same partner, ask one learner to jump up and down about ten times. Immediately, ask the other learner to use the same paper cup to listen to the heartbeat of their partner.
- Ask learners to compare their observations and record their answers.

Talk about

Engage learners to discuss the 'Talk about' questions on page 97.

What I have learnt:

You may write the following on the chalk board as a summary, or refer learners to page 102 of the Learner's Book to read.

1. Humans breathe using the respiratory system. This system is made up of various body parts and organs, including the lungs and windpipe.
2. The lungs bring fresh oxygen into the body. They remove carbon dioxide and other waste gases that the body's doesn't need.
3. The diaphragm tightens and flattens, allowing you to suck air into your lungs. To breathe out the diaphragm and rib cage muscles relax, pushing the air out of the lungs.
4. Respiratory diseases include asthma, chronic obstructive pulmonary disease (COPD), pulmonary fibrosis, pneumonia and lung cancer.

Project for home or school

Refer learners to page 101 of the Learner's Book. They can use the web links provided to arrange the question.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 97-101 of the Learner's Book and pages 46-49 of the Workbook.

Answers to Review Exercises
Exercise 1
1. d
2. e
3. d
4. b
5. c
6. d
7. a
8. a
9. c
10. a

Exercise 2
1. Respiration aids in the production of heat and the provision of chemical energy to organisms (human).

2.
- Ribs
- Lungs
- Aveoli
- Trachea
- Diaphragm
- Nostrils
- Pharynx
- Larynx
- Bronchus
- Nasal cavity

Exercise 3

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

Exercise 4

1. ribs
2. diaphragm
3. larynx
4. alveoli
5. oxygen
6. pharynx
7. bronchi
8. nostril
9. trachea
10. breathe

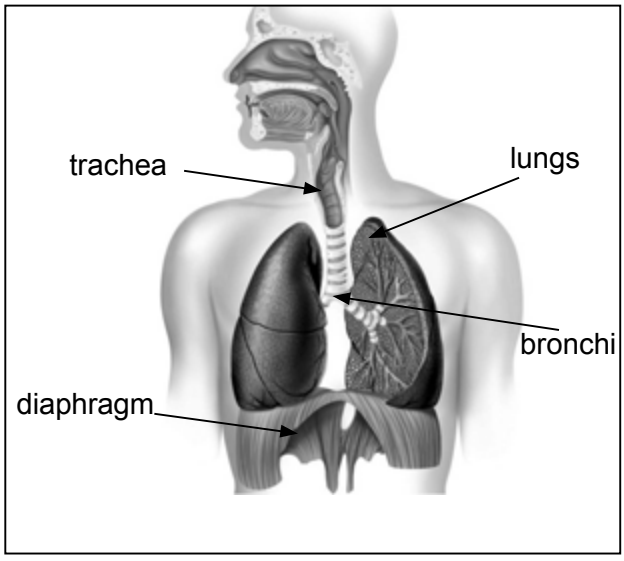
Answers to Workbook

Trial 1

1. b
2. b
3. a
4. a
5. b
6. c

Trial 2

1



2. a. Alveoli
   b. Bronchi
   c. Villi
   d. Respiratory
   e. Trachea

Trial 3

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

LESSON 1: Components of the solar system

LB: pages 103-111 WB: pages 50-52

CONTENT STANDARD
B5.3.2.1 Show understanding of the orderliness of the sun, planets and satellites in the solar system, as well as the important role of the sun in the existence of the solar system.

INDICATOR
B5.3.2.1.1 Identify the components of the solar system (sun, earth, moon, other planets, satellite).

LEARNING EXPECTATIONS
Learners will:
- Identify and name the component of the solar system.
- Explain the importance of the sun on earth.
- Explain that it is the tilt of the Earth axis that causes the seasons.
- Name and describe the four seasons.
- Explain that the heavenly bodies that orbits around the sun are called planets.

NEW WORDS
Axis, Earth, Gravity, Orbit, Planet, Solar System, Space, Sphere, Star, Mars, Jupiter, Saturn, Uranus, Neptune, seasons, Autumn, summer, winter, spring

RESOURCES
Glue, straw, thread or rope, round ball, cardboards, coloured pencils, black polythene bags, a pair of scissors, picture of the solar system.

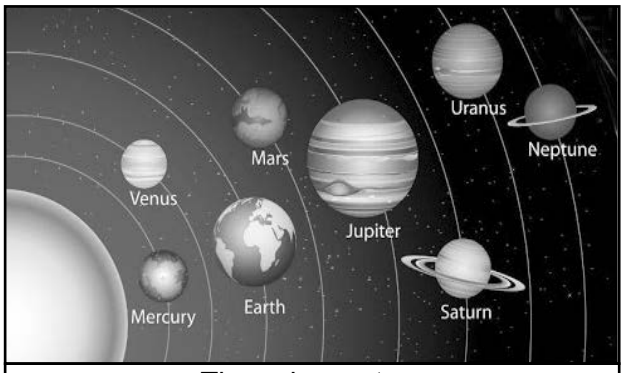
CORE COMPETENCIES
Digital Literacy
Personal Development and Leadership
Communication and Collaboration

SUBJECT SPECIFIC PRACTICES
Objecting, Analyzing, Classifying, Communicating Designing, Interpreting

HELPFUL LINKS
- https://study.com/academy/lesson/facts-about-the-solar-system-lesson-for-kids.html
- https://www.youtube.com/watch?v=d8y8kc317EE
- https://www.youtube.com/watch?v=zzbCEF37MfU

Background information
Our solar system consists of eight planets that orbits around our home star, the sun. Our solar system was formed 4.6 billion years ago.
The sun is one of about 200 billion stars moving in the Milky Way.

The eight planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Mercury is the closest planet to the sun .Jupiter is the largest planet of the solar system whiles Neptune is the furthest planet from the sun.



The solar system

Starter
Show a picture of the solar system to learners. Let them identify each of them by mentioning their names. Ask them this question, which part of the solar system is very large and big and at the same time keeps on burning? Answer is the sun.

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

Teaching instructions

Activity 1
Simulation of solar system

- In groups, learners make a simulation of how the planets move around the sun. (Learners can work in groups of nine.)
- One person represents the sun and the other eight learners represent Mercury, Venus, Earth, Mars, Jupiter, Saturn, Venus, Neptune.
- One learner stands in the centre this is the sun. The other learners stand at different distances and they each move around the 'sun' without crashing into each other.

Activity 2
Constructing a model of the solar system

- Supply cardboards, coloured pencils, black polythene bags, a pair of scissors to learners in groups of four.
- Using an unguided inquiry approach, allow learners to mould the solar system with the materials provided.

Note: Learners may look at pictures from books, magazine, and charts to help them do the moulding of the solar system.

Activity 3
Naming the planets using musical chairs

- Using a song of your choice, let nine learners stand in a circle in front of eight chairs outside the classroom.
  Each student will represent a planet.
  This is done by giving name tags to learners with their planet name on it.
- With the music in play, call out the name of a planet randomly and stop the music.
- The learners act fast to find a chair to sit on.
- The learner whose planet name was mentioned stays out of the game if he or she does not get a chair to sit on.

Activity 4
Mnemonics

- Put learners into groups of about eight.
- Let each group come out with their mnemonics phrase of the solar system, for example Mercy Vega Eats Mango Jelly Sandwiches Under Nancy.
  Mercury – Mercy
  Venus – Vega
  Earth – Eats
  Mars – Mango
  Jupiter – Jelly
  Saturn – Sandwiches
  Uranus – Under
  Neptune – Nancy
- Let each group use their mnemonics phrase to learn the names of the solar system.

Activity 5
Solar system bookmarks

- Put learners into groups of five. Supply them with strips of paper, thread, paint, and coloured pencils.
- Learners punch a small hole at the top of each of the strip of paper.
- Learners thread a few different pieces of coloured string through the hole and tie.
- Learners draw, paint or colour pictures of the sun and the eight planets on each strip.

Note: The planets must follow each order from nearest to the farthest, for example Mercury and Netpune.

Talk about

Engage learners to discuss the 'Talk about' questions on page 108.

Accept multiple responses.
The climate of Ghana is tropical and there are two main seasons: the wet and dry seasons. A dry desert wind blows in north-east Ghana from December to March, lowering humidity and causing hotter days and cooler nights in the northern part of Ghana. The dry season is best for wildlife viewing.

What I Have Learnt

You may write the following on the chalk board as a summary, or refer learners to page 111 of the Learner's Book to read.

1. The solar system consists of the sun, the eight planets and satellites.
2. The sun is the centre of the solar system.
3. The earth is the third planet within the solar system.
4. All the eight planets move round the sun.

Project for home or school

Refer learners to page 110 of the Learner's Book.
Task them to observe the stars at night away from light and write down what they see.

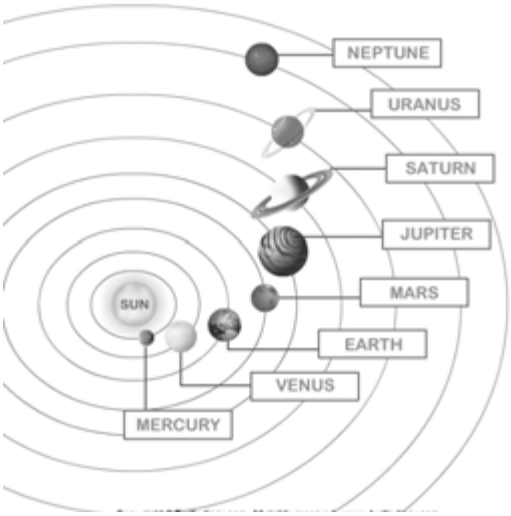
Assessment for learning
Supervise learners to do the assessment task.
Refer them to pages 109-110 of the Learner's Book and pages 50-52 of the Workbook.

Answers to Review Exercises

Exercise 1
1. Sun
2. Neptune
3. Mercury
4. Earth
5. Mars
6. Asteroid
7. Jupiter
8. Saturn
9. Uranus
10. Neptune

Exercise 2
1. The sun, the planets, the natural satellites, moon, etc.
2. Mercury, venus, earth, mars, jupiter, saturn, uranus, neptune.

3.



Exercise 3

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

Answers to Workbook
Tial 1
1. a. ii
   b. i
   c. i
   d. True
   e. True

Trial 2
1. Jupiter, Saturn, Uranus, Neptune.
2. Mars is the fourth planet from the sun.
3. The movement of the planets around the sun is called a revolution.
4. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.

Trial 3

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

LESSON 1: The adaptation of organisms in their habitat

LB: pages 112-120; WB: pages 53-56

CONTENT STANDARD
B5.3.3.1 Show understanding of ecosystem, interdependency of organisms in an ecosystem and appreciate the interactions.

INDICATOR
B5.3.3.1.1 Know how various organisms are adapted to survive in their habitat.

LEARNING EXEPECTATIONS
Learners will:
- Explain the term adaptations.
- Name different habitats and give example of organisms in a particular habitat.
- Explain why a bird cannot survive in water.

NEW WORDS
climate, composite, conservation ecology, energy, environment, habitat, ozone, pollution, recycle, biotic, abiotic, biome

RESOURCES
Pictures, videos and charts on forest, pond and arboreal habitats, old magazine, carton boxes, coloured pencils, empty bottle and empty transparent containers.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Evaluating, Generalising, Designing, Interpreting

HELPFUL LINKS
- https://www.youtube.com/watch?v=SYNEjBvPkps
- https://study.com/academy/lesson/ecosystems-lesson-for-kids-definition-facts.html

Background information
Every organism has a unique ecosystem within which it lives.This ecosystem is natural habitat. This is where the basic needs of the organism to survive are met, food, shelter, water, and place to bread its young.

All organisms needs to adapt to their habitat to be able to survive. This means adapting to be able to survive the climate condition of the ecosystem, predators and other species that compete for the same food and space.

An adaptation is the modification or change in the organism's body or behaviour that helps it to survive.

An animal may adapt to its habitat in different ways. It may be a physical or structural adaptation, just as the limbs of birds have modified into winds or the way the cheetah is shaped for running at a faster speed. It may be the way the animal lives, whether it is hunting for food, or running fast to avoid predators or migrating to other places for food or survival.

It may also be in the way the body works in circulating and respiration, for instance the gills that fish have enables them to breath in water.

With increasing population growth and human activity that disturbs the natural habitat, animals must learn to adapt to these kinds of threats as well. Animals in the wild can only live in place they are adapted to. They must have the right kind of habitat where they can find the food and space they need. Some animals camouflage themselves so they can adapt to their environment.

Adaptation can protect animals from predators or from harsh weather. Many birds can hide in the tall grass and weeds and insert can change their colour to blend into the surrounding. This makes it difficult for predators to seek them out for food.

Starter
Assist learners to recite the rhyme on the ecosystem on page 112 of the Learner's Book.

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

Teaching instructions

Activity 1
Habitats of animals

- Introduce the lesson by asking learners to talk about the kinds of things animals will need to survive.
- Put learners into groups of five. Encourage them to talk about similarities between people and animals. Guide them by asking questions like: Where do animals (e.g. dog/ cat/hen) like to rest/sleep? What do animals eat? Do animals need anything to stay safe from pradators?.
- Using think-pair-share strategy, have learners sit face to face with a partner. Give them one minute to think in silence. At your signal, learners should take turn sharing a response to each question.
- Put the class together and invite few learners (volunteer) to share their thoughts with the whole class. Write learners ideas on the board.
- Let learners know by explaing that animals live in at a place called habitat, which is the most ideal or natural home of an animal.

Activity 2
Meaning of ecosystem

- Ask learners this questions: What is an ecosystem? Without providing the answer show learners pictures of examples and non-examples of ecosystems, like: bear, rock, and moon (non-examples), Deer, plants pool of water on a street and aquarium as example of ecosystem.
- After showing learners each picture, ask them to talk about ecosystem with their partners. Go around and ask them probing questions like: Does an ecosystem have to have sunlight?.
- After the engagement, invite learners to the front to share their findings with the class.

Possible response:
Birds have no sweat glands, so they need less water than mammals. However, they do lose water through respiration and in their droppings. Most small birds need to drink at least twice a day to replace the lost water. Birds get the liquid they need from their food and by drinking.

Talk about

Engage learners to discuss the 'Talk about' questions on page 117.

What i have learnt

You may write the following on the chalk board as a summary, or refer learners to page 120 of the Learner's Book to read.

1. An ecosystem includes all of the living things (plants, animals and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, and atmosphere).
2. Ecosystems are the foundations of the biosphere and they determine the health of the entire earth system.
3. A living organism is adapted to its environment. This means that the way they look, the way they behave, the way that they are built, or their way of life makes them survive and reproduce in their habitat. Behavior is also an important adaptation.
4. Adaptation is very important in order to survive and move ahead in the world. The ability to adapt to people, situation and surroundings give people, animals, and plants a great's opportunity to get what you want and what you.

Project for home or school

Refer learners to page 120 Learner's Book for their project.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 118-119 of the Learner's Book and pages 53-56 of the Workbook.

Answers to Review Exercises
Exercise 1
1. a
2. b

Exercise 2

1. A **habitat** is the natural home or environment of a plant, animal, or other organism. It provides the organisms that live there with food, water, shelter and space to survive. **Habitats** consist of both biotic and abiotic factors. **Habitat examples** include lakes, streams, forests, deserts, grasslands, or even a drop of water. All **habitats** on the Earth are part of the biosphere.
2. **Animals** tend to live naturally in specific areas. **Different** kinds of plants grow naturally in **different** areas too. Plants and **animals** will choose where they live mostly because of the water, food and climate of a specific. The place that a plant or **animal** lives in **is** called a **habitat**. **Animals** and vegetation **vary** from **place to place** due to variations in environment. They adjust to different climatic conditions. Natural pre-conditions determine the presence of different forms of vegetation and **animals**.

Exercise 3

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

Answers to Workbook:

Trial 1

1. a. ii
   b. ii
   c. ii
2. a. animals.
   b. herbivore.

Trial 2

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

Trial 3

1. a. A thick layer of fat under the skin of some animals that live on land, that help keep their body warm.

   b. A forest is a large area covered with plants.

2. Aquatic habitat is habitat with water. The three main kinds are freshwater, marine and coastal.

4

Strand:

Forces and energy

LESSON 1: Energy transformation

LB: pages 122-125; WB: pages 58-59

CONTENT STRAND
B5.4.1.1 Demonstrate understanding of the concept of energy, its various forms and sources and the ways in which it can be transformed and conserved.

INDICATOR
B5.4.1.1.1 Explain how energy is transformed from one form to another.

LEARNING EXPECTATIONS
Learners will:
- Define energy.
- Name and describe some forms of energy.
- Explain energy transformation.
- Describe how energy is transformed form one form to another form.

NEW WORDS
Transformation, Sound, Heat, Electrical.

RESOURCES
Flashlight, radio, drum, hammer, wood and nail.

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

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Evaluating, Classifying, Designing and Interpreting

HELPFUL LINKS
- https://www.youtube.com/watch?v=aC_Pvs1kDAk
- https://study.com/academy/lesson/forms-of-energy-lesson-for-kids.html

Background information
Energy is the ability or capacity to do work.
It can be transformed from one form into another.
This is what is called energy transformation.
Many activities such as swimming, hitting a nail with a hammer into a wood, switching on a torch or a television is seen as energy is being transformed form one form into another.

Starter
Display learning resources before learners. Let them pick the items one after the other, name them and tell their uses in everyday life.

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

Teaching Instructions

Activity 1
- Ask questions to explore learners' previous knowledge on the forms of energy (eg. electrical, heat, light, sound).
- Use some common devices (e.g. flashlight, radio, television, etc) to demonstrate transformation of energy to learners.

Activity 2
- Ask learners to discuss energy transformation that take place in the school eg. ringing of bell, beating of gong-gong, drumming, etc.
- In groups of four or five, let learners identify other forms of energy transformation in the school community and write their findings to be discussed in class.

Activity 3
- Put learners into groups of five.
- Guide learners to design a flow chart to explain how energy from the sun is transformed into energy for walking.

Talk about

Engage learners to discuss the 'Talk about' questions on page 124 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 125 of the Learner's Book to read.

1. Energy can be changed from one form to the other.
2. There are various forms of energy transformations in our communities, homes and schools.
3. Energy is measured in joules (J).

Put learners in groups to share ideas on what they have learnt.

Project for home or school

Refer learners to page 125 of the Learner's Book. They are to identify examples of energy transformation at home and design a flow chart to explain how energy from the sun is transformed into energy for walking.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 125 of the Learner's Book and pages 58-59 of the Workbook.

Answer to Review exercise
Exercise 1
1. Energy is the ability to do work.

2. a. Electrical to light energy.
   b. Kinetic to sound energy.
   c. Chemical to light and heat.

Answers to Workbook
Trial 1
1. Kinetic to sound energy.
2. Chemical energy to light and heat energy.
3. Potential energy to kinetic energy.
4. Chemical to light energy.

Trial 2
1. Energy transformation is when energy changes from one form to another.

2. Light energy, heat energy, sound energy, potential energy.

3. It leads to different forms of energy, which are used for different activities.

4. For movement.
   Helps us to do work.
   Leads to formation of other forms of energy.
   Can help growth of living things.
   Warms the Earth.

LESSON 2: Efficient use of electricity in the home

LB: pages 126-129; WB: pages 60-61

CONTENT STANDARDS
B5.4.1.1 Demonstrate understanding of the concept of energy, its various forms and sources and the ways in which it can be transformed and conserved.

INDICATOR
B5.4.1.1.2 Know how to use electricity efficiently in the home.

LEARNING EXPECTATIONS
Learners will:
- Define electricity
- Describe and explain how to use electricity efficiently.

NEW WORDS
Efficient, Gadgets, Power, Outage

RESOURCES
Electrical appliances: e.g. pressing iron, stove, radio set/wireless, television set

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

SUBJECT SPECIFIC PRACTICES
Analysing, Evaluating, Manipulating

HELPFUL LINK
- https://www.youtube.com/watch?v=pY6fAYkscTY

Background information
Electricity can be generated from many sources such water, sun or some chemical reaction. In whichever way, electricity generation has become very expensive therefor there is the need to use it efficiently.

Electricity users have to adapt the effective ways of using electricity such as putting off all electric lights every morning. In this way we can save a lot of electricity and also reduce the amount of electricity tariffs paid at the end of the month.

Starter
Let learners mention some things that uses electricity at home. E.g. TV, iron, computer.

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

Teaching instructions

Activity 1
- Ask learners to mention some of the things that use electricity in the classroom or at home.
- Brainstorm with learners to come out with how they use the electrical gadgets.
- Learners talk about what will happen if electrical gadgets are not switched off when not in use.

Activity 2
- In a think-pair-share activity, guide learners, to identify how they can use electricity efficiently in the home, community and school. E.g.:
  a. Ironing in bulk,
  b. putting off electrical gadgets and freezers when ironing,
  c. using energy efficient bulbs and other electrical gadgets with higher energy efficient ratings: (more star simply higher energy efficacy).

Activity 3
- Elaborate on and link learner's ideas with the issue of power outage crisis which come as a result of inefficient use of electricity in our homes and industries.

Talk about

Engage learners to discuss the 'Talk about' questions on page 128.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 129 of the Learner's Book to read.

1. Electricity should be used efficiently in our homes, schools and industries.
2. If electricity is not used efficiently, it will lead to a power (crisis) meaning we cannot get electricity regularly.
3. Efficient use of electricity can be called energy efficiency or efficient energy use.

Project for home or school

Explain and task learners to answer question on page 129 of the Learner's Book. Encourage learners to use the internet with the help of parents to explore more about electricity, its generation and effective usage.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 128 of the Learner's Book and pages 60-61 of the Workbook.

Answers to Review Exercises

Exercise 1

1. Mobile phones (when charging), computers, clothes iron, fan, refrigerator.
2. a. Picture A is television
   picture B is computer.
   b. Electricity.
   c. i. Repairing them when they are faulty.
   ii. Do not over charge some of them like mobile phones.

Answers to Workbook

Trial 1

1. Freezer, electric iron, electric fan.
2. It is as a result of supply shortages, or natural disasters.
3. a. Electrical energy.
   b. Repairing them when faulty, Unplugging them when not in use, Using them for their purpose.
   c. Ensure that only a qualified electrician looks at the machine.
4. Mrs Abanga used electricity efficiently and Mr Banini did not use electricity efficiently. Mr Banini will now have to pay a much higher bill than Mrs Abanga.

LESSON 3: Heat and temperature

LB: pages 130-132; WB: pages 62-63

CONTENT STANDARDS
B5.4.1.2 Show understanding of the concept of heat energy in terms of its importance, effects, sources and transfer from one medium to another.

INDICTOR
B5.4.1.2.1 Show the relationship between heat and temperature

LEARNING EXPECTATIONS
Learners will:
- Explain temperature and heat.
- Describe what will happen when heat is applied to a substance.

NEW WORDS
Heat, Temperature

RESOURCES
Water, metal plates, stones, plastic bowl.

CORE COMPETENCIES
Personal Development and Leadership
Communication and Collaboration

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Generalising

HELPFUL LINKS
- https://www.youtube.com/watch?v=2wqtK3GNFdQ

Background Information
Heat is a form of energy. It can be transferred from one medium to another medium. Temperature is the degree of hotness or coldness of a body. Heat is measured in joules (J) and temperature is measured in kelvin (K) or degrees Celsius (^{O}C). When heat is lost, temperature reduces and when heat is gained, temperature increases.

Starter
Ask learners to touch a cold bottle of water and a warm bottle of water and tell you what they noticed.

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

Teaching instructions

Activity 1
- In groups of five, learners find out what would happen when heat is applied to a substance or lost from a substance e.g. when a substance is placed in the sun for a while or when a substance is put in the fridge.
- Learners undertake an activity of placing objects such as metal plates, pieces of stone in the sun for about 10 minutes.
- Learners should then place the stones or metal in the bowl and afterwards touch again to determine whether they have become hotter or colder than they were before.
- Elaborate on learner's ideas, emphasizing heat as the factor that changes temperature.

Activity 2
- Summarise the lesson by explaining to learners that when heat is lost, temperature reduces, when heat is gained, temperature increases.

Talk about

Engage learners to discuss the 'Talk about' questions on page 131.

What I have learnt

You may write a summary, of what they learnt during the lesson on the chalk board.

Project for home or school

Explain to learners how the home activity should be done. Refer them to page 132 for instructions.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 132 of the Learner's Book and pages 62-63 of the Workbook.

Answers to Review Exercises
Exercise 1
1. a. Picture A has high temperature whilst B has low temperature. OR Picture will be hotter than Picture B.
   b. Diagram A has high temperature becuase its in the sun whilst B has low temperature because its in cold water.
   c. By placing it in cold water.
2. Heat is a form of energy while temperature is the degree of hotness.
3. Heat is a form of energy.

Answers to Workbook
Trial 1
1. Yes: When heat is applied to an object it changes the state or increases the temperature of the object.
2. i. A The shea butter will melt.
   B The stone becomes hot.
   C The metal becomes hot.

Trial 2
1. A. Heat : Heat is a form of energy
   B. Temperature : Temperature is how hot or cold something is.
2. a. Soup on fire ..... High temperature
   b. Cassava dough in water .....Low temperature.
   c. Mango fruit in the sun ...High temperature.
   d. Cooking oil on fire ..... High temperature.

LESSON 4: Measuring temperature using thermometer

LB: *pages 133-136;* **WB:** *pages 64-66*

CONTENT STANDARD
B5.4.1.2 Show understanding of the concept of heat energy in terms of its importance, effects, sources and transfer from one medium to another.

INDICATOR
B1.4.1.2.2 Measure and record temperature using thermometer.

LEARNING EXPECTATIONS
Learners will:
- Read and record temperature using a thermometer.
- Describe the differences between a clinical and a laboratory thermometer.

NEW WORDS
Clinical, Laboratory, Temperature, Thermometer.

RESOURCES
Realia of clinical and laboratory thermometers
Plastic bottles, plastic straws, dyes and water.

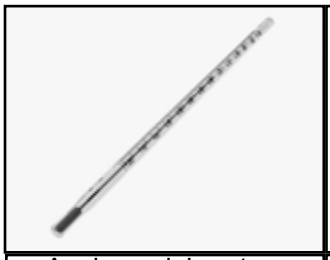
CORE COMPETENCIES
Critical Thinking and Problem-Solving
Personal Development and Leadership
Communication and Collaboration

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

HELPFUL LINKS
- https://study.com/academy/lesson/measuring-temperature-lesson-for-kids.html
- https://www.youtube.com/watch?v=K2CH1cUkMgs

Background Information
Temperature is the degree of hotness of body. The instrument that measures temperature is the thermometer. Clinical and laboratory thermometers are mostly used to measure temperature.

Clinical thermometer is used to measure and record body temperature and the laboratory thermometer is used to measure the temperature of things in a laboratory, e.g. warm water.



Analogue laboratory thermometer

Digital infrared thermometer

Digital clinical thermometer

Starter
Engage learners to talk about how their temperatures are checked or measured when they visit the clinic or hospital. Take feedback from learners.

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

Teaching instructions

Activity 1
- Guide learners to discuss the relationship between hotness and coldness in terms of heat transfer. (When an object loses heat, it cools and when it gains heat, it becomes warmer or hotter).
- Learners identify the instrument used for measuring the hotness or coolness of a body and give examples of places where thermometers are used.

Activity 2

- In groups of five, assist learners to use the Clinical thermometer to measure and record their body temperatures. Also guide them to use the laboratory thermometer to measure the temperature of warm water.

Activity 3

- Guide learners in groups of four, to produce their own improvised thermometers using plastic bottles, plastic straws, dyes and water. Refer to https://youtu.be/1LOk1XzbPxg.

Talk about

Engage learners to discuss the 'Talk about' questions on page 135 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 136 of the Learner's Book to read.

1. Mercury and alcohol are found in thermometers.
2. Temperature tells us how hot or cold something is.
3. Kelvin degrees Celsius and degrees Fahrenheit are units of temperature.
4. A clinical thermometer has a kink for safety reasons.
5. Hospitals, industries, laboratories and some homes use thermometers
6. Clinical thermometers must be kept in warm water or alcohol after use to get rid of germs.

Project for home or school

Ask learners to open to page 135 of their text book for the home activity.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 135 of the Learner's Book and pages 64-66 of the Workbook.

Answers to Review Exercises

Exercise 1

1. Temperature is how hot or cold something is.
2. Mercury and alcohol
3. Thermometric liquid is a liquid use in thermometers.
4. Hospitals, school, laboratory, weather stations, clinics.

Answers to Workbook

Trial 1

1. Temperature is how hot or cold something is.
2. Hospitals, clinics, school laboratory.
3. To check the temperature.

Trial 2

1. A. Digital Clinical thermometer
   B. Analogue Clinical thermometer.
2. For measuring temperature.
3. Mercury and alcohol.
4. Laboratory thermometer.
5. Clinical thermometer.
6. Clinical thermometer has a kink and laboratory thermometer has no kink.

LESSON 1: Components of electric circuit

LB: pages 137-140; WB: pages 67-69

CONTENT STANDARDS
B5.4.2.1 Demonstrate knowledge of generation of electricity, its transmission and transformation into other forms.

INDICATOR
B5.4.2.1.1 Identify the components of an electric circuit and their functions.

LEARNING EXPECTATIONS
Learners will:
- Identify components of electric circuit
- Describe the function of components of circuit
- Construct simple electric circuits
- Describe how to build a LED lantern using circuit and plastic bottle.

NEW WORDS
electric circuit, light emitting diode
open circuit, closed circuit

RESOURCES:
Realia of LEDs, wires, batteries, bulbs switches. Pictures/Videos of LEDs, Wises, Switches bulbs and batteries. Pictures/Videos of effects and applications of friction.

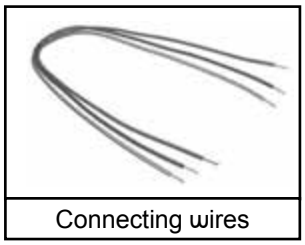
CORE COMPETENCIES
Creativity and Innovation
Personal Development and Leadership
Communication and Collaboration

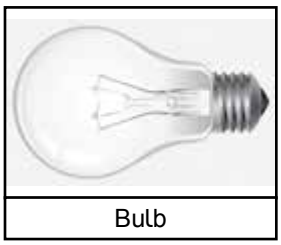
SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Evaluating, Communicating

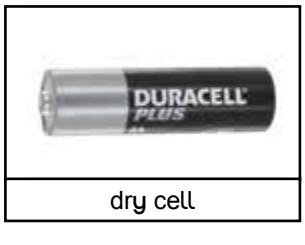
HELPFUL LINKS
- https://www.youtube.com/watch?v=js7Q-r7G9ug

Background information
Electric circuit is made up of a source of energy, conducting wires, a key/switch and a load.

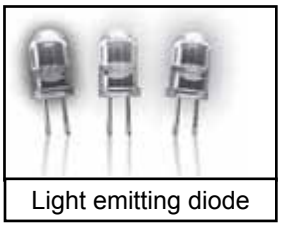
The load is a device that uses electric current to make it work. These components could be batteries, wires, LEDs/bulbs and switches.


Connecting wires


Bulb



dry cell


Light emitting diode

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

Teaching instructions

Activities
Activity 1
- Begin by asking learners what comes into their minds when they hear the term; electric circuit.
- Learners watch pictures and videos of simple electrical circuits and know how they work.

Activity 2
- Learners in groups of four, construct simple electrical circuits using connecting wires, dry cell and a bulb/LED to light up the bulb.
- Assist learners to identify the component and their uses. https://youtu.be/YLSVq-moKrs.

Activity 3

- Assist learners to build LED lantern using circuit and plastic bottles. https://youtu.be/qitkfEAGqcM.

Talk about

Engage learners to discuss the 'Talk about' questions on page 138 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 140 of the Learner's Book to read.

1. Open circuits do not allow flow of current.
2. Closed circuits allow flow of current.
3. Electric circuits are found in homes, schools and work places.
4. Batteries have energy called chemical energy.

Project for home or school

Explain to learners how they will do the home activity. Refer them to page 139 of the Learner's Book.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 139 of the Learner's Book and pages 67-69 of the Workbook.

Answers to Review Exercises

Exercise 1

1. A. Connecting wire
   B. Bulb
   C. Battery
   D. Light Emitting Diode (LED)
2. a. Battery: Provides (chemical) energy to the an electrical circuit.
   b. Connection wire: Allows flow of electricity.
   c. Key: Opens and closes a circuit.
3. Learners to draw.
4. a. Homes, Schools, Industries, ECG stations.
   b. In the open circuit there is no flow of current but in a close circuit there is current.
   c. Light Emitting Diode

Answers to Workbook

Trial 1

1. A. Bulb
   B. Battery
   C. Key
   D. Connecting wire.

2. There is a flow of electricity.

Trial 2

2. Learners to draw.

Trial 3

1. It helps detect and measure electric signals which helps make our lives better .
2. Learners to draw.

3. a. Battery: Provides (chemical) energy to the an electric circuit.
   b. Bulb: Produces light when current flows through it.
   c. Connecting wire: Allows electricity to flow through the circuit.

LESSON 1: Friction and its effects

LB: pages 141-144; WB: pages 70-71

CONTENT STANDARDS
B5.4.3.1 Know that movement is caused by applied forces due to the release of stored energy.

INDICATOR
B5.4.3.1.1 Explain the term, "friction", its effects and applications.

LEARNING EXPECTATIONS
Learners will:
- Explain the term friction.
- Design experiment to investigate the effects of friction.
- Describe some of the applications of friction.

KEY WORD
Friction

RESOURCES
Pictures/Videos of effects and applications of friction.

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

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Predicting, Analysing, Evaluating, Generalising, Communicating, Designing.

HELPFUL LINKS
- https://www.youtube.com/watch?v=aDejNSFufBE
- https://study.com/academy/lesson/characteristics-effects-of-friction.html

Background Information
Friction is the force that opposes the movement between two surfaces in contact with each other or between two bodies sliding over their surfaces that are in contact. When a surface is rough friction increases.

Smoothening surfaces reduce friction. This is why drivers usually move slowly on wet roads. On wet roads the friction between the tyres of the vehicle is reduced. Ball bearings, grease, oil etc. can be used to reduce friction. Friction generates heat.

The efficiency of machines are always not perfect because of the friction between the moving parts of the machine. Friction also produces unwanted heat.

Starter
Find out from learners what a force is and their application. Take feedback from learners.

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

Teaching instructions

Activity 1
- Ask learners to rub their palms together for some time. Have them talk about what they notice.
- Explain to learners that the warmth they felt is caused by a force called friction, and that friction is the force that opposes the movement of two surfaces sliding over each other.

Activity 2
- Let learners explain why cars usually drive slowly on wet roads.
- Task them to explain what happens when one accidentally steps into an oil spill on the floor.

Activity 3

- Ask learners these questions: What is friction? What does it do? How does it work?
- Emphasise the fact that it is because of the friction between the shoes and the ground that we do not fall whilst walking or running.

Talk about

Engage learners to discuss the 'Talk about' questions on page 143 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 144 of the Learner's Book to read.

1. Friction opposes motion or movement between two surfaces that are in contact.
2. When the surface is smooth, friction reduces.
3. Friction can cause wear of materials.
4. Friction helps us to move without regularly.
5. Friction is a force.

Project for home or school

Refer learners to page 144 of the Learner's Books for their project.

Assessment for learning

Supervise learners to do the assessment task. Refer them to pages 143-144 of the Learner's Book and pages 70-71 of the Workbook.

Answers to Review Exercises

Exercise 1

1. a. True
   b. True
   c. True
2. a. Force is pull or push on an object.
   b. Friction is the force that oppose motion.
3. Rubbing of palms, writing, ridding a bicycle.
4. Friction force.
5. e. Rough surface.

Answers to Workbook

Trial 1

1. Oil, ball bearings, powder, water.
2. It is because of friction between the sole of shoes and the ground.
3. Friction is the force that opposes motion between two contact surfaces.

Trial 2

1. The car on the rough surface has high friction. The car on the smooth surface has low friction.

2. a. Friction.
   b. Because of contact.
   c. It helps in writing.

Strand: 5

Humans and the environment

LESSON 1: The need to wash clothes regularly

LB: pages 146-151; WB: pages 74-77

CONTENT STANDARDS
B5.5.1.1 Recognise the importance of personal hygiene.

INDICATORS
B5.5.1.1.1 Know why it is important to wash clothes regularly.

LEARNING EXPECTATIONS
Learners will:
- List and describe materials and equipment for washing clothes
- Explain why it is important to wash clothes regularly
- Describe how to wash clothes
- Describe and classify different types of clothes

NEW WORDS
Underwear, handkerchief, pants, clothes, soap, rub, pegs, wash, washing machine, drying lines, drier.

RESOURCES
Pictures, videos, food, bucket, water, cards, clothes, singlets, boxes, dress.

CORE COMPETENCIES
Critical Thinking and Problem-Solving
Collaboration and communication.
Personal Development and Leadership
Digital literacy
Creativity and Innovation

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Evaluating, Designing, Creating

HELPFUL LINKS
- https://www.youtube.com/watch?v=usyZQwJs5Fs

Background information
We need to keep our bodies clean and protect ourselves from diseases. Things that touch our bodies must not carry infections or dirt.

We use detergents and disinfectants, soap and detol to clean and kill or get rid of germs, bacteria and toxic materials that can contact or enter our bodies to make us sick.

Starter
Find out from learners' the number of times and for how long they wear the same clothes.
Write key ideas on the chalk board.

Teaching instructions

Activity 1
- Let learners talk about how they wash their clothes.
- In small groups of three instruct leaners to write their ideas on cards and share with the other groups.
- Write major ideas from learners on the board.

Activity 2
- Show real materials and objects that are used in washing clothes to learners. Examples: soap, water, detagets, etc.
- In a think-pair-share activity, let learners talk about how often they think is right for them to wash their clothes.
- Write major ideas on the board. Let them take a decision as to how long they should wear the same clothes.

Activity 3
- Learners describe how to wash clothes. They should list the steps they have to use when washing clothes. Also stress on why it is important to separate the clothes and group them according to colour when washing.
- Instruct learners to design a poster of items used in washing clothes.

- Learners should display their work in class and get feedback from their friends.

Talk about

Engage learners to discuss the the 'Talk about' questions on page 147.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 151 of the Learner's Book to read.

1. When we wash our clothes regularly, we maintain a proper personal hygiene.
2. We must wash white clothes with a washing powder to make it easy for us to remove dirt and stains.

Project for home or school

Help learners to make a poster that show five reasons why they should keep their bodies clean.

Assessment for learning
Supervise learners to do the assessment task. Refer them to pages 149-150 of the Learner's Book and pages 74-77 of the Workbook.

Answers to Review Exercise
Exercise 1

1. a. Sort the white clothes and singlet's and pants from the coloured clothes.
   b. Use a bar washing soap to wash the coloured clothing's or washing powder.
   c. Rub gently with our hands to take away any dirt or stain.
   d. Wash twice to be sure that all dirt's and stains are removed.
   e. Squeeze the soap out from the clothes and rinse with clean water or clean water with few drops of Dettol to kill any germ in the clothes.
   f. Squeeze again, the water out and dry on the drying lines, after cleaning the drying lines.
   g. Hold the clothes with pegs to prevent it from falling down.
2. a. We must wash our clothes regularly so that the cloth do not smell.
   b. We must wash our clothes so we do not give a chance to getting sick.

Answers to Workbook
Trial 1

1. a. We can wash off any virus that might have gotten attached to our clothes, which could cause us to be sick.
   b. Our clothes will look neat or clean at any time.
   c. Our clothes will smell good every day.

2. a. False
   b. True

3. a. Washing powder.
   b. Washing soap.
   c. Clothes line.

Trial 2

1. Kofi is outside in the yard at home. Kofi is drying his clothes by hanging them with pegs.
2. The clothes will smell bad.
   Disease causing germs and parasites will get onto our clothes and may make us sick.
3. d
4. b
5. d
6. c
7. b
8. b

LESSON 2: Keeping washrooms clean

LB: pages 152-155.; WB: pages 78-80

CONTENT STANDARD:
B5.5.1.2 Identify, discuss and appreciate the natural and human features of the environment and the need to keep the environment clean.

INDICATOR:
B5.5.1.2.1 Know how to keep washrooms clean.

LEARNING EXPECTATIONS
Learners will:
- Describe a healthy washroom
- Explain how a healthy washroom should be kept
- Describe practices to keep a washroom healthy
- Describe how to keep our toilets and bathrooms clean
- Explain why we should keep our washrooms clean
- Explain why we should immediately and appropriately dispose of waste
- Describe good ways of disposing of different kinds of waste.

NEW WORDS
Washroom, toilet bowl, toilet seat, toilet seat cover, disinfectant, sink, soap, air refresher, mop.

RESOURCES
Pictures, videos of washrooms, towel, soap, scrubbing brush, detergents, mops.

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

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Evaluating

HELPFUL LINKS
- https://www.youtube.com/watch?v=lHzTcRqSOhc

Background information
Our bathrooms and lavatories are critical places that can determine our health status. They are the places where we get rid of toxic and dangerous parasites. Cleaning those place and making sure the parasites are dead and toxic materials are disposed off so that they are not dangerous to us anymore. We need appropriate materials and equipments to clean the washroom. Examples are: Detergents, disinfectants, brushes mops and towels.

Items for cleaning

Starter
Instruct learners to discuss in groups of five and write down how to clean and maintain lavatories and bathrooms at home and in school.
Write learners responses on the board.

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

Teaching instructions

Activity 1
- Ask learners to visit either the male or female washroom in the school twice a day (moring and before clossing) for a period of five days.
- Task them to record their observation using the chart on page 154 of the Learner's Book.

Activity 2

- In groups of five, ask them to write suggestions on how to improve the state of the washrooms they observed.
- Ask them to guess what will happen if their suggestions are practiced by their mates and other learners in the school.

Talk about

Engage learners to discuss the 'Talk about' questions on page 153 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 155 of the Learner's Book to read.

1. I have learnt that keeping washrooms clean is very important to our health.

Project for home or school

Learners are to design a new wash room for their school and show the new items that can help improve the hygienic state of the washroom.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 155 of the Learner's Book and pages 78-80 of the Workbook.

Answers to Review Exercises

Exercise 1

Answers to this question is open. Learner should give answers like:
I will flush the toilet after use.
I will make sure I don't get the floor wet etc.

Answers to Workbook

Trial 1

1. a. Sweep the washrooms every day and empty tissue containers.
   b. Dust and mop floors and clean windows regularly with disinfectants.
   c. Cover the toilet bowl gently and flush faeces or urine any time we use the wash room.
   d. take time to clean the toilet bowl when we realise that after flushing some faeces stains still remain in the toilet bowl.
   e. always clean spills on the floor and keep tissues in tissue containers.
2. a. Mop stick and mop bucket.
   b. Toilet brush and toilet disinfectants.
   c. Broom.

Trial 2

1. It is important to keep our washrooms clean so that we:
   a. do not get infected with any virus or bacterial that can make us sick.
   b. do not spread infectious diseases at home, school and in the community.
   c. Do not contaminate the food we eat and other items with germs we can carry from the washroom outside.

Trial 3

1. Dani's mother is in the washroom. She is cleaning the toilet bowl.
2. Dani is holding a mop stick. He is mopping the floor.
3. Most of Dani,s friends who lived down the hill fell sick frequently because probably they were using washrooms which were not clean.
4. Items Dani's mother can use in cleaning their washroom are parazone, detol, omo (disinfectants), brooms, toilet brush, duster, etc.
5. Other activities Dani can do to help his mother keep the wash room clean are as follows:
   a. Removing cobwebs.
   b. Sweeping the washroom floor.
   c. Cleaning the washroom windows.
   d. Washing the washroom sink.

LESSON 3: How to clean the environment

LB: *pages 156-159;* **WB:** *pages 81-84*

CONTENT STANDARD
B5.5.1.2 Identify, discuss and appreciate the natural and human features of the environment and the need to keep the environment clean.

INDICATOR
B5.5.1.2.2 Demonstrate how to clean the environment regularly.

LEARNING EXPECTATIONS
Learners will:
- Identify and list some essential public places.
- Explain why these places should be kept clean.
- List tools, equipment and materials that one can use to clean particular places.
- Describe how to clean the places named.
- Identify those to be responsible for keeping public places clean.

NEW WORDS
Environment, sweep, dust, weed, mop cutlass, hoe, broom, bathrooms, scrubbing brush, dustbin, dust pan.

RESOURCES
Videos, pictures, dustbins, cartons, small containers, hoe, brooms, cutlass, detergent, dust pan.

CORE COMPETENCIES
Critical Thinking and Problem-Solving
Cultural Identity and Global Citizenship
Collaboration and communication.
Personal Development and Leadership
Creativity and Innovation

SUBJECT SPECIFIC PRACTICES
Observing, Manipulating, Analysing, Evaluating, Designing, Interpreting, Communicating

HELPFUL LINKS
- https://www.youtube.com/watch?v=V0lQ3ljjl40
- https://www.youtube.com/watch?v=cygAkWUWq48

Background information
To stay healthy we must maintain a clean environment. The clean environment will help prevent the contamination of our food, water and the air we breath.
To be cleaning our environment we need the appropriate tools like disinfectants, detergents dirt pan, hoe, cutlass.

Starter
Discuss with learners their impressions when they visit some public places in the community. They should talk about how clean or dirty the places look.

Write learners responses on the board.

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

Teaching instructions

Activity 1
- Show videos to learners on ways of cleaning some public places.
- Learners in groups of four should discuss and share their observations with the whole class.
- Write major ideas on the board.

Activity 2
- Guide learners on a tour to some public places in the community.Example hospitals, markets, lorry parks, etc.
- On the tour, learners should note how the places are kept clean or dirty.
- In their groups ask them to discuss their notes and findings.

Activity 3

- Have learners do the activity in the Learner's Book and provide feedback to the class.
- Write the major ideas on the board.
- Have learners use cartons to provide labelled waste bins.

Talk about

Engage learners to discuss the 'Talk about' questions on page 157 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 159 of the Learner's Book to read.

1. I have learnt that there are different cleaning items used in cleaning the environment.
2. Each one is used for doing a specific cleaning activity. Example broom for sweeping and brush for scribbing.

Project for home or school

Refer learners to page 158 of the Learner's Book to do the following:

1. Name four items used in cleaning at home.
2. Draw and colour any one of these items.
3. Design a new dustpan that can be used in collecting rubbish into dustbins
4. As an aditional activity assign learners to design and make a tool that can be used to clean around their houses. They should later display the tool in class.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 158 of the Learner's Book and pages 81-84 of the Workbook.

Answers to Review Exercises

Exercise 1

1. Cleaning items
   (1) disinfectants
   (2) machetes, hoes, cutlasses, rakes,
   (3) detergents
   (4) brooms, brushes, mopping towels, etc.

More can be added to this list depending on what learners eat at lunch and snack breaks.

2. a. Removes injurious items we find around
   b. Makes the environment attractive.

Answers to Workbook

Trial 1

1. a. Brooms
   b. Dusters and dust pans
   c. Ceiling brushes
   d. Cutlasses, hoes, rakes

2. a. Broom - for sweeping.
   b. Dusters - for dusting objects and dusting furniture such as tables and chairs.
   c. Dust pans - for collecting rubbish after sweeping the floor.
   d. Ceiling brush - for removing cobwebs from the ceiling as well as edges and corners of walls.
   e. Cutlasses and hoes – for weeding our compounds when weedy.
   f. Rakes - for gathering weeds after weeding.

Trial 2

Learners do design a poster.

Trial 3

1a.	C	disease-causing germs
1b.	A	multiply
2a.	D	vectors
2b.	G	germs
3a.	E	rubbish
3b.	B	cans
3c.	F	grass

Trial 4

1. a. Raking
   b. Mowing
2. a. Trimming
   b. Pruning
3. a. Cleaning
   b. Gutters
4. Rubbish
5. Watering

LESSON 1: Explaining the causes, symptoms and control of chicken pox

LB: pages 160-162; WB: pages 85-87

CONTENT STANDARD
B5.5.2.1 Know common diseases of humans; causes, symptoms, effects and prevention.

INDICATOR
B5.5.2.1.1 Explain the causes, symptoms and control of chicken pox.

LEARNING EXPECTATIONS
Learners will:
- Describe the symptoms of chicken pox.
- Explain how it is transmitted.
- Identify the cause of the disease.
- Describe how to control chicken pox.

NEW WORDS
chicken pox, rashes, disease, virus, signs,

RESOURCES
Pictures, Videos, resource persons, internet, etc.

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

SUBJECT SPECIFIC PRACTICES
Analysing, Evaluating, Designing, Interpreting

HELPFUL LINKS
- https://www.youtube.com/watch?v=xNc4kEt4pN0
- https://www.healthline.com/health/chickenpox

Background
Chicken pox is an air-borne disease. We can get the disease when we breathe in air that is contaminated with the virus. The disease can spreads fast.

In just two days, a victim is ready to spread the disease. Yet, it is after twenty one days that the spots on the skin associated with the chicken pox show on the body. What we need to know are the signs or symptoms of chicken pox. They are:
Headaches which are severe.
Body temperature increases
Rashes on the skin which appear as spots.

Starter
Task learners to do a think-pair-share activity to find out If some of the learners have been attacked by the chicken pox disease before. Have learners share their responses in a whole class discussion and write major ideas on the board.

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

Teaching Instructions

Activity 1
- Have learners watch a video that talks about the chicken pox disease.
- In groups of five, have learners discuss their observations.
- Write major ideas from each group on the board.

Activity 2
- Divide the class into five groups. Give each group one of the following questions.
  a. What causes chicken pox?
  b. What are the symptoms of chicken pox?
  c. What should be done if someone has chicken pox?
  d. What are the ways of preventing the spread of chicken pox?
- Engage learners to use the internet to search for more informations.

Activity 3

- Task learners to develop concept maps to show causes, symptoms and prevention of chicken pox and display through a gallery walk.
- Refer learners to do the activity on page 161 of the Learner's Book and provide feedback to the class
- Write major ideas from learners' activities on the board. Also invite a health personnel if possible.

Talk ABout

Engage learners to discuss the 'Talk about' questions on page162.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 162 of the Learner's Book to read.

1. Chicken pox is an air-borne disease.
2. It is caused by a virus.
3. Chicken pox is seen as spots on the skin.
4. It can cause severe headaches with high body temperatures.

Project for home or school

1. Task learners to find out from their home whether members in their home have ever had the chicken pox disease. They should present their responses to the class.
2. Task learners to suggest ways of preventing themselves from contracting chicken pox diseas.
3. Let them design a colourful poster for science fair.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 161 of the Learner's Book and pages 85-87 of the Workbook.

Answers to Review Exercises

Exercise 1

1. a. Rashes on the skin which appear as spots.
   b. Headaches which are severe.
   c. Body temperature increase.
2. When we breathe in air that is contaminated with the virus.Rubella virus.

Answers to Workbook

Trial 1

1. a. Seeing rashes like spots that shows on the person's skin surface.
   b. Rise in temperature of the body.
   c. If the person has severe headaches.

Trial 2

1. a. False
   b. False

Trial 3

1. Chickenpox is caused by a virus, the varicella-zoster virus.
2. Chickenpox spreads from person to person by direct contact or through the air by coughing or sneezing. It is highly contagious. It can also be spread through direct contact with the fluid from a blister of a person infected with chickenpox, or from direct contact with a sore from a person with shingles.
3. It takes from 10 to 21 days to develop symptoms after being exposed to a person infected with chickenpox. The usual time period is 14–16 days.
4. The most common complication is bacterial infection of the skin or other parts of the body including the bones, lungs, joints, and blood. The virus can also lead to pneumonia or infection of the brain. These complications are rare but serious. Complications are more common in infants, adults, and people with weakened immune systems.
5. Answers to this question is open. Learners are to do research on internet.

LESSON 2: Causes, symptoms and prevention of cholera

LB: pages 163-165 ; WB: pages 88-89

CONTENT STANDARD
B5.5.2.1 Know common diseases of humans; causes, symptoms, effects and prevention.

INDICATOR
B5.5.2.1.2 Identify causes, symptoms and prevention of cholera.

LEARNING EXPECTATIONS
Learners will:
- Describe the symptoms of cholera.
- Explain how it is transmitted.
- Identify the causes of cholera.
- Describe how to prevent it.

NEW WORDS
Fruits, bacteria, virus, chemicals, poisonous.

RESOURCES
Fruits, food, videos, pictures, color pencils.

CORE COMPETENCIES
Critical Thinking and Problem-Solving
Collaboration and communication.
Personal Development and Leadership
Digital Literacy

SUBJECT SPECIFIC PRACTICES
Analysing, Generating

HELPFUL LINKS
- https://www.healthline.com/health/cholera
- https://www.youtube.com/watch?v=qacHZKX3h5o

Background
Food-borne diseases are caused by food-poisoning, food infected by flies, bacteria and spoilt fruits, etc. We must keep our foods clean and fresh till we eat them. We must also eat foods that are warm and hot to prevent us from contracting food-borne diseases. When our surroundings are not clean diseases abound.

Disease germs and bacteria reach our bodies through the air, water and food. When we do not dispose of our waste properly we contact diseases.

Cholera gets to us when we do not get rid of our waste properly. Through the water we drink and the food we eat cholera can spread quickly in a community.

Starter
Task learners to talk about the foods they ate in the morning or afternoon or the previous night. They should tell if they bought it or was prepared at home. They should use think-pair-share activity.
Have learners discuss the likelihood that these foods could be contaminated and can make them fall sick.

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

Someone vomiting

Teaching Instruction

Activity 1
- Have learners watch a video that shows the causes, symptoms and prevention of food-borne disease. Refer to https://youtu.be/2QQvhFPZedM.
- In groups of six, have learners discuss their observations.
- Write major ideas from each group on the board.

Activity 2

- In their groups, have leaners list the names of some water and food borne diseases they know and their symptoms.
- Discuss what they have heard and know about cholera.
- Write all major ideas from learners on the board and let them read through.

Activity 3

- Instruct learners to List the symptoms of cholera.
- Learners should describe what they can do to prevent contracting cholera. Provide feedback to learners.
- Write major ideas from learners' activities on the board and give proper feedback.

Talk about

Engage learners to discuss the 'Talk about' questions on page 164 of the Learner's Book.

What I have learnt.

You may write the following on the chalk board as a summary, or refer learners to page 165 of the Learner's Book to read.

1. Cholera is caused by the vibrio cholerae bacteria.
2. It is carried around by contaminated water and food.

Project for home or school

1. Task learners to observe their mother's kitchen at home and find out how vegetables look like when they are stored well.

2. Task learners to design a poster for a school science fair programme and create awareness or write about the cholera disease.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 165 of the Learner's Book and pages 88-89 of the Workbook.

Answers to Review Exercises

Exercise 1

1. Symptoms of cholera:
   i. If one has frequent watery faeces and diarrhoea.
   ii. If a person vomits repeatedly. This makes the one suffering from the disease lose a lot of water and body fluids.
   iii. A person suffering from cholera quickly loses weight.
   iv. Finally a cholera patient can die if not treated immediately.

2. Prevention:
   We can always prevent ourselves from the disease if we drink clean water, eat hygienic foods and live in a clean environment. We must visit the hospital to see a doctor for treatment if we show signs of cholera.

Answers to Workbook

Trial 1

1. a. Watery faeces leading to diarrhoea.
   b. Frequent vomiting.
   c. Rapid loss of water from the body.
2. a. By drinking clean water always.
   c. By eating hygiene food.
   d. By cleaning and keeping our environment clean.

Trial 2

1. Answers to this question is not excusive. Learners are to create a poster.

LESSON 1: Identifying the raw materials used in some local industries

LB: pages 166-168; WB: pages 90-93

CONTENT STANDARD
B5.5.3.1 Recognise the impact of science and technology in society.

INDICATOR
B5.5.3.1.1 Identify the raw materials used in some local industries (kenkey).

LEARNING EXPECTATIONS
Learners will:
- Describe industries that are in your area.
- Identify the raw materials they use.
- Describe the science in the industries.
- Describe how some practices can be mechanized.

NEW WORDS
Bamboo Cane, clay, coconut, palm nut, corn.

RESOURCES

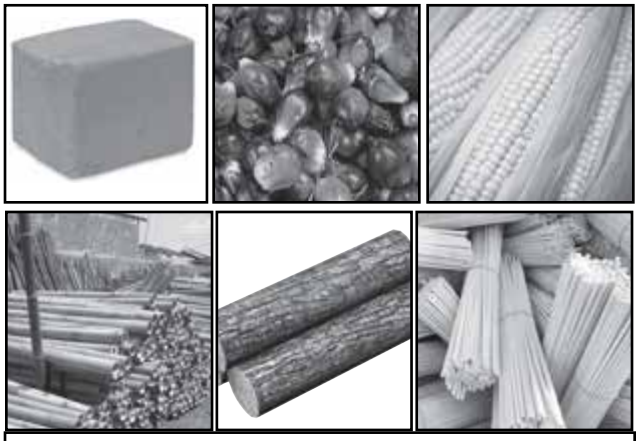
CORE COMPETENCIES
Critical Thinking and Problem-Solving
Collaboration and Communication.
Personal Development and Leadership
Digital Literacy

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Evaluating, Planning, Designing, Interpreting

HELPFUL LINKS
- https://www.youtube.com/watch?v=8q6_sdGsoAQ
- https://www.youtube.com/watch?v=ejPuV1NFxgg
- https://www.youtube.com/watch?v=oHDSKubWikY

Background Information
Raw materials available in an area usually determines the crafts and industries found in that area. People add value to things around to make them useful and marketable.

What we know about the materials around us determine how we can make them useful to bring about prosperity.



Some raw materials

Starter
Ask learners to list the occupations of their parents.
They should further discuss the materials these people work with and where they get them from.
Example: Carpenters use wood which is sourced from the forest area. A tailor uses fabrics which is made from cotton plants.

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

Teaching instructions

Activity 1
- Visit some local indutries with learners. Examples, tailoring shop, carpentry shop, beverages and palm oil producing factories, etc.
- Encourage learners to ask questions like:
  a. What is their main raw materials?
  b. Where/how do they get them?
  c. How do they transform them into marketable product?

Activity 2

- Back in the classroom, put learners into groups of six. Let them brainstorm and write down what they learnt during the visit to the factories.
- Task each group to select a leader, who makes a presentation to the whole class.
- Give them the appropriate feedback.

Talk about

Engage learners to discuss the 'Talk about' questions on page 167 of the Learner's Book.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 168 of the Learner's Book to read.

1. Local industries use raw materials found in the area. Bamboo, cane, clay, coconut, palm nut and corn are all examples of raw materials.
2. Products are made from the raw materials and sold for money.

Project for home or school

Refer learners to page 168 of the Learner's Book to do more project.

Assessment for learning

Supervise learners to do the assessment task. Refer them to page 168 of the Learner's Book and pages 90-93 of the Workbook.

Answers to Review Exercises

Exercise 1

Materials / items
Wood from plant stems and branches. Paper and books.
Timber from plants make tables and other furniture
Clay for pots
coconut for oil
palm nut for palm oil
Wood for paper, books, table and chairs

Answers to Workbook

Trial 1

Product	Raw materials
Book	Wood pulp or paper
Table	Wood
Chair	Wood
Water bottle	Glass or plastics

Trial 2

1. a. Can know how to use the raw materials better and efficiently.
   b. so that we can determine whether any special environment and tools will be needed to process the raw materials into desired finished products.
2. a. leather
   b. fabric
   c. zipper
   d. Button
   e. Plastics

NB. This is also an open answer and depending of what the leaner has in mind, the learner can give response for only rubber bags or leather bags, school bags, etc.

Trial 3

1. d. Raffia

Trial 4

1. Gold
2. Cane
3. Plastic/metal
4. Leather
5. Leather
6. Wood

LESSON 1: The impact of deforestation on climate change

LB: pages 169-171; WB: pages 94-95

CONTENT STANDARD
B5.5.4.1 Know that climate change is one of the most important environmental issues facing the world today.

INDICATOR
B5.5.4.1.1 Identify the impact of deforestation on climate change.

LEARNING EXPECTATIONS
Learners will:
- Describe what deforestation is.
- Explain what brings about deforestation.
- Describe how deforestation affects climate change.
- Describe how deforestation can be minimised.
- Design forestation programmes.

NEW WORDS
Burn, Climate Change, Fossil fuels, nutrients, atmosphere, smoke, fumes.

RESOURCES
Videos or pictures of forest activities.

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

SUBJECT SPECIFIC PRACTICES
Observing, Analysing, Evaluating

HELPFUL LINKS
- https://www.youtube.com/watch?v=DOk9NttqpK4
- https://www.youtube.com/watch?v=Nc7f5563azs

Background information
Bush burning produces carbon dioxide. Too much carbon dioxide in the atmosphere brings about the green-house effect. The green-house effect is caused when gases on the earth's surface prevents the sun's heat from leaving the earth. This makes the earth warmer and promotes climate change. Destroying forests also causes climate change.

This is a major concern of the nations on earth today. Mining, farm plantations and estate developments are bringing about further deforestation. These negatively affect us in the climate change that occurs as a result.

A timber logging site

Starter
Task learners to use think-pair-share to talk about the number of trees around and name some forests they know.
Have learners share their responses in a whole class discussion. Write major ideas on the board.

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

Teaching instructions

Activity 1
- Have learners watch a video on some activities that goes on in the forests.
- In groups of four, have learners discuss what they observed in the video.

- Let them present their finding to the whole class.
- Write major ideas from each group on the board and explain further to learners.

Activity 2
- Still in their previous groups, task learners to discuss activities that lead to the depletion of forests.
- Allow group presentations and gallery presentations and provide feedback.
- Have learners talk about what will happen if we destroy our forests.
- Write learners' responses on the board and provide further explanation on effects of deforestation.

Activity 3
- Task learners to refer to the Learner's Books to do the activity on page 170.

Talk about

Engage learners to discuss the 'Talk about' questions on page 170.

What I have learnt

You may write the following on the chalk board as a summary, or refer learners to page 171 of the Learner's Book to read.

1. I have learnt that trees are useful. We should never cut down trees but instead we should grow more trees.
2. Trees give us fresh oxygen in the environment.
3. When we cut down trees, climate change will occur. This will affect us because we will have less rainfall and less oxygen.

Project for home or school

1. Task learners to look out for and name activities in their homes that can result in increasing deforestation and present for feedback.
2. Have learners design a poster for a science fair and write about what some communities are doing to reduce deforestation.

Assessment for learning
Supervise learners to do the assessment task. Refer them to page 170 of the Learner's Book and pages 94-95 of the Workbook.

Answers to Review Exercises
Exercise 1
1. i. Production of oxygen into the atmosphere.
   ii. Removes harmful carbon dioxide from the atmosphere.
   iii. Serves as wind breakers and protects habitations.

2. Learners to design a poster.
   The answer to this question is open.

Answers to Workbook
Trial 1
1. a. Neem tree – used in making medicine
   b. Teak tree- used for boat building, furniture and more.

2. a. false
   b. true

3. a. So that we will all learn how to take good care of the environment and the atmosphere to prevent floods.
   d. We know the effects of climate change can bring droughts to reduce farm produce.

Trial 2
1. a. True
   b. True
2. B
3. D
4. D

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