

Pages®

PRIMARY Science Practice

Learner's Book

3



PSL PAGES & STATIONERY LTD

Based on 2019 Curriculum by NaCCA

Frederick Kwame Sakyi
Ben Kudjoe

Contents

Page

INTRODUCTION

iii

STRAND 1: DIVERSITY OF WATER

1

SUBSTRAND 1: LIVING AND NON-LIVING THINGS

1

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

1

SUBSTRAND 2: MATERIALS

10

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

10

ES.1.2.2.2 Demonstrate understanding that an object is made of one or more materials

14

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

17

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

20

STRAND 2: CYCLES

26

SUBSTRAND 1: EARTH SCIENCE

26

ES.2.1.1.1 Describe some cyclic events like day and night, wet and dry seasons and their intervals/periods

26

ES.2.1.2.1 Know the importance of the sun to the earth

30

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

34

ES.2.1.4.1 Identify things that make water impure

37

ES.2.1.4.2 Describe the properties of air

42

SUBSTRAND 2: LIFE CYCLES OF ORGANISMS

45

ES.2.2.1.2 Observe the germination of maize and bean seeds

46



STRAND 3: SYSTEMS

SUB-STRAND 1: THE HUMAN BODY SYSTEMS

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

SUB-STRAND 2: THE SOLAR SYSTEM

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

SUB-STRAND 3: ECOSYSTEM

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

STRAND 4: FORCES AND ENERGY

SUB-STRAND 1: SOURCES AND FORMS OF ENERGY

B3.4.1.1.1 Know that light is a form of energy

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

B3.4.1.2.2 Know everyday uses of heat

SUB-STRAND 2: ELECTRICITY AND ELECTRONICS

B3.4.2.1.1. Identify different sources of electrical energy

SUB-STRAND 3: FORCES AND MOVEMENT

B3.4.3.1.1 Explain force and demonstrate how it causes movement

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

STRAND 5: HUMANS AND THE ENVIRONMENT

SUB-STRAND 1: PERSONAL HYGIENE AND SANITATION

B3.5.1.1.1 Describe ways of keeping the environment clean

SUB-STRAND 2: DISEASES

B3.5.2.1.1 Know how common skin diseases can be prevented



51
51
51
55
55
59
59
68
68
70
72
76
76
82
82
84
89
89
89
93
93

B3.5.2.1.2 Explain the term air-borne diseases and give examples

SUB-STRAND 3: SCIENCE AND INDUSTRY

B3.5.3.2.1 Describe the ways foods get spoiled

SUB-STRAND 4: CLIMATE CHANGE

B3.5.4.1.1 Identify human activities that pollute the atmosphere

End of strand self-assessment test

GLOSSARY AND INDEX

ACKNOWLEDGEMENTS

98
105
105
108
108
111
114
121



Sub-Strand 1: Living and non-living things

Words to learn
Living thing,
non-living thing,
mixture

B3.1.1.1 Classify living things into plants and animals by their life processes

Living things are all around us. You know that humans and animals are living, but what about the trees in the forest, or even the small organisms in a pond? Even though they appear to be very different from one another, they are all living things. Scientists study these differences and classify, or group, similar living things together based on their unique characteristics.

Look at the pictures below, identify the plants and animals. What characteristics do they all have that make them living things?



A



B



C



D



E



F



What do an elephant and a spider have in common? More than you might think! Scientists organise living things into groups based on common characteristics. Based on these characteristics, living things are classified into plants and animals. The characteristics common to all living things are:

Movement - Animals move to find food and keep away from predators, plants move to face the light

Reproduction - the ability to produce offspring to keep the species in existence

Sensitivity - responding and reacting to the environment

Nutrition - Animals need food for respiration, plants need minerals from the soil

Excretion - Getting rid of waste

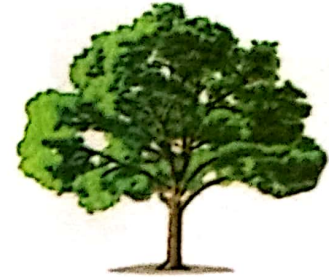
Respiration - Turning food into energy

Growth - Growing larger and stronger → becoming adult size



Think - Pair - Share

Describe at least 6 characteristics that you have in common with a tree.



What do animals eat?

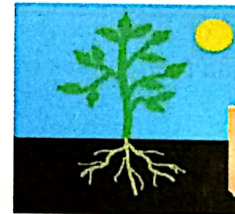


A rabbit eats only plant material.



A lion eats meat of other animals.

What do plants eat?



Plants make food in their leaves unlike animals. They use water and carbon dioxide with an amount of sunlight.

How do animals move?



Goats walk, run.



Kangaroo hops



Can you think of how plants move?



Creeping plants

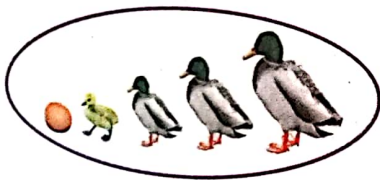


Sunflower, turns to face the sun

Plants cannot move around like animals, but they still show movements. Shoots grow; leaves turn toward the Sun. If a plant has flowers, they open and close. Climbing plants have fine tendrils, or stems, that reach out until they find something firm to grip onto.

Can you think of how plants move?

Just think about all the growing and changing human children do as they grow up. Children grow in height and get heavier until they reach adulthood. Children also change as their bodies mature.



The bird started from an egg and grew into a mature bird.

How do plants grow?

Plants start as seeds. When a seed starts to grow we call that germination. When a plant is mature, it produces flowers. Most plants then make seeds in the form of fruit.



Plants and animals are different in important aspects. The chart below summarizes some of these differences.

Comparing	Plant	Animal
Definition	Plants are green in colour due to the presence of a substance in them called chlorophyll and are able to prepare their own food with the help of sunlight, water and air. They are known for providing oxygen to the atmosphere.	Animals are the living organisms which feed on the food from the plants.
Movement	Plants do not have the ability to move from one place to another, as plants are rooted into the ground.	Animals can move from one place to another freely.
Mode of nutrition	Plants prepare their own food.	Animals depend on plants for their food, either directly or indirectly.
Response	Plants show the response to stimuli like touch, light, though are less sensitive due to the absence of the sense organs.	They are regarded as highly sensitive.

Below are examples of different plants with their names.



Neem tree



Mango



Maize



Pawpaw



Baobab

Below are examples of different animals with their names.



Dolphin



Lions



Crocodiles



Snake



Bird



Activity 1: Sorting living things into plants and animals

You need

Pictures of plants and animals.

Work in groups.

- Pass out pictures of various plants and animals.
- Talk with the learners about characteristics of plants: they have roots underground, seeds and leaves.
- Then give characteristics of animals: they eat food, possibly have fur or scales and can move on their own.
- Look at the pictures together, identify the plants and the animals.
- Ask the children to colour the plants green and the animals red.
- Draw two large circles and let learners place living things into different circles for plants and animals based on their life processes
- Produce more materials for different activities.
- Create a mural by gluing the pictures to a large piece of butcher paper, displaying plants on one side and animals on the other.

Activity 2: Plant and animal collage

You need

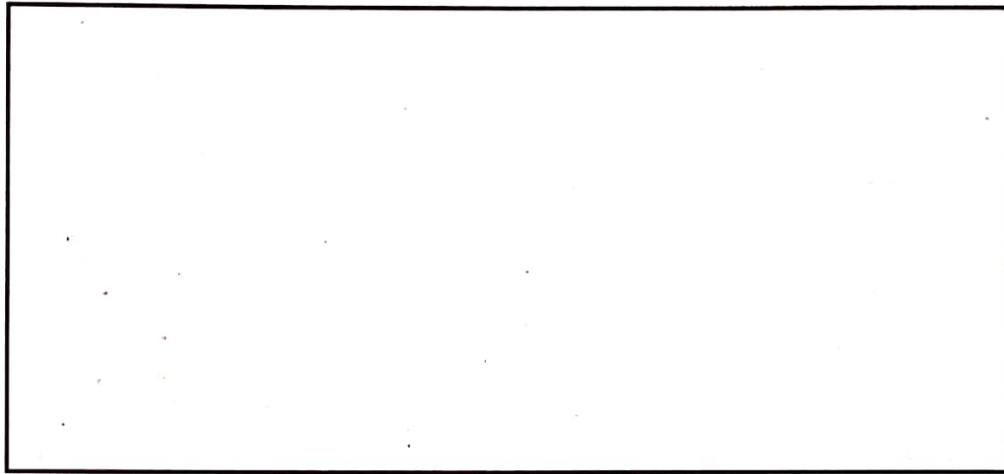
Magazines, scissors, paper glue

Work in groups.

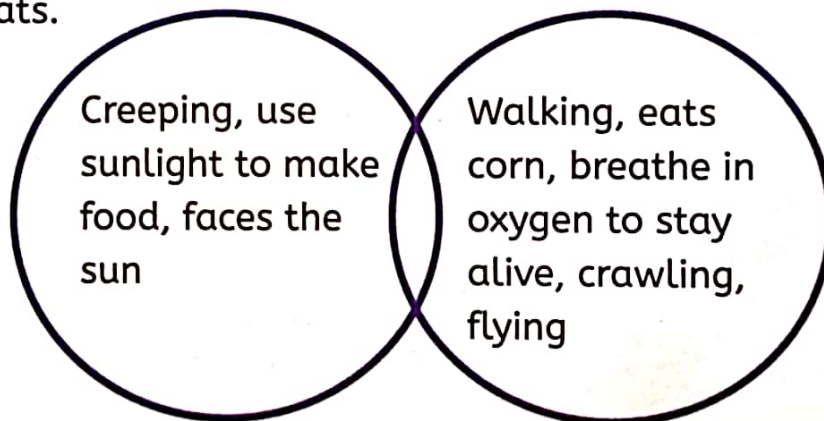
- Cut out several pictures of plants and animals from magazines.
- Fold a piece of construction paper in half, labelling one side "plants" and the other side "animals."
- Ask children to sort the magazine pictures and glue them to the correct side of the paper.
- Have each child to tell you a sentence about their collage and record their thoughts at the bottom of the page.
- Then display the artwork in the classroom.



2. Draw a picture of something that has roots, fruits, stem, flowers and leaves.



3. Classify the following living things using the circles below based on their life processes. Goat, ferns, sunflower, crocodile and bats.



What you have learnt

- The characteristics of living things are represented using the acronym; Mrs Gren - movement, respiration, sensitivity, growth, reproduction, excretion and nutrition.
- Most plants cannot move from place to place but most animals can move from place to place.



Sub-Strand 2: Materials

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

Would you make a teapot out of chocolate?

A chocolate teapot would melt when you pour hot water into it. It would be better to make it from a material that doesn't melt easily.

Objects are made from materials that suit what the object will be used for.

What are different objects made from?

Look at the picture below. Identify at least 5 objects, and find out what they are made of and why!



Common materials in the kitchen

Look around you in your class, name 4 objects and the materials they are made of and why?

10

Materials

Materials around us include:

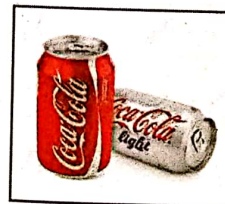
Metals, wood, plastics, leather, cotton and paper.



Cotton is a raw material used for making shirts. It has the ability to control moisture, insulate, provide comfort and it is also weatherproof and is a durable fabric.

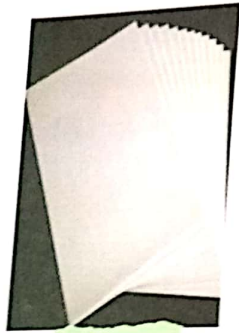


Aluminium is a durable, flexible yet strong metal, it is used in a variety of uses involving cans, foils, kitchen utensils, and other domestic applications. However, high graded aluminium is also used in the aerospace industry, including most aircrafts.



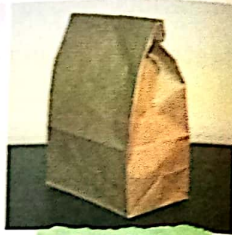
Old cooking utensil

11



Paper

Paper is a thin material produced by pressing together moist fibres derived from wood or grasses, and drying them into flexible sheets. Its uses include writing, printing, packaging, cleaning, decorating, and a number of industrial and construction processes. Used to make toilet rolls, books and paper bags.



Paper bag



Toilet roll

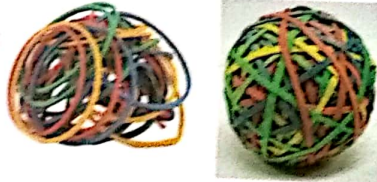
Exercise books



Which material would you use to make a bouncy ball?

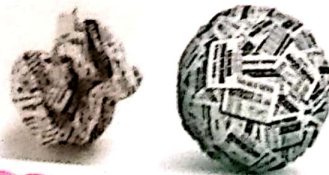
Rubber Bands

If you wind rubber bands together, you will get a very bouncy ball.



Newspaper

If you scrunch up newspaper, you can make a ball out of it. But it won't bounce!



Metals

Metals are used for making car bodies because they are hard.



Plastics

Plastics are used for making bottles, buckets, bowls because they can be moulded into different shapes.



Activity 3: Everyday uses of materials and their properties

You need

Pictures/videos, pen/pencil, notebook/jotter.

- Show learners pictures and videos of common materials such as wood, plastic, paper, metals, leather and cotton.
- Brainstorm with learners to come out with the uses of the materials in relation to their properties.
- Engage learners to match the following products; buckets, cups, books, tables with their material sources such as metals, clay, glass, wood and plastics.
- Provide a lot of materials for the learners to do more activities.

An object is made of one or more materials. Look at the following objects below;

Are they made of one or more materials?

Materials are the matter or substance that objects are made from. We use so many different materials daily and these different materials are combined to make an object; some of the materials include:

- metal
- plastic
- wood
- glass
- ceramics

Different materials have different features, or properties, which make them suitable for different uses. Now let us have a look at what the following objects are made of.



Components of a computer

Computers are made from different metals, plastics, glass and other materials.

Made of Metals

Common metals like copper, lead and gold are used on different parts of a computer.

Word of the Week

Use of plastic
The use of plastic is important to protect computer parts against heat.

Made of glass

Part of the computer screen is made up of a glass.

Components of a shirt

Parts of a shirt can be made of cotton, nylon, plastics and rubber.

Activity 4

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

You need

Pictures/videos,
Pen/pencil,
notebook, [other]

- Engage learners to give examples of objects and the materials used to make them.
- Do more activities with learners to build the concepts of objects and materials using the following materials; table, pen, eraser, bulb, torchlight and drum.
- Let learners do presentation of their works.

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

Mixture

A mixture is made when two or more substances are combined. Let us look at solid-liquid mixtures.

Solid-Liquid mixture

If solid particles are mixed in a liquid to form a mixture, the ingredients will soon separate, with the heavier solid particles settling at the bottom. For example, if you mixed sand and water, the sand would soon sink to the bottom.



A mixture of water and sand



A mixture of sand and water for building

If the solid particles are lighter than the liquid as in the case of sawdust mixed in water, they will separate and float to the top.



Sawdust in water

Let us look at a range of day-to-day examples of separating liquids and solids. This is something that we regularly do with the help of a sieve or filter.

Examples include fish being caught in a net, spaghetti being drained in a colander, chips being lifted out of fat using a basket, a dishwasher filter, and a coffee filter.



Fish caught in the sea using a net



Draining water from spaghetti

Activity 5: Solid-liquid mixture

Work in groups.

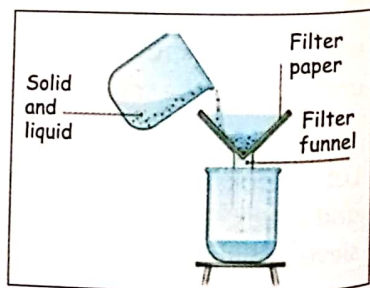
- Provide solid and liquid substances; water, sand, iron, iron filings, and powdered charcoal.
- Learners add sand to water or any solid to a liquid
- Learners observe and come out with their findings on the components of the mixture
- Learners describe solid-liquid mixtures and how the components can be separated.
- Each group should discuss the uses of solid-liquid mixtures in everyday life and do presentations before the class.

You need

water, sand, filter paper, filter funnel, containers

Filtering

A mixture of water and an insoluble substance like sand can be separated using a method called filtering. The filter allows only tiny particles smaller than its size to pass through.



Salt and sugar dissolve in water and particles that do not dissolve in water such as sand will remain on the filter.

The insoluble substance that remains on the filter paper is called residue and the soluble substance that passes through the filter is called filtrate.

In the absence of a filter paper, use a piece of cloth or cotton and plastic water bottles cut into half.

Project

Assist learners to separate solid-liquids such as gari and water, salt and water.

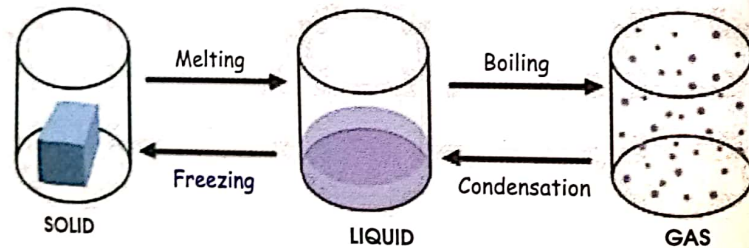
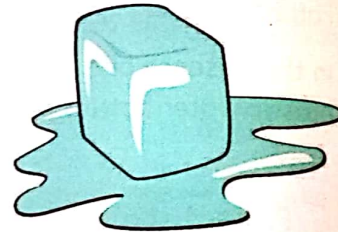
B3.1.2.3.1 Explain how substances change state between solid, liquid and gas

Change of state of matter

Matter can change its form from one state to another.

The process by which a solid changes into a liquid is called melting.

When you take out an ice cube from the freezer and leave it in normal room temperature, you will see that the ice starts to melt into water.



The process by which a liquid changes into vapour is called evaporation. When you heat a liquid, you see vapour forming on the surface of the liquid.

The process by which a gas changes into a liquid on cooling is called condensation. When you hold a cold steel plate over a pot of boiling water, you will see tiny drops of water condensing on the tray.



Water evaporating from a pond

Physical states of some materials

The state in which a material can exist at room temperature is called its physical state. What is the physical state of water that flows out of your taps? What is the state of the physical state of the chair you sit on in class?

Let us look at the physical states of shea butter, candle wax, ice and water. What will happen to these materials when heated?



Shea butter is a solid at room temperature.



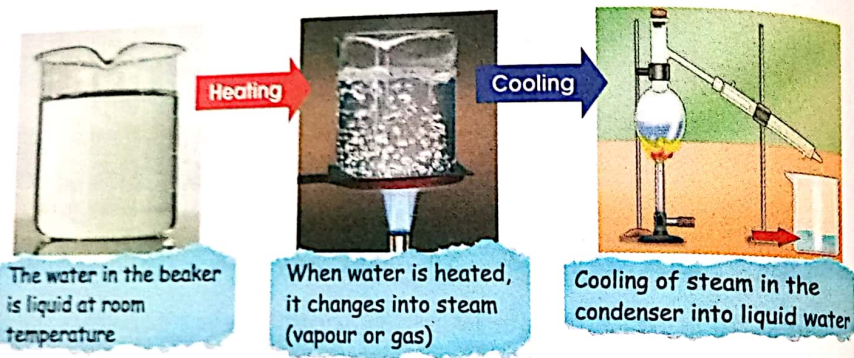
The solid shea butter changes into a liquid after heating



Liquid Shea butter hardens (becomes solid) on cooling

The process by which liquid changes into a solid on cooling is called freezing. If you fill water in an ice tray and keep it in the freezer, you will see that after sometime the water turns into ice.

Many substances can be changed from one state to another by heating or cooling. No new substance is formed during these processes.



Activity 6: Change of state of matter

You need
water, candle wax, shea butter, ice, source of heat

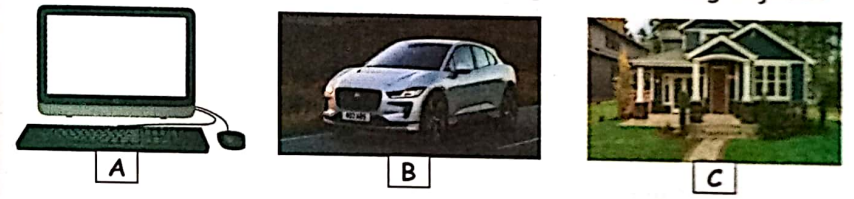
- Learners watch pictures/videos of solid, liquid and gaseous substances
- Provide learners with substances such as shea butter, water, candle wax, and ice.
- Let learners identify the physical states of the materials provided.
- Heat water for learners to observe how it changes to gas and cools down from gas to water.
- Engage learners to melt shea butter and candle wax and let them observe how they change from solid to liquid and liquid to solid.

Exercise B3.1.2.3.1

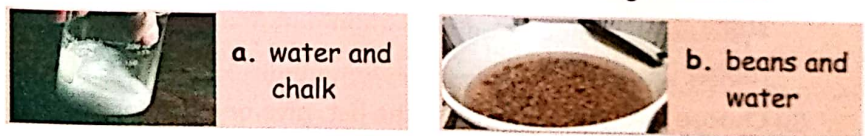
1. Write down four objects made from the following materials and one reason why they are made from these materials.

Material	Objects	Reason for using such material
Wood		
Metal		
Plastic		
Paper		
Leather		
Cotton		

2. Identify the materials used in making the following objects.



3. Explain how you will separate the following mixtures.



What you have learnt

- Objects can be made from plastics, wood, glass, rubber, cotton, leather, paper.
- A mixture is made when two or more substances are combined, but they are not combined chemically.



End of strand self-assessment test

1. Kojo is looking at living and non-living things. He looks at a giraffe and a toy robot.



(a) Which life process are the giraffe and toy robot doing?
 (b) Name one life process that only the giraffe can do.

2. (a) Materials have different properties. Here are four different materials.

cotton metal stone rubber

Name one property for each material.

cotton
 metal
 stone
 rubber

(b) Choose two materials from the list, give one use for each.

material
 use
 material
 use

(c) Give one reason why each material is used for what you stated.

Reason 1.

Reason 2.

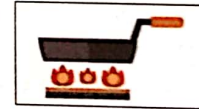
3. The table shows the properties of some materials.

Material	Is it hard or soft?	Is it strong or weak?	Is it a metal?	Does it conduct heat?
A	hard	very strong	yes	yes
B	soft	weak	yes	no
C	soft	strong	yes	no
D	soft	strong	no	no
E	hard	strong	no	yes

(a) Material A is used to build this bridge over a river.



(b) Material E is used to make this saucepan.



Write down two reasons why E is a suitable material to make the saucepan. Use information from the table.

(c) This shirt can be made from one of the materials in the table.



Which material would be best to make this shirt?

Choose from A, B, C, D, E.

Explain your answer.

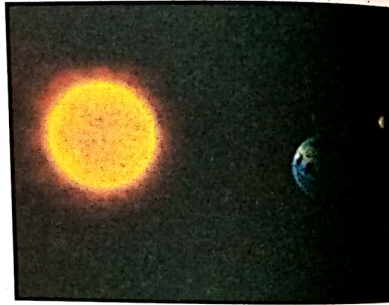
Words to learn
seasons, impure,
precipitation,
germination

B3.2.1.1.1 Describe some cyclic events like day and night, wet and dry seasons and their intervals/periods

What are day and night?

Daytime is when you can see the sun from where you are, and its light and heat can reach you.

Night-time is when the sun is on the other side of the Earth from you, and its light and heat don't get to you.



What are day and night?

You wake up in the morning and prepare for school during school days.

You close from school in the afternoon and get home.

At night you go to bed.

This cycle continues.

The sun rises from behind the Earth in the East and sinks below the Earth in the West. The time when it appears is called sunrise, and the time when it disappears is called sunset.

The length of time between sunrise and sunset is called daytime.

Wet and dry seasons

Our planet earth takes one year to make a complete revolution around the Sun. It is commonly believed that the variation in distance between earth and the sun causes the seasons, but it is not true. The tilt of the Earth on its axis during the revolution is the main reason for the changes in seasons. A season is a part of a year.

In Africa, we have the wet and dry seasons. This is because, the rain changes more than the temperature. In other areas of the world there are four seasons in a year: spring, summer, autumn (British English) or fall (US English), and winter.



Wet season in Ghana



Dry season in Ghana



Dry and Rainy Seasons: Ghana

Generally, the dry season runs from November to April in Ghana. The harmattan, is a period where dry and dusty wind blows from the Sahara Desert at this time of year.

Ghana has two rainy seasons, one lasting from the end of April to mid-July, and another, shorter one in September and October. In the north where there is less rainfall, there is only one rainy season, which lasts from July to September.



Exercise B3.2.1.1

1. Mention the importance of day and night, and seasonal changes
2. Name some activities associated with day and night, and seasonal changes.
3. Draw the cycle of day and night.

Research

Find out about cyclic events such as, going to school, independence day celebrations and cultivation of maize.

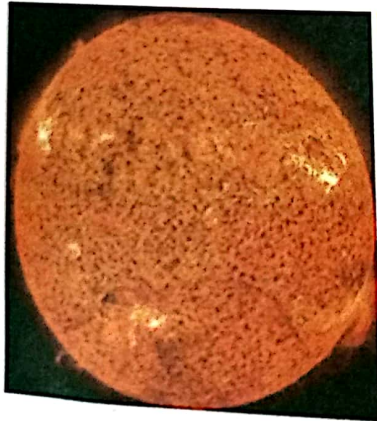
B3.2.1.2.1 Know the importance of the Sun to the earth

Do you love swimming at the beach or playing outdoors with friends? How about the change in seasons? All these things are made possible by the Sun. The Sun is a star made of burning gases. It is closer to us than any other star. Without the Sun, the Earth would be a frozen wasteland. No life could survive here.

Exercise B3.2.1.2.1

1. What is the Sun?
2. What are some of the ways through which the earth benefits from the sun?

The Sun gives life to the Earth and the Earth would have no life at all without the energy it receives from the Sun. Learners should perform outdoor activities to illustrate the importance of the sun.



The Sun is only one of millions and millions of stars in the Galaxy. The Sun is bigger than can really be imagined, over one million times bigger than the Earth.

The Sun

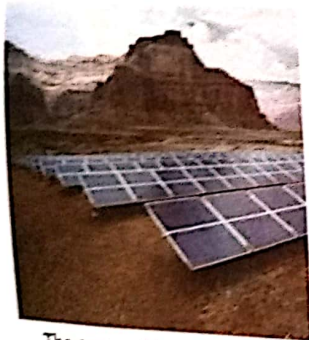
The Sun controls our seasons. It controls how and when food grows. It even controls when we are asleep and awake.

The Sun is the largest thing in our solar system. It makes up 98 percent of the matter in the solar system. Because of its size, it has a strong gravitational pull. It keeps the Earth, the stars, the moons and the other planets in line. Without the gravity of the Sun, the Earth would go spinning off into space.

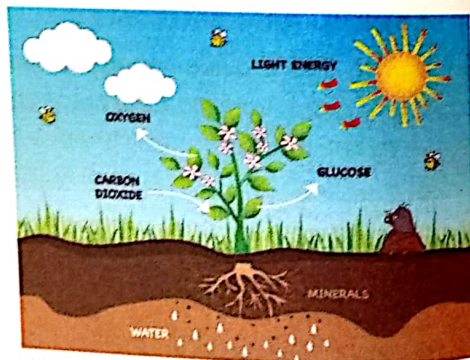
- The Sun is very important in the plant's growth. The Sun helps the plants to make their own food by the food production process.
- The Sun is very necessary for the other living organisms that it provides us with light for the vision and to do our work.
- The Sun provides us with the heat to warm our bodies.
- The Sun provides some animals and humans (that feed on plants) with food as it helps the plants to make its own food by the photosynthesis process.
- The Sun is used in heating water and warming houses by the solar heater which changes the solar energy of the Sun into the heat energy. The heat energy is used in warming houses and heating water.
- The Sun is very important in the formation of the clouds, the rain and the winds. When the Sun evaporates the water in the seas, the lakes and the oceans, the water vapour is formed and the clouds are formed. When the water vapour rises in the sky, it cools and condenses forming the clouds.

The clouds move by the effect of the winds and when the volume of the water drops in the clouds increase and the air can't carry them, so the rain falls.

- The Sun is very important in the formation of petroleum oil and coal. It is one of the main factors in the formation of the fuel.
- The Sun is used to generate electricity by the windmills. The windmills change wind energy into electric energy.
- The wind that is produced by the Sun is used in rotating the windmills which are used to operate the generators to generate the electricity.
- The Sun is used to generate the electricity by the solar cells and the windmills, The solar cells change the solar energy into the electric energy.



The sun provides solar energy



The sun provides plants with the energy to grow



The Sun helps in the formation of clouds



Exercise B3.2.1.2.2

1. Mention 4 uses of the sun to the earth.
2. Draw a picture showing one benefit of the sun to life on earth (drying of clothes).

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

Types of precipitation

If you have ever run through the rain, made a snowman, or marvelled at white hail stones falling from the sky, you have been part of the water cycle. Part of the process of the water cycle is precipitation.

Precipitation is the release of water from the sky, it can be liquid or solid, for example, rain, sleet, hail and snow.

Activity 7: Identifying the types of precipitation

Work in groups.

- Provide learners with videos or cut-out pictures of the snow, hail and sleet. This may be foreign to them.
- Learners examine the pictures and communicate ideas on the different types of precipitation.
- Using flashcards, learners match pictures showing the different types of precipitation with their correct names.
- Each learner should now draw a picture showing a rainy day.

You need

Pictures/videos of snow, scissors, sleet, pen/pencil, hail, notebook

Rain

"Rain, rain, go away, come again another day". How many times have you sang that little song when you want to play outside, but can't because of the rain?

Rain begins when small droplets of water join together in the clouds until they become too heavy and gravity pulls them down to earth.



A woman using umbrella to protect herself from the rain

Snow

For many, snow is probably the most exciting form of precipitation. When temperatures reach below 0°C (32°F), rain droplets freeze, making white snowflakes. Snowflakes form in a variety of different sizes and shapes.

Snow can lightly cover the ground or can fall heavily for longer periods of time.



Snow covering the roof of the house and the soil

Some parts of the world never have snow because the temperature in these places never gets low enough to freeze rain. Other parts of the world have snow all year round as the temperature rarely gets above freezing. If the air isn't cold enough we get sleet, which is a mix of water and snow.

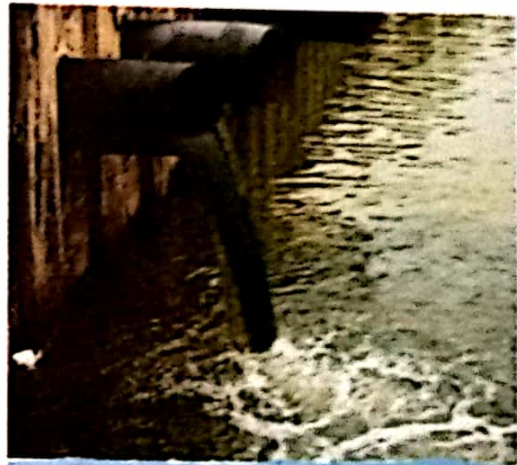
B3.2.1.4.1 Identify things that make water impure

Did you know that the water we use today is the same water the dinosaurs used? We cannot create new water. For millions of years, the water we have, has been used again and again. Water becomes impure when mixed with dirt.

Water Pollution

Water pollution is defined as any change in the water that renders it unusable and harmful for living organisms. In other words, water gets so bad that you cannot drink it, bathe in it, wash clothes, or give it to animals.

Water gets polluted when unwanted substances enter it and change its composition. The unwanted material is what we call a pollutant. Not just freshwater but seawater, too, is prone to several types of pollution.



water pollution



plastic waste pollution

People are polluting our water. Businesses and cities dump chemicals and waste products into our rivers, lakes and oceans. People throw trash; furniture, garbage, old tyres, cars, plastics, old fencing, anything they can think of—into the water. People also pollute the water by accident, by allowing their cars to leak oil and gas onto the ground. The oil and gas eventually wash into the water during rain storms and when people clean their driveways off with water.

The acid rain caused by pollution poisons water on the surface of the earth. Acid rain soaks into the soil. Like clean rainwater, it drains down into the aquifer through layers of rock that clean the water. However, the acid eats away much of the rock and does not allow it to filter properly, so when it reaches the groundwater, the acid rain pollutes it. It becomes unusable.

What is the cure for acid rain? We have to clean up the air.



Millions at risk from rising air and water pollution

Flood

Why do floods happen? Discuss this in class.

Have you ever heard a reporter talk about a flash flood warning in the news? A flood happens when water covers land that is usually dry. A flash flood is a term we use to describe a flood that happens very quickly in low-lying land, and it's usually caused by very heavy rains.



floods in some parts of Ghana

Flood water can contain debris and pollutants. Debris can include trees and stones, or even pieces of houses.

Pollutants in flood water, such as bacteria and pesticides, can be carried far distances. Debris and pollutants including plastics, polythene and other waste materials are carried by the flood into rivers, sea, lakes which make the water very dirty and unhealthy to use.



plastic wastes carried by flood



Polluted water sources

When flooding stops, water sources like lakes and rivers are sometimes no longer safe to drink from. In these cases, people have to find other places to get their water and make sure not to drink water from the tap until the areas have been cleaned up.

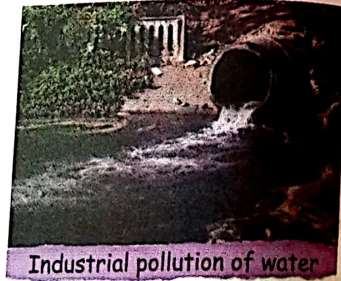
Industrial waste dumped into water

Industry is a huge source of water pollution, it produces pollutants that are extremely harmful to people and the environment.

Many industrial facilities use freshwater to carry away waste from the plant and into rivers, lakes and oceans. Fertilisers used in agriculture can pollute the water bodies (lakes, river etc). Oil from industry can also form a thick cover (layer) on the surface of water. This can stop marine plants receiving enough light for preparing food. It is also harmful for fish and marine birds. Industrial waste includes waste like lead, mercury or sulfur that is drained into fresh water supplies.



Industrial pollution of water



Industrial pollution of water

Mining

Mining is the process of crushing the rock to get coal and other **minerals** from underground. These substances contain harmful chemicals and can increase the number of the amount of poisonous substances when mixed up with water which may result in health problems.



Polluted water body due to mining

Mining activities release a large amount of metal waste from the rocks which is harmful to the water.

Activity 8: Identify things that make water impure

You need
Pen/pencil,
notebook

Work in groups.

- Learners observe littered parts of the community to identify things that make water impure



Think about it!
What will happen if you drink impure water?

B3.2.1.4.2 Describe the properties of air

Questions

1. What is air?
2. Where does air come from?
3. Can you see and touch air?
4. What shows that there is air in your classroom?

What is Air?

Right now, take a large, deep breath. Inhale, exhale. Do it again. Inhale, exhale. Let's think about what exactly is happening in your body that is allowing you to breathe. Well, when you inhale, or breathe in, your lungs fill up with oxygen that is passed to your bloodstream.

Did you know that the layer of air that covers the earth is about 400 miles high? This is called the atmosphere.

So... what is air? Air is a mixture of gases, water vapor, and other substances, and it has specific properties or characteristics. These are;

- Air is made up of gases
- Air has mass
- Air exerts pressure and has weight
- Air can be compressed

Activity 9: Air occupies space

You need

Ziploc bag/balloon

- Take an empty Ziploc bag, open it and pull it through the air like a parachute.
- Now close it, seal it and try to squish the bag.
- There's nothing in the bag, right? Wrong.
- The Ziploc bag is full of air.
- You can also prove this by blowing up a balloon.



The balloon expands because you are putting something into the balloon; air.

This air takes up space, so the more air you put into the balloon, the more space it takes up.

When you use a pump to blow up a football, you don't put nothing into it, you put air into it - this air takes up space which is why the football expands.

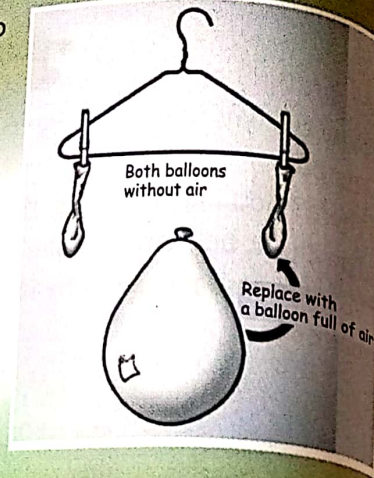
Activity 10: Air has mass

You need

Balloons, hanger, weighing scale

- Place an empty balloon on a scale and weigh it.
- Take this same balloon and inflate it.
- Weigh it again.
- What do you see?

- A really clear way to show this is to make a balance with a stick or coat-hanger suspended by a string in the middle.
- Tie an empty balloon on each side to prove they weigh the same.
- Inflate one balloon and rehang it.
- That side of the balance will be heavier.
- If air had no mass, there would have been no change.
- Learners demonstrate how to make more air enter their classrooms in groups.
- Let each group present their findings.



Exercise B3.2.1.4.2

1. Why don't we experience snow in Ghana? Explain.
2. When do we say water is impure?
3. Explain two natural causes of water pollution and two human causes of water pollution

What you have learnt

- It takes 24 hours for the world to turn all the way around, and we call this a day.
- The Sun controls our seasons.
- Precipitation is the release of water from the sky, it can be liquid or solid, for example, rain, sleet, hail and snow.
- Air is a mixture of gases, water vapor, and other substances.





Sub-Strand 2: Life Cycles of Organisms

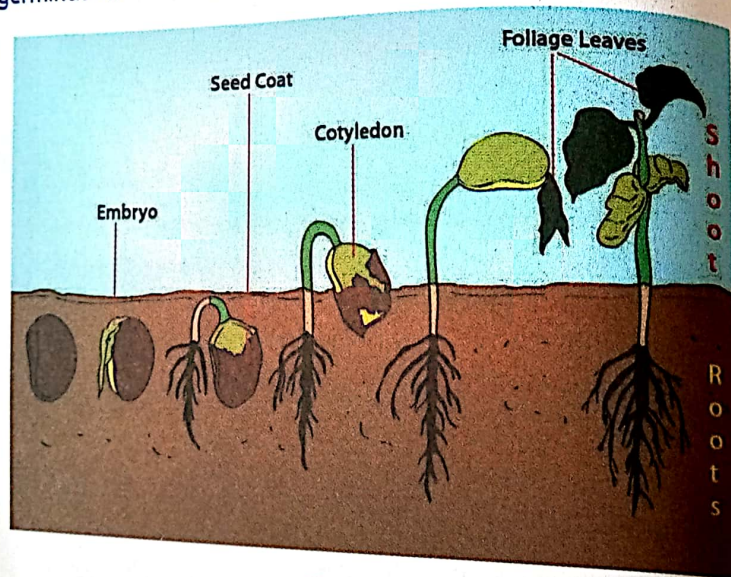
B3.2.2.1.2 Observe the germination of maize and bean seeds

Can you grow some corn in your house? While you may not grow a field of corn stalks, you can certainly grow a field of tiny corn plants in a container!

How does a corn seed grow, and how does its growth differ from that of a bean seed?

What is germination?

The growth of a seed into a young plant or a seedling is called germination.



Seed germination

Seeds do not necessarily need soil to grow. They can also grow in water and on cotton balls or even tissue paper. Cotton retains some similar properties as soil does. Even though soil is better, it is known that cotton has the ability to support plant life. Seeds germinate on cotton and grow into a plant, the growth and production are delayed.



Seeds germination on cotton

Also seeds can germinate in water without being planted in the soil. In both cases, the seeds contain a food store that provides them with the nutrients which helps them to grow.



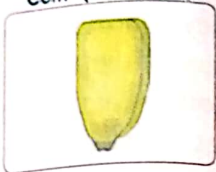
Seeds germinating in water

Talk about this!

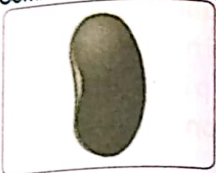
Is it possible for bean and maize seeds to germinate/sprout in water without soil?

Structure of maize and bean seeds

Corn - (a monocot)



Common bean - (a dicot)



Activity 11: Observing germination of bean and maize seeds

You need

Beans, maize, pots, soil, water

- Place learners into two groups and give each group.
- Two transparent glasses or plastic containers (labeled A and B), cotton wool, water and viable maize and bean seeds.
- Learners pack container A with the cotton wool and push one of each of the different seeds through the side of the container but not to touch the bottom.
- Guide learners to pour a little water to soak the cotton wool. The set-up is left to stand for one week while keeping the cotton wool always wet.
- Guide learners to prepare container B using the same method but with a dry cotton wool.

- Learners observe the set-up critically and record whatever they see in the table below.
- Challenge learners with the question: what made the seeds germinate in set-up A?



Exercise B3.2.2.1.2

1. Describe the structure of a seed.
2. Mention two differences observed in the germination of a bean seed and a maize seed.

What you have learnt

- The growth of a seed into a young plant or a seedling is called germination.



End of strand self-assessment test

1. How would you demonstrate that oxygen and water are necessary for seeds to germinate?
2. Outline the stages in the germination of the following seeds with the help of labelled diagrams: (a) Bean (b) Maize
3. Jamila and Lily are investigating how a seed grows.

Jamila puts 2 seeds in a glass pot.

Lily adds water.

They leave the seed to germinate.

They look at the seed every day for 6 days.

(a) Seeds need water to germinate.

Write down one other thing seeds need to germinate.

Here are the results.

Day	Length of root in cm	Length of stem cm
0	0	0
1	1.0	0
2	1.8	0
3	2.8	0.5
4	4.0	4.0
5	5.6	5.9
6	7.4	8.0

(b) The results are written in a table. Describe one other way of showing the results.

(c) Complete the sentences about the results. The first one has been done for you.

On day 3 the root is longer than the stem.

On day 4

On day 5



Sub-Strand 1: The Human Body Systems

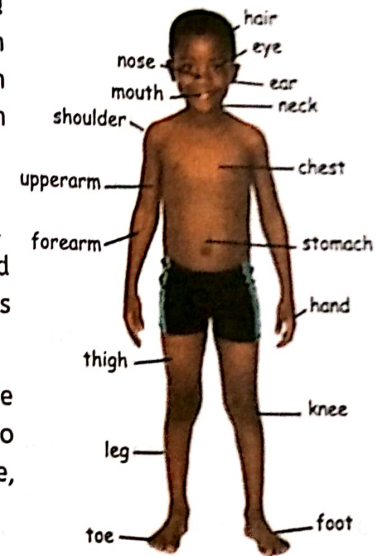
Words to learn
Solar system,
ecosystem,
adaptation

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

Our body is more than what you see when you look in the mirror. There are different parts that have different jobs, but each part works together so you can eat, sleep, sit in class and play with friends.

Your body is a pretty amazing thing! While there are lots happening on the outside that you can see, such as scratching an itch, eating lunch with your friends at school and running outdoors, there is even more happening inside. Find out more about your bones and muscles, and about your five senses and the nervous system.

Do you remember the song on the body parts? Sing this song to identify the head, eyes, ears, nose, mouth, etc.



Parts of the human body

Functions of the parts of the body

The functions of the parts of the body such as shoulder, mouth, nose, knee, toes, eyes, fingers and foot are provided below:

Shoulder – the joint near our neck that attaches our arm to our body, allowing it to move around.

Mouth – part of our face that we need to eat, talk and smile!

Nose – part of our face that helps us breathe and smell things.

Knee – the joint in the middle of our leg that lets us bend it so we can walk and run.

Toes – five small digits attached to the end of each of our feet.

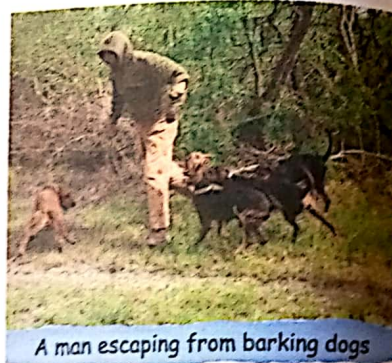
Eyes – part of our face that can see things.

Fingers – five long, thin digits attached to the end of each of our hands.

Foot – the parts at the very end of our legs that we use to stand up, walk and run.

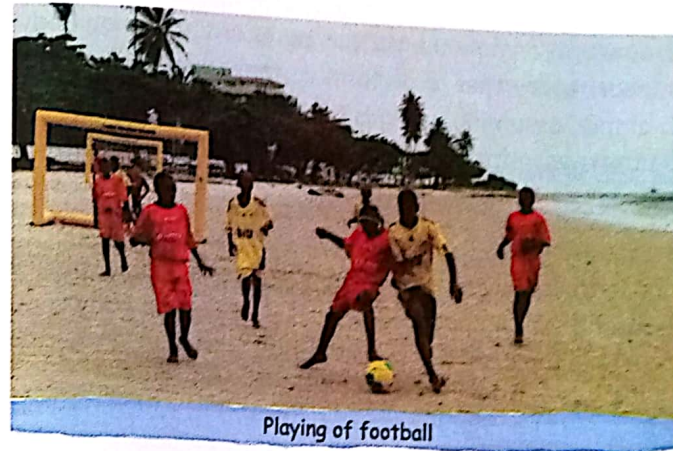
How the various body parts work to support each other during danger or an activity

The body parts work together to carry out an activity such as escaping from danger when a dog barks at you. When a dog barks, you hear of its bark with your ear, your eyes help you see the dog whether it is near or at a distant and your feet help you run away from the dog so that it won't bite you or cause any harm to you.



A man escaping from barking dogs

When playing football, your eyes help you to see the ball, players and the goal post, your ears help you to hear your team mates when they call out to you to pass the ball to them, your feet are used to kick the ball and run around for the ball and your head is used to head the ball to score or pass it to a team mate. Your hand and shoulder work together to provide you the support you need to defend yourself from an opponent.



Playing of football

This shows that, every part of the body is important and must be taken care of.

Main Structures

From the outside, the human body can be divided into several main structures. The head houses the brain which controls the body. The neck and trunk house many of the important systems that keep the body alive and healthy. The limbs (arms and legs) help the body to move about and function in the world.

External Organs
We have 5 external sense organs namely; eyes, ears, nose, tongue and skin. They are known as our sense organs as well. We come to know about what is happening in our environment through them.

Brainstorm!

Brainstorm on how the various parts of the human body support each other to perform various functions.
Example, assuming a dog is barking towards you, how do the eyes, ears, feet help you to recognise danger and escape?

Engage learners in various activities such as skipping, playing football and explain how the various parts of the body contribute to undertake the activities successfully.



Exercise B3.3.1.1.1

1. Explain how you can take good care of the following external organs of your body; nose, ears, eyes and skin.
2. How do they work together to carry out a function?

What you have learnt

- Every part of the body is important and must be taken care of.

sub-Strand 2: The Solar System

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

What is the Solar System?

The Solar System includes the Sun, the Earth (where you are now!) and all of the other planets, asteroids and comets that go around and around it.

Everything in the Solar System revolves around the Sun. The Sun is a star; a massive ball of hot gas that gives off light and heat.

The Earth travels around the Sun in a loop that is shaped a bit like an oval. We call this the Earth's orbit.

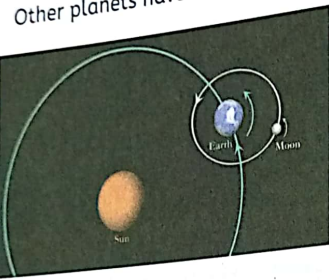
The Earth is always spinning around – sometimes from where you stand on the Earth you can see the Sun (this is the daytime) and sometimes the part of the Earth where you are, is facing away from the Sun so it is dark (this is the night-time). It takes 24 hours for the Earth to spin all the way around, and we call this a day.

It takes 365 days for the Earth to complete one circuit around the Sun. We call this a year.

There are eight planets that orbit around the Sun. In order, going from the closest planet to the Sun, to the one that is farthest away, they are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

All of the planets and the Sun are round, like balls.

The Moon is a ball of rock that orbits around the Earth, in the same way that the Earth orbits around the Sun. It is much smaller than the Earth and takes 28 days to complete one orbit. The Moon is 239,000 miles away and is the only place in the Solar System that man has travelled to apart from Earth.



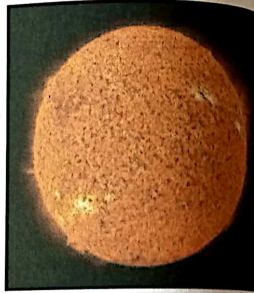
The earth orbiting the sun and the moon orbiting the earth

Role play!

Engage learners in an activity to role play the movement of the earth around the sun, and the moon around the earth.

Uses of the sun

You may have realized that the sun gives off heat. It feels so good to feel the warm sun on our skin when we're cold! The sun has an amazing amount of heat and even though we only get a small amount of that heat, it's just the right amount for us. You also may have realized how much light it provides us. Without the sun, we cannot see. What about the moon?

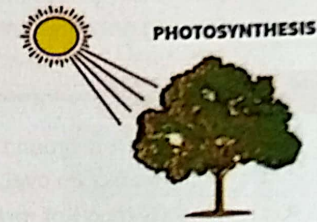


Where does the energy to build, light, and heat our houses and schools come from? The sun has actually created almost all of the energy we use today.



The sun helps us to dry our clothes after washing them

The sun allows life on earth to exist.



Solar cells are put together to make solar panels. Solar panels are put on your home's roof to collect sunlight and turn it into power.

If you have seen big shiny panels on the roof of a house, that house is using solar energy!

SOLAR ENERGY



Uses of the moon

You can see the surface of the Moon by using a pair of binoculars or a small telescope. It consists mostly of iron, but may also contain large amounts of sulfur and other elements. Do you know that we have two tides on our beaches caused by the Moon?



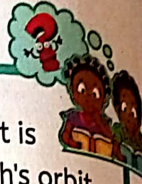


Group Project work

Learners in groups make a model of the solar system showing only the sun, earth and moon.

What you have learnt

- The Earth travels around the Sun in a loop that is shaped a bit like an oval. We call this the Earth's orbit.
- The Moon is a ball of rock that orbits around the Earth,



Sub-Strand 3: Ecosystem

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

Habitat of some organisms

All living things need a place to live where they will be comfortable, have food, and be safe. For you, it is your home, the place where you sleep at night, and the place you feel most safe. However, for many animals, they need a place that will be suitable for them, a place where their surroundings can adapt to their needs. For them, it may not be your comfortable and cozy home - it may be a tree or the water.

A **habitat** is a place where an animal or plant lives. There are several habitats where different animals adapt best. A habitat is more like a **community** than a house. Think about the forest: an animal has to share the trees with all the other animals who may be strangers to it. You don't share your house with strangers.



Animals get food from their habitat



A habitat providing shelter for an animal



A habitat provides water for animals

Where do animals live?

Animals live in different habitats. Some of these habitats include; Desert, Rainforest (Jungle), Forest, Savannah, Arctic and Antarctic, and Ocean.

Desert

Deserts are very hot and dry. There aren't many animals or plants. There are lot of cacti. Desert animals are nocturnal: they sleep during the day and hunt at night when the desert is cool.



Cacti plants



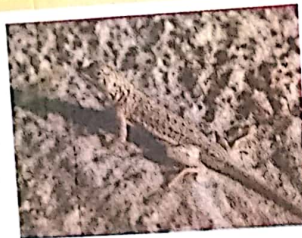
Scorpion



Snake



Camel



lizard

Forest

There are a lot of trees and plants and a big variety of animals because there is plenty of water.



Rabbit



Deer



Owl



Mahogany



Rose wood

Arctic and Antarctic

Arctic is near the North Pole. Antarctic is near the South Pole. Winters are long, cold and dark. Some animals migrate in winter to find food.



Penguin



Polar bear



Arctic hare



Antarctic octopus

Savanna

A savanna is a hot grassland where there are few trees. Savannas have only two seasons: a dry season and a rainy season.



Savanna tree



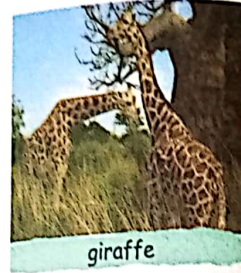
zebra



lion



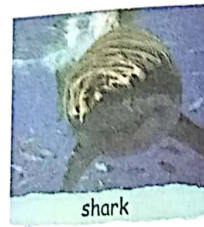
kangaroo



giraffe

Ocean animals

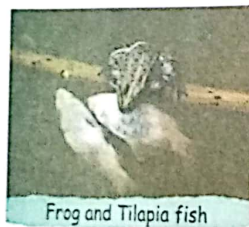
Water covers nearly 75% of the Earth's surface. There are many species of plants and animals who live here.



shark



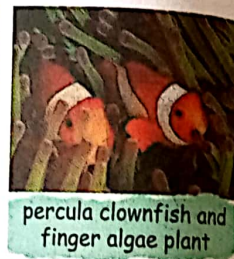
humpback whale



Frog and Tilapia fish



sea turtle



percula clownfish and finger algae plant



Birds and insects on trees



Frog and fish in a pond



Different plants on a farm

Field trip

1. Take learners on a field trip to study about some **ecosystems**. Examples; birds and insects on trees, frogs and fish in a pond, grasshoppers and insects on a grass field and different plants on a farm.
2. Assist learners to identify some observable features that enable organisms to live successfully in their habitat. Example, tilapia has fins to help it swim in a pond. Birds have wings to help them.

Adaptation

Most plants and animals are specially adapted to survive in a particular habitat. They have developed special features to suit the demands of their environment.

This is called adaptation.

Some examples of adaptation



Webbed feet for swimming



These wings act as flippers

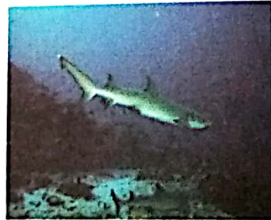
Some animals are camouflaged to blend in with their surroundings.

This keeps them safe as it is more difficult for other animals to see them or catch them for food.



This lion blends in well with the grassy background.

Aquatic animals have streamlined bodies to move more easily in the water.



Questions

1. Is a frog a fish?
2. Why can't a fish live on land?

Project

Learners plan, design and draw posters showing organisms in their natural homes

What you have learnt

- A habitat is a place where an animal or plant lives.
- All living things need a place to live where they will be comfortable, have food, and be safe.
- Habitats include; Desert, Rainforest (jungle), Forest, Savannah, Arctic and Antarctic, and Ocean.
- An ecosystem is a community of interacting organisms and their environment.
- Adaptation is when plants and animals develop special features to suit the demands of their environment.

End of strand self-assessment test

1. (a) Humans have five senses that help us. Draw a line to match the sense to the correct sense organ.

sense	sense organ
I hear with my	tongue
I taste with my	nose
I see with my	skin
I smell with my	ear
I feel hot and cold with my	eyes

2. LeBron James plays basketball.
Explain how the various body parts of his body contribute to undertake playing of basketball successfully.



a basketball player

3. Identify and describe some observable features that enable the following organisms to live successfully in their habitat.



Bird



Polar bear



Frog



Giraffe

Words to learn
energy, light, heat,
electricity, force,
simple machine

BS.4.1.1.1 Know that light is a form of energy

Light

What is light and where does light come from?

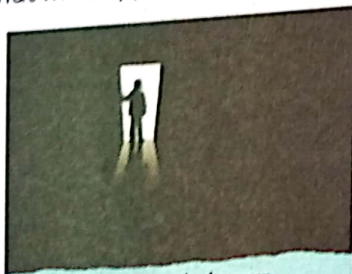
Ama opens and closes the windows of the classroom; switches on torch or lights a candle to look for an object in a dark room, switches on and off the light in the classroom.

Explain what Ama is trying to do. Now, carry out these activities in the class with the help of your teacher. Find a dark room where you will need to light a torch or candle to find an object.

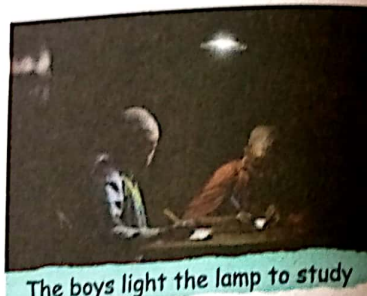
What is the experience like to search for objects in the dark without the help of a torchlight as compared to using a torchlight in the dark?

Why do you need a torch or candle in the dark?

What will happen if there is no light on earth?



A boy in a dark room



The boys light the lamp to study

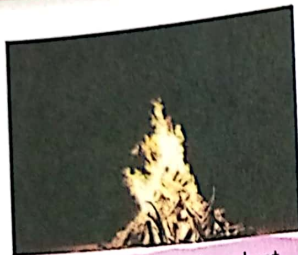
Light is a type of energy that makes it possible for us to see the world around us.

We need light to see. Light comes from different sources called light sources; our main natural light source is the sun. Other sources include fire, stars and man-made light sources such as light-bulbs and torches.

Thanks to light, we see life in glorious colour; our eyes see different wavelengths of light as different colours.

Light also powers the technology around us: laser beams make CD and DVD players and printers possible, microscopes and telescopes use lenses to bend light (refraction), cameras record light as it reflects off objects and fibre-optic cables and lasers allow us to communicate at incredible speed.

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



Lighting of fire produces heat



When a bulb is switched on for a long time, it produces heat



Charging phones and laptops produce heat

Heat is a form of energy. Heat flows from hot objects to cool objects. It flows from one object to another because of their difference in temperature. The cool object absorbs the energy and becomes warmer.

As an object is heated, the heat quickly spreads to the other part. When this happens, the object becomes hotter.

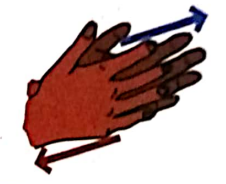
From the stove in the house, to the sun outside, there are forms of heat energy all around us, but only some of them are natural.

Activity 1: Identify some sources of heat

You need
Pen/pencil,
notebook

Work individually.

- Predict what will happen when you rub hands together vigorously.
- Rub your hands together. Do your hands feel warmer?
- Rub your hands together again only faster and longer. Put your hands on your cheek.
- How do your hands feel? Run water on your hands and see if it rubs the same. Now add lotion to dry hands and rub them again.
- Do you feel a difference in the amount of heat?
- Which other processes can generate heat?



B3.4.1.22 Know everyday uses of heat

Heat as a form of energy

If you go camping, you usually build a fire to sit around at night.

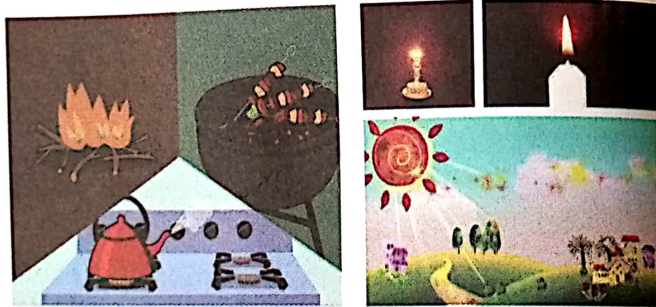
Have you ever wondered why some foods get cooked without touching the flame, why the smoke rises, or why water in a pan boils? Heat can move from one object to another in three different ways.

Think about what your life would be like without heat. No more hot showers, hot food, or for that matter, no more warm sunlight to heat you up on a cold day! Imagine waking up in the morning and taking a cold shower, then eating a cold breakfast while sitting in your cold kitchen. Then getting in your cold car on a cold day, and heading to a cold school to sit in your cold classroom. What a crazy life that would be! Most of us take heat, a form of energy, for granted!

Everyday uses of heat

Question

Identify all the sources of heat in the pictures below.



Ironing

Ironing is the use of a heated tool (an iron) to remove wrinkles from fabric. The first known use of heated metal to "iron" clothes is known to have occurred in China.

The iron is the small appliance used to remove wrinkles from fabric. It is also known as a clothes iron, flat iron, or smoothing iron. The piece at the bottom is called a sole plate. Ironing uses heat energy, chemical energy, electrical energy, and mechanical energy.



Ironing with an electric iron



Ironing Box, old model

Food preparation and preservation

Do you know how food is prepared? What is the source of energy used to cook at home? Cooking is the act of using heat to prepare food for consumption. Heating foods is a way of preserving food.



Heating water



Precaution: Let learners observe safety whiles dealing with hot substances.

Farmers burn their fields to remove plants that are already growing and to help the plants that are about to come up. These burns are often called "prescribed burns" because they are used to improve the health of the field. This is not a good practice.



Drying the hair with a hair dryer

A hair dryer, also known as a blow dryer, is an electrical device used to dry and style hair. It uses an electric fan to blow air across a heating coil; as the air passes through the dryer it heats up. When the warm air reaches wet hair it helps evaporate the water.

Think - Pair - Share

Through think - pair - share, ask learners to mention one application of the use of heat energy by the following professions; farmers, nurses, hair dressers, blacksmiths, tailors and seamstresses.

Ask learners to explain why farmers need heat.

Blacksmiths work by heating pieces of iron or steel until the metal becomes soft enough for shaping with hand tools, such as a hammer, an anvil and a chisel.



Exercise B3.4.1.2.2

1. Explain three ways you can keep warm on a very cold day.
2. Why do we use heat energy to cook?
3. Why do we say the farmer uses "prescribed burning" on the farm?

What you have learnt

- Everyday day uses of heat energy in the home include ironing, heating water, cooking and preserving food.
- Heat energy is used by farmers, hair dressers, blacksmiths, tailors and seamstresses and nurses.





Sub-Strand 2: Electricity and Electronics

BS.4.2.1.1. Identify different sources of electrical energy

Electricity is a type of energy that we use to power lots of things around our homes. It is used to power lights, mobile phones, Television sets, radios, and computer. To use all this electricity, we have to produce it. This is called electricity generation.

Electricity is very important in the modern home, and it has completely changed the way that people live their lives. Can you imagine living without any electrical things in your home? We have to be careful how we use it, though. It takes a lot of work to generate electricity, and some of the ways have bad side effects on the environment. So, it's best only to use the electricity that we need.

Electricity is made from many different resources, including non-renewable and renewable sources.

Non-renewable sources include **fossil fuels**, like coal and natural gas. When they are used to generate power, these sources produce waste, and will eventually run out.

On the other hand, **renewable sources** can be used over and over again to produce energy without creating waste. That makes these resources environmentally friendly. Some examples of renewable sources include solar and wind power. Remember, they only work when the wind blows or when the sun shines.



Transmission tower

Nuclear Power

Some power plants have machines called nuclear reactors where the heat is produced. Within these reactors are atoms of a radioactive metal called uranium. Heat is created when these atoms are split apart. This heat boils water, creating steam that turns turbines to generate electricity.



Nuclear reactor

Coal

This fossil fuel is burned in large boilers that are found in power plants. The burning coal heats water in a boiler. And this produces steam, which spins a turbine engine to produce electricity.



Boiler

Hydro

Electrical energy created from water stored in huge dams. The energy created by the water released from these dams is transformed into electricity by hydro-electric turbines and generators.



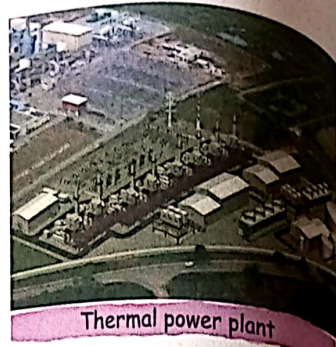
Akosombo dam



Bui dam

Thermal Power

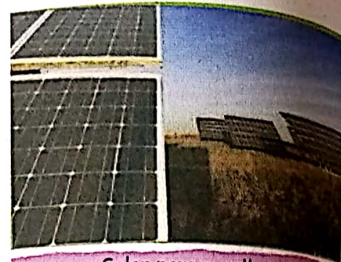
A thermal power station is a power station in which heat energy is converted to electric power. In most of the places in the world the turbine is steam-driven. Water is heated, turns into steam and spins a steam turbine which drives an electrical generator.



Thermal power plant

Solar Power

Solar power is energy that is created directly from the light or heat of the sun. One method uses special solar panels to capture the sun's light and convert it directly into electricity. The other uses the sun's heat to produce the steam that will spin turbines and generate electricity.



Solar power cells

History of electricity

Starting with Ben

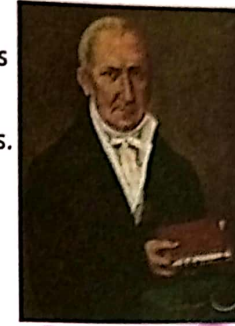
Many people think Benjamin Franklin discovered electricity with his famous kite-flying experiments in 1752. Franklin is famous for tying a key to a kite string during a thunderstorm, proving that **static electricity** and **lightning** were indeed, the same thing. However, that isn't the whole story of electricity. Electricity was not "discovered" all at once.



Benjamin Franklin

A Different Kind of Power: The Battery

Learning how to produce and use electricity was not easy. For a long time, there was no dependable source of electricity for experiments. Finally, in 1800, Alessandro Volta, an Italian scientist, made a great discovery. He soaked paper in salt water, placed zinc and copper on opposite sides of the paper, and watched the chemical reaction produce an electric current.



Alessandro Volta

Volta had created the first electric cell. By connecting many of these cells together, Volta was able to "string a current" and create a battery. It is in honor of Volta that we rate batteries in volts. Finally, a safe and dependable source of electricity was available, making it easy for scientists to study electricity.

A Current Began

An English scientist, Michael Faraday, was the first one to realize that an electric current could be produced by passing a magnet through a copper wire. It was an amazing discovery. Almost all the electricity we use today is made with magnets and coils of copper wire in giant power plants. Both the electric generator and electric motor are based on this principle. A generator converts motion energy into electricity. A motor converts electrical energy into motion energy.



Michael Faraday

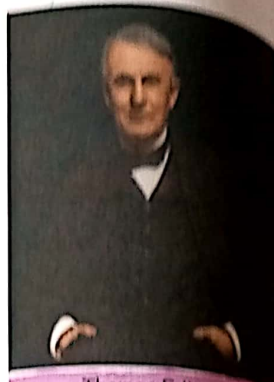
Thomas Edison and His Light
 In 1879, Thomas Edison focused on inventing a practical light bulb, one that would last a long time before burning out.

Edison wanted a way to make electricity both practical and inexpensive. He designed and built the first electric power plant that was able to produce electricity and carry it to people's homes.

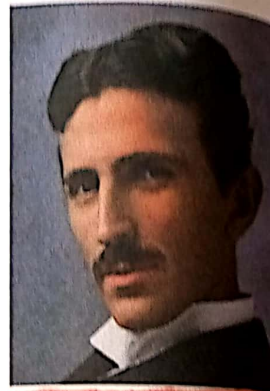
Nikola Tesla

The turning point of the electric age came a few years later with the development of AC (alternating current) power systems. Croatian scientist, Nikola Tesla came to the United States to work with Thomas Edison. After a falling out, Tesla discovered the rotating magnetic field and created the alternating current electrical system that is used very widely today.

Tesla teamed up with engineer and business man George Westinghouse to patent the AC system and provide the nation with power that could travel long distances.



Thomas Edison



Nikola Tesla

Activity 2: Demonstrate how to produce electricity

- Learners watch a video or look at a poster on how electricity is produced from various sources; batteries, solar, hydro, thermal and generators.
- Learners demonstrate how to produce electricity from simple sources such as dry cells (batteries) to light a torch or a lamp.

What you have learnt

- Electricity is a type of energy that we use to power lots of things around our homes.
- Electricity is made from non-renewable and renewable resources.
- The major sources of electricity in Ghana include; thermal (Aboadze thermal plant), solar and hydro (Akosombo and Bui dams).



Sub-Strand 3: Forces and Movement

B3.4.3.1.1 Explain force and demonstrate how it causes movement

Questions

1. What is a force?
2. What are the effects of forces on objects?
3. How is force described?
4. What forces do you observe in everyday life?

Activity 3: Demonstrate how forces cause movement

Work individually.

- Rub pens in the hair and use it to pick pieces of paper.
- Use a magnet to attract iron nails or pins.
- Throw stones into water in a bucket to cause the water to shake.
- Push a toy car down on the floor.

You need

pen, magnet, paper, stone, bucket, water, toy car

What will happen when you comb your hair on a dry day? The hair is attracted to a plastic comb. The charged comb attracts pieces of paper. Try this in class. You can also use a pen to rub your hair to pick pieces of paper.

What causes these phenomenon?

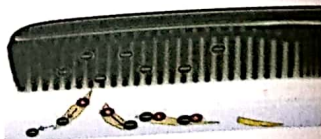
Electric charges are produced:



in the comb when you comb your hair



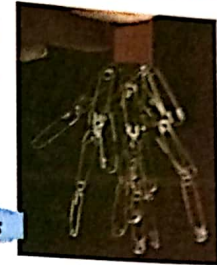
in the ruler when you rub the ruler



82

Forces and movement

What happens when you bring a magnet close to some pins? The magnet will attract the pins. Why will this happen?



Magnet attracts pins

Throwing stones into water causes a splash. The force from the stone causes the water to move creating such a circular movement of the water.



Stones thrown into water causes splash



For example, a game called stone skipping (or stone skimming) is the art of throwing a flat stone across water in such a way (usually Sidearm) that it bounces off the surface, preferably many times. The objective of the game is to see how many times a stone can bounce before sinking. As it bounces, it causes water to move.

The push force from Joe is causing the toy car to move.



Boy applies force to push a toy car

83

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

How to maintain and care for simple machines

Take a look at the simple machines below. Identify them.



Uses of scissors

Scissors are used for cutting various thin materials, such as paper, cardboard, metal foil, cloth, rope, and wire. Scissors are also used for shaving.

Safety precaution

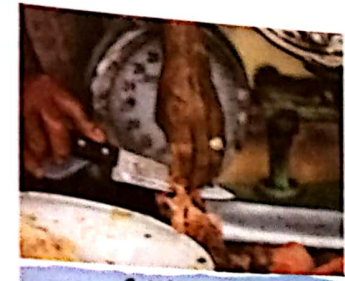
Do not run with scissors or even walk about when using them. Cut when sitting at a table. Store scissors downwards in a safe place.



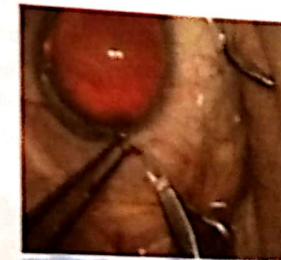
Knife



Cutting eggplant



Cutting meat



Performing a surgery

Knife Safety Tips

- Use a Sharp Knife. When you use a dull knife to cut, you need to apply more force.
- Choose the Right Knife for the Task.
- Keep Your Knives Clean.
- Store Your Knives Correctly.
- Know the Proper Cutting Techniques.
- Pay Attention to What You're Cutting.

Bottle opener

A bottle opener is a device that enables us to remove the metal bottle caps from glass bottles.



Maintenance of simple machine

How can you maintain the knife, pair of scissor, hammer and bottle opener you use at home or in school? You can do this by; oiling, removing dirt and greasing, using them for the correct purpose and keeping them from water.



Cleaning a pair of scissors



Oiling a pair of scissors

Activity 3: to demonstrate how to maintain and care for simple machines

Work in groups

- Learners identify the following simple machines; a pair of scissors, knife, bottle opener, tin cutter and hammer and talk about their uses.

- Engage learners to mention how simple machines are maintained and stored in their homes.
- Assist learners to undertake basic maintenance practices such as oiling, removing dirt and greasing, using them for the correct purpose and keeping them safe from water.

Exercise B3.4.3.2.1

- What type of simple machine is a bottle opener?
- In what 2 ways can it be used in our daily lives?
- Why is it not good to use your teeth to open bottles?
- Do you need a bottle opener to open all bottles? Which type of bottles do not require a bottle opener? Mention 2.

What you have learnt

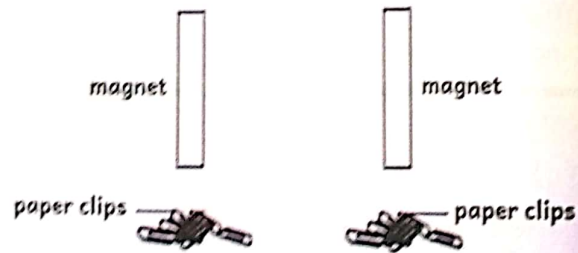
- A force is a pull or push of an object.
- Movement is caused by applied forces due to the release of stored energy
- Simple machines can be maintained by oiling, removing dirt and greasing, keeping them away from water and using them correctly.

End of strand self-assessment test

1. Kwame is investigating magnetic materials. He holds a magnet next to each object to see if it is made of magnetic material. Two of the objects are magnetic.
(a) Circle the two magnetic objects.



(b) What happens to the magnetic object if the material is magnetic?
(c) Kwame has two different magnets. He wants to know which magnet has more force (strength). He uses each magnet to pick up some paper clips.



Describe how Kwame will know which magnet is stronger.

Sub-Strand 1: Personal Hygiene and Sanitation

Words to learn
hygiene, sanitation,
diseases, pollution,
environment,
atmosphere

B3.5.1.1.1 Describe ways of keeping the environment clean

What do you do to keep the home clean?

In which of the following environments would you like to stay and why?



Activity 1: How to keep the environment clean

You need
Pencil/pen,
notebook

Work in groups

- Learners brainstorm to come out with the different ways of keeping the home and school clean.
- Learners present their ideas to class and compose a song on cleanliness.
- Present learners' ideas on the writing board and reshape learners' ideas by providing more details on different ways of keeping the environment.

Sanitation

Sanitation means having ways to safely deal with human waste (faeces and urine). It also includes ways to maintain hygiene by disposing of garbage, treating waste water and managing waste. Sanitation is important because it helps prevent the spread of germs and diseases.

In poor countries, people have poor sanitation because they do not have good toilets. They also do not have good sewage systems. In developed countries, people have good sanitation because they use toilets to filter all the waste water. In poor countries, people do not use toilets properly. They dispose of waste by



Some of the activities we can do to keep our environment clean include; sweeping, weeding and scrubbing.

In our lives in general, it is important to sweep and clean - for instance, sweep our rooms and backyards. Cleaning our living environment, just as cleaning our bodies by taking a shower or a bath, has a positive effect on making our minds clear and pure as well.



Sweeping



Mopping



Weeding

Activity 2: Demonstrate how keep the environment clean

- Learners to draw pictures showing ways of keeping the environment clean.
- Engage learners in an activity to clean selected parts of the school environment.

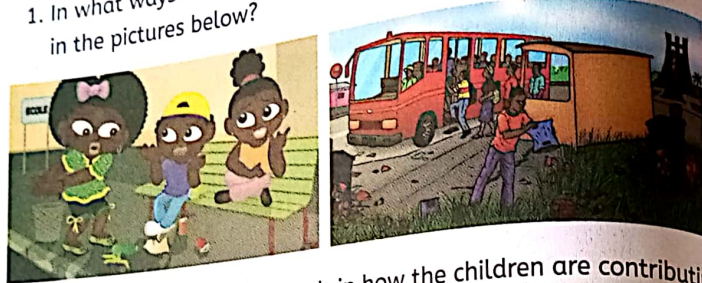


Safety precaution:

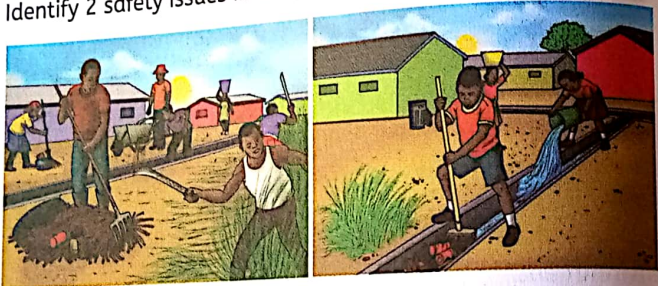
Learners must use nose masks when sweeping or dusting.

Exercise B3.5.1.1.1

1. In what ways are people making the environment dirty as seen in the pictures below?



2. From the picture below, explain how the children are contributing to a clean environment?
3. Identify 2 safety issues in the pictures below.



What you have learnt

- Sanitation means having ways to safely deal with human waste.
- We keep our environment clean by sweeping, scrubbing and weeding.

Sub-Strand 2: Diseases

B3.5.2.1.1 Know how common skin diseases can be prevented

Rashes

A rash is swelling or itching of the skin. It can be red, dry, scaly, and itchy. Rashes also can include lumps, bumps and even pimples. Eczema is also a common type of a rash. Most people have had a rash or two. When you were a baby, you probably had diaper rash!

But some rashes, especially combined with a fever, can be signs of serious illnesses. Some rashes can also be serious because they can be a sign of an allergic reaction and the person may need immediate medical attention.



A baby with rashes

Rash Prevention

- avoid contact with substances that you are allergic to.
- With eczema, stay away from harsh soaps that might dry out your skin. Also, make an effort to moisturize your skin with creams or ointments. Short, cool showers are a good idea, too, because hot showers and baths can further dry out your skin.
- When it comes to sun, you should always wear sunscreen to avoid a red and itchy sunburn.

- Why do you wash before coming to school and going to bed?
- Why do you change your clothing after bathing?
- Ask learners to participate how they bath and talk about how regular bathing can prevent skin diseases.
- Learners watch pictures and videos on common skin diseases and their prevention.
- Engage learners to discuss and name some common skin diseases.

Eczema

What is eczema?

Eczema (eg-zuh-MUH) is the name for a group of conditions that cause the skin to become red, itchy and inflamed. Eczema is a dry skin condition that causes the skin to become red (inflamed) and itchy. It usually begins early in childhood.



Eczema on the arm

What causes eczema?

The skin of people with eczema is more sensitive to irritants (such as soap) and more at risk of infection. A child is more likely to develop eczema if there is a family history of eczema, asthma or hay fever.



Eczema on the face

Treatment

Don't use soap in the bath - you can use moisturisers instead of soap.

Use moisturisers several times a day all over the body and face - moisturisers can help keep eczema away.



Eczema on the back

You can get moisturisers for eczema from your doctor.



MOISTURISERS FOR ECZEMA



Ringworm

Ringworm is a type of fungal skin infection.

When fungi infect the skin, they cause mild but annoying rashes. Fungal skin infections are also known as tinea infections.



Ring worm

When fungus grows in the area of the groin, upper thighs, and buttocks, it is called jock itch. When it grows on the feet, it is called athlete's foot.

But when fungus grows anywhere else on the body, it's known as ringworm.

Ringworm can often be prevented. To avoid it:

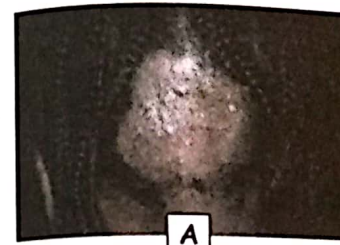
- Keep your skin clean and dry. Wash daily and dry completely, particularly after showering, swimming, and sweaty activities.
- Use clean towels and avoid sharing clothing, towels, combs, brushes, and hats.
- Change your clothes every day.
- Wash your hands well with soap and water after playing with pets.

Learners share their personal experiences or stories on getting skin infections.

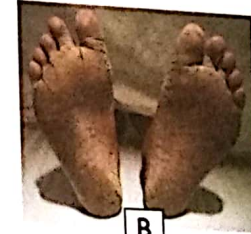
Reshape learners' ideas, stressing that it is good to seek medical attention to stop the spread of skin diseases.

Questions

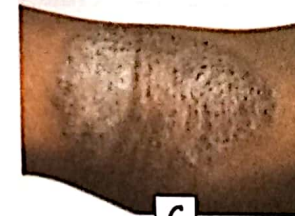
1. Identify the following skin diseases



A



B



C

2. Mention two ways you can prevent each of the skin diseases named in question

B3.5.2.1.2 Explain the term air-borne diseases and give examples

Begin the lesson with a song, rhyme or poem on air-borne disease. Example, *I have a little cough Sir.*

Learners in groups name and discuss some common air-borne diseases such as cold, cough, measles, chicken pox and rashes.

Brainstorm with learners to bring out the meaning of the term 'air-borne disease'.

You can catch some diseases simply by breathing. These are called airborne diseases.

Airborne disease can spread when an infected person coughs, sneezes, or talks, spewing nasal and throat secretions into the air. Certain viruses or bacteria take flight and hang in the air or land on other people or surfaces.

When you breathe airborne disease causing organisms in, they take up residence inside you. You can also pick up germs when you touch an infected surface, and then touch your own eyes, nose, or mouth.

Because these diseases travel in the air, they are hard to control.

Common cold

A lot of cases of the common cold occur each year. Most adults get two or three colds a year. Children tend to get them more frequently.

The common cold is the top reason for absences at school and work. It is caused by a virus.



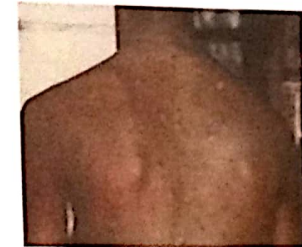
Common cold

Chicken Pox

Chicken pox is the primary infection caused by a virus. It is an acute, highly infectious disease most commonly seen in children under 10 years old. It is possible to develop chickenpox as a result of exposure to a person. Second attacks of chickenpox are rare but do occur.

Chickenpox may initially begin with cold-like symptoms, for days before the rash appears. The rash begins as multiple small red bumps that look like pimples or insect bites. They develop into blisters filled with fluid.

Chicken pox



Transmission

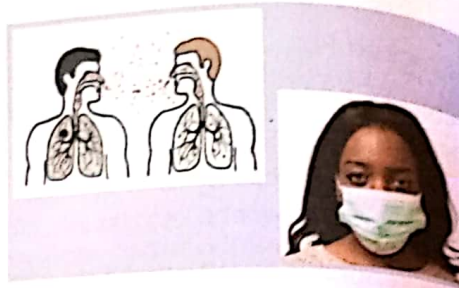
Chickenpox is highly contagious, infecting up to 90% of non-immune people who are exposed to the disease. The incubation period (the time from becoming infected until symptoms appear) ranges from 10 to 21 days although is usually from 14-16 days.

Individuals who have been in contact with a person with chickenpox should be considered potentially infectious from the 10th to the 21st day after exposure.

The most infectious period is 1-2 days before the rash appears.

Chickenpox is transmitted by the following routes: -

- Airborne respiratory droplets; sneeze or cough
- Direct contact with the vesicle fluid.
- Indirect contact through contact with clothes/linen freshly soiled by the fluid.



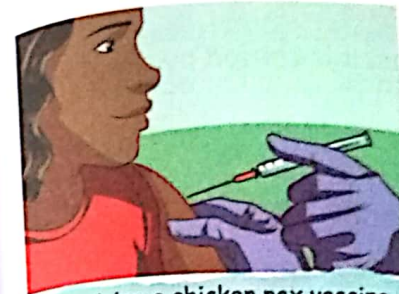
Transmission

Symptoms of chicken pox include;

- cold-like symptoms before the rash appears
- Fever and mild headache
- An intensely itchy, vesicular (fluid-filled blister-like) rash appears.
- Tiredness
- Sore throat

Treatment

There is no specific treatment for chickenpox. It is a viral infection that will therefore not respond to antibiotics. Treatment is based on reducing symptoms such as fever and itchiness.



Receiving a chicken pox vaccine from a doctor

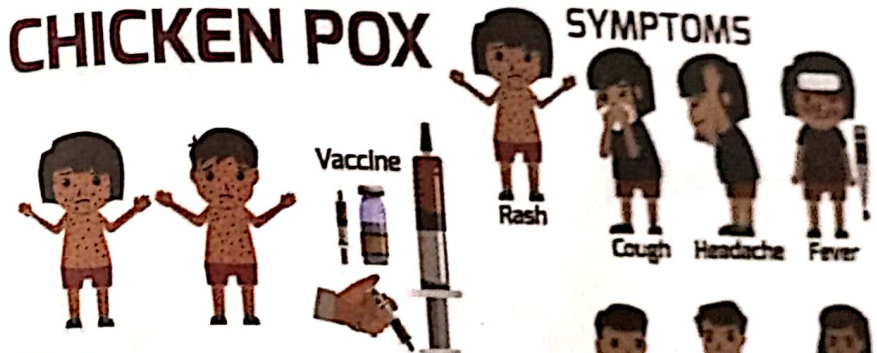
Control

Chickenpox can be controlled by;

- ❖ Getting the chickenpox vaccine
- ❖ Stay away from anyone who has the chickenpox infection and any other infected with the fluid.

CHICKEN POX

SYMPTOMS



RISK



Airborne Infection

TREATMENT



Separation of Patients



See a Doctor

Measles

It is one of the childhood killer diseases. It is caused by a virus. It appears as rashes on the body.

Measles

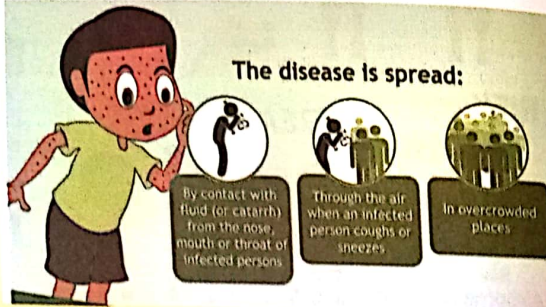
IT ISN'T JUST A LITTLE RASH

Measles can be dangerous, especially for babies and young children.



Transmission

When an infected person coughs or sneezes, the virus is released into the air and can infect a healthy person.



Sharing an infected person's handkerchief, towel, clothes, also spread these germs to a healthy person.

Symptoms

The symptoms include;

- ❖ Fever
- ❖ Sneezing
- ❖ Running nose
- ❖ Dry hacking cough
- ❖ Swollen eyelids and inflamed eyes
- ❖ Watery eyes
- ❖ Reddish brown rash

Treatment

Treatment include;

- ❖ Taking plenty of fluids.
- ❖ Encouraging extra rest.
- ❖ Treating sore eyes
- ❖ Treating cold-like symptoms.

Control

Some of the control or preventive measures include;

- ❖ Measles vaccination
- ❖ Have good ventilation
- ❖ Avoid getting in contact with infected people



Learners in a class discussion, find out the effect of unclean air.

Learners investigate the effects of smoking cigarette on the health of a person and communicate their findings.



Exercise B3.5.2.1.2

1. What are air-borne diseases?
3. Why shouldn't a healthy person come into contact with fluid from the nose or mouth of an infected person?

What you have learnt

- Eczema is a dry skin condition that causes the skin to become red (inflamed) and itchy.
- Ringworm is caused by a fungus.



Sub-Strand 3: Science and Industry

B3.5.3.2.1 Describe the ways foods get spoiled

Food spoils when it gets old. This is because food contains bacteria which is invisible to the naked eye. Over time, the bacteria grow and breaks down proteins and other substances found in food. When that happens, we can say that the food is spoilt.



Air and Oxygen

One important cause of food spoilage is air and oxygen. Because air is colourless, odourless, and tasteless, it is often taken for granted and sometimes forgotten as a means to cause food to spoil.

Basically, oxygen can cause food spoilage in several ways. It can provide conditions that will enhance the growth of microorganisms; it can cause damage to foods.

Moisture

Water is one of the most common substances on earth. It is an essential component of all foods. The amount of water in a food affects the appearance, texture, and flavor of the food.

Moisture can condense on the surface of a product and this can result in many common food spoilages. The moulding of grain, soggy cereals, and the caking and lumping of dry products like powders and cake mixes can result from too much moisture.



How can we tell food is spoilt?

Spoilt food can have an unpleasant smell or can taste different. It can also become softer than normal and change in colour or texture.

Why happens when you eat spoilt food?

We get sick when we eat spoilt food. Some spoilt foods can cause food poisoning.

Project

Take a piece of bread and leave it in a closed jar or outside for a few days and see what happens. Write down 10 places where you would find bacteria in your home and cross check with friends or family. How does a refrigerator help in storage of food?

Activity 1: How food gets spoilt**Work in groups**

- Get two fresh fish.
- Rub salt over one of the fish and dry it in the Sun.
- Place the other fish in a container and leave it in the open.
- Leave untouched for about a week in a cool place and observe the differences.
- Learners discuss ways by which food gets spoilt.
- Engage learners to present their ideas in groups to the whole class.
- Tabulate group responses and reshape learners' ideas.

You need

2 fresh fish, salt water, container

Learners dramatise about a child who ate spoilt food.

What you have learnt

- Food when left in the open can get spoilt if it comes into contact with water and air.
- When the food is spoilt, it changes its taste, colour and texture.
- A spoilt food smells.

Sub-Strand 4: Climate Change

B3.5.4.1.1 Identify human activities that pollute the atmosphere

Have you ever looked up into the sky and wondered what was in the sky or what was in the air? Well of course there are stars and constellations, but there's also the atmosphere. You've no doubt heard about the atmosphere but do you really know what it's all about?

The atmosphere is a thin layer of gases (air) that covers the Earth, a lot like a big blanket. One of its jobs is to basically cover the planet to protect us from the vacuum of space, down here on Earth. That is pretty cool don't you think so?



Atmosphere of Earth

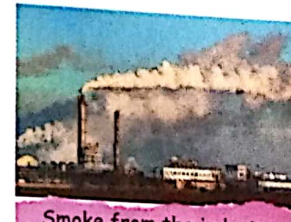
108

What happens when the atmosphere gets polluted? What human activities pollute the atmosphere?

Air pollution occurs when gases, dust, smoke, or odour get into the air and make it unclean. Air pollution is unsafe for humans and animals to breathe and for plants to live with. Examples of human activities that pollute the atmosphere include; burning of waste and bush, exhaust fumes from moving cars and emissions from factories.



Bush burning makes the air unclean



Smoke from the industry pollutes the air



Exhaust fumes from cars make the air unclean

Learners watch a video and picture on human activities that pollute the atmosphere.

Atmosphere refers to the air around us.

The atmosphere gets polluted by burning of waste and bush and exhaust fumes from moving cars.

109

Activity 2

To demonstrate how the atmosphere gets polluted

You need

Match box/lighter, mosquito coil

Work in groups

- Light a mosquito coil outside the classroom.
- Observe the smoke that is produced.
- Where does the smoke go to?
- Which other activities pollute the atmosphere?



Exercise B3.5.4.1.1

1. What are the possible causes of the polluted atmosphere in the picture below?



2. Which other activities contribute to air pollution in your community. Name 2.

What you have learnt

- Atmosphere refers to the air around.
- Air pollution occurs when gases, dust, smoke, or odour get into the air and make it unclean.



End of strand self-assessment test

1. River pollution is bad for the environment.



- (a) Dirty water is put into the river water. Describe two things this dirty water does to the living things in the river water.
- (b) A man drinks from and swims in this river.



What can happen to the health of the man?

2. The atmosphere of a community is polluted



- (a) Where do the air pollution come from?
 - (b) What will happen to you if you live in polluted area and breathe in the polluted air?
 - (c) Explain 3 air-borne diseases and how they can be prevented
3. Jayden Abalo bought a loaf of bread. He forgot and left the bread in the open for 3 weeks.



- (a) What happened to the bread?
 - (b) Why did the bread change in colour, texture and taste?
 - (c) What will happen to Jayden if he should eat this bread?
 - (d) How could Jayden have preserved this bread for the 3 weeks?
4. Joelle Amoah and her little sister are shown in the picture below



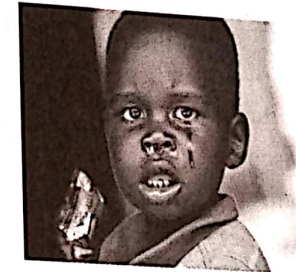
- (a) What are they doing?
- (b) Why do they do that?

Their mother also joined them in the activity.



What is their mother doing?

5. Nathan woke up from bed and started experiencing the following; fever, sneezing, running nose, dry hacking cough, swollen eyelids and inflamed eyes and watery eyes.



- a. Could Nathan be suffering from an air-borne disease?
- b. Reddish brown rash were found all over his upper body parts.



Explain the type of air-borne disease Nathan is suffering from.

Glossary and index

absorb(s)	to soak up something mostly liquid	70
adaptation	the ability to adjust to a condition	64
acute	If a bad situation is acute, it causes severe problems or damage	99
aerospace	producing or operating aircraft or spacecraft	11
antibiotics	a medicine or chemical that can destroy harmful bacteria in the body or limit their growth	100
aquifer	a layer of rock, sand, or earth that contains water or allows water to pass through it	38
arctic	characteristic of the extremely cold, snowy, windy weather	60
atmosphere	a mixture of gases that surrounds any planet	5
athlete's foot	a fungal infection affecting mainly the skin between the toes. It is a form of ringworm.	96
airborne	transported by air	98
autumn	the season of the year that comes between summer and winter	27
bacteria	a type of very small organism that lives in air, earth, water, plants, and animals, often one that causes disease	105
battery	a device that produces electricity to provide power for radios, cars, etc.	74
blacksmith(s)	a person who makes and repairs things in iron by hand	74
blend	mix with another substance so they combine together	64
breathing	the act or process of taking air into your lungs and releasing it	98
burns	flame or glow while consuming a material such as coal or wood	74



carbon dioxide	a colourless, odourless gas produced by burning carbon and organic compounds and by respiration	3
cables	a set of wires, covered by plastic, that carries electricity, phone signals	69
chlorophyll	a green pigment, present in all green plants which is responsible for the absorption of light to provide energy for photosynthesis	5
characteristics	A features describing something	1
creeping	growing along the ground or other surface by means of extending stems or branches	4
colander	a bowl with small holes in it, used for washing food or for emptying food into when it has been cooked in water	18
condensation	the drops of water that appear on cold windows or other surfaces, as a result of hot air or steam becoming cool	20
consumption	the amount used or eaten	73
chemical reaction	a process in which the structure of atoms or molecules that make up a substance are changed	79
convert	change the form, character, or function of something	78
chicken pox	an infectious disease causing a mild fever and a rash of itchy inflamed pimples which turn to blisters and then loose scabs	98
condense	change or cause to change from a gas or vapour to a liquid	106
constellation(s)	any of the groups of stars in the sky that seem from earth to form a pattern and have been given names	108
community	a group of people living in the same place or having a particular characteristic in common	59
desert	a place with little rainfall and high temperature	60
disease	illness of people, animals, plants, etc., caused by infection or a failure of health rather than by an accident	90



earth	the planet on which we live; the world	26
ecosystem(s)	all the living things in an area and the way they affect each other and the environment	63
environment(s)	the air, water, and land in or on which people, animals, and plants live	88
energy	the power from something such as electricity or oil, which can do work, such as providing light and heat	69
evaporation	the process of a liquid changing to a gas, especially by heating	20
electricity	a form of energy that can be produced in several ways and that provides power to devices that create light, heat, etc.	76
exhaust fumes	strong, unpleasant, and sometimes dangerous gas or smoke	109
excretion	the process of removing waste matter	2
experiment(s)	a test done in order to learn something or to discover if something works or is true	78
eyelid(s)	either of the two pieces of skin that can close over each eye	103
fibre(s)	a thread or filament from which a vegetable tissue, mineral substance, or textile is formed	12
freezing	change of state from liquid to solid	20
flakes	a small, thin piece of something, especially if it has come from a surface covered with a layer of something	35
fossil fuel(s)	fuels, such as gas, coal, and oil, that were formed underground from plant and animal remains millions of years ago	76
fever	a medical condition in which the body temperature is higher than usual and the heart beats very fast	100



fluid	a substance that flows and is not solid	99
flexible	ability to bend easily or change into different shape	11
food spoilage	when food becomes unsafe for eating or drinking	105
food poisoning	an illness usually caused by eating food that contains harmful bacteria	106
germination	the process of a seed starting to grow, or the act of causing a seed to start growing	4
germs	a microorganism, especially one which causes disease	90
gravity	the force that attracts objects towards one another, especially the force that makes things fall to the ground	31
greenhouse(s)	a building with a roof and sides made of glass, used for growing plants that need warmth and protection	36
growth	increase in size and weight	2
generator(s)	a machine that produces electrical power	77
greasing	to put fat or oil on something	86
habitat	the natural home or environment of an animal, plant, or other organism	59
harmattan	a very dry, dusty easterly or north-easterly wind on the West African coast, occurring from December to February	28
hydro	using the power of water	81
human waste	waste products obtained from humans, e.g. faeces	90
hay fever	an illness like a cold	94
healthy	strong and well	53
immune	protected against a particular disease by particular substances in the blood	99
insoluble	does not dissolve in a solvent (liquid)	18
inflamed	red or swollen	94



infection	to pass a disease to a person, animal, or plant	96
Jupiter	a planet in the universe	55
jungle	a tropical forest in which trees and plants grow very closely together	60
machine(s)	a piece of equipment with several moving parts that uses power to do a particular type of work	77
magnetic field	an area around a magnet or something magnetic, in which it has a force to attract objects to itself	80
mercury	a heavy silvery-white metal which is liquid at normal temperatures	40
microscope(s)	a device that uses lenses to make very small objects look larger	69
mineral(s)	a valuable or useful chemical substance that is formed naturally in the ground	41
movement	act of moving from one place to another	2
moisturiser(s)	a substance that you put on your skin to stop it from becoming dry	95
muscle(s)	one of many tissues in the body that can tighten and relax to produce movement	51
motion	the action or process of moving or being moved	79
non-renewable	relating to materials, etc. that are not able to be replaced	76
nutrition	the process of providing or obtaining the food necessary for health and growth	2
ocean(s)	a very large area of sea	38
oxygen	a colourless, odourless gas and the life-supporting component of the air	5
pimples	a small raised spot on the skin that is temporary	99



photosynthesis	the process by which green plants and some other organisms use sunlight to make their own food	31
pollution	damage caused to water or air by harmful substances or waste	37
precipitation	rain, snow, sleet, or hail that falls to or condenses on the ground	45
respiration	a process in which living things get energy	2
refraction	the fact of light or sound being caused to change direction or to separate when it travels through water, glass, etc.	69
renewable	not depleted when used	76
revolution	movement of the earth that causes seasonal changes	27
saturn	a planet in the universe	55
savannah	a grassy plain in tropical and subtropical regions, with few trees	60
sewage	waste water and excrement conveyed in sewers	90
scientist(s)	a person who is studying or has expert knowledge of one or more of the natural or physical sciences	1
scrunch	to crush material such as paper or cloth into a rough ball in the hand	12
sensitivity	respond to external or internal stimuli	2
shoot(s)	the part of a plant above the ground	4
stimuli	something that causes growth, activity, or reaction	5
sprout	a shoot of a plant	48
species	a set of animals or plants in which the members have similar characteristics to each other and can breed with each other	2
solar panel(s)	a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating	57



sore throat	a condition in which your throat is red and feels painful, especially when you swallow	100
transparent	If a substance or object is transparent, you can see through it very clearly	48
technology	the application of scientific knowledge for practical purposes, especially in industry	69
thermal	relating to heat	78
tendrils	a thin, stem-like part of a climbing plant that holds on to walls or other plants for support	4
tilt	move or cause to move into a sloping position	27
temperature	degree of hotness or coldness of a place or a body	20
vacuum	a space entirely without matter	108
vaccine	a substance given to a person or animal to prevent them from getting the disease	101
vapour	gas or extremely small drops of liquid that result from the heating of a liquid or solid	20
Venus	a planet in the universe	55
virus	a very small organism that causes disease in humans, animals, and plants	99
waste water	water that is not clean because it has already been used in homes, businesses, factories, etc	90
water cycle	the way that water is taken up from the sea, rivers, soil, etc. and then comes back down as rain or snow	34
winter	the coldest season of the year, in the northern hemisphere from December to February and in the southern hemisphere from June to August	27
wrinkle(s)	a small line in the skin caused by old age	73



ACKNOWLEDGEMENTS

The author and publisher have made every effort to identify the sources of all the materials used, however it has not been possible to identify the sources of all materials used or trace all the copyright holders. If any omissions are brought to our notice, we will be happy to include the appropriate acknowledgements on reprinting.

The publisher is grateful to the ministry of education, Ghana for the access to the new science curriculum.

Baxter, F., Dilley, L., and Board, J., (2014). Cambridge Primary Science, Learner's book 3 and 4. Cambridge university Press. PP 3 – 110; Baxter, F., Dilley, L., and Board, J., (2014). Cambridge Primary Science, Learner's book 3. Cambridge university Press. PP 5 – 110; Baxter, F., Dilley, L., and Board, J., (2014). Cambridge Primary Science, Learner's book 6. Cambridge university Press. PP 5 – 110; Gupta, V., and Gupta, A., (2013). Oxford Science in everyday life, New edition, 4th publication, Oxford University Press. Learner's Book 5, Pp 1 – 160; Ministry of Education (2018). Science curriculum for class 5. Ghana Education Service, National Council for Curriculum and Assessment, Accra, Ghana; Cambridge progression test stage 3, 2014, 2018.

<https://education.seattlepi.com/activities-sorting-plants-animals-preschool-3895.html>
<https://www.tripsavvy.com/africas-dry-and-rainy-seasons-1453967>
<https://www.climatetypesforkids.com/tropical-wet-and-dry-climate>
<https://kids.kiddle.co/Season>
<https://easyscienceforkids.com/types-of-seasons/>
https://www.researchgate.net/publication/295034036_Additional_file_2
<https://www.wikihow.com/Distill>
<http://www.planetsforkids.org/star-sun.html>
<https://easyscienceforkids.com/all-about-the-sun/>
<https://www.nrdc.org/stories/water-pollution-everything-you-need-know>
<https://www.standard.co.uk/news/uk/shocking-photos-expose-the-scale-of-plastic-waste-pollution-in-londons-river-thames-a3738046.html>
<https://www.ghgossip.com/category/lifestyle/page/154/>
<https://study.com/academy/lesson/flood-lesson-for-kids-definition-facts.html>
<https://www.ducksters.com/science/environment/water-pollution.php>
<https://www.kidsecologycorps.org/our-environment/natural-cycles/water-pollution>
<http://post.jagran.com/Immediate-steps-sought-to-check-industrial-pollution-1410948653>
<https://www.water-pollution.org.uk/industrial-water-pollution/>
<https://www.waterpebble.com/water-pollution-in-africa/>
<https://www.conserve-energy-future.com/sources-and-causes-of-water-pollution.php>
<https://www.education.com/science-fair/article/single/>



<https://www.theschoolrun.com/homework-help/parts-body>
<https://www.ducksters.com/science/biology/humanbody.php>
<https://www.first-learn.com/care-of-the-sense-organs.html>
<https://www.theschoolrun.com/homework-help/solar-system>
<https://www.coolkidfacts.com/moon-facts-for-kids/>
<https://study.com/academy/lesson/types-of-habitats-for-living-things-lesson-for-kids.html>
<https://www.generationgenius.com/ecosystems-for-kids/>
<https://carrotsareorange.com/light-energy/>
<https://www.theschoolrun.com/what-is-light>
<https://kids.britannica.com/kids/article/heat/390761>
<https://kids.kiddle.co/Ironing>
<https://www.britannica.com/topic/cooking>
<http://kids.saveonenergy.ca/en/what-is-electricity/the-in-and-outs-of-making-electricity.html>
<https://kids.kiddle.co/Sanitation>
<https://nationaleczema.org/eczema/children/>
<https://www.kidshealth.org.nz/eczema>
<https://kidshealth.org/en/teens/ringworm.html>



The contents of the Pages Primary Science Practice Learner's Book for Basic 3 is based on Ministry of Education's Primary Science new curriculum, and its focus is to give learners with different learning abilities all the help, support and practice needed for learning Science; to develop enquiry skills, practise the core scientific vocabulary, application of Scientific skills as well as the subject knowledge.

The contents are carefully planned such that an enquiry-based style of teaching and learning is encouraged. Exercises and revision materials (self-assessment tests) are also provided throughout the book to help learners achieve optimum possible standard in Science.

Distributed by:



**PAGES &
STATIONERY LTD**

ISBN 9789988862022



9 789988 862022