NEW AGE SCIENCE

FOR BASIC SCHOOLS

TEACHER'S GUIDE BOOK

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Preface

The teacher's guide has been written to assist the teacher to help learners to acquire the required skills and attitudes and also to help them understand the concepts as explained in the textbooks and workbooks.

The Teacher's Guides have been written to deliver the new curriculum for Basic Schools produced by the Ministry of Education for the National Council for Curriculum and Assessment (NaCCA). It has been developed by an expert team of Ghanaian teachers and educators and its aim is to achieve the content standards and indicators and exemplars of the curriculum and to support the teachers as they work with the learners throughout the six years.

The curriculum uses a learner-centered approach and works to develop the skills that the learner should acquire. The curriculum is designed to help learners acquire both scientific attitudes and process skills and cognitive ability and be able to apply them. The course is activity-based and proceeds on the knowledge that learners learn best when they are actively doing science and not just listening or reading about it.

The Teacher's Guide is designed to support teachers as they create the facilitating and learning opportunities and activities through which the learners will develop their science skills, their attitudes and cognitive abilities.

For each indicator in the learner's book the guide provide a list of key words introduced in the indicator, advice on lesson planning, materials and resources required for the indicator to enable the facilitator achieve his or her aim. Local materials of low or no cost are suggested.

The teachers are also provided with different kinds of assessments to enable them find out what the learners know already (diagnostic) and whether they are following the steps as the lesson progresses (progressive)

The answers to these assessment questions and those of study questions in the learners textbook as well as those in the workbook have all been provided in the teacher guide. These will help the facilitator to do his or her work effectively.

School-based Assessment (SBA) is an important feature of the new curriculum. The study questions at the end of each indicator in the learners book are written in the same line as the SBA. We hope that this will assist the facilitator in their assessment. We hope that you will enjoy using the guide and it will help in your work as a facilitator to help the learners develop their scientific abilities.

General Introduction
Science and Technology is the backbone of social, economic, political and physical development of a country. It is because of this realization that the Ministry of Education through the Ghana Education Service and the National Council for Curriculum and Assessment (NaCCA) has developed the curriculum for basic schools.

Aims and Objectives of Teaching Basic Science in the Primary School.

The curriculum is aimed at shaping individuals to become scientifically literate, good problem solvers, have the ability to think creatively and develop both the confidence and competences to participate fully in Ghanaian society as responsible local and global citizens. The Science curriculum is designed to help learners to;

- Develop the spirit of curiosity, innovation and critical thinking for investigating and understanding their environment;
- Develop skills, habits of mind and altitudes necessary for scientific inquiry;
- Communicate scientific ideas effectively;
- Use scientific concepts to explain their own lives and the world around them;
- Live a healthy and quality life;
- Develop humane and responsible altitude towards the use of all resources of Ghana and elsewhere
- Show concern and understanding of the interdependence of all living things and the environment in which they live;
- Design activities for exploring and applying scientific ideas and concepts
- Develop skills for using technology to enhance learning;
- Use materials in their environment in a sustainable manner.

Rationale for teaching Basic School Science.
Science forms an integral part of our everyday life, and it is a universal truth that development is hinged in science. Science consists of a body of knowledge which attempts to explain and interpret phenomena and experiences in rational terms. Science has changed our lives and it is vital to Ghana's future development.

To provide quality science education, teachers must facilitate learning in the science classroom. This will provide the foundation for discovering and understanding the world around us and lay the basis for science and science-related courses of study 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 the origins, causes and effect of things in our environment.

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 has to be taught using hands-on and minds-on approaches, which learners will find as fun and adopt as a culture.

Philosophy

i. Teaching

Ghana believes that an effective science education 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 methodology and learning approaches that engage learners physically and cognitively in the knowledge-acquiring process in a niche and vigorous inquiry-driven environment.

ii. Learning

Science Learning is an active contextualized process of constructing knowledge based on learner's experiences rather than acquiring it. Learners are information constitutors who operate as researchers. Teachers serve as facilitators by providing the enabling environment that promote the continuation 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 Expectation(Role of the Facilitator)

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 an arrangement to provide feedback to both learners and parents.
5. Design and manage learning environments that provide learners with time, space and resources needed for learning science.

Core Competencies

These describe a body of skills that learners at all levels should seek to develop in the learners. There are ways in which teachers 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 process of teaching and learning.

Critical Thinking

This skill helps to develop learners' cognitive and reasoning abilities to enable them analyse and solve problems. This skill enables learners to draw their own experiences to analyse situations and choose the most appropriate out of possible solutions. It requires the learners embrace the problem at hand and persevere and take responsibility for their own learning.

Creativity and Innovation
This skill promotes the development of entrepreneur 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 skills are also able to think independently and creatively.

Communication and Collaboration.
The competence promotes in learners the skills to make use of language, 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
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 competencies and attitudes acquired to contribute effectively towards the socio economic development of the country and in 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
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. This skill (PL) helps learners to acquire the skill of leadership, Self-regulation and responsibility necessary for lifelong learning.

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

Scope of Content
The content standards in the curriculum have been carefully selected to introduce learners to the inquiry process of science as well as the basic ideas in science.

The Teacher's Guide are series of books written in a simple easy to read and understand language. Almost every scientific term used is simplified as much as possible. There are simple illustrations, examples, hands-on minds and eyes-on activities which are very necessary in teaching science.

Organisation of the Teacher's Guide

The Teacher's Guide has been organised to confirm with the Learners Text Book. It is made of strands, sub-strands, content standards, Indicators and examples. A unique annotation is used for numbering the learning indicators in the curriculum for the purpose of referencing. An example is shown in the table below.

Annotation	Meaning/Representation
B3	Year or class
2	Strand Number
4	Sub-Strand Number
1	Content Standard Number
2	Indicator Number

Strands – the broad areas/sections of the science content to be studied.

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

Content Standard – the predetermined level of knowledge, skill and attitude that a learner attains by a set stage of education.

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

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

The Teacher's Guide has also been organized along the same line. In addition it has an introduction , key words, materials and resources, additional information, diagnostic and progressive assessment and their answers as well as answers to text book study questions.

Role of the Facilitator (Before A Lesson)

- Collect materials around the school environment with the help of learners
- Plan the best way to teach the lesson.
- With the help of indicators and exemplars select and plan activities for the learners.
- Try out the activity to find out its suitability to the achievement of the indicators.

The Role of the Facilitator/Teacher (during the lesson)

- Introduce the lesson and give out the materials
- Supervise and guide learners as they perform the activity
- Move round and ask questions or provide clues at times
- Evaluate learners work
- Act as a co-learner
- Encourage learners when the need arises.

The Role of the Facilitator/Teacher (After the lesson)

- Organize a general class discussion with learners to concretize concepts, skills, altitudes and correct misconception.
- Assess learners by giving them assignment, exercises and quizzes.
- Work assignment, quizzes and exercises

The Role of the Learners.

1. Before the lesson.
    - They may be involved in the collection and gathering of materials necessary for the lesson.
    - They may be involved in the planning of the activities.

2. During the Lesson
    - Learners interact with the materials as they try to find out answers to their own question and that of the facilitator through the use of the materials.

Special Attention Learners

A class may consist of learners of different physical problems and mental abilities. Some of the learners may have high abilities whiles others may be slow learners, some may be dyslexic and not able to read or spell well as the others in the class. All these are special needs – learners and need special attention.

Ensure that you give equal attention to all leaners in the class to provide each of the equal opportunities for learning. Learners with disabilities may be hidden talents that can only come to light if you provide them with the necessary encouragement and support in class.

In the classroom, learners should

- Communicate among their group members and with the facilitator.
- Record their findings and observation by making models, sketches and drawings and writing.

After the lesson

- Learners participate in general class discussion with the facilitator
- Cause not their assignments
- Tidy up the classroom

Assessment

The facilitator must continuously assess himself or herself as well as the learners. This is a process of collecting and evaluating information about learners and using the information to improve their learning.

In this curriculum, it is suggested that the facilitator uses assessment to promote learning and so identifies the strengths and weaknesses of learners to enable him or her ascertain the learners response to instructions.

Assessment is both formative and summative. Formative assessment is viewed in terms of assessment as learning and Assessment for learning.

Assessment as Learning:
It relates to engaging learners to reflect on the expectations of their learning. Information that learners provide the facilitators form the basis for refining teaching-learning strategies.

Learners are assisted to play their roles and to take responsibility of their own learning to improve performance. Learners are assisted to set their own goals and monitor their progress.

Assessment For Learning
This is an approach used to monitor learners progress and achievement. This occurs throughout the learning process. The facilitator 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, what they know and can do over a period of time. The emphasis is to evaluate the learners cumulative progress and achievement.

Which assessment the facilitator uses depends on its purpose. 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 learner. When you develop assessment items based on a representative sample of the indicator taught the assessment is referred to as a 'Criterion-Referenced Assessment'. A facilitator cannot assess all indicators taught in a term. The assessment procedure you use i.e. class assessment, 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.

CONTENTS

STRAND 1: DIVERSITY OF MATTER

SUB-STRAND 1: LIVING AND NON-LIVING THINGS

LESSON 1: BASIC STRUCTURE OF PLANTS

Expectations: At the end of this lesson you will be able to:

- uproot young plants from school surroundings with the assistance of the teacher and bring them to class
- identify the basic parts of plants (roots, stem, leaves and flowers)
- describe the basic parts of plants (roots, stem and leaves and flowers)

Content Standard: B2.1.1.1 Demonstrate understanding of the physical features and life processes of living things and use this understanding to classify them

Core Competencies: Digital Literacy, Communication and Collaboration, Personal development and Leadership, Creativity and Innovation

Subject Specific Practices: Observing, Communicating, Classifying

Reference: Learners book 2 page 2 -12

Introduction

We are surrounded by many materials. Some of the materials are living things and others are non-living things. Some of the living things are plants whilst others are animals. There are some of the materials which were alive some time ago but today they are no longer alive. We use the knowledge of how these living things look like to classify them. Plants, for instance, have a basic structure.

Indicators and exemplars: B2.1.1.1.1 Know the basic structure of plants (root, stem, leaves, flowers)

Key words: structure, root, stem, leaves and stem

Additional Information

We see plants around us. Plants are different in many ways. They are different in size. They are different in shape. The basic structure of plants consists of the root, the stem, the leaves and the flowers. There are fruits also found on some tree depending on the season. The root is the part of the plant hidden in the soil. The stem, the leaves and the flowers are above the soil. The leaves are attached to the stem. They are green. The stems of some plants are also green, especially young herbaceous plants. They have different shapes. The flowers have different colours.

Kinds of Plants
There are different kinds of plant but having the same basic structure

Erect plants
These are plants which normally stand straight on their own. Their stems stand straight to support the plant. There are many erect plants around us.

Examples include:
- hibiscus flower plant
- banana plant
- mango tree
- mahogany plant
- odum plant

Creeping plant
These are plants which grow along the ground from their roots. They may grow other roots as they grow along.
Their stems are not strong enough to make them stand upright like the erect plants.

Examples of creeping plants are:
- sweet potato
- some kinds of grasses
- water melon

Climbing plants
These are plants with weak stems.
They cannot stand on their own.
They need to be supported.
They grow round erect plants for support or they are supported by sticks near them to climb.

Examples of climbing plants:
- yam
- some type of bean plants

Even though there are different kinds of plants, their basic structure is the same. This means that they all have roots, stems, leaves and flowers.

Starting the lesson
Start this lesson by engaging the learners in the following activities:

ACTIVITY 1.1.1 (a): Observing different kinds of plants in our environment
Lead learners in groups of four or five to walk round the school compound and observe the different kinds of plants.

Tell learners to uproot samples of the following young plants and bring them to the classroom:
a. erect plants
b. creeping plants
c. climbing plants

Ask learners to describe what makes the plants they uproot erect, creeping or climbing plants.

Tell learners in groups of four or five to examine the different plants they uprooted well and identify the basic parts. Ask learners the following questions:

- Which part of the plant is the root?
- Which part of the plant is the stem?
- Which part of the plant are the leaves?
- What is the colour of the leaves?
- Do the plants have flowers?
- Which part of the plant are the flowers?
- What is the colour of the flower?
- How does the root look like?
- How does the stem look like?
- How do the leaves look like?
- How does the flower look like?
- Which part of the plant is hidden in the soil?
- Which part of the plant was seen above the soil?

ACTIVITY 1.1.1 (b): Drawing different kinds of plants in our environment
Instruct learners to draw the different kinds of plants they brought to the classroom in their notebook and label the parts.

Asks learners if they know any song or poem or rhyme about a plants. Teach learners a song or poem or rhyme about a plant as follows if they do not know any already.

Song
I am a little plant
Growing tall, tall and tall
I am a little plant
Growing among different kinds of plants
I am a little plant
Looking different form other plants
I am still a little plant
I have my root, down, down, down
I have my leaves, I have my flowers up, up, up
I am still a little plant
I have my stem here, here and here
I am still a little plant

These are my root, my stem, my leaves and my flowers
Oooh hooo, hooo! Oooh hooo, hooo!!. Oooh hooo, hooo!!!.

Ask learners to look at the leaves of the different plants they have watched and hence ask them how they look like (broad, narrow, thin, thick or coloured)

Guide learner to come to the understanding that leaves are parts of a plant that help the plant to make its own food and that most leaves are green in colour.

Also explains that leaves can also have other colours such as red and yellow. Different plants have different types of leaves as shown in the drawings.

Flower
Tell learners to look at the flowers of the different plants and ask them how they look like. Emphasise to learners, the fact that flowers can be small, big, have bright colour, have dull colour and have fragrant smell

Draw attention of learners to insects attracted to flowers that have bright colours and fragrant smell.

Root
Tell learners to look at the roots of the different plants they watched and hence ask them how they look like.

Make learners understand that roots:
- can be single and grow deep into the soil (taproots) with smaller branches
- can have many small branches and spread wide in the soil and do not grow deep(fibrous root) .
- absorb water and nutrients from the soil. Some roots can store food and grow big..

Tell learners to look at the stem of the different plants they watched and hence asks them how it looks like. Summarise the responses of learners to establish the fact that the stem can be:
- big
- small
- branched
- found mostly at the middle of the plant

Ask learners the following questions:
- What do you think will happen if there were no plants in your community?
- In what ways do plants help you in your community?
- Where do you get food from?
- Where do you get some of your medicine from?
- On a hot sunny day there are no buildings around you what do you do?

Directs learners' attention to the large picture of a tree he or she has pasted on the wall of the classroom.

Summary

- The root is the part of the plant hidden in the soil.
- The root absorbs water and nutrients from the soil.
- The stem, the leaves and the flowers are above the soil.
- The leaves are attached to the stem.
- The flowers have different colours.

Diagnostic assessment

1. Name the parts of a creeping plant
2. Write down two examples of creeping plants
3. What does a root do to a plant?

Progressive assessment

1. Select two erect plants from the following list: hibiscus flower plant, water melon plant, banana plant, mango tree, sweet potato and mahogany plant.
2. Which part of the plant absorbs water?

Answers to Diagnostic assessment

1. root, stem, leaves, flowers
2. water melon and sweet potato.
3. It absorbs water and mineral salts. It fixes the plant to the ground

Answers to Progressive assessment

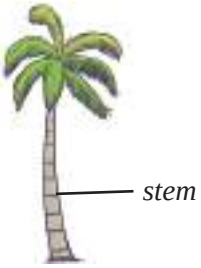
1. hibiscus flower plant, banana plant, mango tree and mahogany plant.
2. Root

Answers to Study Questions

1. i) stem, leaves, flowers
   ii) root
   iii) leaves
2. Root
3. Stem, leaves, fruit or flowers
4. erect plants, creeping plants, climbing plants

climbing plants

creeping plants



erect plants

5. (a) Root
   (b) Fruit
   (c) Flower

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 1: LIVING AND NON-LIVING THINGS

LESSON 2: THE BASIC STRUCTURE OF ANIMALS

Content Standard: B2.1.1.2 Understand the differences between living, non-living things and things which have never been alive

Core Competencies: Digital Literacy, Communication and Collaboration, Personal Development and Leadership

Expectations: At the end of this lesson you will be able to:

- name some animals from the pictures
- identify the basic parts of animals (head, limbs and trunk)
- draw animals of your choice
- design and mould animals of your choice and identify the basic parts of those animals (head, limbs and trunk).
- explain why you chose to mould animals you moulded.

Subject Specific Practices: Observing, Communicating, Classifying, Manipulating, Generating

Reference: Learners book 2, page 13 – 20

Introduction
It is not only plants that have a basic structure. Animals also have a basic structure. Human beings are also animals. This is because the basic structure of human beings is the same as that of other animals. There are only little differences in the basic structure between the various groupings of animals.

Indicators and exemplars: B2.1.1.2.1 Describe the basic structure of animals (head, limbs and trunk)

Key words: head, limbs and trunk

Additional Information
It is good to describe things in the environment. This makes it easy for people to know which of them you are talking about at a particular time. In Pupils' book 1, the learners learnt about living and non-living things. They learnt that plants and animals are living things. Apart from living and non-living things, there are things which were living things in the past but are now dead. They have become non-living things. An example is firewood. There are some things which have never been alive before. They always exist as non-living things. A stone is an example. In

this unit we are going to learn about the basic structure of animals which include the head, the limbs and the trunk.

There are different animals. These include:

- birds
- insects
- fish
- reptiles
- mammals

All these animals have a basic structure. The basic parts of animals are:

- the head
- the trunk
- the limbs

The Head

The head is the part of the body that contains the brain, the eye, the nose, the ear and the mouth. The head contains the skull which is a hard bony structure which protect the brain which is delicate.

The trunk

The trunk is the middle portion of the animal. The chest and abdomen are part of the trunk. The chest contains the heart and the lungs. The abdomen contains the stomach, the liver, the kidney and the intestine.

The Limbs

The limbs consist of the forelimbs and the hind limbs. In some animals, the arms are the forelimbs and the legs are the hind limbs.

Starting the lesson

Start this lesson by showing to learners, video or pictures about different animals. Engage learners in the following activities:

Activity 1.1.2.1 Basic structure of animals (head, limbs and trunk)

- Directs learners to look at the animals in the drawings on page 16 - 17of learners' textbook.
- Tell learners to write down the names of the different animals they have seen in the picture.
- Instruct learners to draw each of them in their exercise book. Go round what learners are drawing and guides them.
- Tell learners to write down the basic parts of the animal they have drawn

Teacher asks learners which part of the animal they have drawn

- is the head?
- is the trunk?
- are the limbs?

Lead learners to go out of the classroom, to look for the animals shown in the drawings in pupils' textbook, for example: birds, insects, fish, reptiles and mammals.

Activity 1.1.2.1 Drawing animals

Instruct learners to draw the following animals in their exercise book: fish, butterfly, bird and snake. Go round to inspect what the learners are drawing and guides them.

Project: Give a project to learners by telling them to use clay to design and mould some animals of their choice and name the basic parts. Ask learners to write down the reason for choosing to mould those particular animals.

Summary

- There are different animals which include: birds, insects, fish, reptiles, amphibians and mammals.
- All these animals have a basic structure which consist of the head, the trunk and the limbs.
- Parts of the head are eyes, nose, mouth and ear
- The trunk is made up of the chest and the stomach.
- The limbs are made up of the forelimbs and the hind limbs

Diagnostic assessment

1. Which of the following is not part of the head?: the brain, the eye, stomach, the nose, the ear, the mouth and legs.
2. Where is the chest found in the human body?

Progressive assessment

1. Name the parts which the following animals have in common: birds, insects and fish
2. Which part of body of a bird are the wings found?

Answers to Diagnostic assessment

1. Stomach and legs.
2. Trunk

Answers to Progressive assessment

1. The head, trunk and limbs
2. Trunk

Answers to textbook Questions

1. a). head, trunk and limbs
   b) i. eyes, nose, mouth, ear (any 2)
   ii. chest, abdomen
2. mammals, reptiles, insects
3. head
4. trunk
5. Any good diagram with correct labels.

			
insect	bird	mammal	reptile

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 1: LIVING AND NON-LIVING THINGS

LESSON 3: GROUPING THINGS IN THE EVIRONMENT AS LIVING OR NON - LIVING THINGS

Content Standard: B2.1.1.2 Understand the differences between living non-living things

Core Competencies: Communication and Collaboration, Personal Development and Leadership.

Expectations: At the end of this lesson you will be able to:

- go on a nature walk, in the company of your teacher, to observe and collect things from the environment.
- sort out things into living and non-living things
- give reasons for materials groupings.
- draw and colour some of the things you collected.

Subject Specific Practices: Observing, Analysing, Classifying, Generating, Manipulating

Reference: Learners Book 2, page 21 – 27

Introduction

In the previous two lessons learners learnt about the basic structure of plants and animals. Knowing the basic structure of plants and animal as well as those of other materials which are not living things, it is possible to use this knowledge to differentiate between them and group them into their unique groups.

Indicators and exemplars: B2.1.1.2.2 Group things collected from the environment into living and non-living things

Key words: living things, non-living things, differences, grouping

Additional Information

The things around us are either living things or non-living things. It is possible to group them into living things and non-living things if you know the differences in their structure and their characteristics. Living things die, reproduce, feed, breathe air, feel but non-living things do not do these things. These differences are used to sort materials out into the appropriate group. Examples of living things are plants and animals such as, lizard, goat, sheep and insects such as housefly, mosquito and spider. Examples of non-living things are stone, wood, plastics, paper, metals, leather and cotton.

Starting the lesson
Instruct learners the previous day to bring pictures of various living and non-living things to school for this lesson.

Lead learners to go on a nature walk, observe and collect things from the environment.

Instruct learners in groups to work to sort out things into living and non-living things (based on the pictures and items collected from the environment). Go round to inspect to make sure the learners sort out the things correctly.

Tell learners to give reasons for their groupings.

Instruct learners to draw and colour some of the things collected. Go round to inspect what the learners are drawing and correct them where possible.

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Project: *Give project to learners to create some living and non-living things from materials such as clay, blu tack, cardboard or paper.*

You have learnt that:
- the things around us are either living things or non-living things.
- you can sort out the things you collected into living and non-living things (based on the pictures and items collected from the environment
- it will be possible for you to use what you learnt in this lesson to differentiate between living and non-living things

Diagnostic assessment
Write down two separate lists from the following list of things and sort out them out into living and non-living things: Bread, lizard, goat, sheep, housefly, stone, wood ,mosquito and spider, plastics, paper, metals, leather and cotton.

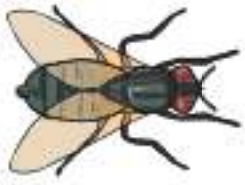
Progressive assessment
1. Is teddy bird a living thing or non-living thing? Give reason
2. State three differences between a cat and a kite

Answers to Diagnostic assessment
Living things: Lizard, goat, sheep, housefly, mosquito and spider
Non-living things: Bread, stone, wood, plastics, paper, metals, leather and cotton.

Answers to Progressive assessment
1. Is teddy bird a living thing or non-living thing? Give reason
2. State three differences between a cat and a kite

Answerst to Study Questions

1. Living things: hunter, daughter, bird, ants, mango tree, wife,
   Non-living things: teddy bird, christmas tree, gun, car
2. Cat can feed. Kite cannot feed. Cat can breathe but kite cannot breathe. Cat can reproduce (born babies) but kite cannot reproduce (born babies). Cat can feel, kite cannot feel.
3. Living things= Dog, cat, tree, goat, sheep (Any 2 correct living things)
   Non-living things = Stone, plastic, glass, etc (Any 2 correct non-living thing).
4. Accept any correct drawing.
5.

Things	Living thing	Non-living thing
	√	X
	X	√
	X	√
	√	X
	√	X

6.

Living thing

Living thing

Non-living thing

Non-living thing

Living thing

Non-living thing

Living thing

Non-living thing

Living thing

STRAND 1: DIVERSITY OF MATTER

SUB-STRAND 2: MATERIALS

LESSON 1: COMMON PROPERTIES OF MATERIALS

Content Standard: B2.1.2.1 Recognise materials as important resources for providing human needs

Core Competencies: Communication and Collaboration, Critical Thinking and Problem Solving, Creativity and Innovation, Personal Development and Leadership.

Expectations: At the end of this lesson you will be able to:

- sort and group materials based on texture (hard or soft), and size (big or small).
- group materials into those that they can see through (transparent) and those that we cannot see through (opaque)
- feel and draw materials that are hard, soft, smooth, etc.
- give examples of products that can be made from materials such clay and raffia palm and why they are used.
- use different materials to create new items such as paper fans, toy cars, toy planes, cooking pans, hats and earthen ware.

Subject Specific Practices: Manipulating, Classifying, Generalising, Analysing, Evaluating

Reference: Learners Book 2, page 28 – 37

Introduction

The learner has developed the capacity to group materials in the environment into living and non-living things having appreciated the fact the things we see around us are either living things or non-living things. The learner now needs to progress to identify materials in their environment which are used in their everyday life and their unique properties.

Indicators and exemplars: B2.1.2.1.1 Know common properties of materials such as soft, hard, rough, smooth, opaque, transparent, bendable

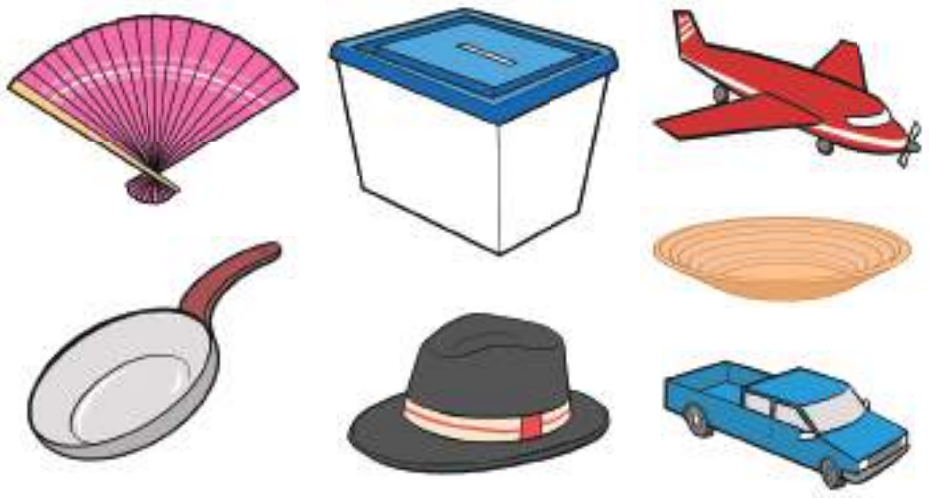
Key words: properties, soft, hard, rough, smooth, opaque, transparent and bendable.

Additional Information

Anything around you is a material. There are different materials around you. The source of these materials can either be from living things or non-living things. For example wood which is used to make furniture is obtained from trees which are living things. A rock is obtained from the ground which is a non-living thing. Some of the materials can be found in your home, school

and community. These materials have different properties. Some of them are soft, hard, rough, smooth, opaque, transparent or bendable.
The properties of materials enable them to be used in making certain products. Some of them are:

- clay is used for making pots because it is soft and can be moulded without breaking.
- raffia palm is used for making basketry because it can bend easily.
- glass is used to make windscreen of cars because it is transparent (you can see through it).
- cotton wool is used to make pampers because it is soft and can soak water.
- transparent plastics are used to make ballot boxes because you can see through them.
- wood is used to make furniture because it is hard.
- marbles are used to make terrazzo floors, tiles in some houses and also countertops in some stores because they are hard, smooth or rough.
- Metal is used to make cars because they are hard
- Aluminium metal is used to make roofing sheets because it does not rust.
- Foam is used to make mattresses because it is soft.
- Iron is used to make iron rods for building houses and bridges because it is hard



Some examples of different materials are:

- big materials: water melon, football
- small materials: tennis ball, pin, pebble, rice grain, sand particle,
- materials you can see through (transparent): glass
- materials you cannot see through (opaque): paper, black polythene, card, black trousers, kente cloth, leaf
- materials that can bend: electric cable, broomstick, leaf, iron rod
- hard materials: stone, rock, pen, wood, most metals,
- Soft materials: cotton wool, piece of cloth, cushion, ripe banana
- Smooth materials: glass surface(windscreen surface, driving mirror surface)

- Rough materials: sand paper, some rocks surface,

Activity: 1.2.1.1 Collecting a variety of everyday materials from your home, school and community

- Tell learners to collect a variety of everyday materials from your home, school and community to the classroom before this lesson.
- Tell learners to make sure the materials they collect include the following:
- cotton wool, pieces of cloths, pieces of papers, cardboard, wood, plastics, polythene bags (coloured or transparent), soil samples, marbles (rough and smooth), chalk, crayon, pen, straws.

Tell learners to sort and group the materials based on:

- texture (soft or hard), and size (big or small).
- those they can see through (transparent) and those you cannot see through (opaque)
- based on those that can bend
- those that are hard and those that are soft, smooth, and rough.

Tell learners to:

- feel the materials with their fingers and draw those that are hard, soft, smooth and rough.
- to display their drawing for class discussion.

Project: *Teacher guides learners to use materials to create new items such as paper fans, toy cars, toy planes, cooking pan, hats and earthen ware*

Summary

- There are different materials around us.
- Some can be found in your home, school and community.
- Some of the materials around us are soft, hard, rough, smooth, opaque, transparent or bendable.

Diagnostic assessment

1. How will a blind person describe the following materials when he or she uses the hands to feel it? :
   i. the surface of a windscreen
   ii. football
   iii. lorry tyre
2. Write down three examples of hard materials in your kitchen

Progressive assessment

1. Write down the names of one material that is
   i. soft and sticky
   ii. hard and having rough surface
2. How will you describe the properties of a balloon?

Answers to Diagnostic assessment

1. (i) smooth, big
   (ii) round, smooth, big
   (iii) round, big, rough
2. spoon, blender, saucepan

Answers to Progressive assessment

1. (i) clay or chewing gum
   (ii) rock
2. big, round, smooth

Answers to textbook Questions

1.
   i. soft material = cushion
   ii. hard material= stone
   iii. smooth material= glass surface
   iv. transparent material= glass in spectacle
   v. bendable material= electric cable

2. (i) small = tennis ball
   (ii) big = football
   (iii) rough =sand
   (iv) translucent =ballot box
   (v) round = football, tennis ball

3.

				
Hard	transparent	hard/opaque	hard/rough	soft/smooth

4.
   Tyre= hard, rough
   Seat= soft, smooth
   Driving mirror= opaque, smooth, hard
   Door= hard
   Car body=hard

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 2: MATERIALS

LESSON 2: PROPERTIES OF SOLIDS, LIQUIDS AND GASES

Content Standard: B2.1.2.2 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

Core Competencies: Communication and Collaboration, Personal Development and Leadership, Critical Thinking and Problem Solving

Expectations: At the end of this lesson you will be able to:

- Display different materials (real or pictures) in the solid, liquid or gaseous state, e.g. ice, water, vapour, fruit juice, oil and gravels.
- observe the materials and describe their properties in terms of appearance, shape, flow, and how easily they can be squeezed, stretched and compressed.
- sort out more materials into solids, liquids and gases.
- demonstrate the formation of vapour (gaseous state) by boiling water

Subject Specific Practices: Observing, Generalising, Classifying

Reference: Learners Book 2, page 38 – 44

Introduction
Substances exist in three main states. These states are solid, liquid and gas. All substances can be made to change from one particular state to another state. Substances can change from one state to the other when they gain heat. Heat causes solids to melt into liquid. When candle wax or shea butter is heated it melts. This is the same substance which has changed from solid state to liquid state. Substances can also change from one state to the other by losing heat. When water vapour (gas) loses heat, it changes into liquid (water). When water is put into refrigerator, it loses heat and becomes cold and finally freezes to form ice which is solid. Solids, liquid and gases do not have the same properties.

Indicators and exemplars: B2. 1.2.2.1 Describe properties of solids, liquids and gases

Key words: solids, liquids, gases, compress, squeeze

Additional Information
The materials around us are solids, liquids or gases. Each of these materials has certain properties. The properties of materials in a solid state are different from those in the liquid or gaseous state. Materials in the different states have different appearances and shapes. Some can

flow easily whilst others cannot. You can squeeze some of them but there are others you cannot. You can also stretch others or compress them but there are still other which cannot. Those materials you can squeeze contain particles which have wide spaces between them. Those that you cannot squeeze have particles which are in close contact with each other.

Starting the lesson
Start the lesson by engaging learners in the following activities:

Activity: 1.2.2.1a Properties of materials
- Displays some materials on your table
- Tell learners to look at the materials on page 39 of Learner's textbook
- Ask learners which of the materials on your table are found in the pictures in the learners' textbook.
- Tell learners to look at each material well.

Proceed to tell learners to write down
- what the appearance of each material is
- what the shape of each material is
- which of the materials can flow
- which of the materials cannot flow
- which of the materials they can squeeze easily
- which of the materials cannot be squeezed easily
- which of the materials they can stretch easily
- which of the materials they can compress easily

Activity 1.2.2.1b: sorting out materials into solids, liquids and gases
- Tell learners to organise themselves in groups of four or five.
- Tell learners to sort out more materials into solids, liquids and gases.

Ask learners
- which of the materials are solids.
- which of the materials are liquid.
- which of the materials are gases.

Activity1.2.2.1c: Demonstrating formation of vapour (gaseous state) by boiling water
Assist learners to:
- pour water about 1/3 full into a beaker.
- place the beaker of water on a source of heat.
- allow the water to heat till it begins to boil.

Tell learners observe and discuss what they see among their classmates.
Summarise learners observation and discussion and writes it on the board.

You have learnt that:

- the materials around us exist in the solid, liquid and gaseous states
- each materials has certain properties.
- some materials can flow easily whilst others cannot.
- you can squeeze some materials.
- you can also stretch other matedrials or compress them.

Diagnostic assessment

1. Name one material in your classroom which
   i. solid
   ii. liquid
   iii. gas
2. Ice cream left in the deep freezer for 24 hours is liquid. True or False
3. LPG cylinder is liquid. True or False?

Progressive assessment

1. Use one word to describe the property of the following
   (i) stone (ii) shea butter
2. When your mother is cooking, name some materials in the kitchen which are
   i. solid
   ii. liquid
   iii. gas

Answers to Diagnostic assessment

1. Name one material in your classroom which
   i. solid
   ii. liquid
   iii. gas
   iv. False
   v. False

Answers to Progressive assessment

1. (i) stone = hard (ii) shea butter = soft
2.
   i. solid= saucepan, fish, salt, pepper, tomato, onion, okro
   ii. liquid = water, soup
   iii. gas= vapour from the soup

Answers to Study Questions

1. i. solid = stone
   ii. liquid = water
   iii. gas = water vapour
2.

Material	**Solid**	**Liquid**	**gas**
Kerosene		√	
Salt	√		
Ice water		√	
Ice-cube	√		
Stone	√		
Air in football			√
Key holder	√		
Sugar	√		

3.
   i. stone
   ii. water
   iii. air
   iv. air
4. Gas
5. (i) solids= table, chair, rice, banku, yam, plantain, spoon, plate, bottle
   (ii) liquids= water, drinks, soup, ice cream
   (iii) gases= gas from pepsi, coca-cola, air
6.

		
liquid	solid	gas

7.

STRAND 1: DIVERSITY OF MATTER
SUB-STRAND 2: MATERIALS

LESSON 3: SOLID-SOLID MIXTURE AND HOW TO SEPARATE THE COMPONENTS

CONTENT STANDARD: B2.1.2.3 Understand mixtures, the types, their formation, uses and ways of separating them into their components

Core Competencies: Digital literacy, Personal Development and Leadership, communication and Collaboration, Critical Thinking and Problem Solving,

Expectations: At the end of this lesson you will be able to:

- combine two materials at a time and observe what happens.
- identify and mention mixtures you have formed after mixing solid materials.
- say that when you mix two or more things together, you form a mixture and that no new thing forms even though the starting and ending substances may look different from each other.
- find out ways of separating the components of the solids-solid mixtures you have prepared.
- separate some common solid-solid mixtures such as sand and stone, iron nails and sand, gari and groundnut.

Subject Specific Practices : Observing, Experimenting, Manipulating, Analysing

Reference: Learners book 2, page 45 – 55

Introduction
The learners after realising that solids, liquids and gases have their properties they can be combined together to for a mixture. The objects we use in every day life is made up of more than one material. When the materials which are combined to make other materials are only solids, they form solid-solid mixtures.

Indicators and exemplars: B2. 1.2.3.1 Describe a solid-solid mixture and how to separate its components

Key words: Combination, mixture, components

ADDITIONAL INFORMATION
Physical combination of two or more substances leads to the formation of a mixture. When two or more substances are added together and shaken or stirred, the particles of the individual substances mingle with each other. Though the particles mingle with each other, they are strongly attached to each other. This means that no new substance is formed. A mixture is not a new substance. They can therefore be separated easily from each other. The starting material

and ending material look different from each other but their behaviour remain the same. For example, if you mixed sand and gari, you will form a solid-solid mixture. This mixture can neither be called gari nor sand. Even if you chose to call it “sandgari” or “garisand”, it is still a mixture. The behaviour of gari is still the same. The behaviour of sand is also the same. When you mix any two solid materials together, they form a mixture called solid-solid mixture.

Ways of separating components of solid-solid mixture you have prepared.

- Separating a mixture of iron filings and sand: pass magnet through the mixture and the magnet will attract all the iron filings
- Separating a mixture of cow pea and sand: Pour the mixture on a sieve. The sand will pass through the holes in the sieve and the cow pea will be left on top of the sieve
- Separating a mixture of charcoal and sand: pick the charcoal with your hand from the sand
- Separating a mixture of chalk and sand: pick the chalk with your hand from the sand

Separation of mixtures in everyday life

We separate mixtures in everyday life. During preparation of palm nut soup, the palm fruit is boiled and pounded. Water is added and stirred well to form a mixture. This mixture contains water, palm oil, palm kernel and the chaff. The mixture is poured into a sieve to separate the palm nut and the chaff from water and oil which are liquids.

Roasted groundnut and its husk is a mixture. This mixture is separated by winnowing where the husks are blown away by wind leaving behind the groundnut. Maize and chaff is also a mixture which is separated by winnowing. At stone quarry, people use sieve to separate stones from sand called quarry dust.

Starting the lesson

- Show to learners, video on solid-solid mixtures.
- Also show to learners the pictures pupils’ textbook on solids-solid mixtures.
- Present to learners for their observation, the following materials: sand, gari, saw dust, chalk, charcoal and cowpea

Activity1.2.3.1a: Forming solid-solid mixtures

- Give to learners following materials: sand, gari, saw dust, chalk, charcoal and cowpea.
- Tell learners to look at the materials supplied to them
- Tell learners in groups of four or five to mix any two of the materials supplied to them.
- Tell learners to watch carefully what happens after mixing the materials
- Ask learners what they have seen
- Ask learners what they have formed
- Tell learners to discuss the type of mixture they have formed with their classmates
- Ask learners whether the product (mixture) formed are the same as the individual materials mixed.
- Ask learners how they will call the material combination they have formed?

Activity1.2.3.1b: Forming and separating solid-solid mixtures

- Tell learners to organise themselves into groups of four or five
- Supply to each group of learners the following materials: sand, gari, saw dust, chalk, charcoal and, beans, corn flour, rice, ground nut, safety pins
- Tell learners to form solid-solid mixtures from the materials they collected from you.
- Tell learners to suggest a method by which they can separate each solid-solid mixture.

Activity 1.2.3.1c: Separating a mixture of sand and stone

- Supply the following materials to learners: sand, stone and sieve.
- Tell learners to mix the sand and stone to form a mixture.
- Tell learners to pour the mixture of sand and stone into a sieve and shake vigorously.
- Ask learners what they have observed.
- Ask learners whether the sand separated from the stones.

Activity 1.2.3.1d: Separating a mixture of iron nails and sand

- Supply the following materials to learners: iron nails, sand and magnet.
- Tell learners to mix the iron nails with sand to form a mixture.
- Tell learners to pass the magnet through the mixture.
- Ask learners what they have observed
- Ask learners whether the iron nails have separated from the sand

Activity1.2.3.1e: Separating a mixture of gari and groundnut

- Supply the following materials to learners: gari, groundnut and sieve.
- Tell learners to mix the gari and groundnut to form a mixture.
- Tell learners to pour the mixture into a sieve and shake vigorously.
- Ask learners what they have observed.
- Ask learners whether the gari separated from the groundnut.

Summary

- Solid materials can be mixed together and they can be separated again.
- When two or more solids are mixed together, a solid-solid mixture is formed.
- Examples of solid-solid mixtures are sand and iron nails, gari and sand.
- Methods of separating solid-solid mixtures include winnowing and sieving.

Diagnostic assessment

1. Mention two solid and two liquid materials.
2. Write down solid-liquid mixture that can be formed from the materials you have mentioned in (1) above.

Progressive assessment

1. Write down two examples of solid-liquid mixtures in your mother's kitchen
2. Is Fanta a solid-liquid mixture? Give reason

Answers to Diagnostic assessment

1. salt and sugar. Water and vinegar.
2. Sugar and water (sugar solution), sugar and water (sugar solution)

Answers to Progressive assessment

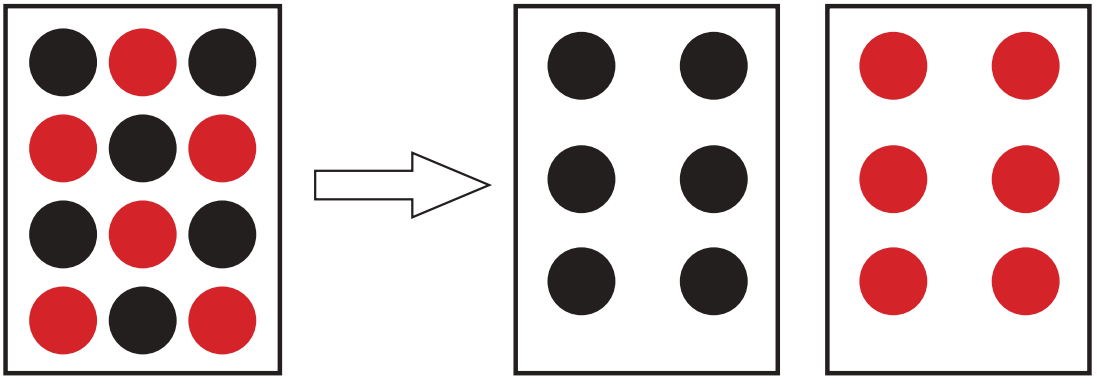
1. Salt solution, soup
2. Yes. It contains sugar which is a solid and water which is a liquid.

Answers to Study Questions

1. Roasted groundnut and its husk is a mixture. This mixture is separated by winnowing where the husks are blown away by wind leaving behind the groundnut.
2. It is the mixing together of two or more things
3. Gari and sand, rice and beans
4.

Solid	Solid	Mixture
Saw Dust	Gari	Saw Dust and Gari
Sand	Gari	Sand and Gari
Saw Dust	Chalk	Saw Dust and Chalk
Charcoal	Cowpea	Charcoal and Cowpea
Sand	Charcoal	Sand and Charcoal
Saw Dust	Sand	Sawdust and Sand

5.



STRAND 2: CYCLES

SUB-STRAND 1: EARTH SCIENCE

LESSON 1: IMPORTANCE OF SOME CYCLIC NATURAL PHENOMENA

Content Standard: B2.2.1.1 Recognise the importance of some cyclic natural phenomena such as dry and wet seasons.

Core Competencies: Personal Development and Leadership, Critical Thinking and Problem Solving.

Expectations: At the end of this lesson you will be able to:

- recite poems, rhymes about cyclic events
- talk about cyclic events.
- say what you like and don't like about the dry season.
- say what you like and dislike about the wet season.
- mention some human activities that take place during wet and dry seasons.

Subject Specific Practices: Classifying, Communicating, Predicting, Analysing, Evaluating.

Reference: Learners Book 2, page 56 – 69

Introduction:
The hands of the analogue clock move in a cyclic manner. They move clockwise. In a year, there are things that repeat themselves. The Sun appears to move from the East to the West daily. We observe the day starts from the morning everyday and ends in the night. All these events, repeat themselves all the time. There are dry and wet seasons which keep repeating themselves. In this sub-strand we are going to learn about events that repeat themselves (cyclic events) and various weather conditions that repeat themselves.

Indicator: Recognise that some events in our environment occur recurrently.

Key Words: Cyclic, Season, Dry, Wet, Tropic of Cancer, Tropic of Capricorn, November to March, April to October.

Additional Information
Every hour of the day has its specific average weather condition. In the morning it can be sunny or rainy, dry or wet. The weather conditions vary from period to period, day to day, month to month throughout the year. Each year repeats similar patterns and conditions. In this sub-stand we shall learn about weather conditions, how they vary and change from time to time.

Materials/Resources: (Low or no cost): Diagrams or charts showing different weather conditions.

Procedure:

- Lead discussion using diagrams and charts.
- Explains the different weather conditions experienced by learners throughout the week. These conditions include sunshine, rainfall, clouds, wind, dust and fog.

Summary

- a season is a period in the year when there is a definite change in the weather conditions.
- during the dry season, the weather becomes dry and dusty.
- during the wet season there is frequent rainfall which makes the weather wet and cold.

Diagnostic Assessment

1. What do you observe on a sunny day?
2. During the dry season, is the weather always sunny?

Answers to diagnostic assessment

1. The sun shines and the weather becomes hot.
2. No, it becomes very sunny in the afternoons.

Progressive assessment

1. List all activities that are performed during the wet season
2. What activities are performed during the dry season?

Answers to Progressive Assessment:

1. i. Thick clothes are worn during the wet season so that we don't feel cold
   ii. We should walk carefully since the rain may make the ground slippery.
   iii. Drivers should be careful and drive slowly.
   iv. We should only wash our clothes if there are no rain bearing clouds.
   v. We must stay indoors for most of the time.
   vi. Farmers sow their crops since the ground will be soft and the rain will make them grow well.

2. i. During the dry season, the weather becomes dusty.
   ii. We must try and avoid the dust
   iii. We should stay in our classrooms or indoors at home to avoid the dust.
   iv. We should carry our handkerchiefs to avoid the dust which may come with flu.
   v. We should drink water actively to avoid dehydration since we will sweat.

Answers to Study Questions

1. (i) Merry-go-round
   (ii) In a cyclic manner
   (iii) Day and night; wet and dry season.

2. (i) Wet and dry seasons are natural occurrences.
   They repeat themselves.
   After the wet season comes the dry season.
   During the wet season, the rain falls.
   During the dry season there is no rain.

(ii) Yes
(iii) Wet season
(iv) Protect themselves from dust by staying in their rooms to prevent dust.

- Drink a lot of water to prevent dehydration
- Help parents to store water because water is normally scarce.

3.   

   (i) Dry season
   (ii) Wet season
   (iii) Dry season

4. (a) December to February
   (b) April to October

STRAND 2: CYCLES
SUB-STRAND 1: EARTH SCIENCE

LESSON 2: SOURCES OF LIGHT TO EARTH.

Content Standard: B2.2.1.2.1 Identify sources of light to the earth.

Core Competencies: Personal Development and Leadership, Cultural Identity and Global Citizenship, Communication and Collaboration, Critical Thinking and Problem Solving.

Expectations: At the end of this lesson you will be able to:

- mention sources of light at home and at the school.
- see and handle certain mention examples of sources of light such as torch, lantern, light bulbs and candle light.
- identify and draw sources of light in your environment.
- sort and classify sources of light as artificial or natural.

Subject Specific Practices: Classifying, Predicting, Observing, Analysing.

Reference: Learners Book 2, page 70 – 76

Introduction:
Light is a form of of energy. This form of energy enables organisms to see. There are different sources of light. These are natural and artificial sources. The sun is a natural source of light and it is the ultimate source of light. The stars also produce natural light. Some fish in deep waters and the firefly are all natural sources of light. Artificial sources of light include burning fires, lamps and lanterns. Candle light, torchlight and light emitting diodes are all artificial sources of light. Without light, organisms cannot see. It is light that brings a difference between the day and the night. During the day, the sun's light is seen. During the night there is no sun and therefore there is darkness.

Indicator And Exemplars: B2.2.1.2 Recognise the relationship between the Earth and the Sun.

Key Words:Light, sources of light, natural, artificial, sun, wood light.

Additional Information:
The ultimate source of light energy on the Earth is the sun. The Sun obtains its energy from the thermonuclear reactions that take place in it. Without this enormous energy, no living things will exist on Earth. Thermonuclear reactions also take place in the stars. In fact, the sun as we know it is also a star and the nearest to Earth and therefore we obtain most of our energy from it.

Materials/Resources: (Low or no cost): Diagrams or charts showing sources of light from pupils book and wall charts to show natural and artificial sources of light. Diagrams of fish in the deep sea, firefly, sun and stars. Lighted candle, torchlight, fluorescent light.

Procedure:

- Start lesson by calling the attention of learners to the sources of light in their text book as well as in the chart.
- Ask them what they all have in common.
- Lead a discussion on natural and artificial sources of light. Also ask learners to name natural and artificial sources of light.
- Lead class to perform activity 2.1.2.1(a) to show that sunlight is a source of light that enables us to see.
- Ask the learners the questions as they perform the activity

Activity 2.1.2.1 (b) To show that torchlight is a source of light that enables us to see.

- Obtains cards boards and a flash light for each group. You may ask learners to bring a flash light to school in each group.
- Lead learners to perform the activity as described in their book and ask them to discuss their findings in their groups.
- Lead the discussion with the whole class
- Ask learners to name sources of light on earth

Activity 2.1.2.1 (c) To show what will happen if there is no light.

- Lead learners to go through this activity
- Ask the learners whether sunlight makes them see clearly
- Lead the discussion on what will happen if there is no light on Earth
- We cannot see anything on Earth without the sun's light.

Summary

- There are natural and artificial sources of light
- Natural sources of light include the sun, the stars and fireflies
- Artificial sources of light include candles and flashlight
- The sun is the primary source of light in our environment.
- Light helps us to see, without it the world will be very dark

Diagnostic assessment

1. Name two natural sources of light.
2. What is the ultimate source of light energy? On earth?

Progressive assessment

1. Why is light important to organisms?
2. Apart from the sun and stars what living things produce light

Answers to Diagnostic assessment

1. Sun, Stars, Fish in deep sea, firefly.
2. Sun

Answers to Progressive assessment

1. It enables living things to see and plants to make their food.
2. Fish in deep sear and firefly.

Answers to Study Questions

1. (a) Lamp (b) torch (c) LED (d) bulb
2. (a) a, c, e
   (b) b, d, f
3. Night because it is dark
4. (a) natural
   (b) night or in a dark area
   (c) sources of light
   (d) artificial

STRAND 2: CYCLES
SUB-STRAND 1: EARTH SCIENCE

LESSON 3: QUALITIES OF GOOD DRINKING WATER

Content Standard: B2.2.1.4 Recognise water and air as important natural resources

Core Competencies: Critical thinking and Problem Solving, Collaboration and communication, Personal Development and Leadership

Expectations: At the end of this lesson you will be able to:

- mention sources of water we drink and use in the home and community.
- mention some qualities of good drinking water
- explain why we should not drink contaminated water

Subject Specific Practices: Observing, Analysing, Generalising, Communication and Collaboration

Reference: Learners Book 2, page 77 – 82

Introduction

The learner understands the fact that light from the sun which shines on the earth play important role. Air and water also play important role as natural resources. Since they are natural resources, it is important to consider their purity. This lesson focuses on the qualities we have to consider before concluding that water is good for drinking.

Indicators and exemplars: B2.2.1.4.1 Find out the qualities of good drinking water

Key words: Rain, pond, sea, pipe borne, well, river, lake. quality

Additional Information

You drink water every day. You use water in your homes every day to do many things. This is because water is one of the important needs of living things. All living things need water. Since human beings need water every day, it is important to think about its quality. Water is said to a universal solvent because almost every material can dissolve in it. The greater portion of blood in human being is water. The water in the blood of human beings comes from sources outside the body. Before water from outside the body finds its way into the body we must make sure it does not contain anything that will harm us. People sometimes drink water from some sources and they begin to have diarrhoea. The skin of some people begins to itch after using water from some sources to bath. These are some of the reasons it becomes necessary to be sure of the quality of water we use. Water can be obtained from the following sources: Rain, pond, sea, pipe borne, well, river, lake.

Starting the lesson

Start the lesson by asking learners where they get water they use at school and at home from. Tell learners to mention some sources of water.

Show to learners drawing from page 78 of Learner's textbook

Tell learners to identify and write down what water is used for. Use the following checklist to check the responses of learners:

From the drawing you can see that water is used for:

- Drinking,
- cooking,
- cooling,
- transportation,
- watering plants,
- putting of fire,
- washing clothes

Activity 2.1.5.1: Examining water from different sources

Tell learners to organise themselves in groups of four or five.

Tell each group of learners to collect the following types of water in small bottles to the classroom:

- Rain water
- Pond water
- Sea water(where possible)
- Pipe borne water
- Well water

- River water(where possible)
- Lake water(where possible)
- Bottled bottle

Give hand lens to each group of learners. In a situation where there is only one hand lens, each group can pass it to another group after using it.
Tell learners to watch each sample of water carefully using hand lens.

Ask learners which of the water samples
- contain solid particles.
- are coloured.
- are clear.
- smells.
- has qualities of good drinking water.

Tell learners to let one person in each group write down the findings of the group in their notebook.
Tell learners to present their finding to you.
Tell learners to copy the findings it in their notebook after you approve it.
Show to learners a sample of good quality water.
Tell learners to watch carefully the sample of good quality water shown to them.
Ask learners, from what they have seen, what they think are the qualities of good drinking water.
Ask learners what they think will happen to them when they drink water that has, taste, solid particles and odour (smell) in it?

Note: Do not drink water from any source. If you drink water which does not have good qualities, you will fall sick. Remember that good quality drinking water must have the following characteristics: It must be tasteless, free from solid particles, colourless and odourless (should not smell)

Summary
- You should not drink water, if you are not sure of its source
- if you drink water which is unsafe, you will fall sick.
- good quality drinking water must have the following characteristics: It must be tasteless, free from solid particles, colourless and odourless (should not smell)
- Examples of good quality water that we can drink are mineral water, pipe-borne water and water from deep wells.

Diagnostic assessment
1. Write down the qualities of good drinking water?
2. What equipment will you use in your school to see if there are particles in water from a particular source?

Progressive assessment

Write down three qualities each of

i. water from the gutter near your home
ii. water from your school canteen

Answers to Diagnostic assessment

1. Tasteless, colourless, odourless, free from particles
2. Hand lens

Answers to Progressive assessment

Write down three qualities each of

i. Bad taste, coloured, particles present, smells
ii. Tasteless, colourless, colourless, free from particles

Answers to Study Questions

1. At home: Rain, pipe-borne, well
   At school: pipe-borne, rain
2. Drinking, bathing, washing
3. Tasteless, colourless, odourless, free from particles
4.

Sources of water	Tasteless	colourless	Particles present	Odourless (no smell)
	×	×	√	×
	√	√	×	√
	√	√	×	√
	×	×	√	×

STRAND 2: CYCLES
SUB-STRAND 1: EARTH SCIENCE

LESSON 4. USES OF AIR

Content Standards: B2.2.1.4 Recognise water and air as important natural resources

Core Competencies: Critical thinking and Problem Solving, Collaboration and communication, Personal Development and Leadership

Expectations: At the end of this lesson you will be able to:
- identify common uses of air
- demonstrate the application of air
- give examples of objects that operate through the application of air

Subject Specific Practices: Observing, Generalising, Communicating

Reference: Learners Book 2, page 83 – 92

Introduction
The learner knows that air and water also play important role as natural resources. He or she also knows about the qualities we have to consider before concluding that water is good for drinking. Now there is the need to look at air and identify what is used for.

Indicators and exemplars: B2. 2.1.5.2 Identifying uses of air

Key words: breathing, sailing, hoovering, inflating, burning, ventilation, kites, balloons and winnowing

Additional Information
Air is a mixture of gases. Gases that can be found in air which makes it a mixture are oxygen, nitrogen, carbon dioxide, hydrogen, rare gases and water vapour. Even though we cannot see air, it can be used in several situations and ways. Air is used in breathing, sailing, hoovering, inflating (pumping) tyres and footballs, burning, ventilation, flying kites and balloons and winnowing.

Starting the lesson
- Start the lesson by asking learners the following questions:
- Imagine what would happen if there were no air, what do you think would happen to you and other living things around you?
- Ask learners what they fill when the wind is blowing.
- Ask learner why they feel what they feel their body when the wind is blowing.

Activity2.1.5.2a: Demonstrating the importance of air

Breathe in. Breathe and out. When you breathe in what enters your body? When you breathe out, what comes out of your body? Why is it important to breathe in and out? What do you think will happen to you if you do not breathe in and out?

Activity2.1.5.2b: Demonstrating the uses of air

In groups of four or five perform the following activities:

- Give balloon to each group of learners
- Tell learners to let one member in each group inflate the balloon by blowing air into it.
- Tell learners to let each member in a group use the bicycle pump to pump the bicycle tyre
- Guide learners in each group to make a kite.
- Tell learners in each group to go outside the classroom to fly the kite.

Activity2.1.5.2c: experiment to show that air helps things to burn

Materials needed: Water trough, water, matches, candle, gas jar

Guide learners to:

- place the water trough on a table
- stick the candle in the water trough
- pour water to about 1/3 full into the water trough
- lit the candle
- turn the jar over the candle
- observe and discuss among their classmates






Summary

- Air is used in breathing, sailing, hoovering, inflating (pumping) tyres and footballs, burning, ventilation, flying kites and balloons and winnowing.
- The uses of air can be demonstrated including breathing, sailing winnowing, hovering and inflating lorry tyres

Diagnostic assessment

1. Write down three uses of air in Ghana
2. If suddenly there were no air, what will happen to you?

Progressive assessment

1. During a wedding ceremony, identify what air is used for apart from breathing.
2. What is the importance of air vulcaniser?
3. During Christmas and New Year what do children mostly use air for?

Answers to Diagnostic assessment

1. Inflating (pumping) tyres and footballs, filling balloons and winnowing.
2. You cannot breath and you will die

Answers to Progressive assessment

1. To inflate balloons
2. To inflate lorry tyres
3. To inflate balloons

Answers to Study Questions

1. (a) When air is blown into it
   (b) When air is removed from it
2. (a)Winnowing
   (b) when the wind(air) blows
   (c) To separate the grains from the chaff?
   (d) Winnowing
3. i) Pumping bicycle tyre
   ii) Flying kite
   iii) Parachuting
   iv) Inflating balloon
   v) Winnowing

STRAND 3: SYSTEMS

SUB-STRAND 1: THE HUMAN BODY SYSTEMS

LESSON 1: THE FUNCTIONS OF THE HUMAN BODY PARTS

Content Standard: B2.3.1.1 Recognise that different parts of the human body work interdependently to perform a specific function

Core Competencies: Digital Literacy Communication and Collaboration, Critical Thinking and Problem Solving, Personal Development and Leadership, Creativity and Innovation

Expectations: At the end of this lesson you will be able to:

- mention the uses of the parts of the body.
- Say what will happen if some parts of the body are absent or not working well.
- write down the main functions of the human body parts.
- draw and colour any two parts of the body.

Subject Specific Practices: Observing, Analysing, Evaluating

Reference: Learners book 2, page 93 – 102

Introduction

The body of Human beings have a basic structure just like any other animal. Each of these parts of the human performs specific function. Though each part of the human body performs specific function, they all act together to cause the whole body to work in unison.

Indicators and exemplars: B2 3.1.1.1 Know the functions of the Human Body parts such as the head, neck, hands, chest, abdomen, ears, mouth, eyes, nose and legs.

Key words: head, neck, hands, chest, abdomen, ears, mouth, eyes, nose and legs

Additional Information

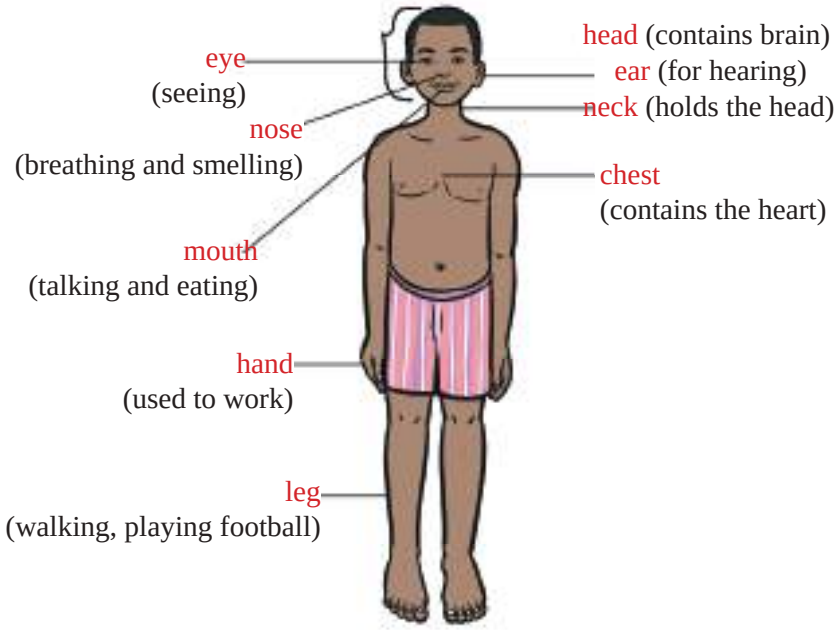
The human body consists of so many parts that work together to perform a function. All the parts which work together form a system. The system has different parts that carry out different functions. Some parts of the human system are external and we see them. Other parts are internal and we cannot see them. When a part of the human body is not working well, it affects the whole system. The external parts of the body include the head, neck, hands, chest, abdomen, ears, mouth, eyes, nose and legs

Starting the lesson
Start this lesson by engaging learners in the following activity:

Activity3.1.1.1a: Identifying parts of the human body
Ask learners to

- select a friend.
- look at the friend critically.
- let the friend also look at him or her too critically.
- mention the parts of the friend's body he or she has seen to him or her.
- let the friend also mention to him or her the parts of his or her body he or she has seen.
- Show video or picture of the human body to learners.
- Tell learners to let the two of them in the pair to talk about the parts of the body they have identified in the video or in the picture.
- Tell learners to talk to their friends about the uses of the parts of the body they have seen in the video or in the picture.

Functions of the Parts of the Human Body



Tell learners to draw the human body showing the parts and their functions and colour the parts. Tell learners to paste what they have drawn on the wall.

Activity 3.1.1.1a: Parts of the body and activities

Guide learners to mention the parts of the body involved in the following activities:

- thinking
- hearing
- carrying the head
- eating
- working
- seeing
- containing the heart
- breathing
- containing the stomach
- walking

Ask learners what will happen when any part of the system is lost.
Explains to learners that when any part of the system is lost it affects the whole system and the system does not work well again and that the internal part of the system is not seen but it works with the external parts for the whole system to function well.

Activity 3.1.1.1b: Singing a rhyme

Teach learners a rhyme if they do not know any already and ask them to sing it as they point to the parts as he or she(teacher) mentions them.
I am a human being.
I have a head, neck and two hands.
I am a human being.
I have a chest, abdomen and two ears.
I am a human being.
I have a mouth, a nose, two eyes and two legs.
These are the parts of my body.
My abdomen contains my stomach.
I cannot see it.

Activity 3.1.1.1c : Drawing the human body to show parts

Instruct learners to draw themselves in their drawing book and show the parts mentioned earlier.
Ask learners if they have a doll in the house.
Ask learners to bring a doll to school and use it to show the parts they have mentioned.
Show to learners a model of the human body for them to see the parts they have mentioned.

Effect of losing part of the human body

Ask learners the following question:
What will happen to you when you lose your right arm?
What will happen to you when you lose one of your legs?
What will happen to you when you lose one of your eyes?
Discuss with your friend the effect of losing a part of your body



Summary

- The human body consists of so many parts that work together to perform a function. All the parts which work together form a system.
- The system has different parts that carry out different functions.
- When a part of the human body is not working well, it affects the whole system.

Diagnostic assessment

1. Name two parts of the human body that can help you
   i. swim?
   ii. learn?
   iii. read?

Progressive assessment

1. If a person loses the following parts of his or her body, write down one activity that he or she cannot perform at all or perform well.
   i. one leg
   ii. two arms
   iii. two eyes

Answers to diagnostic assessment

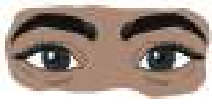
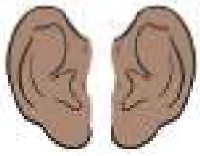
1. (i) Arms and legs
   (ii) Eyes and head
   (iii) Eyes

Answers to Progressive assessment

i. Playing football
ii. Writing
iii. Seeing

Answers to Study Questions

1. chest, mouth, nose, abdomen.
2. (i) reading the Bible or Koran
   (ii) Hearing the preaching, announcement, singing and instruction.
   (iii) Walking to the chapel or mosque
   (iv) Opening the Bible or Koran, clapping of hands
3. (i) He or she cannot play
   (ii) He or she cannot throw a ball.
   (iii) He or she cannot see the ball well
   (iv) He or she cannot hear the whistle or when the team mates are calling him or her
4. (i) He or she cannot write well on the board if he or she is not used to writing with the other one arm that is left.
   (ii) He or she cannot see and read to teach
   (iii) He or she cannot hear what the learners are saying
5.

Part of body	Function
	Seeing
	Breathing
	Hearing
	Eating, talking
	Walking

SUB-STRAND 2: SOLAR SYSTEM

LESSON 2: THE SUN AS THE MAIN SOURCE OF LIGHT AND WARMTH ON EARTH

Content Standard: B2.3.2.1.1: Identify the sun as the main source of light and warmth on earth

Core Competencies: Critical Thinking and Problem Solving, Communication and Collaboration, Creativity and Innovation.

Expectations: At the end of this lesson you will be able to:

- Identify the sun as the main source of light and warmth on earth.
- say what the sun look like, where the sun is located, what you feel(warmer or colder) when the sun is out,
- say why is the sun important to us here on Earth.
- discuss what you use light and the warmth from the sun for.

Subject Specific Practices: Analysing, Evaluating.

Reference: Learners Book 2, page 103 – 109

Introduction:
The Sun is the primary source of energy on Earth. The sun's energy is in the form of light, heat and other types of radiations. This energy is useful to humans and other living things. It is the sun's light that plants use in making food as well as food for other organisms. It is this energy that provides warmth to the earth. Without light and warmth no living thing can exist on earth. Apart from the earth there are other planets that orbit the sun. There are also satellites that orbit the planets. All these bodies perform their motions in harmony.

Indicators and exemplars: B2.3.2.1 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 Solar System.

Key Words: Sun, Earth, Light, Warmth

Additional Information:
The sun is at the centre of the solar system. Other components in the Solar System are the The sun is at the centre of the solar system. Other components in the Solar System are the planets. The planets orbit round the sun at the centre in their orbits. The sun does not move. Each planet has its orbit and the arrangement is such that no planet crosses the other one. All the planets are attracted to the centre of the sun by gravitational forces.

Around the planets are satellites or moons. There are also held in the orbit by the gravitational pull of the planets. Some planets have more than one moon. The Earth is one of the planets in the Solar System. It is the third one from the sun. Life exists on the Earth due to light and heat from the sun. The earth has one moon.

Materials And Resources (Low or no cost): Pupils' handkerchiefs, an aluminium bowl, black polythene to cover potted plants, Provide a dark room by closing windows in the room..

Procedure:
Begin lesson by asking pupils to discuss what they use the sun for. After about 10 minutes, each group should report to the class what they have discussed among themselves.

Activity 3.2.1.1 The need for sunlight to dry a handkerchief.

- Give the procedure for the activity and guides pupils on what to do.
- Ask pupils what happens to the dried handkerchief after one hour.
- Pupils can answer the question: Does sunlight make things dry?

Summary

- The sun enables us to see clearly and also helps things to dry things and become warm.
- The sun provides light for plants to make their own food. Animals also depend on plants for food.

Diagnostic Assessment.

1. What is the primary source of sunlight?
2. What are the components of sunlight?

Progressive Assessment.

1. What do plants use sunlight for?
2. Can there be any living things on Earth without the Sun?

Answers to Diagnostic

1. The primary source of light is the sun.
2. The components of sunlight are heat(warmth) and light.

Answers to Progressive

1. To make their food.
2. 2. No, if there are no plants there will be no food for living things. The earth will also be too cold.

Activity 3.2.1.1, page 101 To show that plants need sunlight to survive.

- Explains the essence of covering the plants with a black cover and not covering one. This will enable the uncovered plant to do well whilst the covered one cannot make food and therefore cannot grow well.

- Lead the discussion after the pupils have brainstormed.
- Without the Sun, the earth will be very cold, there will be no food and therefore no living things will be on earth.
- Ask pupils to draw the sun in their exercise books and write down what humans obtain from it.
- Explains briefly the idea of the solar system as being made up of the sun at the centre with the planets in their individual orbits moving round the sun. Satellites orbit planets.
- They all obtain their energy from the sun. Summarise lesson by stating what humans obtain from the sun. The sun enables us to see clearly, it makes things to dry since it is a source of warmth and therefore warms the earth. It also produces light which enables plants to produce their food on which animals also depend.

Answers to Study Question

1. i) dry ii) warm iii) see
2. (a) warm its body
3. (b) prepare their food
4. (b) dry our clothes
5. (a) cassava
6. (a) night light

STRAND 4: FORCES AND ENERGY

SUB-STRAND 1: SOURCES AND FORMS OF ENERGY

LESSON 1: EVERYDAY APPLICATIONS OF ENERGY

Content Standard: B2.4.1.1.1 Identify everyday applications of energy

Core Competencies: Cultural Identity and Global Citizenship, Communication and Collaboration, Critical Thinking and Problem Solving, Creativity and Innovation.

Expectations: At the end of this lesson you will be able to:

- do various activities involving the use of energy, for example, jumping, clapping, pushing objects, walking, switching on the lights etc. in the classroom.
- Say what helps you to perform activities.
- explain what happens to a person who does not eat food for a long time.
- explain that energy is what gives everybody the strength to do everyday activities
- create a poster of a person doing an activity that uses energy, for example. pushing an object, a farmer weeding and fishermen paddling a boat.

Subject Specific Practices: Analysing, Observing, Creating

Reference: Learners book, page 110 – 118

Introduction:
Work is done when a force moves an object. Energy is the capacity to do work. When work is done on an object it gains or loses energy as the case may be. Energy exists in many different forms, but cannot be created nor destroyed. The sources of energy include food, sun, wind, water, battery, crude oil and natural gas. The suns energy is transmitted to earth by radiation.

Indicator and Examples: Demonstrate understanding of the concept of energy, its various forms, sources and the ways in which it can be transformed and conserved.

Key Words: Energy, Jumping, Walking, Switching on light, Paddling a boat.

Additional Information:
One has the ability to do work because one has energy. Energy is defined as the ability to do work. That is to say that anything that has energy is capable of doing work. A rolling stone hits a stationary stone on a sloping land and causes it to start rolling down. The stationary stone now has the ability to do work and therefore possesses energy. The ultimate source of energy on earth is the sun. The suns energy is transmitted to earth and results in non-uniform heating of the earth's surface. This causes wind systems to be set up. Part of this energy is used by green plants to food which becomes chemical energy for plants and animals.

Materials And Resources (Low or no cost): Learners, lights in the classroom, charts or pictures of people performing activities involving energy, video.

Procedure:
Begin lesson by calling learners to perform the following activities:

- Jumping
- Clapping
- Pushing
- Walking
- Switching on light in the classroom

Questions learners to find out what enables them perform the activities.
They are able to perform activities because they have energy. What makes them get energy?
Could you have performed the activities without food?
Learners answer the questions. They cannot perform the activities when they are hungry. Food is therefore a source of energy.

Summary

- Energy is the ability to do work or activities.
- The sun is the main source of energy on Earth. .
- We use energy for our daily activities such as playing ampe,dancing and walking to school.

Diagnostic Assessment.

1. Is there any learner who didn't eat since morning?
2. Can that learner push a desk?

Progressive Assessment.

1. Name two activities that need energy to perform.
2. Which of the following activities requires the use of more energy; clapping or jumping?

Answers to assessment questions

Diagnostic assessment

1. There will be various answers. They have eaten or not eaten.
2. Without food one cannot have energy to push the desk

Progressive assessment

3. Any of the listed activities: jumping, clapping, pushing, walking and switching on the light
4. Jumping involves the use of more energy than clapping

Sources of energy: Ask learners to look at the different sources of energy in the pupils book pages 108
They include food, the sun,
Explains the importance of food to learners.
Discuss the importance of the sun as a source of energy. It makes the earth warm, causes the wind systems to exist, enables green plants to make their food on which all living things depend.

Discuss other activities learners might have seen being performed which involve the use of energy. Such activities include pounding of fufu, riding a bicycle, weeding, paddling a boat. Ask learners who have performed any of the listed activities to come out with their experiences. Emphasise that to perform any of the activities one needs to have energy and this energy comes from food. We therefore need to eat to have energy.

Answers to Study Questions

1. (a) clap (b) jump (c) walk (d) push
2. (a) sun (b) food (c) wind (d) petroleum
3. energy
4. (i)

(ii) energy

STRAND 4: FORCES AND ENERGY
SUB-STRAND 1: SOURCES AND FORMS OF ENERGY

LESSON 2: HOT OR COLD OBJECTS

Content Standard: B2.4.1.2.1 Understand that objects become hot or cold through loss or gain of heat

Core Competencies: Communication and Collaboration, Personal Development and Leadership, Critical Thinking and Problem Solving.

Expectations: At the end of this lesson you will be able to:

- Give examples of things that are usually cold
- Give examples of things that are usually hot
- Explain how to make things hot or cold
- Identify the effect of heat bon things

Subject Specific Practices: Observing, Experimenting, Generalising

Reference: Learners Book 2, page 119 – 127

Introduction:
One of the types of energy is heat energy. Heat energy makes things hot or cold. When heat is added to a body, it becomes hot. When heat is taken out of a body, it becomes cold. Since heat is a form of energy, hot objects with much more heat energy can do more work than cold objects. Humans use both hot and cold things. Many people drink hot beverages but also drink cold water and soft drinks. In this lesson we will learn about hot and cold things.

Indicators and exemplars: Show understanding of the concept of heat in terms of its importance, effects, sources and transfer from one medium to another.

Key Words: Hot, cold, melting, fire, ice.

Additional Information:
Heat as a form of energy makes things hot when applied to the material. On the other hand, when heat is taken from the material it becomes cold. When cold water is added to hot water, it becomes warm. Fire makes things hot. When things are placed in a refrigerator or deep freezer they become cold. When hands are rubbed together, they become warm. There are several other ways of making things hot or cold. In this lesson we will learn about hot or cold.

Materials And Resources (Low or No cost): Learners, boiling water, Burning candle, cold water, hot electric iron, refrigerator.

Procedure
Start lesson by asking learners to rub their palms together and place them in their cheeks. Ask learners what they feel. Ask learners what they do when they are thirsty in hot afternoons or when they want to drink a cup of tea or milo. Explains that to make tea or milo, water is heated and when the weather becomes too hot, they sit under trees or in a room. At the hospital, cold water is poured on the body to cool it down if patients feel feverish.

Activity 4.1.2.1(a) Feeling hot or cold object
Supply the following items to the learners in their groups.

i. Hot water
ii. Cold water
iii. Hot tea
iv. Iced water

Ask learners to use their second fingers to feel whether the materials are hot or cold. The learners report to the class. They also touch the ice cream and discuss among themselves whether it is hot or cold.

Diagnostic assessment

i. Name two food substances that are taken cold
ii. Name one food item that should be taken hot

Progressive assessment

i. Why is steam hot?
ii. What does a refrigerator do to water to make it cold?

Answers to Diagnostic assessment

i. Soft drinks, ice cream etc.
ii. Kenkey, rice, light soup etc.

Answers to Progressive assessment

i. Steam is hot because heat is added to the water to produce the steam.
ii. The refrigerator removes the heat from the water.

Activity 4.1.2.1 Making things hot
Lead the set of activities by explaining the procedure to the learners in their groups.

i. Ask learners to rub their palms together and touch their cheeks with them
ii. Learners lit a match and use it to light the candle
iii. Boiloils the water and gives a sample to each group. Learners place their finger in it. Go round to observe how the learners perform the activities. Caution: The water should not be too hot.

Activity 4.1.2.1b What makes things lose heat?

In their groups Lead the learners to perform the activities.

1. Pouring cold water in hot water. Dip your finger into the three types of water; cold, warm and hot. Learners share their experiences.
2. Lead to perform the activity by plugging the electric pressing iron and touching it. Remove the plug and leave it for sometimes. Ask learners to touch it and share their experiences
3. Lead and places some water in the refrigerator for sometime. Ask learners to touch the water after a period of time.
4. Lead discussion of what makes things lose heat.

Lead discussion of what makes things lose heat.

Summary

- Objects become hot when they gain heat.
- Objects become cold when they lose heat.

Diagnostic assessment

i. What makes an electric pressing iron hot?
ii. What will make it cool again?

Progressive assessment

i. If a ball of kenkey is too hot to eat what will you do to cool it?
ii. When cold water is added to hot water what happens to the mixture?

Answers to Diagnostic assessment

i. Electric energy is converted to heat energy when it is plugged
ii. If left for sometime, it cools down.

Answers to Progressive assessment

i. Leave it for sometime and it will cool down.
ii. The mixture becomes warm.

Activity 4.1.2.1(c) Touching one another's body.

Instruct learners to form groups of two.
Ask learners to touch each other's bodies and discus among themselves.

Activity 4.1.2.1 (d) To find out whether the weather is hot or cold.

Lead learners out of the classroom for about five minutes and feels whether it is hot or cold. The learners report back to the whole class.

Lead learners to determine whether the following items are hot or cold by asking them to discuss it.

i. Melting candle wax

ii. Soup on fire
iii. Steam
iv. Fire
v. Iced Block
vi. Iced Cream

Sources of heat

Lead learners to discuss where heat is produced. …… To mention how things are heated in the home. This will enable them mention sources of heat. Examples include:

- Sun
- Fire
- Friction
- Fossil Fuels (Petroleum, LPG, Coal)
- Electricity

Lead the discussion on how the sources mentioned produce heat..

Answers to Study Questions

1. (a) hot
2. energy
3. (a) hot
   (b) cold
   (c) heat
   (d) warm
4. (a) hot
   (b) cold
5. (a) hot
   (b) cold
   (c) hot
   (d) warm
6. i. (b)
   ii. (a)

STRAND 4: FORCES AND ENER
SUB-STRAND 1: SOURCES AND FORMS OF ENERGY

LESSON 3: IMPORTANCE OF SAFETY WHEN USING ELECTRICITY

Content Standard: B2.3.2.1.1: Recognise the importance of safety when using electricity

Core Competencies: Communication and Collaboration, Cultural identity and Global Citizenship, Digital Literacy, Critical Thinking and Problem Solving.

Expectations: At the end of this lesson, you will be able to:

- identify safe or unsafe way of using electricity
- mention the safety ways of using electricity.
- state why electrical gadgets are cove

Subject Specific Practices: Analysing, Evaluating, Observing, Generalising.

Reference: Learners book, page 128 – 132

Introduction:
Electricity is a source of energy. It can be produced at a source and transported over long distances to where it is used. Most appliances in the home use electrical energy and cannot operate without this energy. It is a very convenient form of energy.
Although it is convenient, care must be taken when it is being used. This is because it can also do a lot of harm if not used carefully.

Indicators and exemplars: Demonstrate knowledge of generation of electricity, its transmission and transformation into other forms of energy.

Key Terms: Mobile phone, Naked wire, Electric pole, uninsulated, plastic shoes, slippers, dry hands/wood.

Additional information
Electric energy is used to charge mobile phones, plug in Television sets, refrigerators, microwave ovens and electric pressing irons in the house. In industry, sewing machines, washing machines and other appliances operate only with electrical energy. Our lightning systems and light emitting diodes use electricity. Most homes and schools use videos and computers for learning. It is a very useful resource but should be used with care. Do not touch wires if they become scraped off their insulating material. Wear plastic slippers when using any electric appliance. Do not touch plugs with wet hands. You have to be careful with electricity.

Materials And Resources (Low or no cost): Electric wire with insulation on, Plastic slippers.

Procedure:
Ask learners to mention appliances used in the home that use electricity. They will mention common items such as pressing iron, mobile phone, electric bulb, a refrigerator and a microwave oven. Ask learners to state their observations when electricity goes off in the home. This will lead them to understand and appreciate the importance of electricity in the home.

Diagnostic assessment

i. Name three appliances in the house that use electricity
ii. State the effect of power cuts on the appliances

Progressive assessment

i. Is electricity important for appliances in the house?
ii. How do you feel when the power goes off when doing your homework in the evening?

Answers to Diagnostic assessment

i. Blender, Electric pressing iron, Refrigerator, electric stove, microwave oven etc.
ii. When power cuts, appliances will not work again and may cause it to get defective.

Answers to Progressive assessment

i. Yes, it is very important since without it appliances will not work
ii. Very bad since you cannot finish your work.

Safe use of electricity
Lead a discussion on the dangers associated with improper use of electricity.
Lead learners to answer the following questions:

i. What will happen when we touch a hot pressing iron?
ii. What happens to you when you step on or touch a bare electric wire?

Depending on their responses, help learners to explain that both activities are dangerous and can cause death.
Lead learners to discuss the don't of using electricity from pupils book
Basic safety tips of using electricity
Lead discussion by elaborating on what to do when they see bare wires in the home. Lead learners on safety use of electricity by discussion. Explains why electrical appliances are placed in word or plastic covers.

Summary

- Electricity is very useful but it can be dangerous when not properly used.
- Electric cables (wires) are covered with plastic materials to protect users from shocks.
- We must use electricity safely and carefully
- We must not use our wet hands to handle electrical appliances
- When using electrical appliances, we must wear plastic shoes
- We should stay away from exposed wires and faulty electrical gadgets

Diagnostic Assessment

1.
    i. Why should electric cables not be bare?
    ii. Why should we not touch plugged electric iron with our bare hands?

Progressive assessment

i. List three things we should do to be safe when using electricity
ii. Why is it not advisable to put a metallic object into a socket in the home?

Answers to Diagnostic assessment

i. Bare electric cables can produce sparks when they touch and can lead to fire outbreak or give a shock when touched.
ii. Plugged electric irons become very hot and can burn us severely

Answers to Progressive assessment

i.
    a. Do not overload sockets
    b. Do not touch bare electric wires
    c. Do not connect electricity illegally
ii. It can give you a shock because metals conduct electricity.

Answers to Study questions

1. (i) No (ii) Yes (iii) Yes (iv) Yes (v) Yes
2. (i) c (ii) a, b, d
3. (a) Remove the mobile phone from the socket before you use.
   (b) Do not overload sockets. Plug only a few things on a socket. Use dry hands when handling electricity
   (c) Cover wires in non-conduction materials (plastic)
   (d) Wear plastic shoes. Do not touch matallic objects when handling electricity (Any 3)
4. (i) plastic
   (ii) (b) It does not allow electricity to pass through it

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LESSON 1: THE FUNCTION OF BATTERIES IN ELECTRONIC DEVICES

Content Standard: B2.4.2.2.2 : Investigate the function of batteries in electronic devices.

Core Competencies: Personal development and Leadership, Communication and collaboration, Critical Thinking and Problem Solving

Expectations: At the end of this lesson, you will be able to:

- mention common examples of household electronic appliances.
- discuss how toys which use battery will behave without the battery
- do activity to match some named electronic appliances with their uses.
- discuss other gadgets in the home that use batteries.
- draw and colour any one electronic gadget of your choice.
- build a paper circuit using a graphite pencil, battery and LED.

Subject Specific Practices: Manipulating, Recording

Reference: Learners Book 2, page 133 – 139

Introduction

In the modern day, every home has many electronic devices. Laptops, desktops, palm tops are common electronic devices used in most houses. Mobile phones, digital watches are also used. As the older ones use the appliances listed, the young ones use the toy versions of the appliances. In most cases, cells and batteries are the sources of energy for the appliances. A mobile phone will not function without a battery. Your toy car has a battery which is the source of energy in it. In this lesson, we are going to investigate the function of batteries in electronic devices. What do the batteries do for them?

Indicators and exemplars: B2.4.2.2.2: Investigate the function of batteries in electronic devices.

Key Words: Electronic, Toys, Batteries, LED, Mobile phones

Additional Information

Batteries have stored energy. This energy could be chemical or solar. In any case, the energy is stored in the battery. When placed in an electronic device the energy can be converted into other forms. It is first converted into electrical energy then into other forms of energy such as light, sound or mechanical energy depending on the device in which it is placed.

Materials and Resources (Low or no cost): Different battery operated electronic toys. Some should be able to produce sound, some should be able to move, produce light.

Procedure

- Ask learners to mention common examples of household electronic devices. A few examples include mobile phones, torches, digital watches, calculators.
- Provide some of toys that use batteries to each group with batteries in them.
- Lead learners to operate toys and observe how they behave. Some will move, others will play music and some will produce light.
- Ask learners to remove the batteries from the toys and observe their behaviour. The toys cannot function without the batteries.

Diagnostic Assessments

i. What is the use of batteries in toys?
ii. Do batteries have energy?

Progressive Assessments

i. Can toys be operated without batteries?
ii. Name two gadgets in the house that uses batteries.

Answers to Diagnostic Assessments

i. Batteries are the same source of energy for the toy.
ii. Yes, batteries have energy stored in them.

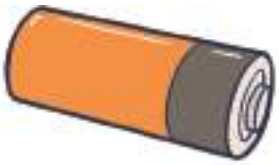
Answers to Progressive Assessments

i. No, most toys need batteries to operate
ii. Mobile phones, calculators, remote controls.

Teacher leads learners to draw and colour any electronic gadget of their choice.
Teacher goes round and looks at the learners as they do the work.
Teacher corrects and guides them to draw good diagrams.
Teacher guides learners to build a paper circuit using a graphite pencil, battery and LED.
Teacher helps the learners perform the activity.

Answers to Study questions

1. Toy car uses batteries, mobile phones also use batteries.
   Refrigerator does not use battery.
2. Accepty any good drawing from the learner
3. No
4.

Gadget	Battery
	
	
	
	

STRAND 4: FORCES AND ENERGY

SUB-STRAND 3: FORCES AND MOVEMET

LESSON 1: EFFECT OF FORCES ON OBJECTS

Content Standard: **B2.4.3.1.1: Discover the effects of forces on objects**

Core Competencies: Creativity and Innovation, Critical Thinking and Problem Solving, Personal Development and Leadership, Communication and Collaboration.

Expectations: At the end of this lesson you will be able to:

- say that forces cause objects to move or stop, e.g. kicking a ball, pushing a chair or pulling a rope etc.
- do activities such as scrambling of paper and metal foils, pushing objects in the classroom, squeezing empty plastic bottles etc.
- mention the effects of forces on objects such as changing shape, making them move, changing the direction of movement and reducing the speed of a moving objects

Subject Specific Pratices: Manipulating, Analysing, Generating

Reference: Learners Book 2, page 140 – 145

Introduction

In nature there are different forms of matter which include living and non- living things. Each matter consists of things within it which have effect on each other. Each one can also have effect on another which comes into contact with it. For example, objects move when they are pushed or pulled. This requires a fore. Force is push or pull. Forces can also cause moving bodies to stop moving. Forces can cause plastic bottles and papers when crumpled to change shape. Forces can cause moving bodies to change direction, speed up or slow down. In this lesson we are going to study the effect of forces on a body.

Indicators and exemplars: B2.4.3.1.1: Discover the effects of forces on objects

Key Words: Force, push, pull, move, stop, change shape, change direction.

Additional Information

Forces exist in everyday living. We get annoyed and push each other. We run and stop. When one kicks a football, a football moves. When another person kicks it, it changes direction. All these are forces which act in a body. Forces cause a body to move, stop, change direction, speed up, slow down or change shape of an electronic body.

Materials and resources (Low or No cost): Learners, football, chair, rope, plastic bottle

Procedure

- Show learners diagrams of a boy puling a girl and a girl pushing a boy.
- Ask learners what happens when there is a pull and a push.
- The expected responses will enable you to explain further. A pull makes the girl move towards the boy and a push makes the boy move away from the girl. In either case, a force has been applied.
- Ask one learners to kick the ball. Ask another learner to push the chair away. The learners perform the actions.

Summary

- a force is a push or pull.
- when a body is pulled, it moves towards where the force is applied.
- when a body is pushed it moves away from where the force is applied.
- whether it is a pull or push, there is movement.
- A force has effects on objects

Diagnostic Assessments

i. When a ball is kicked does it move to or away from the person who kicked it?
ii. Is kicking a ball a push or a pull?

Progressive Assessments

i. Name two effects of forces on a body.
ii. When a force acts on an elastic material, what happens to it?

Answers to Diagnostic Assessments

i. It moves away from the person
ii. It is a push

Answers to Progressive Assessments

i. change direction, move faster, slow down, stop
ii. it changes shape.

Other effects of forces on bodies.

- Lead the class to discuss other effects of forces on bodies. Ask questions to guide learners on what to expect.
- Review the effects of forces that cause a body to increase its speed, slow it down, change its direction, changes its shape.
- Concludes the lesson by suggesting the need for proper feeding to get enough energy to exert forces.

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Answers to Study Questions

1. (i) pull (ii) push (iii) move (iv) stop
2. (i) energy
3. (i) towards
   (ii) away from
4. (a) b
   (b) a man (boy)
   (c) force
   (d) air
5. It moves objects
   It stops moving objects
   It can change the shape of objects

STRAND 4: FORCES AND ENERGY
SUB-STRAND 3: FORCES AND MOVEMET

LESSON 2: SIMPLE MACHINES

Content Standard: B2.4.3.2.1: Identify simple machines used for specific work.

Core Competencies: Communication and Collaboration, Digital Literacy, Critical Thinking and Problem solving, Personal Development and Leadership.

Expectations: At the end of this lesson you will be able to:

- identify simple machines when you see them.
- demonstrate how to use simple machines.
- identify and use specific simple machine for removing bottle tops, cutting a piece of cloth, removing a nail stuck in wood and removing screw from a piece of wood
- draw your favorite simple machines and colour them. .
- create simple machines from cardboards
- mention the machines they will use to do the following activities: weeding, sweeping, digging, tightening a bolt and knot, and explain why

Subject Specific Pratices: Observing, Classifying, Manipulating

Reference: Learners book 2, page 146 – 158

Introduction:
The human hand does a lot of activities but cannot perform all activities very efficiently. For this reason, humans have developed some objects which can help them achieve their objectives more easily and faster. These objects are referred to as tools or simple machines. When one uses these simple machines, work is done easily and faster.

Indicators and exemplars: B2.4.3.2.1: Identify simple machines used for specific work.

Key Words: Simple machines, pair of scissors, bottle openers, forceps, claw hammer, screw driver.

Additional Information
Simple machines are used in our everyday activities. The human hands for example cannot open a bottle of soft drink. Using a bottle opener makes it easier to open. In many human activities we need simple machines otherwise our work cannot be done. Simple machines are specific. One cannot perform all activities. Each one does one particular activity. The method of using each one has to be learnt so that it can be used effectively.

Materials and Resources (Low or No Cost): Obtain the following devices; bottle-top opener, pair of scissors, screw driver, claw hammer and forceps. The learners can assist by bringing some of them to school from home.

Procedure

Display the simple machines brought to school on tables in the groups. Ask learners to identify the machines and their uses, learners discuss the names and their uses among themselves. Move from table to table to observe how they go about it and helps and correct them. Demonstrate how they can be used effectively.

Summary

- simple machine makes work easier and faster.
- simple machines are used for specific work
- bottle opener, for example, helped the bottle top to be removed easily and faster.

Diagnostic Assessments

i. Name any two simple machines
ii. Why are they called simple machines?

Progressive Assessments

i. Do all the devices used to do work faster and easier look alike?
ii. Do all the devices do the same kind of work?

Answers to Diagnostic Assessments

i. Names- pair of scissors, bottle top opener, claw hammer, forceps, screw driver
ii. Because they are used to do work easier and faster

Answers to Progressive Assessments

i. No, they don't.
ii. No, each is specific and does a particular work.

Activity 4.3.2.1 The use of simple machines

Group work: In your groups obtain the following simple machines: Pair of scissors, Bottle opener, forceps, claw hammer, screw driver.

Move from table to table to demonstrate the correct use of each simple machine. Supervise how learners try to use the machines and corrects them. Make sure that learners try to use the machines and corrects them.

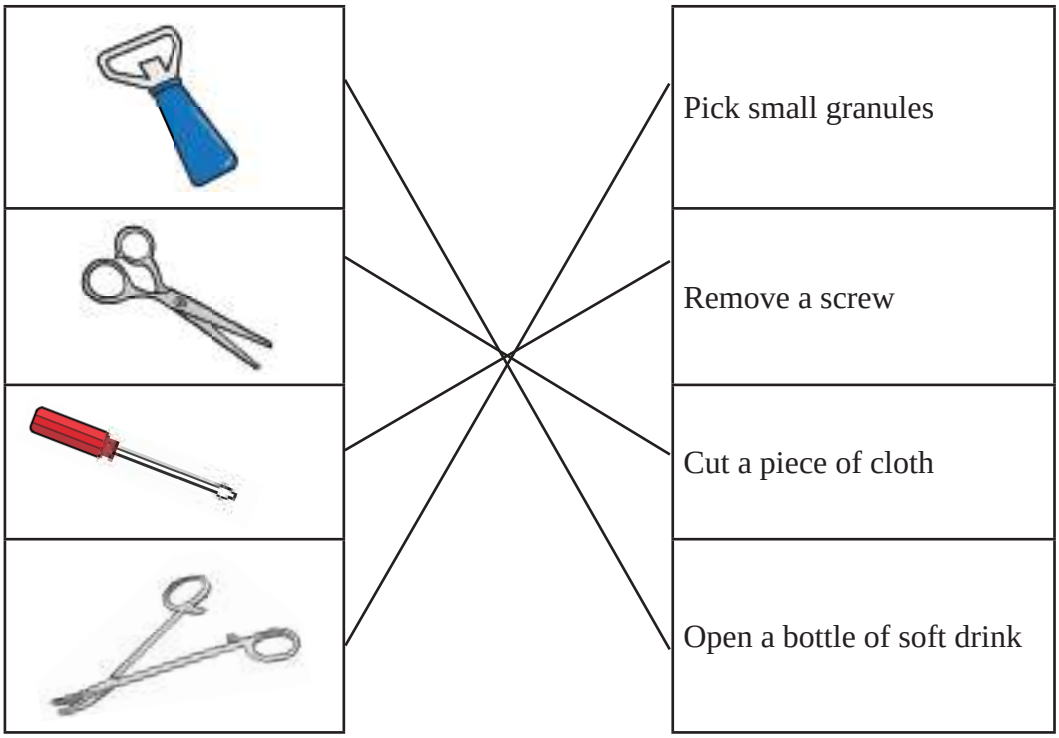
Make sure that learners have acquired the knowledge of the best method of using the simple machines brought to the classroom by looking at how they go about their work. Help the learners by asking them to mention the simple machines used to perform the following activities.

- Weeding

- Sweeping
- Digging
- Tightening a bolt

Corrects learners

Answers to Study Questions

1. Simple machine and faster
2. 

3. 
i. claw hammer


ii. pair of scissors

4. (a) cutlass
   (b) broom
   (c) spanner
   (d) pick axe

STRAND 5: HUMANS AND THE ENVIRONMENT

SUB-STRAND 1: PERSONAL HYGIENE AND SANITATION

LESSON 1: HOW TO KEEP THE BODY CLEAN AND WHY IT IS IMPORTANT

Content Standard: B2.5.1.1 Recognise the importance of personal hygiene

Core Competencies : Critical Thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership

Expectations: At the end of this lesson you will be able to:

- sing songs, tell stories, and recite poems and rhymes on personal hygiene
- explain why it is important to keep the finger nails clean. .
- explain why you will not share your personal effects with friends.
- say what will happen if you leave your finger nails and hair to grow without cutting or trimming them regularly.

Subject Specific Practices: Observing

Reference: Learners book 2, page 159 – 166

Introduction

The simple machines that make work easy for us need to be maintained so that they can last long. The human beings that use these simple machines to work also have to be in a healthy condition. One way of keeping our selves healthy is to always keep our bodies clean. This is important which the learner needs to know.

Indicators and exemplars: B2.5.1.1.1 Explain how to keep the body clean and describe why it is important

Key words: finger nails, bath, personal hygiene, trimming nails

Additional Information

If your finger nails are long, dirt can hide in them. Germs that cause diseases can also hide in the dirt. When we eat with the long and dirty finger nails, we take in the dirt that is in them. This can make us sick because the dirt may contain germs. When your finger nails are short and you wash your hands with soap, all the dirt will be removed.

Starting the lesson

Begin the lesson by telling learners to sing songs, tell stories, and recite poems and rhymes on personal hygiene.

Teach a song, tell a story, or recite a poem and a rhyme on personal hygiene.

Poem
Wash, wash, wash
Wash your hands clean
Wash your hands with soap and water

Wash, wash, wash
Wash your body clean
Wash your body with soap and water

Wash, wash, wash
Wash your hair clean
Wash your hair with soap and water

Brush, brush, brush
Brush your teeth clean
Brush your teeth clean with paste and brush

Cut, cut, cut
Cut your finger nails short and clean
Cut your finger nails short with nail cutter

Tell learners to mention some activities they undertake with their fingers (Scratching parts of our body which irritates us, peeling fruits such as oranges, scratching surfaces of materials, removing stickers from surfaces)
Explains to learners why it is important to keep the finger nails clean.
Ask learners what are some of the things they do that make their finger nails dirty.

Ask learners why they should keep their finger nails short and clean.

Items used for trimming nails

Items used for trimming hair

Ask learners

- why it is important to wash their hair every day.
- whether they wash their hair every day.
- whether it is important to cut their hair short regularly.
- whether they cut their hair short when it is grown regularly

Bushy hair can harbour dirt and lice may grow inside it.
Hair which is not cut, washed and kept clean will make you look ugly

Show to learners item used to trim the hair on page 163 of Learner's textbook.
Ask learners whether they know how to use the items in the diagram you show to them. Tell learners how to use item to trim the hair.

Ask learners:

- whether they use the same pair of scissors, shaving stick with razor blades and barbering machine and other personal effects with other people.
- whether it is good to use the same pair of scissors, shaving stick with razor blades and barbering machine and other personal effects with other people.
- what will happen to them if they use the same pair of scissors, shaving stick with razor blades and barbering machine and other personal effects with other people .

Go on to explain that if a person has a particular skin disease and uses certain items such a pair of scissors, shaving stick with razor blades and barbering machine, the germs that causes that skin disease will get into those items. If they also use those same items they will get the disease.

You have learnt that:

- If your finger nails are long, dirt can hide in them.
- Germs that cause diseases can also hide in the dirt.
- When we eat with the long and dirty finger nails, we take in the dirt that is in them
- We must trim our hair and keep it short at all times.
- If a person has a particular skin disease and uses certain items such a pair of scissors, shaving stick with razor blades and barbering machine, the germs that causes that skin disease will get into those items.
- If you also use those same items you will get the disease.

Diagnostic assessment

1. Write a short poem about personal hygiene
2. What do you think will happen to you if you do not cut your finger nails short regularly?
3. Use two words that are put together which talk about keeping your body neat always.

Progressive assessment

1. Write down the three advice you will give to your friend in another school about personal hygiene from the lesson you have just learnt.
2. A teacher shows to a class a pair of scissors, shaving stick with razor blades, barbering machine, soap, sponge, bucket of water.
   i. What do you think the teacher is going to talk about?
   ii. Write down two activities you can undertake with these items

Answers to Diagnostic assessment

1. Poem
   Wash, wash, wash
   Wash your hands clean
   Wash your hands with soap and water

   Wash, wash, wash
   Wash your body clean
   Wash your body with soap and water

2. Germs will hide in them which will make you fall sick if you eat with them. When you scratch your skin with them, you will also get skin disease.
3. Personal hygiene

Answers to Progressive assessment

1. Write down the three advice you will give to your friend in another school about personal hygiene from the lesson you have just learnt.
2. (i) What do you think the teacher is going to talk about?
   (ii) Bathing, cutting the hair

Answers to Study Questions

1. When we eat with the long and finger nails, we take in the that is in them. This can make us because the may contain.
2. a) so that germs will not hide in it
3. a) Dirt and lice will not hide in it which will affect your head.
4. a) nail cutter
   b) pair of scissors, barber's machine, shewing stick
   c) They can cut you and hurt you.
5. a) finger nail
   b) hair
6.

Appearance	Hair	Finger nails	Armpit	Teeth	Skin	clothes
Neat person	Kept short	Cut short	Kept neat	Brushed,	washed	Washed clean
Dirty person	Kept Long	Kept long	Hairy and not shaved, smells	Not brushed, decayed, smells	Not washed	Left dirty,Not washed

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 1: PERSONAL HYGIENE AND SANITATION

LESSON 2: THE NEED FOR KEEPING CLASSROOMS AND SCHOOL COMPOUND CLEAN

Content Standard: B2.5.1.1 Recognise the importance of personal hygiene

Core Competencies: Critical Thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership, Digital Literacy

Expectations: At the end of this lesson you will be able to:

- sing songs, tell stories, and recite poems and rhymes on personal hygiene.
- explain why it is important to keep the finger nails clean.
- explain why you will not share your personal effects with friends.
- say what will happen if you leave your finger nails and hair to grow without cutting or trimming them regularly.

Subject Specific Practices : Analysing, Evaluating

Reference: Learners book 2, page 167 – 173

Introduction

There is the saying that "a sound mind in a sound body". We can also say that a clean body in a clean environment. It is not only good to keep our bodies clean but equally good to keep our environment clean so that our clean bodies can live in a clean environment. Our classrooms and school compounds form part of our environment which need to be kept clean.

Indicators and exemplars: B2. 5.1.1.2 Know the need for keeping classrooms and school compound clean

Key words: sweeping, mopping, cobwebs, cleaning, gutters, water closet

Additional Information

Classrooms and school compound need to be kept clean. This is because a healthy body needs to be in a clean environment. A healthy person who stays in an unclean environment soon becomes sick. This is because germs that make people sick lives in unclean environment. A person who is sick today and goes to hospital for treatment and comes back healed must make sure his or her environment is kept clean. If the person does not keep the environment clean, he or she will fall sick again. This is the reason why we need to keep the classrooms and compound clean.

Staring the lesson
Begin this lesson by telling learners to look at the ceilings, the windows and the floor and the sitting areas of their classroom.

Ask learners:
- what they have seen
- how the places look like
- whether the places look clean or dirty

Tell learners to discuss what they have seen with your classmates.
Ask learners why they need to keep the classroom and the school compound clean
Lead learners round the school compound.
Ask learners whether the school compound was clean or dirty.
Use the following points as a checklist to assess the responses the learners will give as to why the classroom and the school surroundings need to be clean:

You should keep our classroom and the school compound clean to:
- avoid sicknesses and diseases like cholera and typhoid fever
- prevent spiders from making cobwebs in the ceilings
- prevent the breeding of mosquitoes by destroying their breeding grounds
- to destroy the hiding places of snakes and wall geckos
- prevent bad smell from rotten materials
- prevent the breeding of houseflies
- make the classroom and the compound beautiful and attractive
- prevent the growth of weeds on the compound so that snakes and harmful insects cannot hide in them and bite us.
- prevent slipping and falling down when water pours on the floor
- ensure good ventilation

Ask learners how they can keep the classrooms and school compound clean. Guide learners to mention methods such as sweeping, mopping and removing cobwebs, cleaning gutters, clearing the bush in our surroundings and cleaning the water closet.

Summary
You should keep our classroom and the school compound clean to:
- avoid sicknesses and diseases like cholera and typhoid fever
- prevent spiders from making cobwebs in the ceilings
- prevent the breeding of mosquitoes by destroying their breeding grounds
- prevent bad smell from rotten materials
- prevent the breeding of houseflies
- make the classroom and the compound beautiful and attractive
- prevent the growth of weeds on the compound so that snakes and harmful insects cannot hide in them and bite us.

- prevent slipping and falling down when water pours on the floor
- ensure good ventilation

Answers to Diagnostic assessment

1. (i) sweeping, removing cobwebs, moping the floor
   (ii) sweeping, clearing gutters, clearing bushes/weeds
2. What will you use the following items for? Write it under each item

To put rubbish inside

To sweep

To mop liquids on the floor

To clear chocked gutters

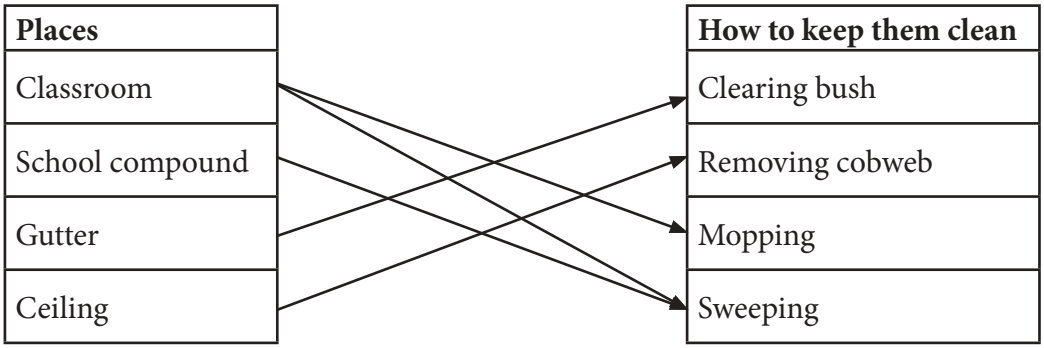
To clear weeds

To protect the hand when cleaning places

Answers to Progressive assessment

1. (a) (i) Broom, ceiling brush, dustbin, hand gloves
   (ii) Broom= sweeping, ceiling brush= to remove cobwebs, mob= to clean liquids on the floor, dustbin= to put rubbish inside it. Hand gloves = to protect the hands when cleaning.
   (b) (i) Broom, dustbin, hand gloves, cutlass
   (ii) Broom= sweeping, dustbin= to put rubbish inside it. Hand glove = to protect the hands when cleaning, cutlass= to clear bushes/weeds

Answers to Study Questions

1. Classroom, School, clean, cholera
2. (c) avoid sickness
3. (b) sweeping
4. (b) when there is liquid on the floor
5. (a) cabweb
6. 

STRAND 5: HUMANS AND THE ENVIRONMENT

SUB-STRAND 2: DISEASES

LESSON 1: CAUSES AND PREVENTION OF RINGWORM

Content Standard: B2.5.2.1 Know common diseases of humans, causes, symptoms, effects and prevention

Core Competencies: Critical Thinking and Problem Solving, Collaboration and communication, Personal Development and Leadership, Creativity and Innovation

Expectations: At the end of this lesson you will be able to:

- state possible causes of ringworm and other skin diseases such as eczema.
- discuss the modes of prevention of skin diseases
- compose a rhyme or song on the prevention of ringworm

Subject Specific Practices: Observation, Prediction

Reference: Learners book 2, page 174 – 180

Introduction

We can keep our bodies and environment clean but it is not everybody that is able to do that. Those that are able to do that should tell others to do so. There are some diseases which easily attack the skin of people who do not always keep their bodies clean. An example of these diseases is ringworm which is a skin disease. There is the need to know its causes and ways of preventing it. Learners learnt in Basic one that Ringworm is caused by a fungus. It makes ring patches on the head and body of a person affected by the disease. It comes as a result of improper cleaning of the body (lack of personal hygiene). It causes itching and pain of the body.

Indicators and exemplars: B2. 5.2.1.1 Identify causes and prevention of ringworm

Key words: Fungus, spores, prevention, ringworm

Additional Information

There is a saying that prevention is better than cure. To prevent sickness is better than curing sickness. If you know what causes a particular sickness and you try to prevent it, it is better than the sickness attacking you before you struggle to cure it. There are germs that cause skin diseases. The main cause of every skin disease including ringworm and eczema is when your skin comes into contact with the germ that causes it. The germ that causes ringworm is fungus. The fungus is just like the things that grow on bread when you keep it at a warm and moist

place. The spores of the fungus are found in the air. It can settle on the skin or on clothing. People can get into contact with the spores of the fungus through many ways such as

- wearing the same clothing with people without washing them very well.
- wearing dirty clothes and not washing them regularly.
- not washing your hands with soap and water after shaking hands with people and visiting the toilet.
- keeping your finger nails long and dirty
- not bathing regularly which causes bacteria, fungus and viruses which may grow on the sweat secretions on the skin to cause the disease

Starting the lesson

Begin this lesson by showing pictures of people suffering from ringworm
Guide learners to bring out possible causes of ringworm and other skin diseases such as eczema.

Activity 5.2.1.1: Ways of preventing ringworm

- Tell learners to form groups of four or five and appoint a leader for each group.
- Tell learners to lets the leader in the group to lead a discussion on the different ways of preventing ringworm.
- Tell learners to record what they have discussed in their notebook.
- Tell learners to show what they have written down to you..

Use the following as checklist for what the learners have written down about the ways of preventing ringworm:

You can prevent ringworm and other skin diseases such as eczema in many ways. Some of these ways include:

- Keep your body clean by removing germs
- Avoid wearing the same clothing with people without washing them very well.
- Wash hands with soap and water after shaking hands with people and visiting the toilet.
- Keep finger nails short and clean
- Wash(bath at least two times a day) to remove bacteria, fungus and viruses which may grow on the sweat secretions on the skin
- Keep your clothing clean and change them frequently.

Tell learners to compose a rhyme or song on the prevention of ringworm
Rhyme

- Ring worm, ring worm
- Are you a worm? Are you a bell?
- If you were a bell I will ring you
- Kran, kran, kran
- Don’t touch me, don’t touch me
- If you were a worm I will kill you
- Die, die, die

- Ring worm, ring worm
- My skin is clean, my skin is clean
- Don't touch me, don't touch me.
- I take my sponge, I take my soap
- I bath, I bath, I bath
- Ring worm away!!!, ringworm away!!!

Summary

- Ringworm is caused by a fungus.
- Ringworm makes ring patches on the head and body of a person affected by the disease.
- Ringworm comes as a result of improper cleaning of the body.
- We can prevent ring worm by keeping ourselves and our surroundings clean at all times

Diagnostic assessment

1. List skin diseases from the following list of diseases: typhoid, tuberculosis, ringworm, roundworm, eczema, chicken pox, malaria
2. Is ring worm caused by a worm?
3. What is the main symptom of ringworm?

Progressive assessment

What will happen to a person who does the following things?
He or she likes wearing the same clothing with people without washing them very well.
He or she likes wearing dirty clothes and not washing them regularly.
He or she does not like washing his or her hands with soap and water after shaking hands with people and visiting the toilet.
He or she always likes keeping his or her finger nails long and dirty

Answers to Diagnostic assessment

1. List skin diseases from the following list of diseases: ringworm, eczema, chicken pox
2. No
3. Ring patches on the head and body of a person affected by the disease

Answers to Progressive assessment

He or she will get skin diseases

Answers to Study Questions

1. Skin
2. Fungus
3. Ring patches
4.
    - To keep my body clean by removing germs
    - To avoid wearing the same clothing with people without washing them very well.
    - To Keep my finger nails short and clean

- To wash(bath at least two times a day) to remove bacteria, fungus and viruses which may grow on the sweat secretions on the skin
- Keep my clothing clean and change them frequently.

5. (i) No

   (ii)
   - She did not keep her body clean by removing germs
   - Maybe she was wearing the same clothing with people without washing them very well.
   - Maybe she did not keep her finger nails short and clean
   - Maybe she does not wash(bath at least two times a day) to remove bacteria, fungus and viruses which may grow on the sweat secretions on the skin
   - Maybe she does not keep her clothing clean and change them frequently.

   (iii)
   - To keep my body clean by removing germs
   - To avoid wearing the same clothing with people including that of Nancy without washing them very well.
   - To Keep my finger nails short and clean
   - To wash(bath at least two times a day) to remove bacteria, fungus and viruses which may grow on the sweat secretions on the skin
   - Keep my clothing clean and change them frequently.

6. Ringworm

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 2: DISEASES

LESSON 2: SOME COMMON WATER-BORNE DISEASES AND THEIR PREVENTION

Content Standard: B2.5.2.1 Know common diseases of humans, causes, symptoms, effects and prevention

Core Competencies : Critical thinking and Problem Solving, Collaboration and communication, Personal Development and Leadership, Digital literacy

Expectations: At the end of this lesson you will be able to:

- identify causes of water-borne diseases
- discuss how you will prevent water-borne diseases (boiling water, filtering water, etc.).
- create posters, compose songs or rhymes on how to prevent water- borne diseases.

Subject Specific Practices: Predicting, Analysing, Generating

Reference: Learners book 2, page 181 – 188

Introduction
Among the common diseases that affect humans which have specific causes, symptoms and effects, there are those that are caused by germs that are live in water and food. These can also be prevented. The learner needs to know examples of these water-born diseases after they have made to understand what the term means.

Indicators and exemplars: B2.5.2.1.2 Name some common water-borne diseases and their prevention

Key words: diseases, water-borne, prevention, germ

Additional Information
There are germs that live in water that is unclean. Clean water does not contain germs. If you drink water that is not clean you will fall sick. The food you eat too contains water. The germs that live in water can also live in food. If you eat food that is not kept neat you will also fall sick. You can prevent this. It is necessary to know the names of some of the common water-borne diseases and how they can be prevented.

Some common water borne diseases and their symptoms are in the table below

Disease	**The germ that causes the disease**	**Symptoms and effects(what you feel)**
Typhoid	Bacterium called Salmonella typhi	• Mild fever(body pains) • Slight to severe abdominal pains with constipation(inability to have free bowels) • Diarrhoea
Cholera	Bacterium called Vibrio cholerae	• Severe diarrhoea (watery stool) • Vomiting • Abdominal pains
Poliomyelitis (polio)	Virus called poliovirus	• Fever • Headache • Aching neck and muscles • Wasting away of limbs leading to paralysis

You can be infected by water-borne diseases by

- drinking contaminated water which contain the germs
- eating cold food (germs cannot live in cold food)
- eating food exposed to houseflies

Water-borne diseases can be prevented by

- boiling water to kill germs
- filtering water to remove germs
- eating hot food (germs cannot live in hot food)
- drinking treated water to avoid the germs.
- covering food to prevent houseflies from settling on it

Starting the lesson

- Show to learners a bucket of dirty water and a bucket of clean water
- Tell learners to in their groups of four or five to watch carefully the water in the two buckets.
- Show to learners, pictures or video of people suffering from diarrhoea, cholera and typhoid.
- Ask learners which water in the two buckets is likely to contain microorganisms that can cause diseases.
- Ask learners how they will prevent themselves from contracting water-borne diseases.
- Tell learners write them down in their exercise book.

Project: *Create posters, compose songs or rhymes on how to prevent water-borne diseases*

Summary

- the germs that live in water can also live in food.
- if you eat food that is not kept neat you will also fall sick.
- diseases that are spread through water are called water-borne diseases. Examples are cholera, typhoid and dysentery.
- You can prevent water-borne diseases by making sure that the food you eat does not contain these germs.

Diagnostic assessment

1. Write down three examples of diseases which people can get by drinking contaminated water.
2. State three ways by which water-borne diseases can be prevented

Progressive assessment

1. What advice will you give to a friend from a school in another region who has come home because there is cholera outbreak there?

Answers to Diagnostic assessment

1. Cholera, typhoid and Poliomyelitis (polio) .
2. Boiling water to kill germs, eating hot food (germs cannot live in hot food), covering food to prevent houseflies from settling on it

Answers to Progressive assessment

1. To boil water to kill germs before drinking, to eat hot food because germs cannot live in hot food, to cover food to prevent houseflies from settling on it

Answers to Study Questions

1. The germs that live in **water** can also live in **food**. If you eat **food** that is not kept **neat** you will also fall **sick**
2.
    i. Water-borne disease
    ii. The cold food contains germs.
3. Cholera, typhoid, Poliomyelitis (polio)
4.
    i. Cholera:
    Severe diarrhoea (watery stool)
    Vomiting
    Abdominal pains
    ii. Typhoid
    Mild fever(body pains)
    Slight to severe abdominal pains with constipation (inability to have free bowels)
    Diarrhoea
5. Cholera can be prevented in my community by the following means:

- By boiling water to kill germs
- By filtering water to remove germs
- By eating hot food (germs cannot live in hot food)
- By drinking treated water to avoid the germs.
- By covering food to prevent houseflies from settling on it

STRAND 5: HUMANS AND THE ENVIRONMENT

SUB-STRAND 3: SCIENCE AND INDUSTRY

LESSON 1: THE TECHNOLOGICAL DEVICES USED IN THE COMMUNITY AND THEIR IMPACT

Content Standard: B2.5.3.1 Recognise the impact of science and technology in society

Core Competencies: Critical Thinking and Problem Solving , Collaboration and communication, Personal Development and Leadership, Digital literacy, Creativity and Innovation

Expectations: At the end of this lesson you will be able to:

- say how people communicated, travelled, sought medical care, etc. in the olden days (in the absence of modern-day technological inventions)
- name some technological devices they see in the school, at home, in the market places, hospitals, mosque, churches, bus stations, airport, etc.
- see and handle handle some products of technology that can be seen in the community
- operate some common devices such as mobile phones, laptops, toy cars etc.
- state what will happen if there were no modern technological devices in the community
- draw a technological device that will improve their communities in future

Subject Specific Practices: Observing, Evaluating, Analysing

Reference: Learners book 2, page 189 – 199

Introduction

The learner knows some common diseases of humans, causes, symptoms, effects and prevention. When a person is sick and goes to the hospital, the medical doctor uses certain devices to help him or her(the doctor) diagnose the disease. Devices such as thermometer, stethoscope are examples of such devices. These devices are technological devices.

Indicators and exemplars: B2.5.3.1.1 Identify the technological devices used in the community and describe their impact

Key words: impact, technological, device

Additional Information

We use devices every day to do things. In the past people use devices to do things. At present people still use devices to do things. In the future people will still use devices to do things. The devices people use in the past to do things may not be the same as those used today to do things.

The way people do things in the past is not the same as the way they do things today. The things that we use today to make life easy for us were not available to people in the past.

Starting the lesson

- Tell learners to think critically about the way people do things in the past whether it is the same as the way they do things today
- Tell learners to discuss these things with their classmates.
- Tell learners to organise themselves into groups of four or five and appoint a leader for themselves.

Ask learners the following question:

- How did people communicate in the olden days?
- How do people travel in the olden days?
- How do people seek medical care in the olden days?
- How do people entertain themselves in the olden days?
- How do people cultivate their farm in the olden days?

Tell learners to tell their classmates about their answers to the above questions
Tell learners to name some technologies that they see:

- in their school
- in the market
- in their home
- at the hospital
- in their church
- in their mosque
- at the bus station
- at the airport

Use the following as checklist for the responses that learners will give to the above question:
Some technologies that one can see at places in our communities include::

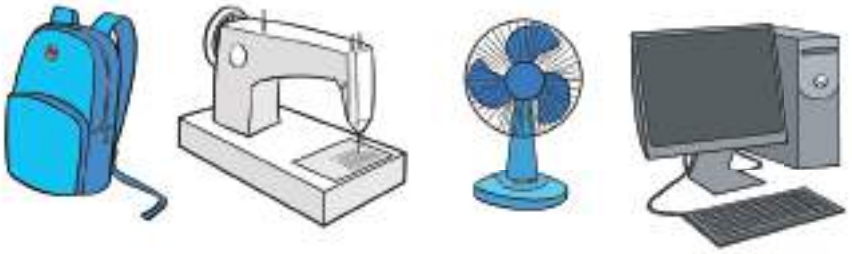
- in schools: school bag, computer, calculator, laptop, photocopier, printer, telephone
- in the market: calculator, megaphone, computer, sewing machine
- in the home: television set, electric iron, electric stove, mobile phone
- at the hospital: stethoscope, thermometer, scanner, microscope
- in the church premise: microphone, megaphone, electric drum, piano, amplifier, speakers, trumpet, tambourine,
- in the mosque: megaphone, microphone, speakers
- at the bus station: cars, megaphone, computer
- at the airport: aeroplane, radar, microphone, computers

Ask learners what they think will happen if there were no

- radio?
- television?

- camera ?
- computer?
- cars?
- tractors?
- mobile phones?
- calculators?
- fridges?

Tell learners to look at the devices in the pictures on page 192 of Learner's textbook:



Tell learners to look at the computer in their classroom. In the absence of a computer the you can use your mobile phone.
Ask learners if they know how to use these gadgets.
Teach learners how to use these gadgets
Tell learners to draw a technological device that they think will improve their community in the future.

Summary

- The way people do things in the past is not the same as the way they do things today.
- The things we use today to make life comfortable for us are called technological devices.
- examples of technological devices include mobile phone, laptop, computers, sewing machines, fan and school bag.
- If you use the things that you learnt in science to make things or do things that make life comfortable for all of use, it is called technology.

Diagnostic assessment

Write down the impact of the following technological devices on society:

i. megaphone
ii. microscope
iii. refrigerator

Progressive assessment

Write down the technological devices that can be used for the following:

i. Megaphone or microphone and loudspeakers

ii. Thermometer
iii. Telephone or mobile phone
iv. Blender

Answers to Diagnostic assessment

i. Speaking to a large crowd of people so that everybody can hear
ii. It makes people see things which are too small for the naked eyes to see
iii. It makes people store things so that they will not spoil

Answers to Progressive Assessment

i. Speaking to a large crowd of people so that everybody can hear
ii. Taking the temperature of a sick person
iii. Talking to a friend who has travelled outside the country
iv. Grinding tomato and pepper

Answers to Study Questions

1. Technology
2. (i) Photographs and video
   (ii) Camera
   (iii) video camera, digital camera, smart phone, microphone, speaker, piano.
3. (i) drone: to fly things from one place to another, to take photographs and videos from the sky
   (ii) l aptop: To store information, to play games, to type things and store them
   (iii) calculator: To calculate things such as adding number, multiplying number and dividing numbers
4.

				
Camera	Aeroplane	Computer	Smart phone	Thermometer

5. Thermometer

STRAND 5: HUMANS AND THE ENVIRONM
SUB-STRAND 3: SCIENCE AND INDUSTRY

LESSON 2: THE WAYS FOODS ARE PROCESSED FOR CONSUMPTION

Content Standard: B2.5.3.2 Exhibit knowledge of food processing and preservation

Core Competencies: Critical thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership, Digital Literacy

Expectations: At the end of this lesson you will be able to:

- draw and display the foods you eat every day.
- state why food must be processed before it is consumed.
- discuss ways of processing foods for consumption.
- talk about how you can process foods for consumption.

Subject Specific Practices: Generalising, Generating

Reference: Learners Book 2, page 200 – 211

Introduction
Refrigerator is now a common technological device which makes life easy in many homes. This means that food items can now be washed well and kept in this device to prevent it from getting spoiled. There are other ways of processing and preserving food items.

Indicators and exemplars: B2.5.3.2.1 Know the ways foods are processed for consumption

Key Words: Food processing, preservation, spoil, washing, boiling, drying, smoking, Salting, frying, canning

Additional Information
When food is prepared and kept for a long time, it can spoil. In your homes, some food items are processed and prepared for immediate consumption. Such food cannot be kept for a long time. For example, fufu cannot be kept for a long time.

Food processing is the different ways by which food items are treated so that they can be kept for long periods of time. Food items in their natural form can easily get spoilt in a very short period of time. When food is processed well it can stay for long period of time without spoiling.

Food preservation is the different methods and ways by which processed food is kept for long periods of time without spoiling. They ways of processing and preservation of food items for preservation include: Washing, boiling, drying, smoking, salting, frying and canning

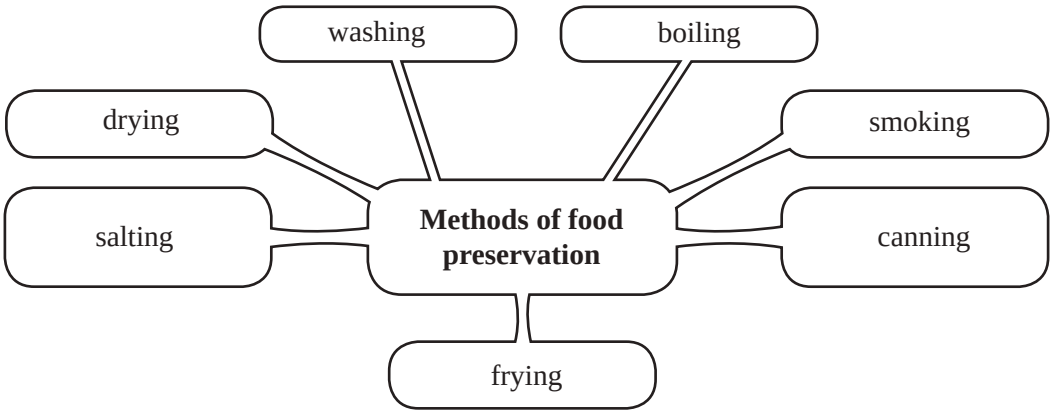
Starting the lesson

- Tell learners to organise themselves in groups of four or five.
- Ask learners what food they ate that morning
- Tell learners to ask their classmates about the food they ate that morning.
- Tell learners to mention the things that were used to prepare the food they ate that morning. Tell learners to ask their classmates about the things that were used to prepare the food they ate that morning.
- Show to learners samples of food items

Tell learners to:

- look at the sample of food items he or she shows them.
- name the vegetables, fruits and other types of food that can be processed and preserved at home and write them down in their exercise book.
- let each person in the group talk about how food is prepared in his or her home.
- find out from their classmates in their group how they will process the following items for consumption: yam, plantain, fish, ginger, rice, meat?

Guide learners to list foods item that are processed for preservation in their communities which may include; Fish, meat, maize, rice, sorghum, millet, yam, cocoyam, cassava, ginger, garlic, onions, vegetables (okro, pepper, cabbage, carrot), fruits (pineapple, mangoes, oranges)



Tell learners to look at the chart above which shows the different methods of food and processing preservation.

Summary

- when food is kept for a long time, it can spoil.
- food processing is the different ways by which food items are treated so that they can be kept for long periods of time.
- some food items are processed and prepared for immediate consumption.
- Methods of processing food include smoking, canning, frying and drying

Diagnostic assessment

Write down the ways by which the following food items can be processed and preserved:

i. Maize
ii. Yam
iii. Ginger
iv. Garlic
v. Grass cutter

Progressive assessment

Mention three food items in the northern region of Ghana and how they are processed for preservation

Answers to Diagnostic assessment

Write down the ways by which the following food items can be processed and preserved:

i. Maize: Boiling and drying
ii. Yam: drying
iii. Ginger: drying
iv. Garlic: drying
v. Grass cutter: smoking and canning

Answers to Progressive assessment

Guinea fowl: smoking
Yam: drying, frying
Millet: dying

Answers to Study Questions

1. (i) Drying: Fish(Kobi)
   (ii) canning: tomatoes
   (iii) frying : fish
   (iv) boiling: fresh maize
2. Tilapia: frying or drying under the sun
   Maize: boiling or drying under the sun
3. (i) washing, drying, smoking and frying
   (ii) To prevent the fish from getting spoilt(to preserve the fish)
4.

				
Name:	Yam	Plantain	Fish(Tilapia)	Pepper
Preserve it by	Drying	Roasting	Frying or drying	canning or drying

SUB-STRAND 4: CLIMATE CHANGE

LESSON 1: SOME COMMON HUMAN ACTIVITIES THAT ARE HARMFUL TO THE ENVIRONMENT

Content Standard: B2.5.4.1.1: Explain some common human activities that are harmful to the environment.

Core Competencies: Critical Thinking and Problem Solving, Collaboration and Communication, Personal Development and Leadership.

Expectations: At the end of this lesson you will be able to:

- There are identify different activities that could harm the environment
- fossil fuels like the petrol used in cars is causing the world to become warmer, affecting the weather.
- The weather pattern in farming and fishing communities has changed recently due to human activities.

Subject Specific Practices: Observing, Communicating

Reference: Learners Book 2, page 212 – 221

Introduction:
Atmospheric temperature are rising. Rainfall patterns are changing. There are floods in some places and severe droughts at other places. Humans continue to set fire to forests and grasslands. They continue to burn rubbish at many sites. They throw rubbish into water bodies. All these cause environmental pollution causing the climate to change.

Key Words: Environment, Pollution, Rubbish, Burning, Weather

Indicators and exemplars: Know that climate change is one of the most important environmental issues facing the world today.

Additional Information:
Humans do a lot of harm to the environment. Modern living introduces many harmful substances to the environment. These substances include gases such as carbon dioxide, carbon monoxide, sulphur dioxide and oxides of nitrogen. Chlorofluorocarbons are all introduced into the atmosphere. Burning of fossil fuels is the main cause of these gases. The use of chemicals in the agricultural sector and in fishing is polluting the water bodies.

All these are causing climate change. In this lesson we will learn about climate change and its effects on humans

Materials and Resources (Low or No cost): Charts showing bush fire, refuse burning site, rubbish into lakes, sea defence wall, flooding.

Procedure
Show the class charts of bush burning, rubbish burning and people throwing rubbish burning and people throwing rubbish into water bodies. Ask the learners their opinion about the actions. Explains that the actions contribute to environmental pollution. Mention some of the gases that are produced by these actions and their effect on living things. Lead the discussion on this.

Summary
- There are many human activities that harm the environment.
- Human activities that harm the environment include bush burning, burning of rubbish, and many others,
- There are some gases which are released into the atmosphere through human activities.
- Some gases called greenhouse gases prevent heat from escaping from the atmosphere into space.
- Greenhouse gases make the weather warm. We call it global warming.
- Global warming changes the weather
- In order to avoid global warming we must avoid burning bushes

Diagnostic assessment
i. Name two activities that cause environmental pollution
ii. State one effect on individuals who drink polluted water.

Progressive assessment
i. Are humans contributing to environmental pollution?
ii. Name two gases that envelope the earth

Answer to Diagnostic assessment
i. Bush burning, throwing rubbish into water bodies, burning of refuse
ii. They can get stomach upset or stomach ache.

Answer to Progressive assessment
i. Yes, by throwing rubbish into water bodies, burning bush and using fossil fuels.
ii. Carbon dioxide, methane.

Lead discussion on greenhouse effect and causes of greenhouse effect. Explains that it leads to climate change. Farmers are not getting enough rains and other places are getting flooded. At some parts of coast, the seas and oceans are washing away the land because more water is flowing into the sea from melting ice at the poles and ice caps.

This condition of climate change is affecting farmers and fishermen.
Conclude the lesson by stating the effects of climate change such as loss of agricultural land due to flooding and loss of land and flooding of seas and oceans leading to loss of fishing sites. Breathing of smoke will lead to respiratory diseases and so on. The world is becoming warmer and changing the weather patterns.

Answers to Study Questions

1. Diagrams of activities being performed
   i. (a) bush burning
      (b) burning toilet papers
      (c) burning rubbish
   ii. smoke
   iii. polluting the environment
2. They throw rubbish into water bodies.
3. (i) carbon dioxide (ii) ice (iii) flooding
4. (a) sea defence.
   (b) dust bin.
   (c) prevent flooding

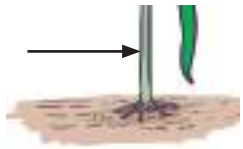
APPENDIX

ANSWERS TO WORKBOOK

STRAND 1 : DIVERSITY OF MATTER
SUB-STRAND 1: LIVING AND NON-LIVING THINGS

B2.1.1.1.1 Know the basic structure of plants (root, stem, leaves, flowers)

1. Stem, leaves and flower
2. Mango, Mahogany, Cocoa(Answers will vary)
3. (i)

		
Leaf	Stem	Root

(ii) Roots
(iii) Stem, leaf
(iv) Stem

4. (i) Leaves
(ii)Root
(iii)Root
(iv) Stem

LESSON 2: THE BASIC STRUCTURE OF ANIMALS

B2.1.1.2.1 Describe the basic structure of animals (head, limbs and trunk)

1. ears, eyes, nose, mouth
2. Four limbs
3. Chest, abdomen
4.

Part of heae	Part of limb	Part of trunk
eyes, mouth, nose, ears	leg, hand, nails	breast, chest, abdomen

5. Any correct diagram with parts corretly labelled.

LESSON 3: GROUPING THINGS IN THE EVIRONMENT AS LIVING OR NON-LIVING THING

B2.1.1.2.2 Group things collected from the environment into living and non-living things

1. i) a, b and d ii) a, b, c and g iii) d, e and f.
2. Non-living things: stone, chair, plastic, table, sand, paper, rubber (any 3 or any other 3 correct non-living things)
3. i) car ii) balloon iii) River iv) mountain, rock v) Box

SUB-STRAND 2: MATERIALS

LESSON 1: COMMON PROPERTIES OF MATERIALS

B2.1.2.1.1 Know Common properties of materials such as soft, hard, rough, smooth, opaque, transparent, bendable

1. i) straw ii) metal, wood, glass iii) fabric iv) clay v) glass vi) metal vii) straw
2. (a) transparent and smooth
   (b) rough and hard
   (c) soft, smooth and round.
3. i) soft material = cushion
   ii) hard material= stone
   iii) rough= rock
   iv) smooth material= glass surface
   v) bendable material= electric cable
4. (a) False
   (b) False
   (c) True
   (d) False
   (e) True

LESSON 2: PROPERTIES OF SOLIDS, LIQUIDS AND GASES

B2. 1.2.2.1 Describe the properties of solids, liquids and gases

1. i) Solid: cement, oil, sugar
   ii) Liquid: vinegar, water, salt
   iii) Gas: sand, oxygen, carbon dioxide
2.

Material	Solid	Liquid	gas
Palm oil		√	
Sugar	√		
Ice water		√	
Ice-cube	√		
Rock	√		
Air in football			√
Padlock	√		
Shoe	√		

3. i) gas
   ii) solid
   iii) liquids
   iv) solids
   v) gas

LESSON 3: SOLID-SOLID MIXTURE AND HOW TO SEPARATE THE COMPONENTS

B2. 1.2.3.1 Describe a solid-solid mixture and explain how to separate the components

1. Salt and sand, sand and beans, rice and beans (any other correct 3 examples)
2.

Mixture	How to separate
Grandnut and sand	Magnetisation
Iron nails and sand	winnowing
Corn and chaff	Sieving
Sand and stone	Hand picking

3. i) Sand + sugar = Mixture of sand and sugar
   ii) gari + salt = Mixture of gari and salt
   iii) stone + groundnut = Mixture of stone and groundnut
   iv) iron nails + sand = Mixture of iron nails and sand
4. (a) A. Beans, gari
   B: Charcoal, chalk
   (b) Beans and charcoal, Gari and Chalk

STRAND 2: CYCLES
SUB-STRAND 1: EARTH SCIENCE

LESSON 1: IMPORTANCE OF SOME CYCLIC NATURAL PHENOMENA

B2.2.1.1 Recognise the importance of some cyclic natural phenomena such as dry and wet season.

1. a) cyclic
   b) day
   c) dry and wet
2. a) False
   b) Time
   c) False
   d) False
   e) True
3. i) (a) rainy season (b) dry season
   ii) crops grow well, water is available
   iii) No water available, To much dust
   iv) Store water. Use pipe-borne water
   v) Improve drainage system, put sand and saw dust on the ground to soak water
4. i) thick
   ii) hot, homes

LESSON 2: SOURCES OF LIGHT TO EARTH

B2.2.1.2.1 Identify sources of light to the earth

1. a) earth, sun, artificial, see, bulbs
2. i) light ii) sun iii) two iv) natural, aritificial
3. i)

Artificial Sources	Natural Sources
lamps, candle, lantern, flashlight	stars, sun, fireflies, glow worm

4. i) Accept any good diagram
   ii) Accept any good diagram
5. i) You cannot watch television
   ii) You cannot do your homework
   iii) You cannot iron your clothes
   iv) You cannot see clearly.

6. front, light
7. There will be no food since plants cannot make food without light
   There earth will be dark
   There cannot be movement since we cannot see

LESSON 3: QUALITIES OF GOOD DRINKING WATER

B2.2.1.4.1 Find out the qualities of good drinking water

1. Tastles, odourless, colourless and must have no particles
2. Pipe-borne water, rain water and bore-hole water.
3. River water, pond water, lake water, lagoon water.
4. Drinking, washing hands, cooking food in the canteen.
5. Tasteless, colourless, odourless, must have no particles.
6. It may contain particles, odour, colour and some taste.
7.

Sources of water	Taste	colour	Particles	Odour
River	May have taste	May have colour	May have particles	May smell
Rain	tasteless	colourless	no particles	No smell
Pond	May have taste	May have colour	May have particles	May smell
Pipe-borne	tasteless	colourless	no particles	No smell

LESSON 4. USES OF AIR

B2.2.1.4.2 Identify uses of air

1. (a) (i) Hospital = Breathing.
   (ii) Airport = Helps aeroplanes to fly
   (iii)Market= For winnowing to separate some seeds from the chaff
   (iv) Vulcanizers workshop= To inflate lorry tyres
   (b) It will be flat and the car cannot move
2. i) False
   ii) True
   iii) True
   iv) False
   v) False
3. (a) Electric fan
   (b) To blow air to cool my body
   (c) Paper fan
4. Accept any correct diagram

STRAND 3: SYSTEMS
SUB-STRAND 1 THE HUMAN BODY SYSTEMS

LESSON 1: THE FUNCTIONS OF THE HUMAN BODY PARTS
B2 3.1.1.1 The functions of the Human Body parts (head, neck, hands, chest, abdomen, ears, mouth, eyes, nose and legs).

1. Head, Nose, chest, abdomen, neck, mouth(any 2)
2. (i) eyes= See the ball, other players and the goal post
   (ii) ears= Hear the whistle and other players
   (iii) legs= Run and kick the ball
   (iv) hands= Throw the ball into play
3. (i) Can only play the ball using artificial leg.
   (ii) Can throw the ball into play with only one hand
   (iii) Can see the ball and other players with with only one eye
4.

Part of body	Pair/single
	Pair
	Pair
	Pair
	Single
	Single

5. SUB-STRAND 2: SOLAR SYSTEM

LESSON 2: THE SUN AS THE MAIN SOURCE OF LIGHT AND WARMTH ON EARTH

B2.3.2.1.1 Identify the sun as the main source of light and warmth on earth

1. a) sun
   b) sky
   c) i) Light
      ii) warmth
2. i) sun ii) light iii) heat iv) cold v) light
3. i) light ii) light iii) heat iv) heat v) light
4. Accept any correct diagram.

STRAND 4: FORCES AND ENERGY
SUB-STRAND 1: SOURCES AND FORMS OF ENERGY

LESSON 1: EVERYDAY APPLICATIONS OF ENERGY

B2.4.1.1.1. Identify everyday applications of energy

1. i) work
   ii) food
2. i) light
   ii) sound
   iii) electric
3. i) light
   ii) chemical
   iii) food
   iv) chemical
   v) petrol
4. i) chemical ii) chemical iii) chemical
   iv) light v) heat
5. i) To walk
   ii) To see
   iii)To play football or ampe

LESSON 2: HOT OR COLD OBJECTS

B2.4.2.1.1 Understand that objects become hot or cold through the loss or gain of heat.

1. a) i) Burning candle
      ii) Prepared food
      iii) water on fire
   b) i) ice blocks
      ii) yoghout from the fridge
2. a) True
3. i) refrigerator
   ii) gas cooker
4. i) it becomes cold
   ii) it becomes hot
5. hot
6. electric , heat
7. steam , melting candles and wax
8. ice block , yogurt from fridge
9. hot cold

10. it will cool down .

LESSON 3: IMPORTANCE OF SAFETY WHEN USING ELECTRICITY

B2.4.2.1.1 Recognise the importance of safety when using electricity

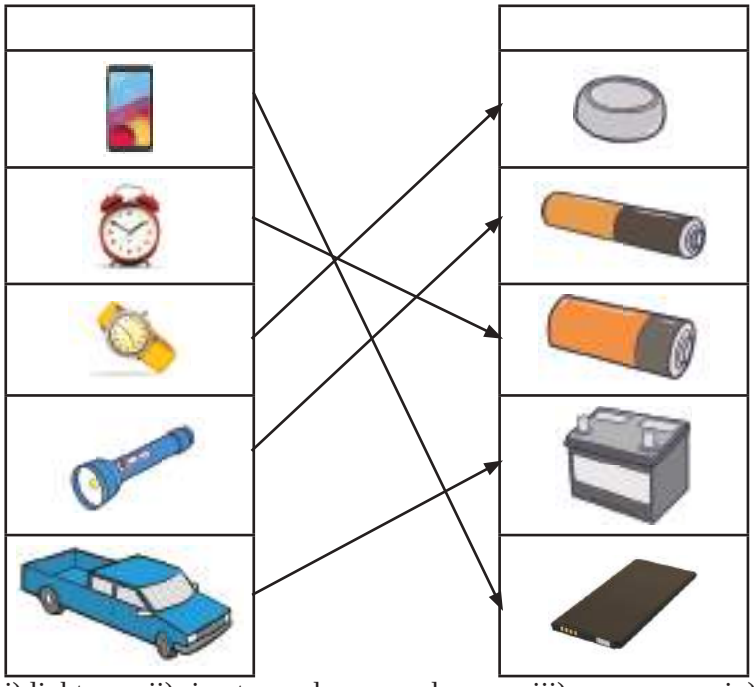
1. electric fan , television set , pressing iron, refrigerator, radio
2. Television set , refrigerator
3. a) True
4. a) True
5. wet hands
6. bare wires
7. sockets
8. i) plastic
   ii) dry wood
9. yes

STRAND 4: FORCES AND ENERGY
SUB-STRAND 2: ELECTRICITY AND ELECTRONICS

LESSON 1: THE FUNCTION OF BATTERIES IN ELECTRONIC DEVICES

B2.4.2.2.2 Investigate the function of batteries in electronic devices

1.



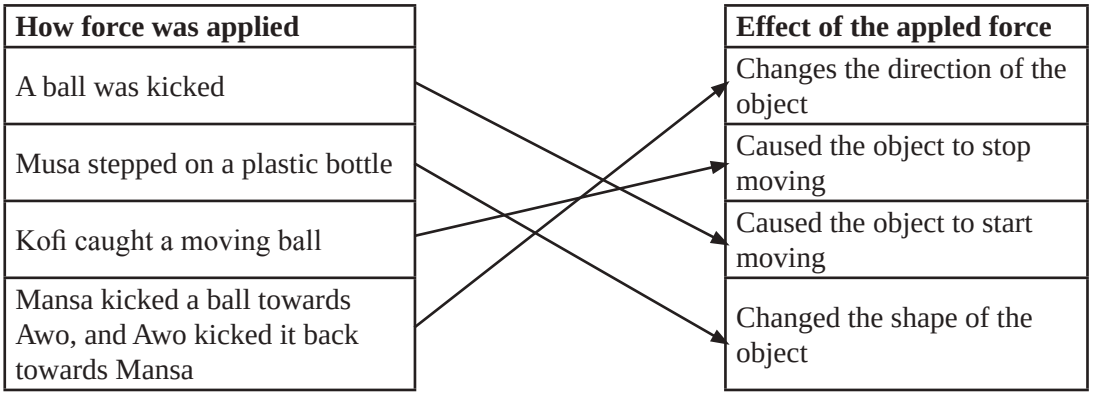
2. i) light ii) ring to produce sound iii) move iv) move v) start
3. (a) i) wrist watch
   ii) mobile phone
   iii) digital camera
   (b) battery
   (c) To supply energy
4. Accept any correct diagram
5. i) radio ii) mobile phone iii) flashlight iv) wrist watch v) toy car

SUB-STRAND 3: FORCES AND MOVEMENT

LESSON 1: EFFECT OF FORCES ON OBJECTS

B2 4.3.1.1 Discover the effects of forces on objects

1. push or pull
   towards the one pulling (direction)
   away from the one pushing (directions)
2. i) kick a ball
   ii) throw a stone
   iii) play ampe
3. i) The boy is kicking a ball
   ii) The girl is pushing the chair
   iii) They are pulling a tug-of-war
4. i) cause a body to move
   ii) cause a moving body to stop moving
   iii) change the direction of a moving body
   iv) change the shape of an electric body
5.



LESSON 2: SIMPLE MACHINES

B2.4.3.2.1 Identify simple machines used for specific work

1. i) pair of scissors
   ii) bottle top opener
   iii) forceps
   iv) claw hammer
   v) screw driver
   (b) Because the do work easier and faster

2. i) Because it can be used to open the bottle top easier than the hand.
   ii) No, the hand cannot be used easier than the pair of scissors
3. i) cutlass
   ii) broom
   iii) spanner
   iv) bottle opener
   v) barbar's machine
4.

Simple Machine	**Use**
Claw hammer	For sweepaing
Cutlass	For digging the ground
Pick axe	For removing nails from wood
Rake	For weeding
Broom	For gathering weeds

5. Accept any correct diagram

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 1: PERSONAL HYGIENE AND SANITATION

LESSON 1: HOW TO KEEP THE BODY CLEAN AND WHY IT IS IMPORTANT

B2.5.1.1.1 Explain how to keep the body clean and describe why it is important

1. i) Bath
   ii) sweep your room
   iii) Brush your teeth
   iv) Wash your hands before you eat
2. i) Germs that cause diseases will enter your body make you sick
   ii) When you make up in the morning and when you are going to sleep in the evening
   iii) Two times morning and evening
   iv) No
3. (a) i) Clothes ii) Hair iii) fingernail iv) Armpits v) Skin iv) Teeth
   (b) i) to be washed
   ii) cut short and washes
   iii) cut short
   iv) shaved and cleaned daily
   v) to be washed
   vi) brush
4. i) barber's machine
   ii) Tooth brush
   iii) Nail cutter
   iv) soap, sponge, water
   v) comb

LESSON 2: HOW TO KEEP THE BODY CLEAN AND WHY IT IS IMPORTANT

B2. 5.1.1.2 Know the need for keeping classrooms and school compound clean

1. i) Sweep the classroom and school compound
   ii) Use a mop to clean the washroom
   iii) Remove cabwebs from the classroom
2. i) Throwing pieces of paper around.
   ii) Not sweeping the classroom
   iii) Not removing cabwebs from the classroom
3. i) broom ii) mop iii) shovel iv) rag
4. i) Bad ii) Bad iii) Bad iv) Good v) Good

SUB-STRAND 2 : DISEASES

LESSON 1: CAUSES AND PREVENTION OF RINGWORM

B2. 5.2.1.1 Identify causes and prevention of ringworm

1. (a). eczema, chicken pox, heat rushes(any 2)
   (b) Fungus
   (c) Ring patches
   (d) It affects the skin as a ring and itches the sufferer.
   (e).
   - Keep her body clean by bathing always.
   - Avoid wearing the same clothing with people without washing them very well.
   - Keep her finger nails short and clean
   - Keep her clothing clean and change them frequently.

   (f) From an infected person
2. i) Bath always with soap and sponge
   ii) Avoid wearing the same clothes with people
   iii) Wash your clothes regularly
3. Skin, fungus, rings, sharing, combs

LESSON 2: SOME COMMON WATER-BORNE DISEASES AND THEIR PREVENTION

B2.5.2.1.2 Name some common water-borne diseases and their prevention

1. i) Typhoid ii) cholera
2. (a)
   - Severe diarrhoea (watery stool)
   - Vomiting
   - Abdominal pains

   (b)
   - boiling water to kill germs
   - filtering water to remove germs
   - eating hot food (germs cannot live in hot food)
   - drinking treated water to avoid the germs.
   - covering food to prevent houseflies from settling on it
     (Any 4)

3.

Disease	The germ that causes the disease	Symptoms and effects(what you feel)
Typhoid	Bacteria	Diarrhoea
Cholera	Bacteria	Diarrhoea
Poliomyelitis (polio)	Virus	Paralysis

SUB-STRAND 3: SCIENCE AND INDUSTRY

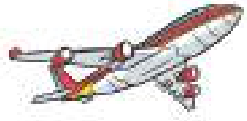
LESSON 1: THE TECHNOLOGICAL DEVICES USED IN THE COMMUNITY AND THEIR IMPACT

B2.5.3.1.1 Identify the technological devices used in the community and describe their impact

1. (i) Car
   (ii) Pictures, video
   (iii) Camera
   (iv) a) Motor cycle
   b) Bicycle
   c) Car
2. (i) ship = To transport people and goods
   (ii) radio = To broadcast news, to make announcements, to educate people(Any one)
   (iii) thermometer = To measure body temperature
3.

Car

Laptop



Aeroplane

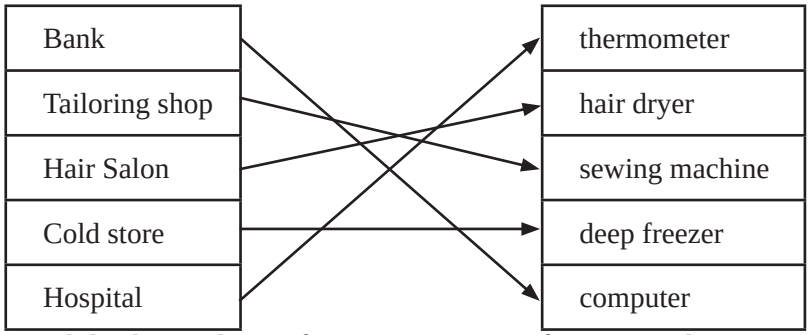
Mobile phone

Wrist watch

Sewing machine

stethoscope

4.



5. i) mobile phone, electric fan, pressing iron, refrigerator, television, computer
   ii) Refrigerator, computer, electric fan, printer, mobile phone

LESSON 2: THE WAYS FOODS ARE PROCESSED FOR CONSUMPTION

B2.5.3.2.1 Know the ways foods are processed for consumption

1. i) drying
   ii) refrigeration
   iii) frying
   iv) baking
   v) roasting
2. i) Garlic
   ii) yam
   iii) ginger
   iv) maize
3. i) drying
   ii) canning
   iii) drying
4. i) smoking, frying, drying
   ii) so that it will not spoil after sometime and she can keep it.

STRAND 5: HUMANS AND THE ENVIRONMENT
SUB-STRAND 4: CLIMATE CHANGE

LESSON 1: SOME COMMON HUMAN ACTIVITIES THAT ARE HARMFUL TO THE ENVIRONMENT

B2.5.4.1.1 Explain some common human activities that are harmful to the environment.

1. i) Bush burning
   ii) Burning rubbish
   iii) Rubbish being thrown into water bodies.
2. i) smoke
   ii) contaminated
   iii) litter bins
   iv) cut down
   v) air
3. warmer, melt, seas, tree, environment
4. i) deforestation
   ii) it contaminates the river
   iii) Produces smoke which pollutes the air