Everyday Science

Level 4

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Introduction

Everyday Science is made up of six levels, each designed to meet the delicate educational requirements of the target age group. The structure of the series harmoniously balances four scientific branches: biology, chemistry, physics, and Earth sciences. The series promotes the importance of careful observation and experiments to verify facts and arrive at conclusions based on scientific methods. Through the variety of activities it provides, the series illustrates to young learners the connection between the subject studied and the real world, something that's often overlooked in ateaching science.

Everyday Science is all about encouraging students to think about the world in terms of how & why. It directs youngsters' curiosity in the way of learning, discovering and understanding common occurrences and different natural phenomena.

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Unit 1

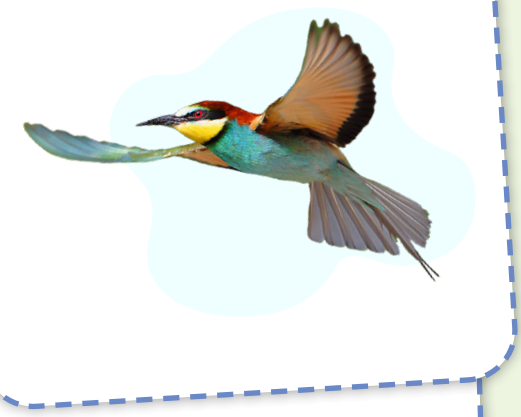
Growth and Movement in Living Things

Living things are quite from non-living things. They have characteristics which non-living things do not have.
Plants and animals are things. Rocks, stones and sand are non-living things.

What living things can do:

Living things eat food. Plants can make their own food. Animals eat plants and other animals.
Living things breathe. They take in air to get energy.
The oxygen in the air changes the food inside their bodies to energy.
Living things need energy for all their activities.
Living things get rid of waste of unwanted things from the body.

Movements in animals:



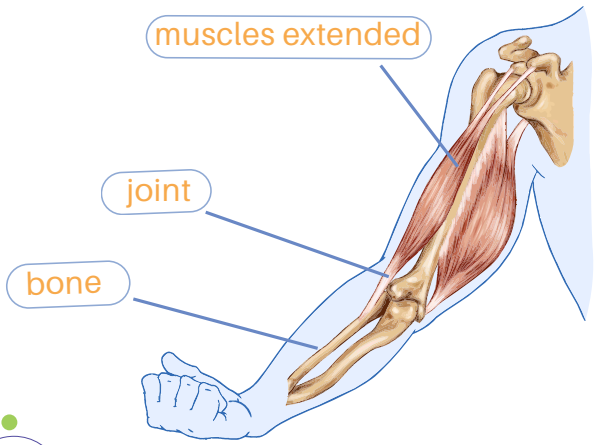
Animals can move parts of their bodies.
They can also move from one place to another.
Animals have special body parts that help them to move.
Fish have fins to swim in water.
Birds and insects have wings to fly.

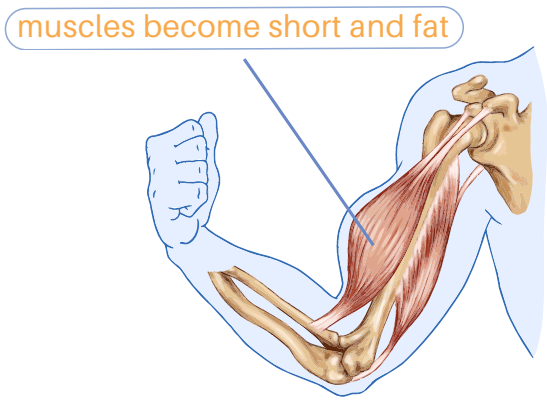
Unit 1

Most animals have legs to walk, hop, jump or crawl on land, like rabbits, monkeys and kangaroos.

Muscles make your body move. Some muscles of your body are joined to the bones. The point where two bones are fitted together is called a joint. The framework of bones is called a skeleton.

Bones move at the joints. Muscles help the bones to by becoming short and fat.





Some animals do not have bones inside their bodies. They have a hard outer covering. Muscles are attached to it. The hard outer covering is called an exoskeleton. For example, ants and cockroaches have exoskeletons.

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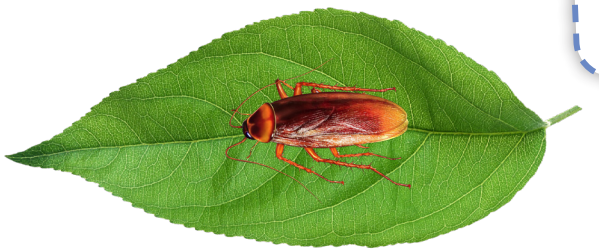
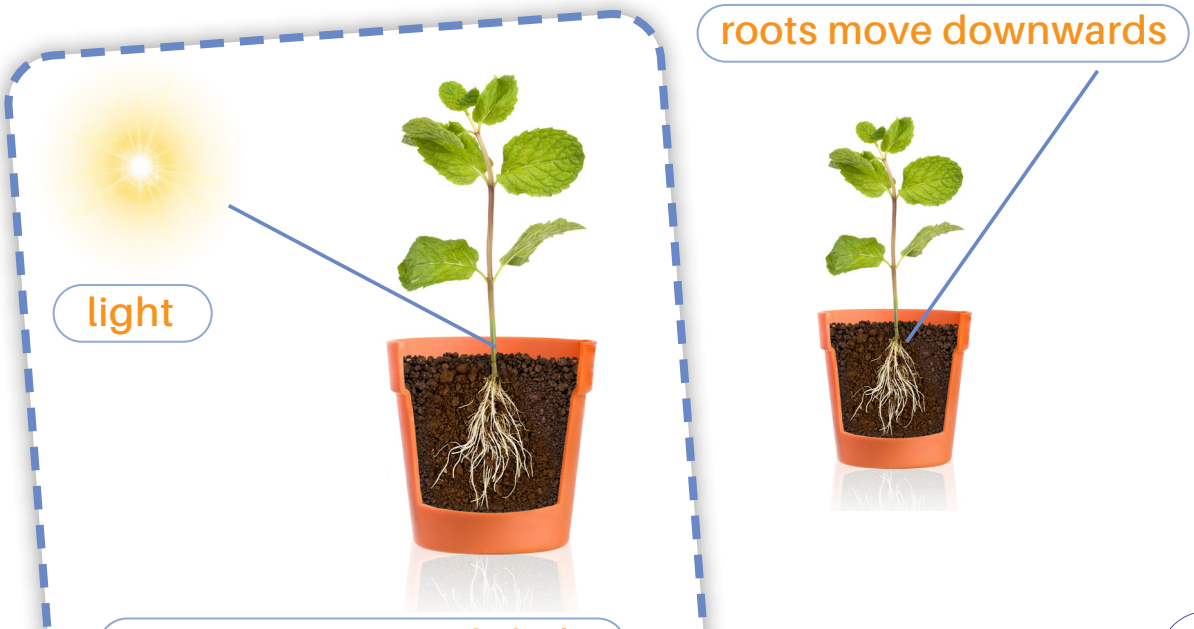


cockroach

Movement in plants:

Plants are living things. They also move, but their movements are very slow. They cannot move from one place to another on their own.

Plants need light to make their food. The food of a plant is made in the leaves. The stem of a plant grows towards the light and the leaves turn to face the light. The roots of plants move downwards to find soil and water.



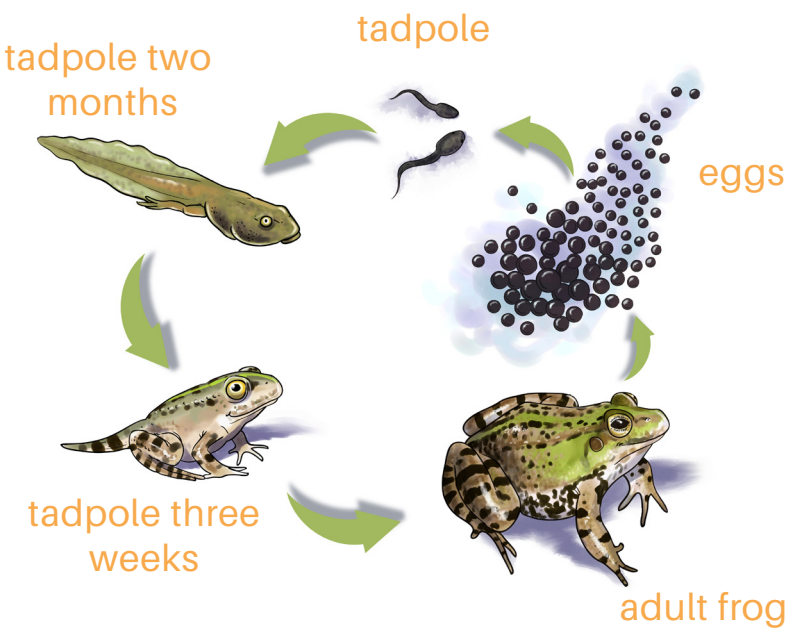
The sunflower turns its face towards the Sun.

The leaves of the touch-me-not plant close when they are touched.

Some flowers open up in daylight and close at night.

Growth in animals:

Animals are living things. They eat food to grow big.
The whole body of an animals grows.
It keeps on growing till it becomes as big as its parents. Then it stops growing.

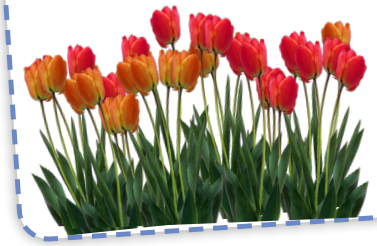


Some animals are quite different from their parents at the time they are born. As they feed and grow, they change their shapes till they start looking like their parents.

Growth in plant:

Plants keep on growing all their lives. If you cut off the tip of a stem, new branches will grow from the sides.

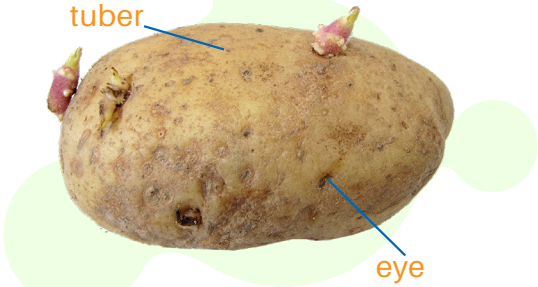
The tips of the stem root and leaves have special groups of cells which keep on dividing. A plant grows at the tips. Pull off the leaves of a twig. You will see tiny buds on it. Each bud has a number of tiny leaves folded up inside. Buds can grow into branches or flowers.
There is a bud at the tip of the stem. It helps the stem to grow long.



Plants can also grow from other parts:

A potato is a swollen part of the stem of a plant. It grows in the soil. It has a lot of stored plant food in it. It is called a tuber. A potato has many eyes on it.

Each eye is a bud.
The stored food in the potato helps the buds to grow into new potato plants.



An onion is a bulb. It is made up of thick leaves which have a lot of stored plant food in them. There is a bud in the centre of the bulb. The bud grows to make an onion plant.

Uses of plants and animals:

Plants and animals are very useful to humans.

How animals are useful:

Cattle and sheep give us meat, milk, wool and hide. Milk can be made into butter, yoghurt and cheese. Poultry gives us meat and eggs.









How plants are useful:

Crops provide us with food grains. Cotton and jute plants give us fibre for making cloth.
Trees are useful for building houses and furniture.




We get different kinds of fruits and seeds from plants.

Some plant stems and roots store food which we eat.

Some important chemicals and medicines also come from plants

Population and food needs:

As the population of the world is increasing, the need for food is also increasing, scientists have to find ways to improve the quality of plants and animals which will give more meat, grain and fruit.

Better ways of growing crops and better fertilizers will lead to an increase in the production of food and other useful things.

Exercises

1. Answer the following questions.

(a) Write five things that living things can do. eat, breathe, move, grow and get rid of waste

(b) How do animals move? they have special parts that help them move

(c) What makes your body move? muscles make body move

(d) What is an exoskeleton? the hard outer covering

(e) Can plants move? How is their movement different from that of animals? yes, but they can't move from one place to another on their own

(f) How does the body of animals grow? the whole body of an animal grows

(g) Which part of a plant grows? the tip of a stem

(h) What is a bud made up of? tiny leaves folded up inside

(i) Which parts of a plant can grow into new plants? buds

2. Fill in the blanks to complete the statements

(a) Plants can make their own .....food..... in sunlight.

(b) Animals eat plants and other ....animals..... .

(c) Living things take in air to get ...energy..... .

(d) Animals have special .....parts..... to help them to move.

(e) The point where two bones meet is called a .....joint..... .

(f) Tiny plants have an .....eye..... which helps them to know where the sunlight is.

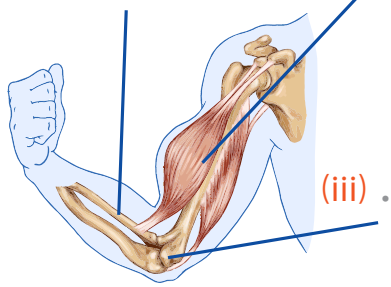
(g) A bud grows into new branches or ...flowers..... .

(h) A .....tuber..... is the swollen part of the potato stem which has a lot of stored plant food.

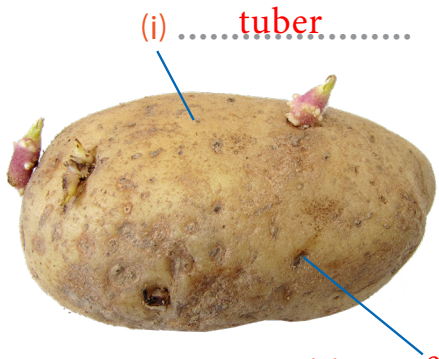
(i) An onion is a .....bulb..... .

(j) Pieces of stem from which new plants can grow are called .....buds..... .

3. Label the following.



(a)



(b)

4. Write the names of the following parts of plants.

(a) roots

(b) bulb

(c) buds

Unit 2

A Balanced Diet

Food gives energy to the body. Food contains many different substances that keep the body fit and healthy.

Carbohydrates and fats give energy to the body. Carbohydrates are found in potatoes, rice and bread. Fats are found in milk, butter and cheese.

Proteins help the body to grow and repair worn out or damaged parts. These are found in meat, eggs, milk and grains.

Vitamins and minerals in food keep the body healthy. They are found in fresh fruits and vegetables.

Food also contains fibre. That part of the food which cannot be broken into simple substances by the body. Fibre keeps the intestines in good working order. Vegetables, fruits and grains have fibre.

Food has water in it. We also drink water. Water helps blood to carry all the substances around the body.

Food and Health:

To stay healthy, you must eat meals that contain all the food substances in the right amounts. Eating such food is called a balanced diet.
While you are growing, you need proteins. You also need fresh fruits and vegetables. You should eat meals with regularity and should not remain hungry for longer periods of time.
You should exercise regularly.
You must also rest to let your body get back the energy it has used up.
You must wash and keep yourself clean so that you don't become ill or catch some infection.

Breakfast

Lunch

Dinner

Exercises

1. Answer the following questions.

(a) How is food useful for the body? food gives energy to the body

(b) Name the important food substances. carbohydrates – fats – proteins – vitamins – fiber and minerals

(c) What is a balanced diet?
eat meals that contain all the food substances in the right amounts

2. Fill in the blanks.

(a) Food gives ..energy.. to the body.

(b) carbohydrates and fats give energy to the body.

(c) ..proteins.. help the body to grow and repair itself.

(d) ..vitamins.. and minerals keep the body healthy.

(e) ..fiber.. is that part of food which cannot be broken into simple substances by the body.

(f) ..water.. helps your blood to carry all the substances around your body.

(g) A meal that contains all the food substances in the right amount is called a balanced diet .

(h) You must eat fruits and ..vegetables.. .

(i) ..rest.. lets your body get back the energy it has used up.

3. Fill in the table.

Type of food	Found in	Use in the body
(a) Proteins	meat, eggs, milk and grain	grow and repair damaged parts
(b) Fats	milk, butter and cheese	gives energy
(c) Carbohydrates	potatoes, rice and bread	gives energy
(d) Vitamins and minerals	fruits and vegetables	keep the body healthy
(e) Fibre	vegetables, fruits and grains	keep the intestines in good working order

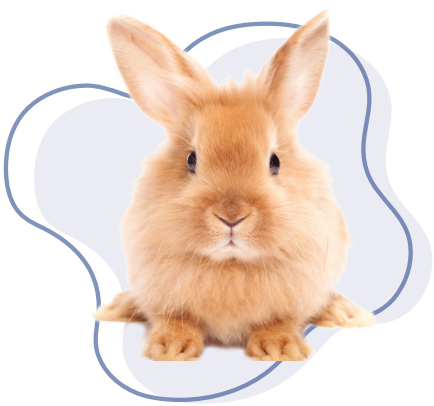
Unit 3

Living Things and their Environment

Every living thing is linked to every other living thing in the world. Living things are also linked to the non-living things in the world, such as sunlight, soil, water and air. Living and non-living things depend on each other and work together.
All the food in the world comes from plants. They provide food for animals.
Green plants can make their own food. They make their food from the energy of the Sun. The energy of the Sun passes from plants to animals.

What animals eat:

Some animals eat plants. These animals are called herbivores. Sheep, cows and rabbits are herbivores.

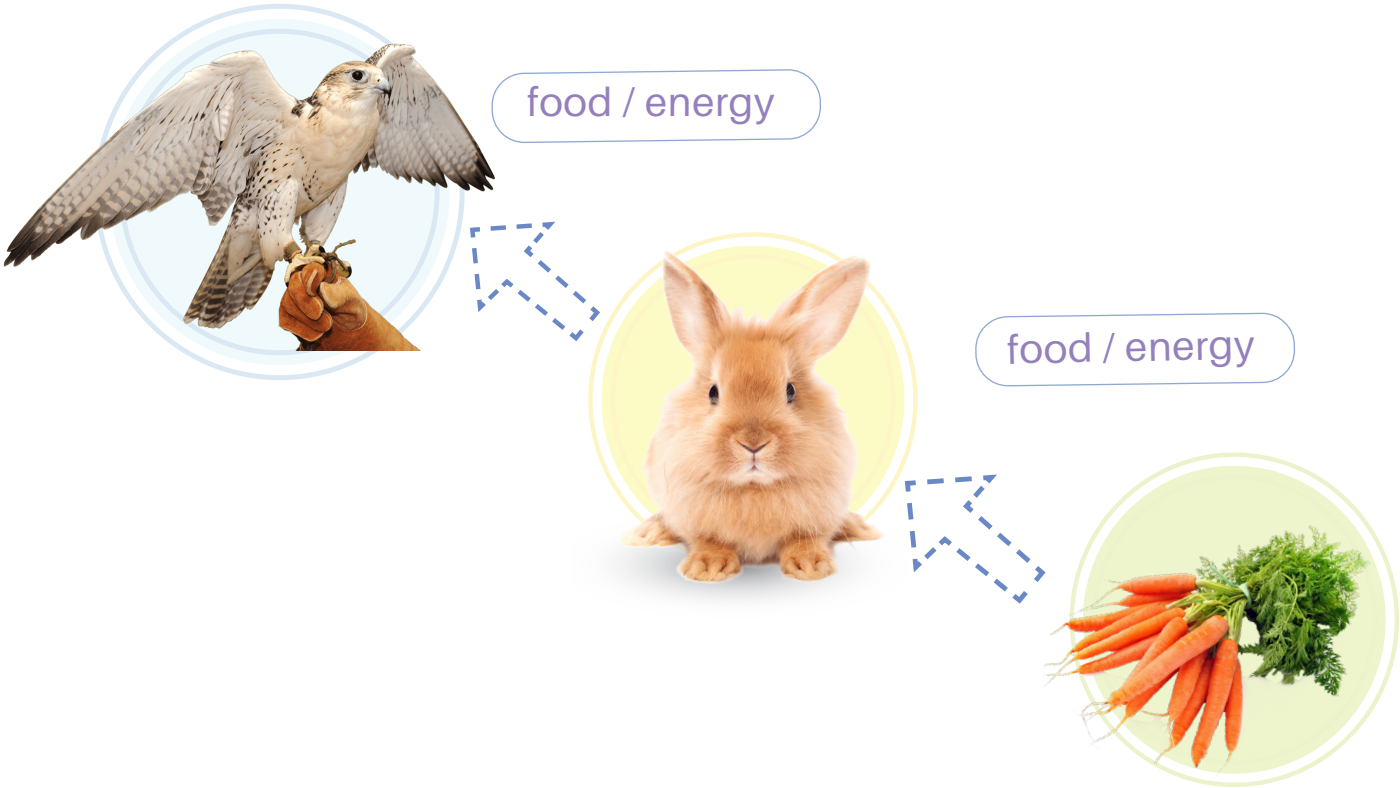


Some animals eat other animals meat. They are called carnivores. Lions, tigers, foxes and dogs are carnivores.

Human being and some animals eat both plants and animals. They are called omnivores.

Food chain:

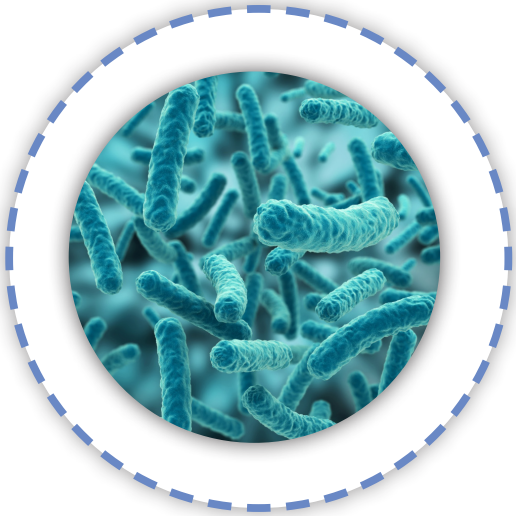
Food energy passes from plants to animals in the form of a long chain. This is called a food chain.



Food cycle:

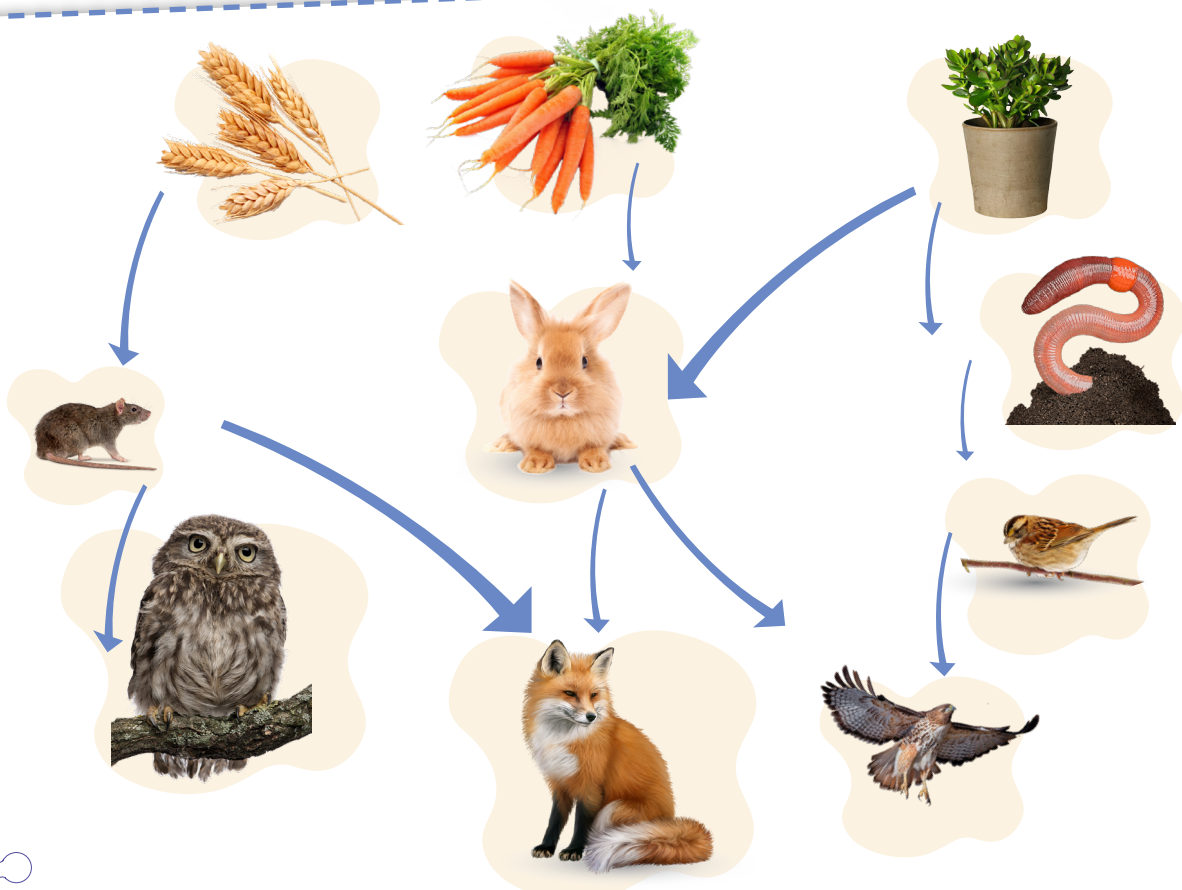
When plants and animals die, all the chemical substances in their bodies return to the soil.

There are millions of tiny living things in the soil. These tiny living things are called bacteria.
Bacteria feed on dead animals and plants. They break them down into tiny particles which mix with the soil. Plants again take up these particles to make their food.



Food web:

One kind of food is eaten by many animals, and many animals eat the same kind of food. Food chains cannot be separated from each other. They are linked to each other at many points. These linked food chains make a food web.



Adaptations:

All living things grow and change. When an animal or plant changes to fit its surroundings, we say it has adapted to its surroundings.
The special body parts that a plant or animal develops to adapt to a particular place or living condition are called adaptations.

Adaptations in animals:

Each animal is fitted or adapted to live in its surroundings or environment. It is adapted to find food. It is safe from heat and cold.
It is safe from its enemies.
Some animals have special body parts for protection.
A tiger has sharp claws and teeth for tearing flesh. A deer has horns for stabbing. A mountain goat has hoofs for kicking and climbing rocks.
An eagle has a sharp beak and claws for catching mice and rabbits.

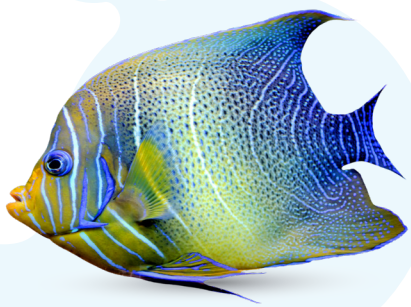
A deer has horns.

A mountain goat has hoofs.

A tiger has sharp claws and teeth.

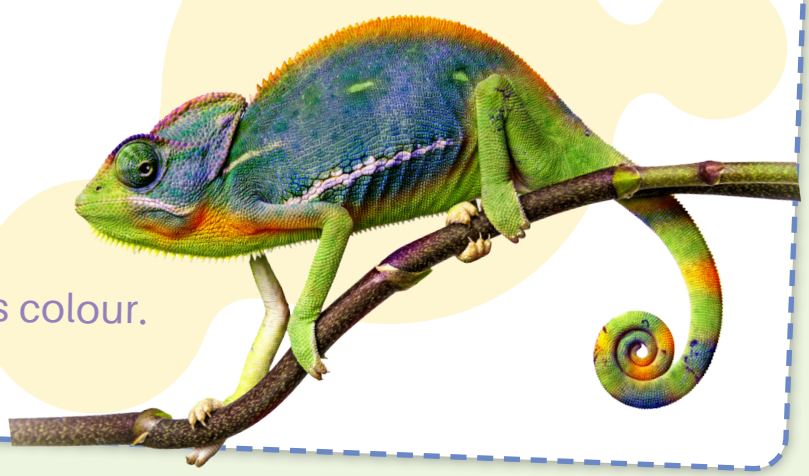
An eagle has a sharp beak.

A chameleon changes colour so that it can blend in with its surroundings.
A bird has wings to fly.
A fish swims in water with its fins and tail.



A fish swims with its fins and tail.

A seagull flies with its wings.



A chameleon changes colour.

Animals have special body parts to find food:

The beak of a humming bird is adapted for taking nectar from deep inside a flower.

A humming bird sipping nectar.

Animals that live in very cold places:

Animals that live in very cold places, like polar bears, seals and whales, have thick fur on their bodies. They have a thick layer of fat under their skins.

A white polar bear.

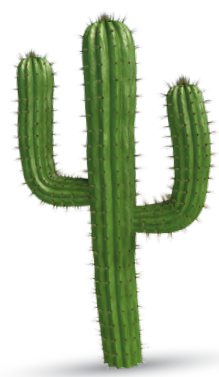
Animals that live in very hot places:

Most animals that live in very hot places, like camels, lizards, and snakes rest during the day and look for food at night. They can store water in their bodies for a long a time.

Plants are fitted to live in their surroundings:

Plants that grow in very cold places have needle-like leaves. They make seeds inside cones. Plants that grow in very hot places have thick, fleshy stems which can store water.

Their leaves are very tiny. They have very deep roots. They have hard waxy coats and thorns for protection.



Exercises

1. Answer the following questions.

(a) Where does all the food in the world come from? from plants

(b) How is the energy of the Sun passed on to animals? plants make their food from the energy of the sun so, plants provide food for animals

(c) What is food chain? food energy passes from plants to animals in the form of a long chain

(d) What happens to the bodies of dead plants and animals in the soil? bacteria feed on dead animals and plants

(e) What are adaptations? the special body parts that a plant or animal develops to adapt to a particular place or living condition

(f) How are animals that live in very cold places adapted to live there? they have a thick layer of fat under their skins

2. Fill in the blanks to complete the statements.

(a) Living things are linked to other living things as well as the ..non-living.. things of the world.

(b) Plants get energy from the ..Sun.. to make their food.

(c) Animals that eat plants are called ..herbivores.. .

(d) Animals that eat other animals are called ..carnivores.. .

(e) ..Omnivores.. eat both plants and animals.

(f) Tiny living things in the soil are called ..bacteria.. .

(g) When a living thing grows and changes to fit its surroundings, we say it has ..adapted.. .

(h) The surroundings of an animal or plant is called its ..adaptation.. .

(i) Plants that grow in very cold places have ..needle-like... leaves.

(j) Plants that grow in very hot places have .....thick..... , ...fleshy..... stems which can store water.

3. Match the animals to their adaptations.

Animals	Adaptations
(a) tiger	sharp claws and beak
(b) deer	hoofs
(c) mountain goat	sharp claws and teeth
(d) eagle	horns

4. (a) make:

(i) a food chain and (ii) a food web form the following:
Grasshopper, fox, bird, snake, hawk, green plants, frog, insects, rabbit.

(b) Pick out from the above list:

(i) a herbivore
grasshopper, bird and rabbit

(ii) a carnivore
snake, hawk

(iii) an omnivore
fox and insects

Unit 4

Mixtures

A mixtures is not a pure substance.

A mixture contains more than one substance.

Air is a mixture of many gases.

Coffee is a mixture of water, sugar and coffee beans.

Coins are made of different metals mixed together.

Kinds of mixtures:

When we mix sugar and water, the mixture is clear. We cannot see sugar in the water. This mixture is called a solution.
We cannot see the sugar because it has mixed with the water.
The sugar has dissolved in it.
In a solution of sugar and water, the sugar is called the solute and water is called the solvent.
We say that sugar is soluble in water.
Salt is also soluble in water.
Sugar and salt are more soluble in hot water than in cold water.
Some substances are not soluble in water.
We say that they are insoluble. They do not dissolve in water.

Sand and chalk are insoluble in water.
If you add some powdered chalk to a glass of water and shake it, you will see white specks in the water.
The chalk is insoluble in the water.
It has not dissolved in the water.
We call this mixture a suspension.

Suspension

Emulsion

Add some cooking oil to a glass of water and shake it. You will see that the water becomes milky. Oil is not soluble in water. Oil and water do not mix properly. We call this type of a mixture an emulsion.
If you leave the emulsion on a shelf for some time you will see that the oil comes to the top of the water.

Separating mixtures:

There are many ways of separating mixtures.

- By filtering:

Filtering is done to separate a solid from a liquid.
Sand can be separated from water by filtering the mixture through a filter-paper. The water will pass through, but the sand will be left on the filter-paper.

- By evaporating:

Salt can be separated from water by heating the solution. The water will evaporate from the solution and the salt will be left behind.

Evaporating

Filtering

- By stirring with a magnet:

A mixture of sand and iron filings can be separated by stirring the mixture with a magnet. The iron filings will stick to the magnet and the sand will be left behind.

- By adding water:

A mixture of coloured substances in black ink can be separated by adding water to it.

Activities

1. Take a glass of cold water. Add sugar to it with a teaspoon and stir. The sugar dissolves in the water. Keep on adding sugar to the solution and stirring. After some time, no more sugar will dissolve in it. The sugar settles at the bottom. Heat the solution gently and stir it. The sugar will dissolve in the hot water.

2. Put a small drop of black ink on a filter-paper. Allow it to dry. Now add three or four drops of ink on the same spot. Put water on the spot, one drop at time, with a dropper. You will see that coloured rings of the ink will spread out slowly. The number of rings will show how many substances were mixed in the ink.

Exercises

1. Answer the following questions.

(a) What is a mixture? A mixture contains more than one substance

(b) What is a solution? When you mix two substances and get the mixture clear

(c) Why is a mixture of sugar and water a clear solution? The sugar has dissolved in it

(d) What is a suspension? Give an example. Substances are insoluble in water so they can't be dissolved. e.g sand and chalk

(e) What is an emulsion? is a mixture of two liquids that would not normally mix

(f) What is an alloy? Give an example. alloy is a combination of metals. e.g brass

(g) How can you separate a mixture of sand and water? by filtering

(h) How can you separate salt from water? by evaporating

(i) How can you separate a mixture of sand and iron filings? by stirring with a magnet

2. Fill in the blanks to complete the statements.

(a) Air is a mixture of many ...gases..... .

(b) Sugar .....dissolves..... in water so we cannot see it.

(c) The sugar in a solution is called the .....solute..... .

(d) Water is a .....solvent..... .

(e) Sand does not .....dissolve..... in water.

(f) Chalk is .....insoluble..... in water.

3. Write examples of the following mixtures.

Mixture	Example
(a) gas+gas	air
(b) liquid+gas	fog
(c) liquid+liquid	oil with water
(d) solid+solid	copper with zinc

4. Name the method of separating the parts of a mixture.

(a) evaporating

(b) filtering

Unit 5

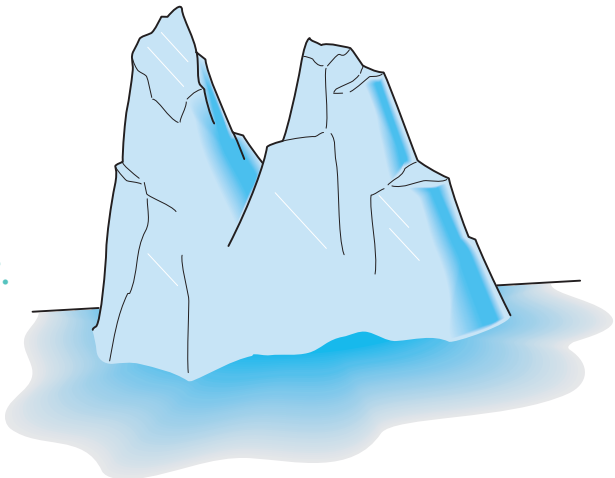
Water

Every living thing on Earth needs water. Animals drink water. Plants need water to live and grow. We use water for drinking, washing, bathing and cooking.

States of water:

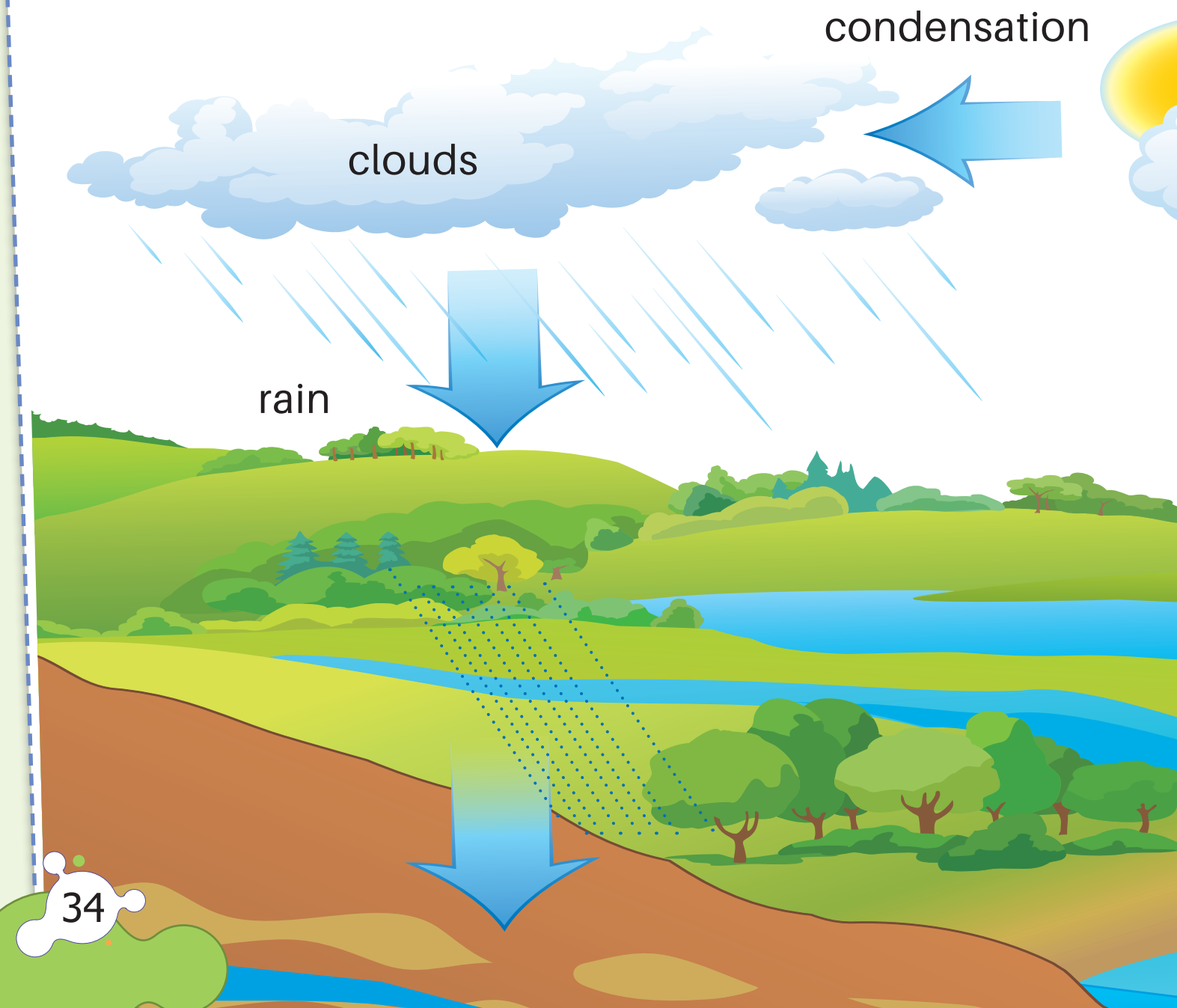
Water is found in three states or forms:

- Solid water is ice.
- Water in liquid form is water.
- Water in gaseous form is water vapour.



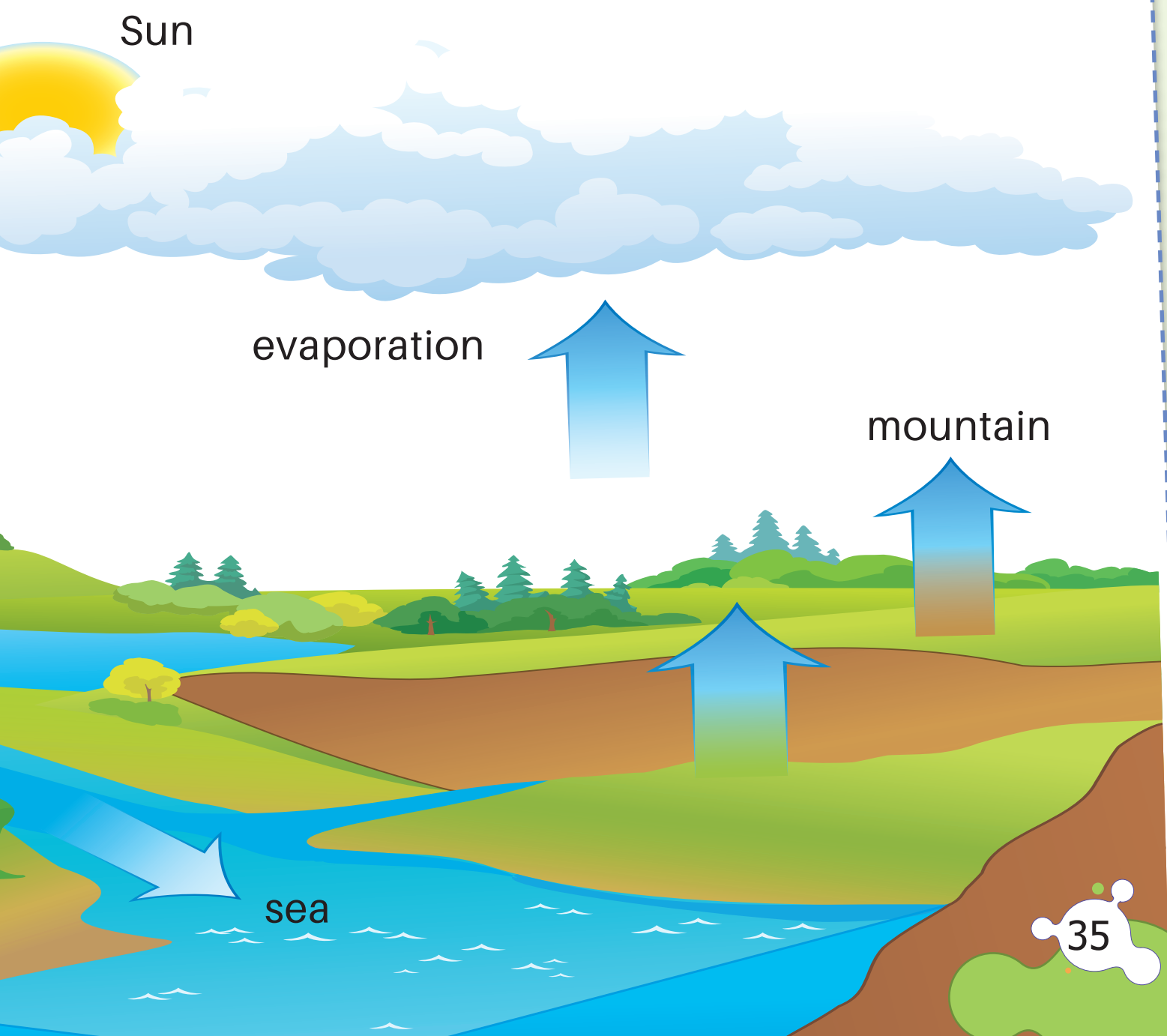
The water cycle:

Water can easily change from one form to another.
When the Sun warms the water of seas, rivers, ponds and lakes, it changes into water vapour. Water vapour rises in the air. It cools and changes back into tiny droplets of water which form clouds. The drops then fall to the ground as rain. In cold weather, the water drops in the cloud freeze and fall as hail or snow.



Water pollution:

Unwanted chemicals, germs and harmful substances in water cause water pollution.
Rivers provide us with water for drinking and for growing crops. Fish and many other animals and plants live in rivers. Rivers are also used to carry people and cargo by boats.



Exercises

1. Answer the following questions.

(a) Why do living things need water? to live and grow

(b) What are the three states of water? ice, water and vapor

(c) What is snow? the water drops in the cloud freeze and fall

2. Fill in the blanks .

(a) Unwanted chemicals, germs and substances in water cause water ....pollution.... .

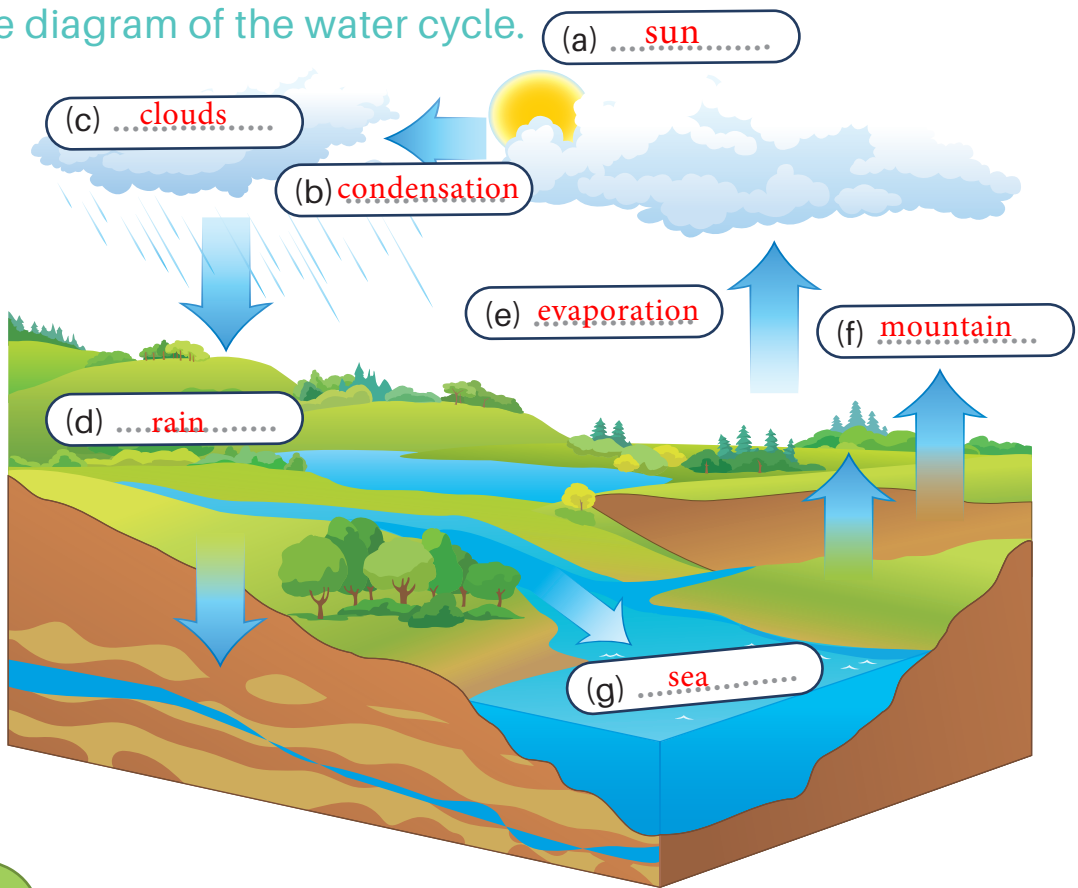
(b) .....Rivers..... provide us with water for drinking and for growing crops.

(c) Chemical wastes from .....humans..... are pumped into rivers.

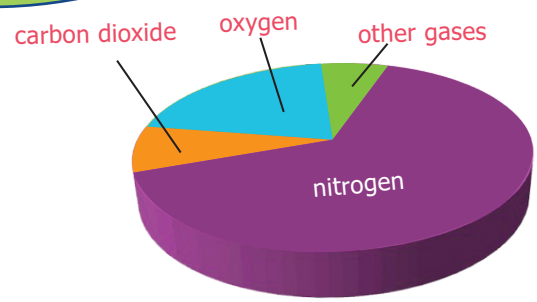
(d) Animals and human waste contains harmful .....substances..... .

(e) Fish and other river life cannot live without .....water..... .

3. Label the diagram of the water cycle.



Unit 6 Air



composition of gases in the atmosphere

The Earth is surrounded by a layer of air. Air is a mixture of gases. It consists of nitrogen, oxygen and a little carbon dioxide, dust and water vapour. It also has small amounts of other gases like argon and helium.

Air is important for all living things. Nitrogen from the air is used for making chemical compounds called nitrates. Nitrates are added to the soil as fertilizers.

Carbon dioxide in the air is used by plants to make their food.

Water vapour in the air falls as rain. Oxygen is an important gas. It helps living things to breathe and stay alive. It also helps things to burn.

Breathing:

Living things breathe all the time. They need oxygen to produce energy. Glucose from food combines with the oxygen that they breathe in from the air. They breathe out carbon dioxide and water vapour. Heat energy is also produced. This energy is needed by the body for moving, growing and doing other things.

Burning:

A candle needs oxygen to burn candle wax combines with oxygen from the air. It produces carbon dioxide and water vapour. It gives off energy in the form of heat and light.

Air pollution:

Air in the countryside is fresh and clean. Fresh air contains oxygen which is needed by all living things.
The air in towns and contains many substances that can harm living things.
Burning coal and oil produces harmful gases such as Sulphur Dioxide. Other gases and chemicals come from factory chimneys. When petrol and diesel oil burn in car engines, they produce chemicals such as lead, which come out from the exhaust pipes. These chemicals can cause cancer and other diseases.

And chemicals in the air mix with rainwater to produce acid rain. Acid rain kills trees and harms fish and water plants. It also attacks the stonework of buildings.

Activities

1. Test your breathing rate.

Sit quietly on a chair and count the number of breaths you take in a minute. Stand up and jump at your place ten times. Now sit down and count your breaths which activity made your breathe faster?
Why?

.....

2. We breathe out vapour.

Breathe out on a cold window-pone. What do you see on the glass?

.....

3. We breathe out carbon dioxide. It is a gas which turns lime water milky.

Take some freshly prepared lime water in a beaker. Blow in it with a drinking straw. What happens to the lime water? Why?

.....

4. A burning candle gives out carbon dioxide.

Light a candle. Blow it out and hold a lit matchstick in its smoke.
The matchstick goes out why?

.....

5. A candle needs oxygen to burn. It also gives out water vapour.

Light two candles. Cover one with a glass tumbler. Cover the other with a glass tumbler on blocks.
Which candle goes out. Why?
What do you see inside the glass? Why?
Why does the other candle keep burning?

.....

6. Put an insect in a glass jar. Fix a tissue paper on the mouth of the glass jar with a rubber band. Moisten it and place the jar in an open space. Leave it for a day. Examine the tissue with a magnifying glass.

Unit 6

Exercises

1. Answer the following questions.

(a) What is air? mixture of gases

(b) Name the components of air nitrogen, oxygen, carbon dioxide and other gases

(c) How do plants use carbon dioxide? to make their food

(d) Why is oxygen an important gas? to produce energy

(e) Why do living things need oxygen? it helps living things to breathe and stay alive

(f) How can acid rain affect the environment? it kills trees and harms fish and water plants. It could also damage stonework of buildings

(g) Which kind of pollution can cause diseases such as cancer? when petrol and diesel oil burn in car engines, they produce chemicals such as lead

(h) What is acid rain? chemicals in the air mix with rainwater

2. Fill in the blanks.

(a) Air is a mixture of gases .

(b) nitrates are chemical compounds which are used to make fertilizers?

(c) water vapor in the air falls as rain.

(d) Living things need oxygen to produce energy.

(e) When you are resting, you need less energy.

(f) When you are running, you need more energy.

(g) A candle needs oxygen to burn.

Making Healthy choices

Choose food that is high in fiber. Fiber can be found in fruit and vegetables as well as food items like whole bread. On the other hand, fat, oil and sugar should be taken in small amounts although they help make food tasty.

- Choose food that is high in fiber and be sure to drink at least eight glasses of water a day. This will give you healthy bowel movement that cleans your body of waste products and toxins.

- If you eat a lot of food that contains high amounts of fat, oil, salt and sugar, you could end up with health problem such as high blood pressure, this could lead to heart disease and heart stroke.

What is in your food?

Have you heard of food poisoning? Food poisoning is caused by eating food that contains germs such as harmful bacteria. Bacteria are living things that are so tiny they can only be seen by microscope; Bacteria present everywhere, if they get onto your food, and you can become ill.

If you do not want to get food poisoning, make sure your food does not become contaminated. So avoid raw food or half-cocked food, eat food that is properly cooked and keep it covered if you are not ready to eat it. Practice good hygiene habits and wash your hands well before starting a meal.

Unit 7

Magnets and Magnetism

An object that can attract iron is called a magnet.
Natural magnets are found in many parts of the world. nickel and cobalt mixed with steel.

Shapes of magnets:

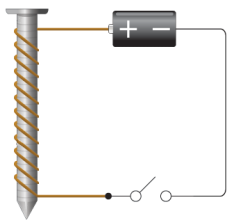
Magnets are of many shapes. They can be rectangular, cylindrical, horseshoe-shaped, U-shaped or round.

U-shaped

rectangular/bar magnet

horseshoes

cylindrical or rod



electromagnet

Electromagnets:

Electromagnets consist of a coil of wire wound round a rod of iron. When an electric current is passed through the coil, the iron rod becomes a magnet.

Force of a magnet:

You can pick up steel pins and paper clips with a magnet. You have to pull hard to pull the pins from a magnet. The force which holds objects to a magnet is called magnetic force.
Try to pick up a steel pin and a toothpick with a magnet. You will see that the magnet does not attract the toothpick.
It will only attract some metals such as iron, steel, nickel and cobalt. Wood, rubber and paper are non-magnetic materials.
Magnetic force can act through non-magnetic materials.

Poles of a magnet:

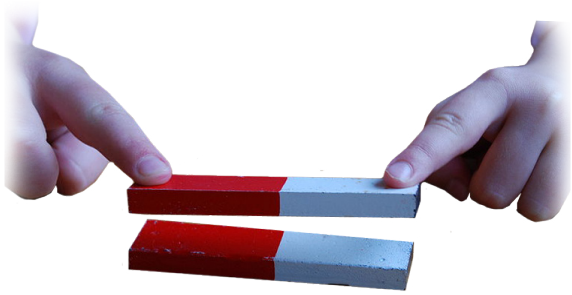
Sprinkle some iron filings evenly on a cardboard. put a magnet on the filings and lift the magnet.
You will see that the filings will be clustered at the ends of the magnet. These ends are called the poles of the magnet. One end is the North Pole and the other is the South Pole. The force of the magnet is strongest at the poles.

To mark the poles of a magnet:

Tie a bar magnet with a string and hang it. It will point to the north and south positions of the Earth. The end that points north is the North Pole and the opposite end is the South Pole.

Attraction and repulsion:

Hang a bar magnet by a string. Bring the North Pole towards the North pole of the hanging magnet, and it will swing away from it. Put another magnet near its South Pole.
The opposite poles will rush towards each other.



Opposite poles of a magnet will repel each other.

Uses of magnets:

Magnets are used in many electrical machines and motors. They are used in loudspeakers and cassette recorders.
Electromagnets are used to lift scrap iron and steel from scrapyards. They are also used in electric bells and in the doors of refrigerators and freezers.

Electromagnets are used to separate scrap iron and steel.

Activities

Place some common pins on a piece of paper stretched between two books. Move a magnet on the underside of the paper. You will see that the pins will move around with the magnet. This shows that magnetic force can act through non-magnetic materials.

Exercises

1. Answer the following questions.

(a) What is a magnet?

(b) What is a natural magnet?

(c) What are artificial magnets made of?

(d) What is an electromagnet?

(e) What is magnetic force?

(f) What are the poles of magnet called?

2. Write the names of the magnets.

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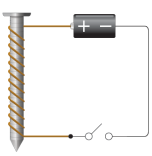

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3. Write True or False.

(a) Natural magnets are made of steel. .....

(b) The force of a magnet is strongest in the centre. .....

(c) A magnet can attract wood and paper. .....

(d) The end of a magnet which points towards south is called the North Pole. .....

(e) The opposite poles of magnets attract each other. .....

Unit 8

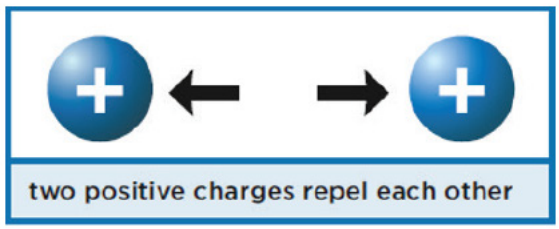
Static Electricity

What is electrical charge?

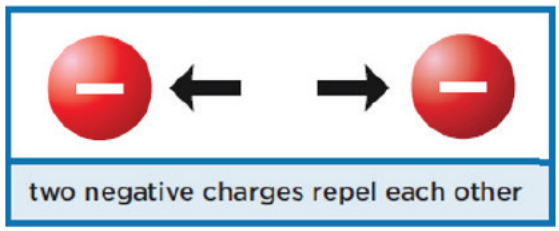
What is electricity?

To answer the question, you need to think that everything is made up of tiny particles, too small to be seen.
Each of these tiny particles can have an electrical charge. There are two kinds of electrical charge, positive or negative, that can:

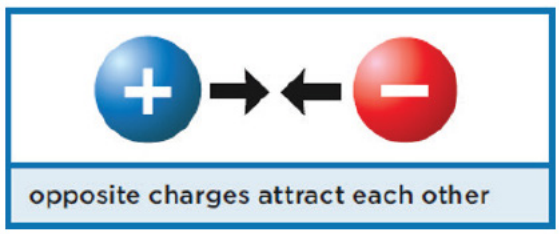
- Repel (push away) each other—if they are the same kind of charge.
- Attract (pull toward) each other, if they are opposite charges.



two positive charges repel each other



two negative charges repel each other



opposite charges attract each other

Most objects are made up of the same number of positive and negative charges. Objects with the same number of both charges are neutral.
When two objects touch or nearly touch, charged particles can move from one object to the other.
Negative charges move from object to object more easily than positive charges.

For example, rub a balloon with a wool cloth:

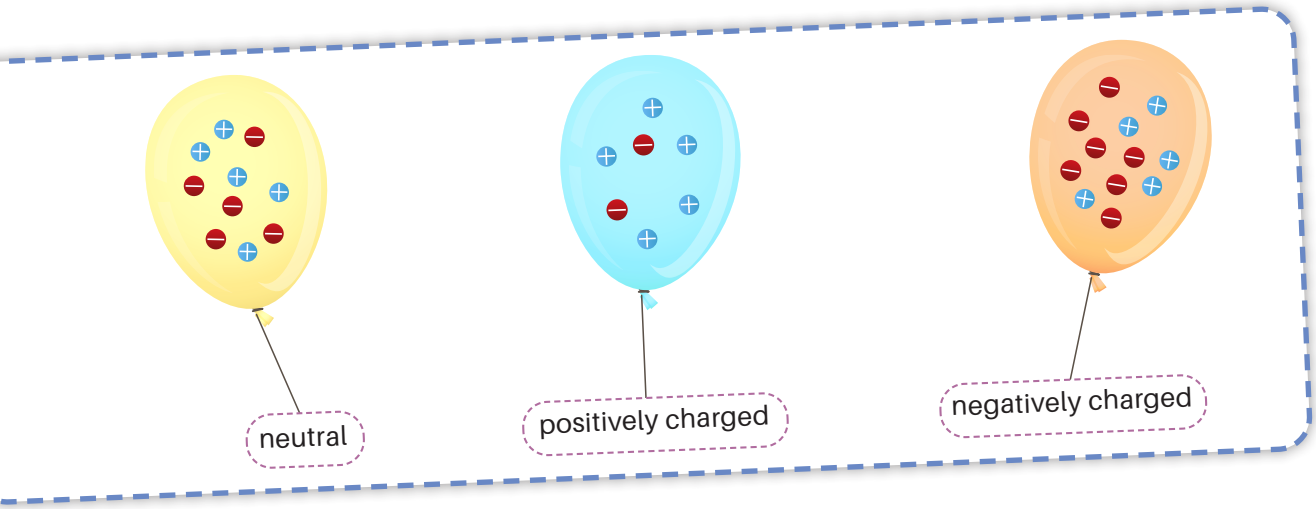
- Negative charges move from the wool to the balloon
- The balloon now has more negative charges than positive charges. The balloon is negatively charged.

What is Static Electricity?

A balloon starts out with the same number of positive charges and negative charges.

Remember what happens if you rub the balloon with a wool cloth? Negative charges move from the wool to the balloon.

Rubbing causes a buildup of negative charges on the balloon. A buildup means that there are now more negative charges on the balloon than positive charges. The balloon is negatively charged. A buildup of electrical charges on an object is called Static Electricity.

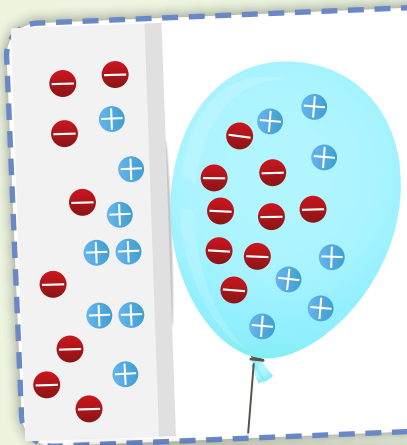


The neutral balloon has 5+ and 5–. The positively changed balloon has 5+ and 2– The negatively changed balloon has 5+ and 7–.

As you saw, rubbing can cause negative charges to move from one object (such as wool) to another (a balloon). Charged particles can also move inside an object.

Think of what happens when you try this:

- Rub a balloon with wool. Rubbing causes a buildup of negative charges on the balloon.
- Hold the negatively charged balloon near a wall. Positive charges in the wall are attracted to the balloon and move toward it. Negative charges in the wall are repelled from the balloon and move away.
- The wall and the balloon attract each other. The balloon sticks to the wall.



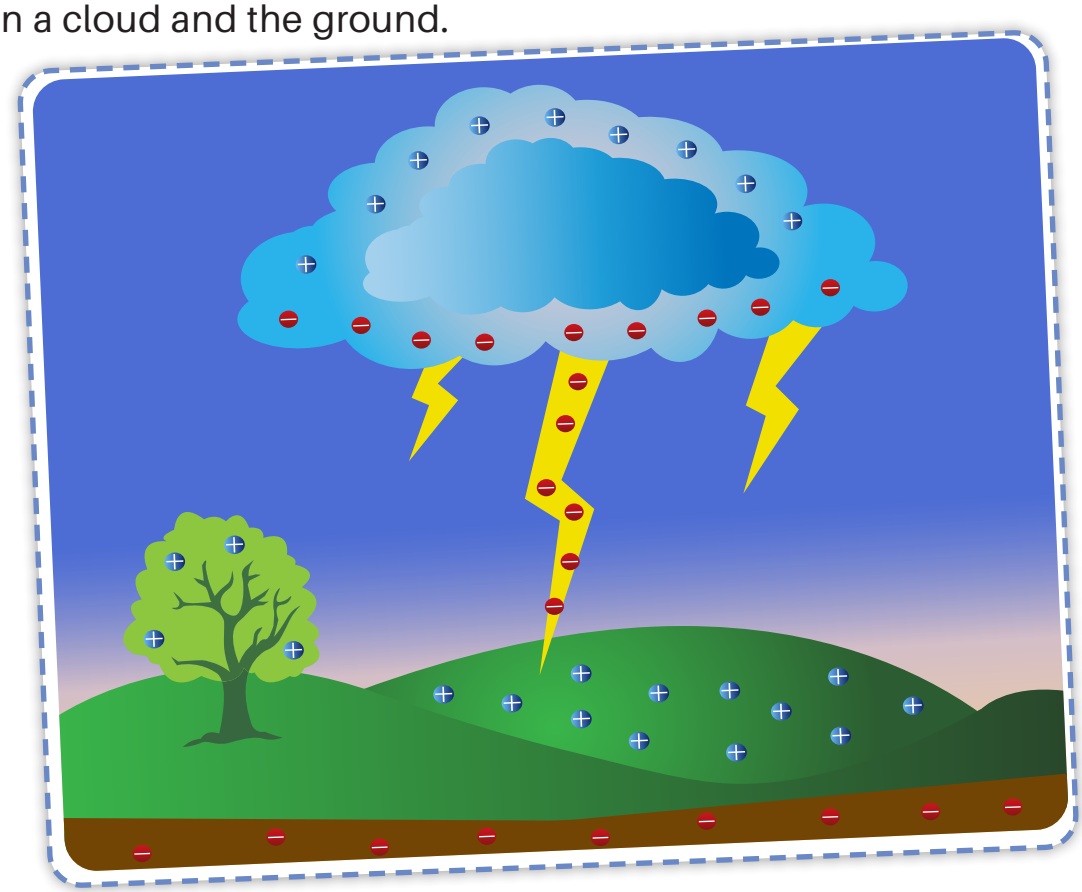
The balloon is negatively charged. The wall is neutral, but the positive charges build up in the wall near the balloon.

Uses of magnets:

Lightning is a discharge of static electricity between:

- A cloud and the ground
- Two clouds
- Two oppositely charged parts of a cloud.

To help you understand how lightning forms, remember that charges can move inside something. Charges can move to different parts of a cloud and the ground. Now follow the numbers in the diagram to see how lightning occurs between a cloud and the ground.



What is electric current?

Electric current is the flow of electricity through a conductor.
The current is caused by the movement of electrons.
An electric current can provide energy to do work.

How is electrical energy used?

When you plug in a TV set and turn it on, electric charges are flowing through wires. A flow of electric charges is an electric current. In an electric current, electric charges keep moving until you turn the current off.

Activities

1. Pull a plastic comb through your hair many times and bring it near bits of paper. The pieces of paper will be attracted to the comb.

2. Rub an inflated rubber balloon on a woollen jumper. Hold it against a wall. The balloon sticks to the wall. This shows that a charged body can attract a neutral body towards itself by producing an opposite charge on it.

3. To show that similar charges repel or push each other away:
Rub two plastic rulers with a dry cloth and hang them close to each other by threads. The rulers will swing away from each other.

4. To show that unlike charges attract:
Rub a glass rod with a silk cloth and a plastic ruler with a woollen cloth. Hang them close to each other by threads. The two objects will cling to each other because they have opposite charges.

Exercises

1. Answer the following questions.

(a) What are the two kind of electric charges?

(b) How is static electricity produced?

2. Fill in the blanks.

(a) Electricity which is not moving is called ..... electricity.

(b) Like charges ..... each other.

(c) Unlike charges ..... each other.

(d) An electric spark in the sky is called ..... .

(e) Rubbing gives a material an electric ..... .

3. Write attract or repel.

(a) – – .....

(c) -+ .....

(b) +- .....

(d) ++ .....

Unit 9

Heat

Rubbing your hands together produces heat.

All things are made up of tiny particles.
These tiny particles are called molecules.
Molecules are always moving.
When molecules move fast they produce heat.
When we rub our hands together they become hot. Rubbing makes the molecules move faster
The movement of molecules produces heat. Many people sitting in a small room also produce a lot of heat.

Thermometers:

We use an instrument called a thermometer to find out exactly how hot something is.
A thermometer is made of thin glass tube with a bulb at one end. The bulb has mercury in it.
When the bulb is dipped in glass of warm water, the mercury rises in the tube. When the bulb is dipped in a glass of cold water, the mercury falls.

Temperature scales:

The glass tube of a thermometer has markings on it. This is called the temperature scale. The level of the mercury on the scale shows the temperature.

Celsius scale:

In the Clesius scale, the freezing point of water is 0°C, and the boiling point of water is 100°C.

Fahrenheit scale:

In the Fahrenheit scald, the freezing point of water is 32°F and the boiling point of water is 212°F.

Activities

1. We can find out how hot or cold something is by touching it. But we might not be right.

Take three bowls. Put very cold water in one, lukewarm water in another, and hot water in the third. Dip one hand in the hot water and the other in the cold water for a minute. Now dip both hands in the lukewarm water. The lukewarm water feels hot to the hand that was in cold water earlier, while the same water feels cold to the hand that was in hot water.

2. Marking the temperature scale on the glass tube of a thermometer:

Dip the bulb of the thermometer in boiling water. The level of the mercury is marked as 0°C which is the freezing point of water. Dip the bulb of the thermometer in boiling water The level of the mercury is marked as 100 °C which is the boiling point of water.

3. Take your temperature:

A doctor's thermometer is marked in degrees Clesius. Wash a doctor's thermometer and put its bulb under your tongue for one minute. Take it out and read the level of mercury on the marked scale. It should be 37°C.

If you have fever, the temperature of your body will be higher.

4. Make a water thermometer:

Put a glass tube through a cork and fit it in the mouth of a glass bottle full of water, put some coloured water in the glass tube with a dropper. Mark the level of the coloured water.

Put the bottle in a tub of hot water. The level of the coloured water in the glass tube will go up.

Put the glass bottle in a tub of cold water. The level of the coloured water in the glass tube will come down.

Exercises

1. Answer the following questions.

(a) How do molecules produce heat?

(b) What is thermometer?

(c) What is a temperature scale?

(d) What is your normal body temperature?

(e) What is the boiling point of water in the Celsius scale?

.....

2. Fill in the blanks.

(a) All things are made up of tiny particles called ..... .

(b) When molecules move fast they produce ..... .

(c) A ..... tells us how hot something is.

(d) When the bulb of a thermometer is dipped in hot water, the level of the mercury ..... .

(e) When the bulb of a thermometer is dipped in cold water, the level of the mercury ..... .

(f) The freezing point of water is ..... ^{o}C.

(g) The boiling point of water is ..... ^{o}F.

(h) If you have fever, your body temperature will be ..... than normal.

(i) Many people sitting in a small room produce a lot of ..... .

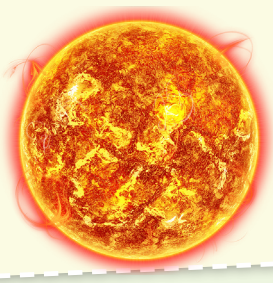
(j) The glass tube of a thermometer has ..... in it.

Unit 10

Light

Can you think of what the world would be like without light? There would be no colours, no plants and no animals on Earth. The Sun gives heat and light to the Earth.
We can see objects because they scatter light in our eyes. A burning candle and a bulb give out light.





Light carries energy:

It helps us to do things. The light from the Sun helps plants to make food. A solar calculator works in sunlight.

Light travels very fast:

It travels 300000 kilometres in one second. It travels faster than the speed of sound. We know this because during a thunderstorm we can see the flash of lightning much before we hear the clap of thunder.

Light can travel through space:

We can see the Sun and stars in space. Otherwise the light from them would not have reached us.

Light travels in straight lines:

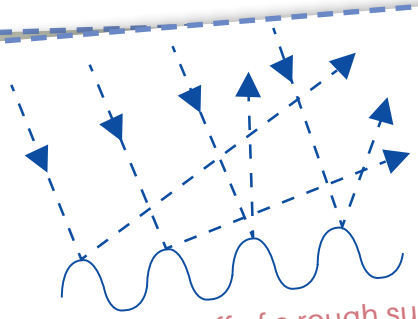
If you look at a candle flame through a drinking straw, you can see the flame. If you bend the straw, you will not be able to see the flame. That is also why you cannot see around corners.

Light travels in straight lines. The straight path of light is called a ray. A ray shows the path of light. Many rays of light make up a beam of light.

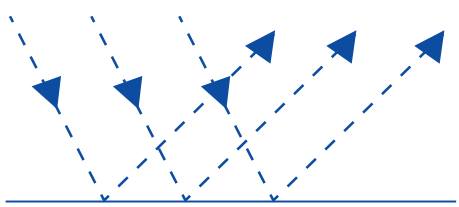
A very narrow beam of light of one colour is called a laser beam. A laser beam gives out heat. It is used by doctors to seal cut blood vessels and skin.

Reflection of light:

When a ray of light falls on a smooth surface such as a flat mirror, it bounces back in the opposite direction.
The bouncing back of light is called the reflection of light.
When light rays fall on a rough surface such as a wooden table, they are scattered in all directions.
The angle at which a ray of light strikes a flat shiny surface is reflected at the same angle but in the opposite direction.
When light rays from an object strike a plane mirror, all rays are reflected from it at the same angle.
We can see the reflection of an object in mirror. The reflection of an object is called an image.
The image of the object is formed at the same distance from the mirror. The image is of the same size as the object. The left side of the object becomes the right, and the right side becomes the left.



Light reflecting off of a rough surface.

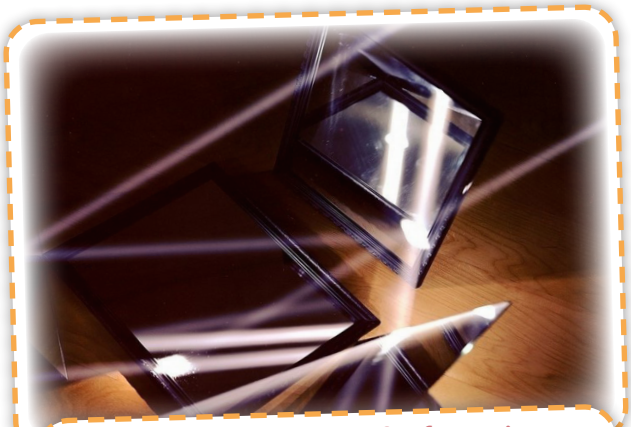


Light reflecting off of a smooth surface.

How do we see things:

Some things such as the Sun, electric lamps, bulbs, fires and candles give off light. They are called luminous bodies.
But most things that we see do not give off light of their own.

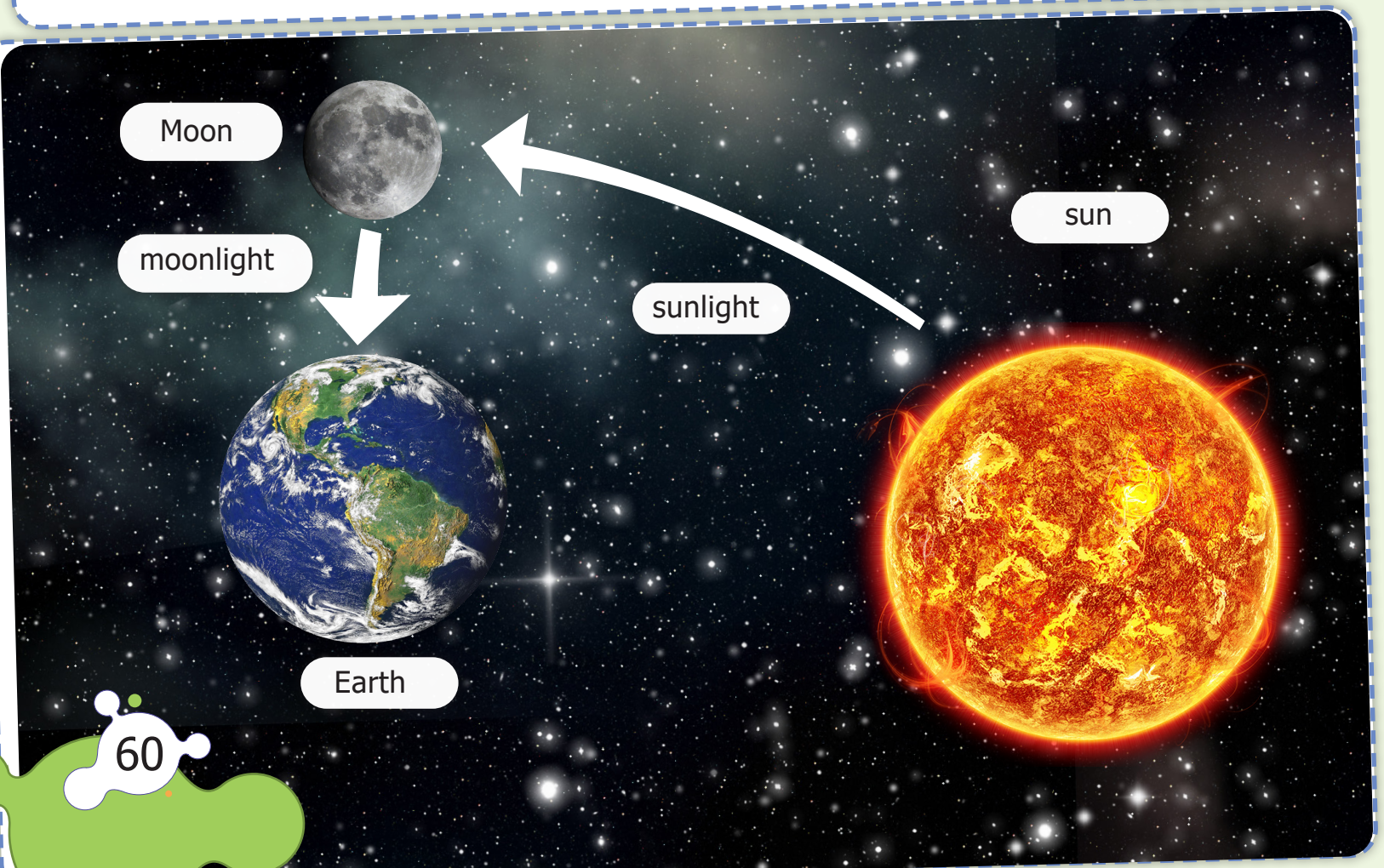
Light from the Sun, a lamp or some other luminous body shines on them. It is only then that we can see them. They reflect the light that falls on them into our eyes. The reflected light tells us the shapes, sizes and colours of the things.



Light reflecting off of a mirror.

Bodies which do not give off their own light are called non-luminous bodies.

The Moon is a non-luminous body. It does not give off light. It only reflects sunlight when the Sun shines on it. What we see as moonlight is really the light from the Sun reflected by the Moon.



Exercises

1. Answer the following questions.

(a) How can we see objects?

(b) What would the world be without light?

(c) What is the speed of light?

(d) Can light travel through space?

(e) What is (i) a ray? (ii) a beam?

(f) What is a laser beam?

(g) What is the reflection of light?

(h) What is the reflection of an object in a mirror called?

2. Fill in the blanks.

(a) Light travels faster than the speed of ..... .

(b) A ..... beam is used by doctors to seal cut blood vessels and skin.

(c) When light rays fall on a rough surface, they are ..... in all directions.

(d) The ..... of an object is formed at the same distance from the mirror.

3. Show the reflection of light on:

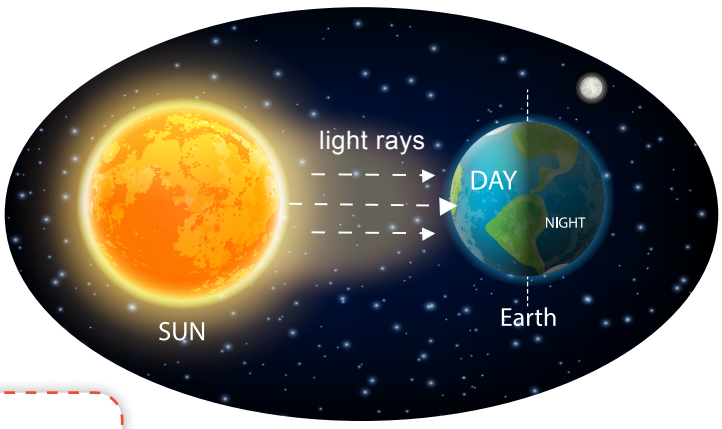
(a) a smooth surface	(b) a rough surface

Unit 11 Movement of the Earth

The Earth is always spinning. It goes round its axis through the North and South Poles. It takes 24 hours to spin once on its axis.
At different times in the day, you can see the Sun moving from east to west. This is because the Earth is spinning on its axis. The Sun does not move.

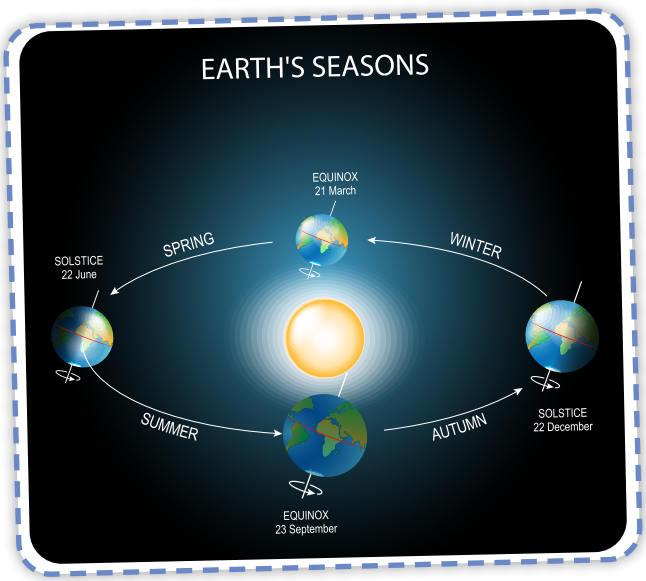
Day and night:

As the Earth spins on its axis, the part of the Earth which faces the Sun has daytime. The part of the Earth which is on the other side has night.



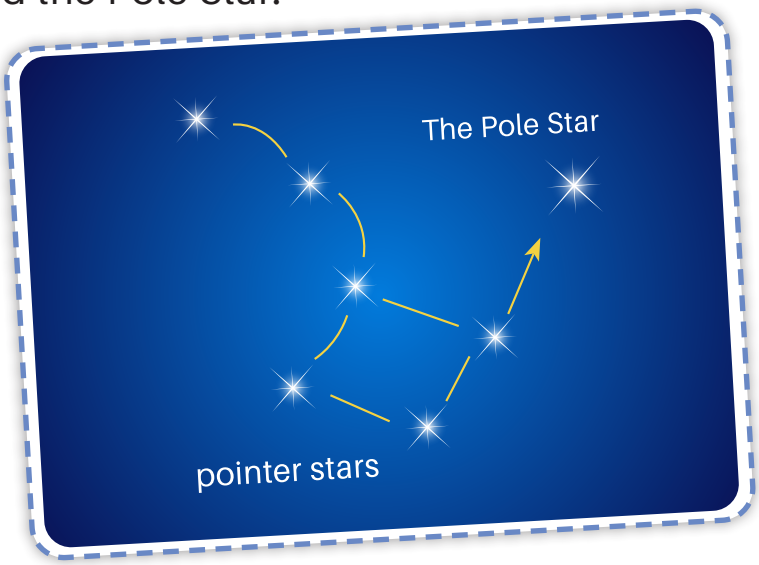
Seasons:

The axis of the Earth is not straight up or down. It is slightly tilted. The Earth goes round the Sun in one year or 365 days.
During the year, sometimes the North Pole is tilted towards the Sun, and sometimes the South Pole is tilted towards it. The part of the Earth which is tilted towards the Sun gets more light, so it is warmer. It has summer. The part which is tilted away from the Sun gets less light, so it is colder. It has winter.
When the Earth is not tilted away from or towards the Sun, it gets equal amounts of light, and it is either spring or autumn.



The Big Bear:

In the northern part of the world, there is a constellation called the Big Bear. It is above your head, high in the sky. It is made up of seven stars arranged as shown in the diagram.
The lower two stars are called pointer stars. They always point to a bright star called the Pole Star or the North Star. The North Star is always in the northern part of the sky, directly over the North Pole. The Big Bear seems to move around the Pole Star.



Land and water on Earth:

If you look at a globe, you will see blue parts which are the oceans, seas, rivers and lakes. The brown and green parts are the plains, mountains and deserts.
We see that almost one-third of the globe consists of land and three-fourths consists of water.

Activities

1. Shine a torch on a globe. Spin it slowly. See which parts get light and which parts are in darkness.

2. Hold a piece of white card and shine a torch on it. Tilt the card slowly. How does the shape change? How does the brightness of the light change? Why?

Exercises

1. Answer the following questions.

(a) How does the Earth spin?

(b) Why do you see the Sun moving from east to west?

(c) Which part of the Earth has day?

(d) Which part of the Earth has night?

(e) Which part of the Earth has summer?

(f) Which part of the Earth has winter?

(g) How much sunlight does the Earth get in spring and autumn?

2. Fill in the blanks.

(a) The ..... of the Earth passes from the North and South Poles.

(b) The Earth is spinning on its ..... .

(c) The ..... of the Earth is slightly tilted.

(d) The Earth goes round the Sun once in ..... days.

(e) The Earth spins on its axis once in ..... hours.

3. Write the names of the four seasons.

(a) .....

(b) .....

(c) .....

(d) .....

Lightning safety

All thunderstorms produce lightning and are dangerous. If you hear the sound of thunder, then you are in danger from lightning. Always listen to the radio and television for the latest information and instructions for your area.

If you are out doors:

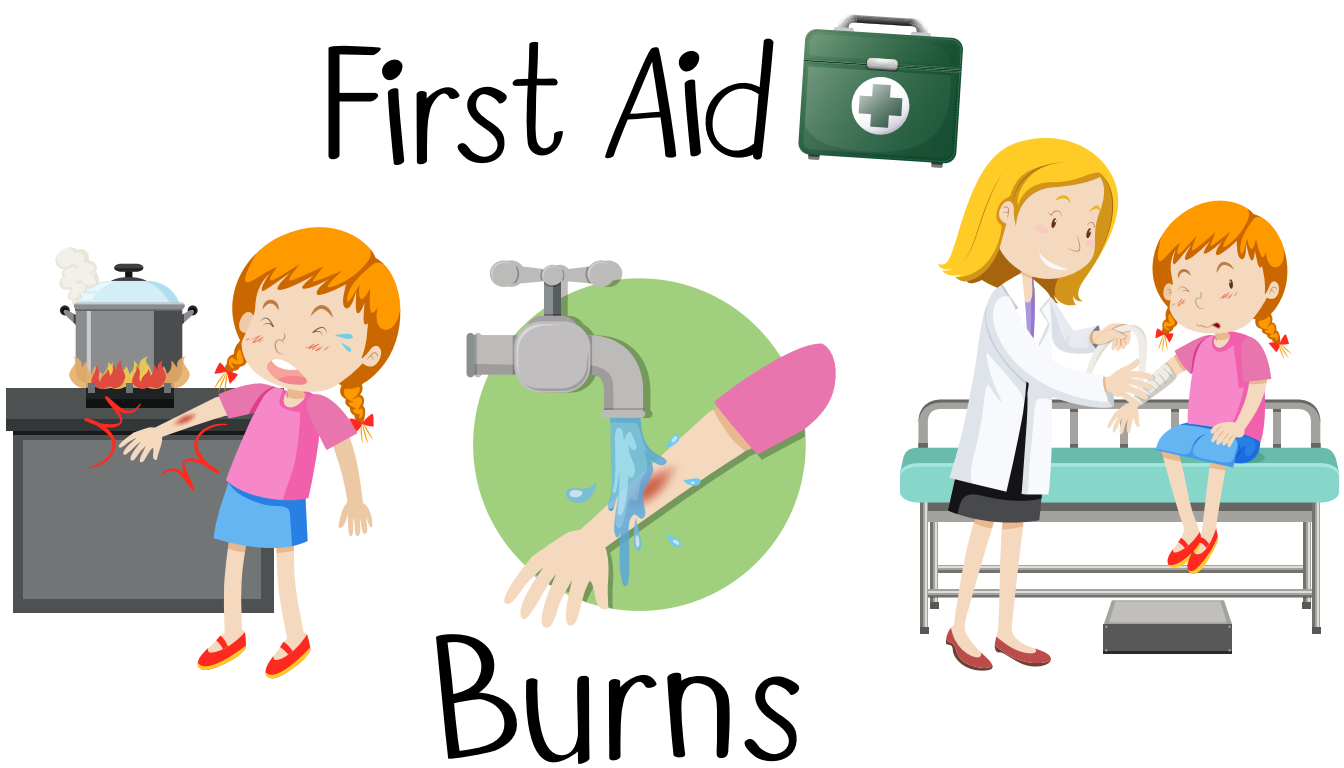
- Keep an eye at the sky. Look for darkening skies, flashes of lightning, If you hear the sound of thunder, go to a safe place immediately.
- The best place to go is a building or a car, but make sure the windows in the car are shut. Avoid picnic areas, and bleachers.
- If there is no shelter around you, stay away from trees
- Stay out of water. It's a great conductor of electricity. Swimming and scuba diving are not safe.
- If you're playing an outdoor activity, wait at least 30 minutes after the last observed lightning strike or thunder.

Burn First Aid:

1. Cool the burn under cold running water for at least ten minutes.
   Cooling the burn will reduce pain, swelling and the risk of scarring. The faster and longer a burn is cooled with cold running water, the less the impact of the injury.

2. After the burn has been cooled, cover it with a clean plastic bag.
   This helps prevent infection by keeping the area clean. Plastic bag won't stick to the burn and will reduce pain by keeping air from the skin's surface.

3. Call 911 if necessary.
   If you can't call 911, get someone else to do it, The burn may need urgent medical treatment.



Test Paper

1. Why do the leaves of a plant move to face the light?

.....

2. Match the animal to its body part.

Animal	Body part
(a) fish	legs
(b) bird	fins
(c) insect	flippers
(d) rabbit	wings
(e) dolphin	wings

3. What three things must you do to stay healthy?

1. ..... 2. ..... 3. .....

4. How can scientists help to increase the production of food?

.....

5. What is a food web? Draw a food web below.

6. How are the animals that live in very hot places adapted to live there?

.....

7. How can you separate a mixture of sand and salt?

.....

8. Fill in the blanks.

(a) Bronze is an ..... of copper and tin.

(b) ..... is a mixture of copper and zinc.

9. How do cloud form?

.....

10. Fill in the blanks.

(a) Warm air has ..... pressure.

(b) Cold air has ..... pressure.

(c) The coming in of fresh air and the escaping of warm air is called ..... .

11. Fill in the table with Yes or No.

	Breathing	Burning
(a) Needs oxygen		
(b) Produces heat		
(c) Produces water vapor		
(d) Produces light		
(e) Produces carbon dioxide		

12. How are magnets useful?

.....

13. Write True or False.

(a) The same poles of magnets attract each other ..... .

(b) Electromagnets are used to lift scrap iron and steel from a scrapyard ..... .

(c) A lodestone is an artificial magnet. .....

(d) The force of a magnet is called magnetic force. .....

14. How does a body get negative charge?

.....

15. What is static electricity?

.....

16. What is the freezing point of water on the Fahrenheit scale?

.....

17. Draw the water cycle.

18. What is a luminous body? Draw two luminous bodies below.

19. Fill in the blanks

(a) A ..... of light is made up many rays.

(b) Light from the Sun helps plants to make their ..... .

(c) Light travels in straight ..... .

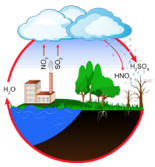
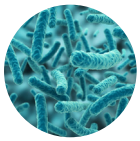
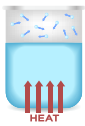
(d) The bouncing back of light from a smooth surface is called ..... .

(e) The Moon is a ..... body.

(f) The Moon reflects the light of the ..... .

20. Draw the Big Bear and the North Star below.

Glossary

Adaptation		process by which an animal or plant becomes fitted to its environment.
Acid rain		rain polluted by acid that has been released into the atmosphere from factories.
Bacteria		one-celled living things that do not have a nucleus.
Boiling point		the temperature at which it can change state from a liquid to a gas.
Carnivores		an animal that eats other animals.
Emulsion		is mixture of two liquids that would not normally mix
Environment		everything that is around us. It can be living or non-living things.
Evaporation		the changing of a liquid into gas.
Exoskeleton		a hard covering that supports and protects the bodies of some types of animals.
Filtering		away of separating particles of different sizes.
Food chain		the path of energy in the form of food going from one living thing to another.

Glossary

Food web		away of showing how food chains in any place are linked together.
Herbivores		an animal that eats mostly plants.
Life cycle		steps that show how a living thing grows, changes, and makes new living things.
Magnet		any object that attracts certain metal objects.
Mixture		a combination of two or more substances that keep their properties.
Pollution		harmful things getting into the air, water, or land.
Omnivores		an animal that eats both plants and animals.
Pole		the part of a magnet where the ability to push or pull is the strongest.
Solute		the part of a solution that gets dissolved.
Solution		a mixture that stays mixed and you can see through clearly.
Solvent		the part of a solution that does the dissolving.
Suspension		a mixture in which the particles settle and separate over time.
Static energy		a build up of electrical charges on an object.