

Science Around US

Book 4



Easy Path Series

A GOG/EFA-FTI Project

Acknowledgements

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SCIENCE AROUND US

BOOK 4

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NOT FOR SALE

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GOVERNMENT OF GUYANA

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Easy Path Series

FOREWORD

One welcomes the publication of this series of textbooks as part of the Primary Education Improvement Project funded by the Inter-American Development Bank and the Government of Guyana.

This series of texts has been long in planning, writing and producing. In the process however, many Guyanese have developed skills in textbook writing and publication. This will serve Education well in the future.

We congratulate all those responsible for the production of these texts. They have done a good job. Guyanese children at the Primary level, and, indeed, the society as a whole, will be the beneficiaries of their labour.

Thanks to the Inter-American Development Bank for its financial support. Primary Education in Guyana will benefit considerably with the availability of relevant reading material.

Hon. Priya Manickchand
Minister of Education

NOT FOR SALE

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CHAPTER 1 THE HUMAN BODY

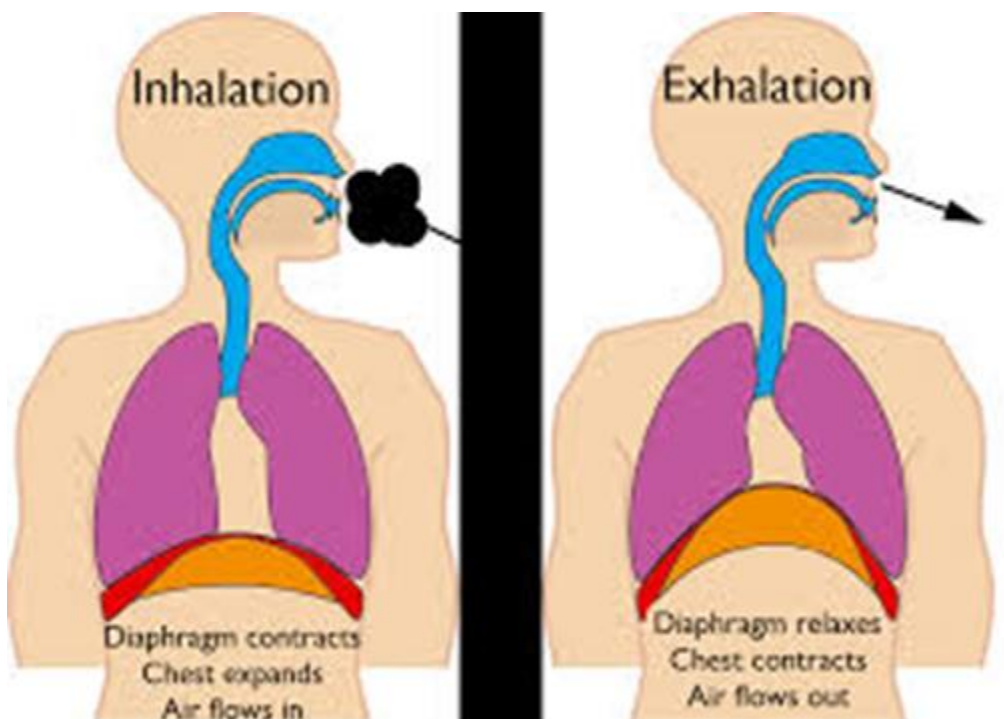
THE PROCESS OF BREATHING.

The way our bodies function is amazing! Have you ever wondered how we breathe?

Put your hand on your abdomen, breathe in and out. What have you observed?

Discuss your observations with your teacher.

Study the diagram below. Are you familiar with what happens when you inhale and exhale?



Now try the activity below;

- Jump up and down. Can you describe your breathing?
- Try saying something while you are breathing in. Try saying something while you are breathing out. Which is easier?

Have you noticed that the air we breathe enters through the nose or the mouth and then goes into the windpipe or trachea? When we inhale, the ribcage in the region of the chest moves up and out, causing your lungs to expand thus becoming filled with air. Upon exhaling the ribcage moves down and in, causing your lungs to become smaller as the air leaves the lungs.

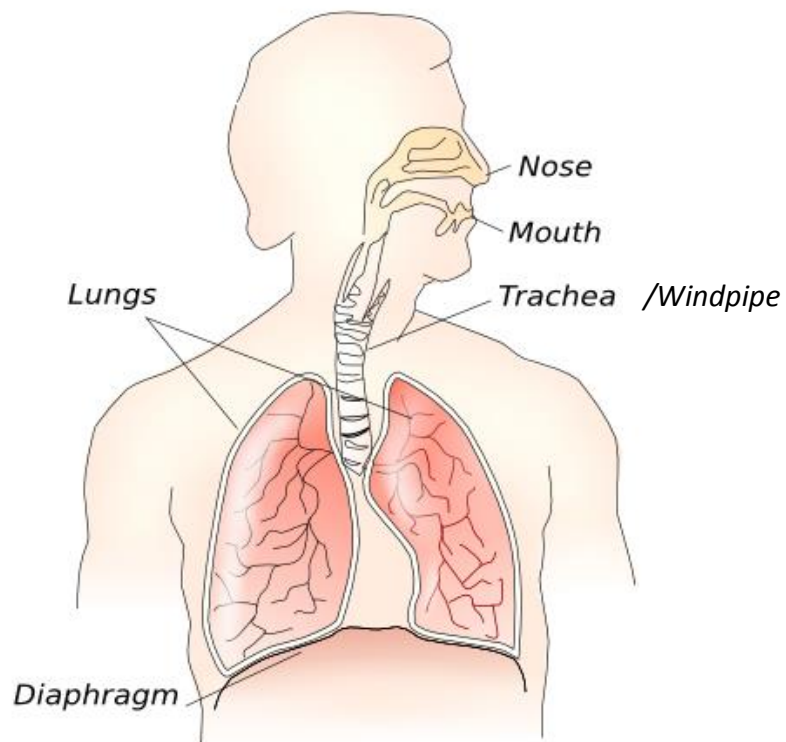
THE RESPIRATORY SYSTEM

The process of breathing is made possible by the **Respiratory System**. This system consists of organs within the body and is found in the thorax which is in the upper part of the body. Respiration is controlled by the brain. You don't even have to think about it.

PARTS OF THE RESPIRATORY SYSTEM

The main parts of the respiratory system are the nose, windpipe and lungs. The hair in the nose removes dust particles from the air. The windpipe takes air to the lungs. The lungs supply oxygen from the air to the blood. The windpipe is also known as the trachea.

Diagram showing parts of the Respiratory System



NOSE

As air passes through the nasal cavities it is warmed and moistened. This helps to protect the delicate tissues that form the respiratory system. The nasal airways are lined with hairs and kept moist by mucous secretions.

THE LUNGS

The lungs are spongy structures where the exchange of gases takes place. They are the main organs of the respiratory system. The purposes of the lungs are to bring oxygen (O₂), into the body and to remove carbon dioxide (CO₂). The red blood cells take oxygen in the lungs to all the body cells that need it. The red blood cells drop off the oxygen to the body cells, then pick up the carbon dioxide which is a waste gas product produced by our cells. The red blood cells transport the carbon dioxide back to the lungs and we breathe it out when we exhale.

RESPIRATORY DISEASES / BREATHING DISORDERS

Asthma is a breathing disorder. Its symptoms include coughing, wheezing, tightness of chest and breathlessness. It is caused by an allergic reaction to materials in the environment such as pollen, cigarette smoke, house dust and pet dander. This common respiratory disease, asthma, causes the small bronchioles in the lungs to narrow. This is what helps to cause shortness of breath, wheezing, or coughing. Allergies to smoke, dust, pollen or other things in the environment may cause asthma attacks.

FIGHTING RESPIRATORY DISEASES

Most non-infectious respiratory diseases cannot be cured, but they can be treated. For some respiratory diseases, such as asthma, people take medication to make breathing easier. People who have these diseases often lead fairly normal lives.

Emphysema, which is one of the worst respiratory diseases cannot be cured or even treated very well.

FUNCTIONS OF THE ORGANS OF THE RESPIRATORY SYSTEM

The main job of the respiratory system is to get oxygen into the body and get waste gases out of the body. It is the function of the respiratory system to transport gases to and from the circulatory system.

The nose

1. filters the air by using the hairs and mucous in the nose
2. moistens the air
3. warms the air

The trachea/windpipe

- The trachea /windpipe takes the air into and out of the lungs.
- It supports the functioning of the digestive system as it ensures that the food we swallow travels into the stomach.

The Diaphragm

1. The diaphragm controls the flow of air into the lungs.
2. It helps in respiration and/or breathing.

CIRCULATORY SYSTEM

Have you ever wondered what happens to the blood in your body? The blood goes around in your body and it makes a complete trip in half a minute. This trip is possible because of the **circulatory system**. The **heart**, **arteries**, **veins** and **capillaries** all make up the circulatory system.

The heart pumps blood around the body. The arteries take blood enriched with **oxygen** from the lungs to all parts of the body. In this way too, **nutrients** from the food we eat are taken to the other parts of the body. The nutrients, oxygen and water pass through the thin walls of the capillaries. The veins take blood containing **carbon dioxide**, produced in the body, back to the heart. The heart pumps this blood to the lungs where the carbon dioxide is given up and breathed out.

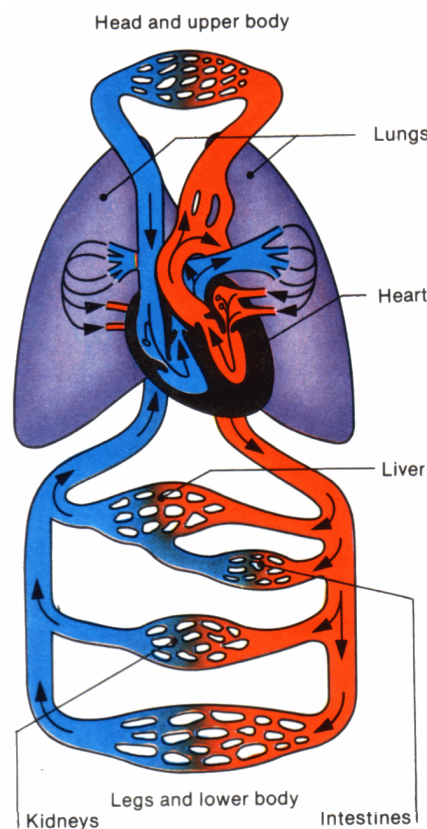


Diagram showing circulation in the body

Eating a balanced diet, avoiding too much fatty foods, exercising, being happy and avoiding tobacco and other harmful drugs help prevent diseases of the heart and circulatory system.

THE SKELETON

The skeleton gives the body shape. The skeleton forms an attachment for muscles or flesh.

The main parts of the skeleton are the skull, ribcage, backbone, pelvis, and bones of the limbs, that is, the arms and legs.

The skull protects the brain, the ribcage protects the heart and lungs and aids breathing. The backbone helps support the body while protecting the spinal cord. The bones in the limbs are for movement.

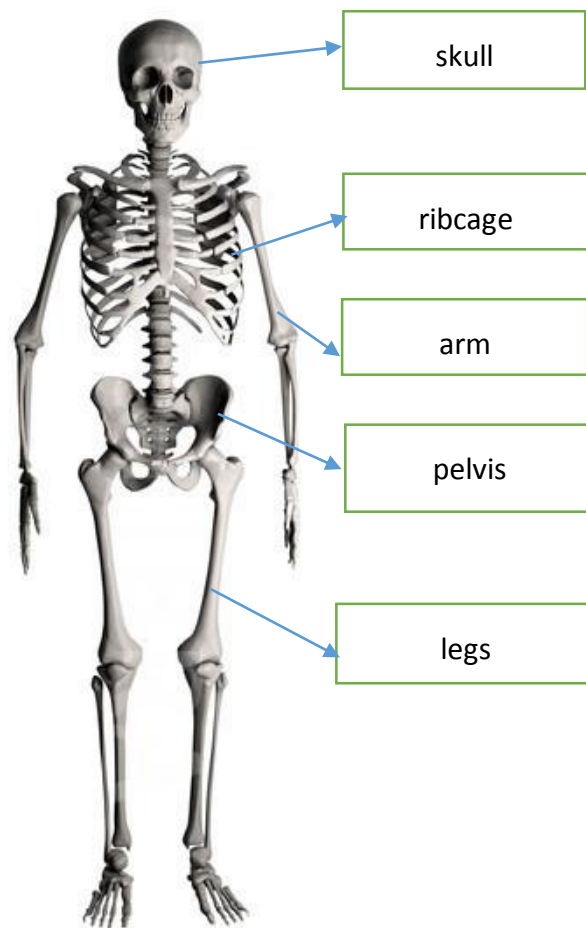
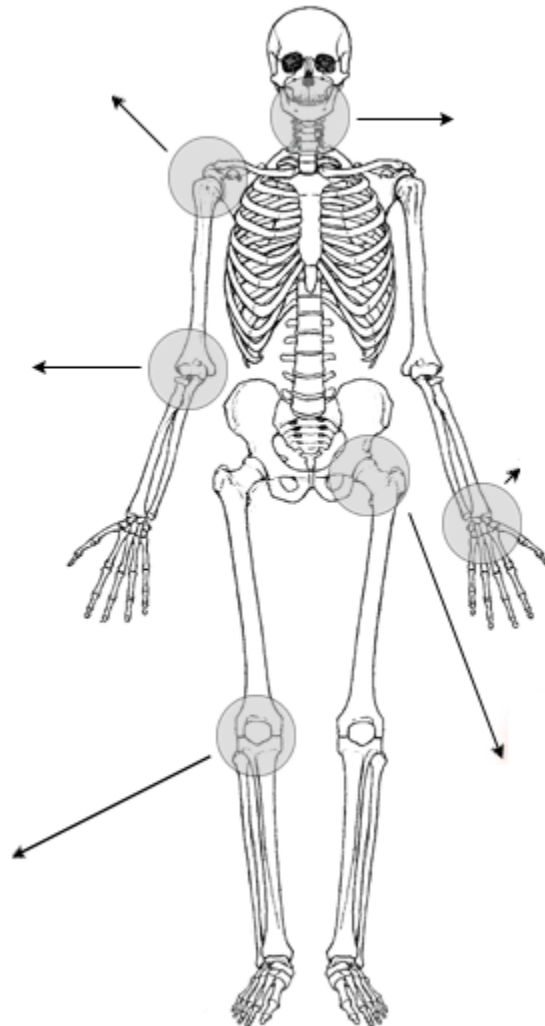


Diagram showing the main parts of the skeleton

JOINTS

A joint is where two or more bones meet. Some joints permit movement of the bones.

Examples of joints are the shoulder, elbow, wrist, hip, knee, and ankle. Joints are flexible and allow for varied movement of the body and its parts.



Name the joints in the diagram above.

SUMMARY

- The process of breathing is made possible by the Respiratory System.
- Air enters the body through the nose or the mouth.
- Air gets to the lungs through the trachea or windpipe.
- The diaphragm controls the flow of air into the lungs.
- The red blood cells take oxygen in the lungs to all the body cells that need it.
- The red blood cells pick up the carbon dioxide which is a waste gas product produced by our cells.
- Carbon dioxide is taken back to the lungs and we breathe it out.
- The main parts of the skeleton are the skull, ribcage, backbone, pelvis, and bones of the limbs, that is, the arms and legs.
- A joint is where two or more bones meet.

CHAPTER 2 ANIMALS

How are you similar to a cat? How are you different? Animals around us are similar in some ways and different in other ways. Animals differ in size, shape and colour. They also differ in what they eat, how they grow and where they live. Think of other ways in which animals differ.

ANIMALS WITH BACKBONES



Here are some common animals. Can you name them? They all look different from each other but they are all alike in one way. Let us find out how.

Something to do

- 1 Run your finger down the centre of your back.

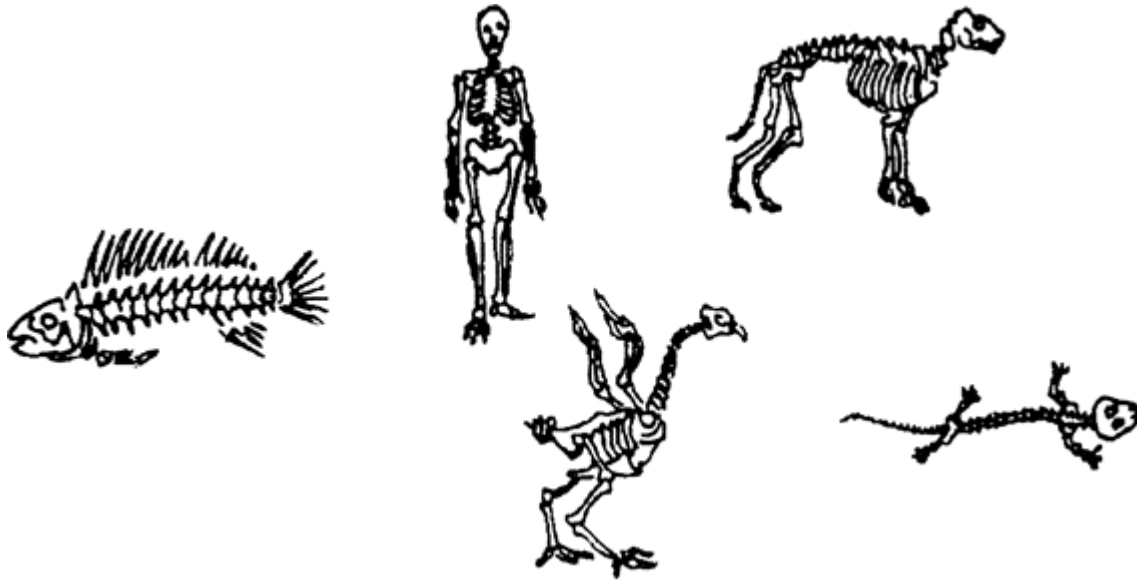
What do you feel?

2. Do the same to your friend's back. What do you feel? What is it called?

Have you a pet dog or cat? Can you feel its backbone? Humans, dogs and cats have backbones.

Animals with backbones are called vertebrates. The backbones belong to a set of bony structures called the skeleton.

Look at these skeletons.



Name the animals to which they belong. Can you find their backbones? Snakes, fish and birds have backbones. They are vertebrates. Name some other vertebrates found in your neighbourhood.

THE FAMILY OF VERTEBRATES

Although all vertebrates are alike in some ways, they differ in many other ways. Look carefully at the coverings of the vertebrates below. Are they the same? With what is each animal covered?

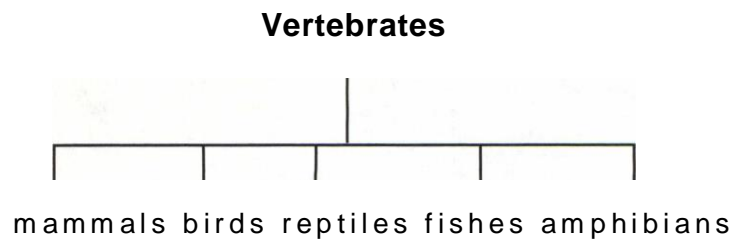


What do fishes have that the others do not have?

We can use these differences to classify vertebrates into five main groups.

These groups are:

1. Fishes
2. Amphibians
3. Reptiles
4. Birds
5. Mammals



Scientists use keys which are special codes to help them find the group to which an animal belongs.

Here is a key for classifying vertebrates. It is made up of paired clues. Use it to find to which group each of the animals mentioned belongs.

Key to Vertebrates

1. Hair present No hair present	Mammal Go to no. 2
2. Feathers present No feather present	Bird Go to no. 3
3. Fins present No fins	Fish Go to no. 4
4. Scales present No scales	Reptile Amphibian

Here is how to use this key.

Let us find out to which group the alligator belongs. Start at 1 in the key.

Does the alligator have hair? No, then move to 2.

Does it have feathers? No, then move to 3.

Does it have fins? No, then move to 4.

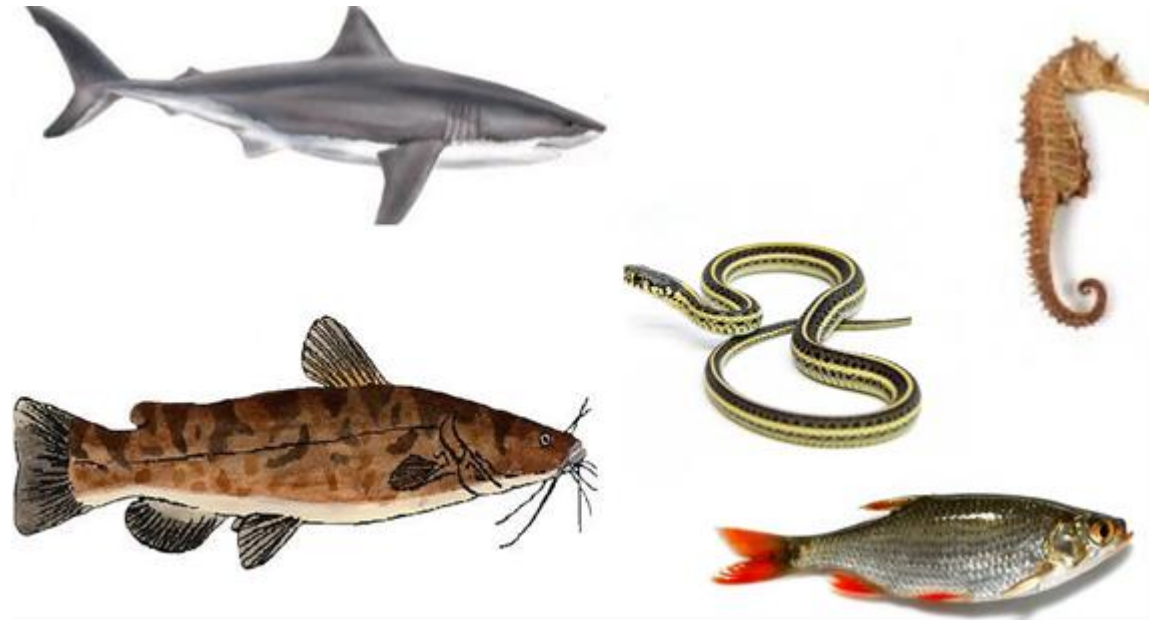
Are scales present? Yes the alligator is a reptile.

Do the same to find to which group the other animals belong.

A CLOSER LOOK AT VERTEBRATES

Fish

Fish are the largest group of vertebrates. They are found in both fresh water and salt water. Can you name some fresh water fish? Look at the fish below. Name them. How are they different from each other?



Fish may differ in colour, size and shape.

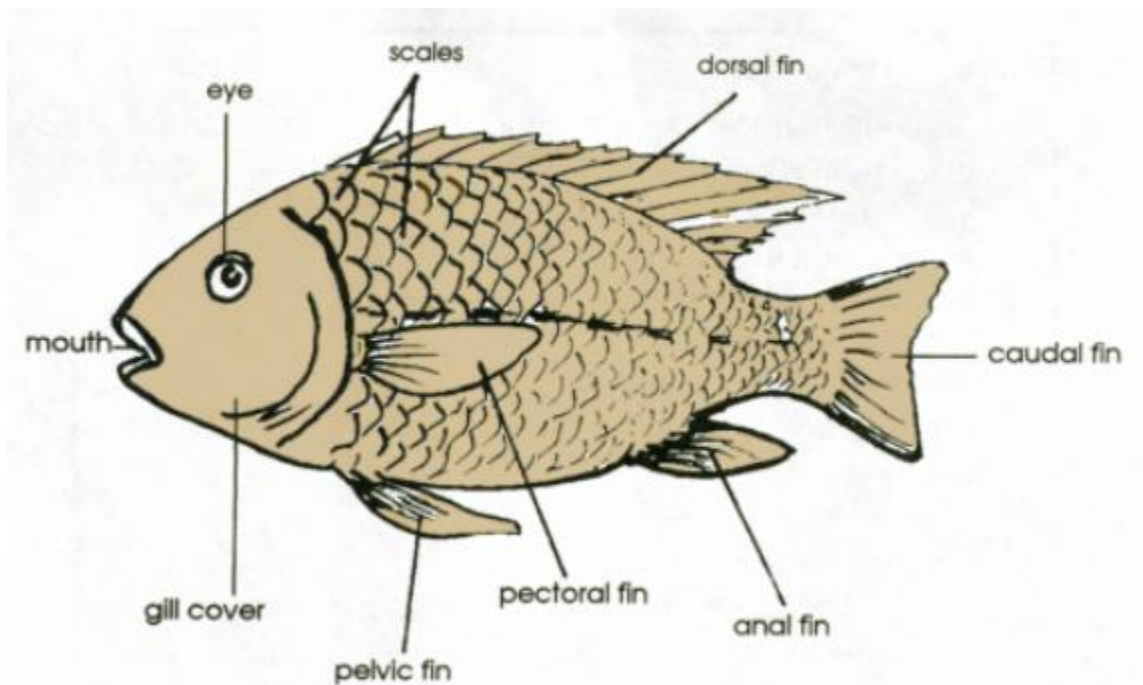
Fish are however alike in many ways. You know already that most types of fish have scales, fins and a bony skeleton. (The shark does not have scales.)

The shark, stingray and dogfish, however, have skeletons which are not made of bones but of cartilage.

Cartilage is a firm, bone-like structure that bends. It is found in the tip of your nose and your ear lobe.

Fish are cold-blooded. Their body temperature changes with that of their surroundings.

Most fish lay eggs. The guppy, however, gives birth to live young and does not lay eggs.



Fish have gills. These are found under the gill cover. Fish use gills for breathing.



Something to do

1. Get a small fresh fish and examine it carefully.
2. carefully rub your hand along it. How does it feel?
3. Look at the fins. How many fins does it have?

Are any of them paired?

4. Look closely at the scales and use a blunt knife to take off some of them. Compare them with scales from another fish.

5. Lift the gill cover. What is the colour of the gills? What do they look like?
6. Let us make an aquarium.

Things you need

- a large glass jar • sand • pebbles
 - water • plants • small fish
- a. Wash the sand and pebbles and line the bottom of a clean jar.
 - b. Pour in water carefully so as not to shift the sand. If tap water is used let it stand for about two days.
 - c. Anchor some water plants in the sand.
 - d. Put in a few small fish.
 - e. Feed fish with tiny bits of earthworm.

Amphibians

Some vertebrates spend part of their lives in water and part on land. These vertebrates are called amphibians.

Amphibians, like fish are cold-blooded vertebrates. Frogs, toads, salamanders and newts are all amphibians.



The very young amphibians are like fish. They live in water and breathe by gills. Most adult amphibians, however, live on land and breathe by lungs.

The bullfrog and some salamanders, such as the mud puppy, live almost their entire lives in water.

Vertebrates that live on land breathe by lungs.



The adult mud puppy has no lungs. It breathes by gills found outside its body.

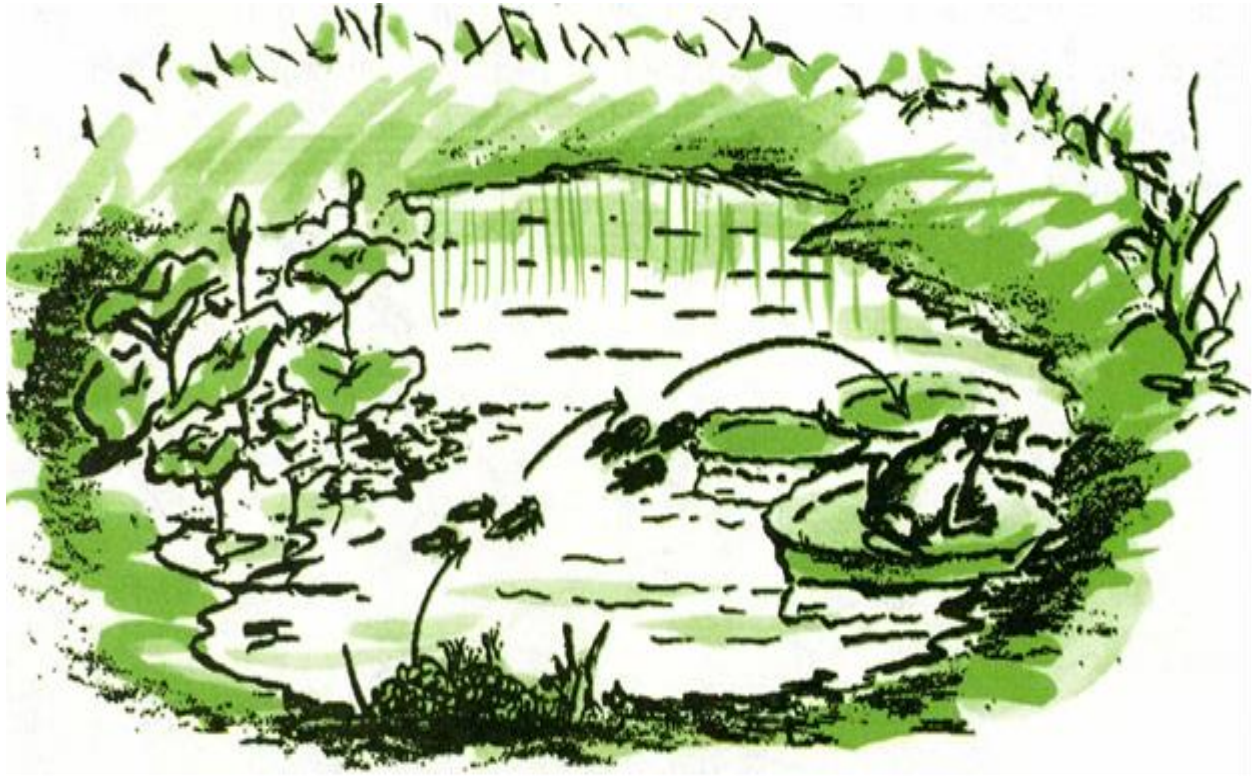
Most amphibians have moist, smooth skin. Look closely at the skin of a toad and of a frog.

How can you tell a toad from a frog?



Life Cycle Of A Frog

Amphibians go through several stages during their lives. These stages make up the life cycle of the frog. Below is the life cycle of a frog. Let us look at the stages.



The frog lays its eggs in the water. Egg-shaped tadpoles hatch from these eggs. They have fins, head, tail and external gills. Back legs develop first, by about eight weeks, then front legs emerge. The tadpole then loses its external gills and develops internal gills. Gradually the tail shrinks and lungs are also developed. The adult frog moves to land.

Birds

Vertebrates with a body covering of feathers are called birds. Birds are generally small and have wings which help them to fly. Which birds cannot fly?

Can you name any birds that swim?

Here are pictures of common birds, Try to name them.

Name birds found in your neighbourhood.



Look closely at the mouth parts of the birds in the picture above. What are they called? How are they similar? How are they different? The beak of a bird tells us about its eating habits.

Birds are warm-blooded animals. Warm-blooded animals have a constant body temperature. Its does not change as the temperature of its surroundings changes.



Birds are egg layers.

When the eggs hatch the parent birds feed and protect their young. Like adult amphibians and reptiles, birds breathe by lungs.

Adult parents teach their young birds to fly and to take care of themselves.

Something to do

1. Make a scrap book about birds.
2. Cut pictures of birds and paste them into the scrap book.
3. Write their names and interesting information about them such as, where they live, what they feed on, how they take care of their young.

Mammals

Vertebrates with a covering of hair are called mammals. Some hair may be fine and soft, short and stiff or thick and wavy. What kind of hair do these animals have? Name other animals with a covering of hair.



Like birds, mammals are warm-blooded.

Mammals give birth to their young. However the duck-billed platypus and the spiny anteater, though mammals, lay eggs.

Look at these pictures. What is the young of each animal doing?



Female mammals have mammary glands or breasts which produce milk for their young. Mammals are the only vertebrates which suckle their young.

Most mammals live on land. However, manatees, whales, dolphins, seals and walruses live in water. Bats are the only mammals that can fly.

Humans are also mammals. They are the most intelligent mammals with the most developed brain. Humans can think and solve problems to satisfy their needs. How are people different from other mammals?

Reptiles

Reptiles have dry, scaly skin and lay eggs. They are cold-blooded, (that is, their body temperatures vary with temperatures of the surroundings).

Some examples of reptiles are:



Snake



Crocodiles

SUMMARY

- Animals with backbones are called vertebrates.
- The five groups of vertebrates are fish, amphibians, reptiles, birds and mammals.
- Fish, amphibians and reptiles are cold-blooded.
- Birds and mammals are warm-blooded.
- Fishes have fins and breathe by gills.
- Amphibians live part of their lives in water and part on land. Young amphibians breathe by gills. Adult amphibians breathe by lungs.
- Reptiles have dry, scaly skins and breathe by lungs.
- Birds have feathers, and breathe by lungs.
- Mammals are covered with hair, breathe by lungs and suckle their young.

What have you learnt?

1. What is a vertebrate?
2. Name three animals from each of the five groups of vertebrates.
3. What are tadpoles? How are they similar and how are they different from fishes?
4. Solve this riddle.

I am covered with hair. I can fly.

What am I?

5. Make up a riddle of your own and let your friend solve it.

CHAPTER 3 PLANTS IN OUR ENVIRONMENT

PLANTS

Plants are all around us. We can find them living on land, in water and some are even found on other plants. Some plants are tall and straight and some are short. All plants need water. In fact, water makes up as much as 95 percent of some plants. Plants also need sunlight to make their own food. During this process, oxygen is used by plants to release the energy from their food for life processes. Plants will not grow well if they do not have enough nutrients.



Something to do:

Pupils grow plants in four different conditions over a period of two weeks, as follows;

1. Take four plants of the same size and species, growing in pots of the same size, and in the same type of soil.

Plant A- Water and air

Water plant every day.

Plant B- Water, no air.

Cover the plant with a plastic bag (make sure it has no holes) and tie string tightly around the base of the stem to cut off air supply to the rest of the plant.

Water every day, the same as plant A.

Plant C- Air, no water.

Do not water this plant. Do not restrict the air supply.

Plant D- No water, no air

Stop the plant getting air as you did for plant B. Do not water this plant.

2. Observe each plant and record your observations. This must be done daily.
3. Let your teacher guide you through other experiments to find out the other needs of plants.

LEAVES DIFFER

There are many kinds of leaves. They may differ in size, shape and colour. Leaves differ in other ways, too. Look carefully at the leaves below.



Can you see the lines on the leaves?

These lines are called veins.

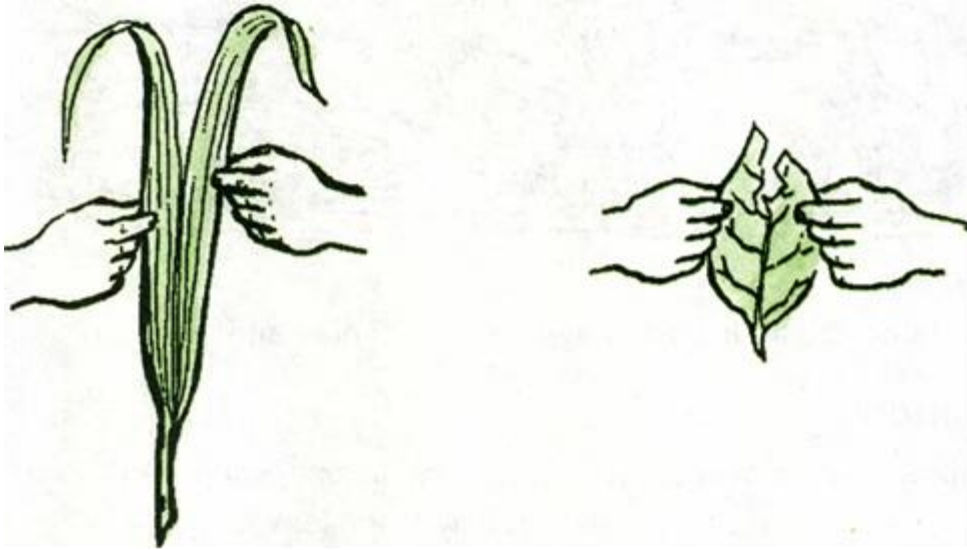
Look at the patterns made by these veins.

Are they all the same?

Something to do

Things you will need

- a variety of leaves



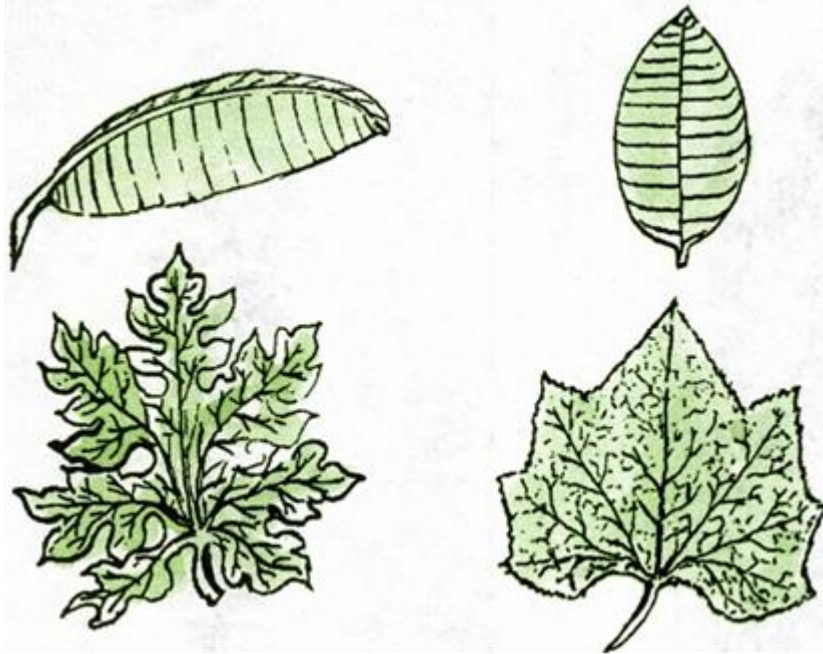
1. Tear a few leaves and observe how they tear. What have you found?
2. Put all the leaves that tear straight into one group.
3. Put all the leaves that do not tear straight into another group.
4. Make a record of your observations.

In our activity, the leaves that we could tear straight are called straight-veined or parallel-veined leaves.

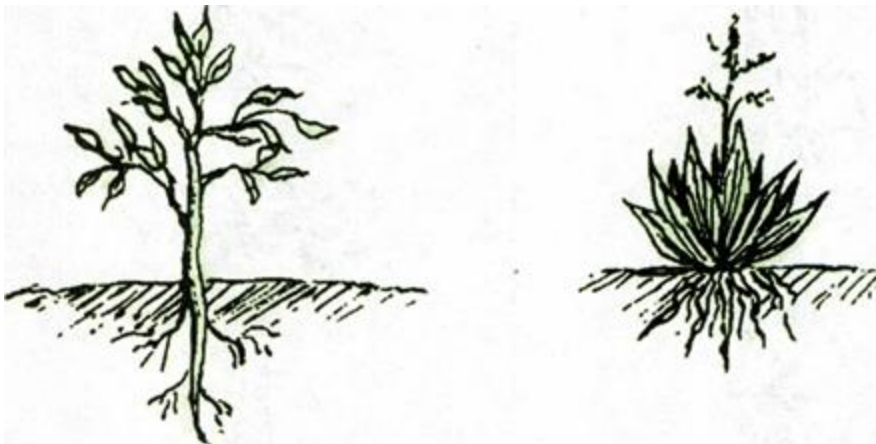
The other leaves that did not tear straight are net-veined leaves.

Make a group or set with net-veined leaves and a group with parallel-veined leaves.

Look at the leaves below.



ROOTS DIFFER TOO





Look at the roots of these plants.

Which plant has a thick, main root with branching roots? Which plant has roots that look like threads?

Roots which have a main root with roots branching from it are called tap roots. These roots grow deep into the soil in search of water and food. Roots which are thread-like are called fibrous roots. These roots are numerous.

They spread out and grow close to the surface of the soil.

Plants with a fibrous root system	Plants with a tap root system
	

Comparing Leaves and Roots

Look at the leaves of the plants with fibrous root systems.

Are the leaves of these plants net-veined or parallel-veined?

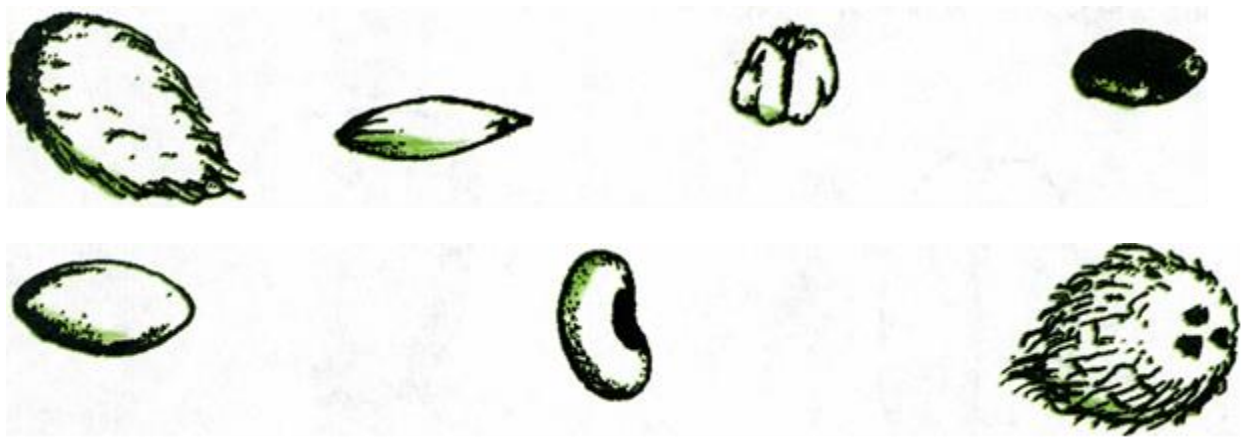
Look at the leaves of the plants with tap root systems.

Do these plants have net-veined leaves or parallel-veined leaves?

Something to do

1. Carefully pull up some plants in your surroundings without damaging the roots.
2. Shake out or wash the soil from the roots.
3. Compare the roots and leaves.
4. Record your observations.
5. What have you found out?

Look at seeds



Name the seeds in the picture.

Seeds differ in many ways. Some are big, some are small, some have soft coverings and some have hard coverings.

Let us think of other ways in which seeds differ.

Something to do

Things you need

- seeds e.g. paddy, corn, blackeye, pigeon pea, peanuts
 - containers
 - water
1. Soak the seeds overnight.
 2. Carefully remove the coverings from each seed.
 3. Record your observations.

Which seeds can easily be divided into two halves?

Which of them cannot?

The blackeye seed can be divided into two. Each part is called a seed-leaf or cotyledon. The corn seed cannot be divided into two. It has one seed-leaf or cotyledon.



How many cotyledons has the peanut?

How many cotyledons has the paddy?

Seeds can have either one or two cotyledons.

Seeds that have one cotyledon are called monocotyledons.

Seeds that have two cotyledons are called dicotyledons.

Something to do

1. Collect a variety of seeds you know.
2. Find out which seeds are monocotyledons and which are dicotyledons.

How plants use their parts

What do you think would happen if a mango tree had no root?

What would happen to it if a strong wind blew or a heavy shower of rain fell?

Roots are important to plants.

They hold the plants firmly in one place. They anchor the plant in the soil.



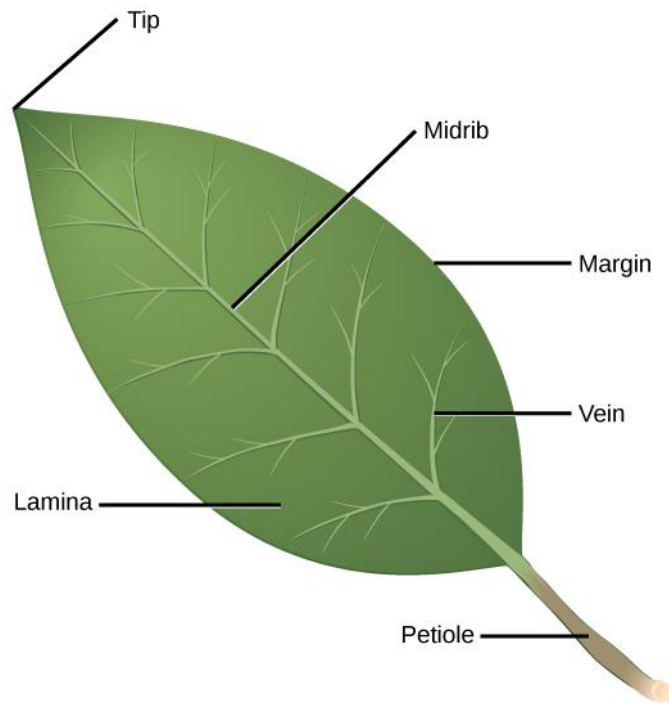
Flowers are important to plants too.

Have you ever seen bees or butterflies or humming birds visiting flowers? Some flowers are brightly coloured and have sweet smells. These brightly coloured flowers attract insects and other animals in search of food. Insects and other animals which visit flowers help the plant to get new ones.

Something to do

1. Take a walk around your neighbourhood and observe plants.
2. Make a list of plants with brightly coloured flowers.
3. Name some insects which visit these flowers.

PARTS OF A LEAF



SUMMARY

- Plants differ in many ways.
- Leaves may be net-veined or parallel-veined.
- Some plants have tap root systems while others have fibrous root systems.
- Plants with net-veined leaves have tap roots.
- Plants with parallel-veined leaves have fibrous roots.
- Seeds may have either one or two cotyledons.
- Roots anchor plants in the soil.
- Flowers that are brightly coloured and highly scented attract insects.

What have you learnt?

1. Name two plants with the fibrous root system and two plants with the tap root system.
2. Put these seeds into their correct columns in a table like the one below.

Tomato awara pigeon pea

corn pear

Monocotyledons	Dicotyledons

3. Draw a table like the one below to show the type of leaf, root system and seed for the following plants.

	leaf		root system		seed	
	net-veined	parallel-veined	tap	fibrous	cotyledon	
					one	two
Mango						
Coconut						
Blackeye						
Paddy						
Squash						

CHAPTER 4 ANIMALS IN OUR ENVIRONMENT

THE IMPORTANCE OF PLANTS AND ANIMALS

Can you imagine a world where there are no plants or animals? What a world that would be!

Plants and animals are very important to human beings. They help in the development of individuals and of a country. The growing of plants and the rearing of animals provide food and many other essential things that humans need. Excess produce can be exported and this can bring in foreign currency which is needed for the development of a country.



Plants Help In Our Development

Look carefully at the picture

What is the woman doing? Do you have a kitchen garden? How does this help to save money? Do you think that having a kitchen garden is a good thing? Why?



How is the man in this picture earning his living? Name the things he is selling. Name some other things sold in the market that we get from plants?

We see that plants provide us with food. The farmers and hucksters earn their living by selling food stuff and are able to provide some of their needs.

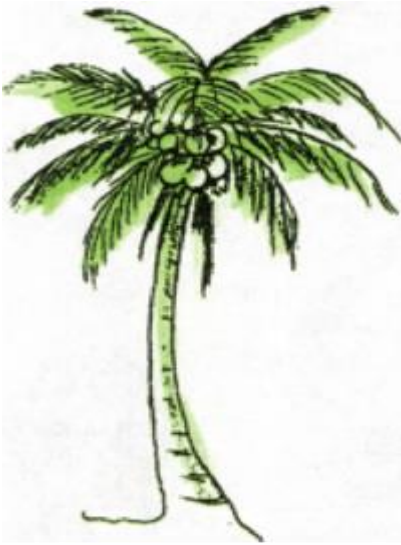


Think about the many people who are rice farmers or are involved in the cultivation of sugarcane, cassava, bananas, corn or coconuts. Farming provides jobs for many people. What is done with the excess sugar or rice produced? What other plant products are exported? How does this benefit our country?

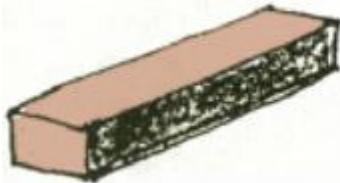
The coconut palm can provide for many of our needs.

Let's take a closer look at this tree.

Something to do



- Find out about all the materials we can get from the coconut palm.
- Make a list of all the materials.
- Collect samples of items made from the palm and say how each is used.
- Display these in the Science Corner of your classroom.



In our forests are many kinds of trees from which we get wood. Can you name some of these different kinds of wood?

Greenheart, a wood found in our forests is used worldwide to make wharves. How does the exporting of greenheart help in our development?

How does having our own wood for construction and making furniture help us to

Something to do

1. Find out how charcoal is made from wood.
2. Collect samples of different kinds of wood.
3. Make a chart with the heading These Are Made Of Wood. Paste pictures or make drawings of as many things as possible that are made of wood.

How does having our own wood for construction and making furniture help us to save money?



Look at the pictures above. What part of the plant is used for making each item?



These clothes are made from cotton. From what do we get cotton? Cotton clothes keep us cool when the weather is hot.

Discuss how producing our own cloth can help in the development of our country.

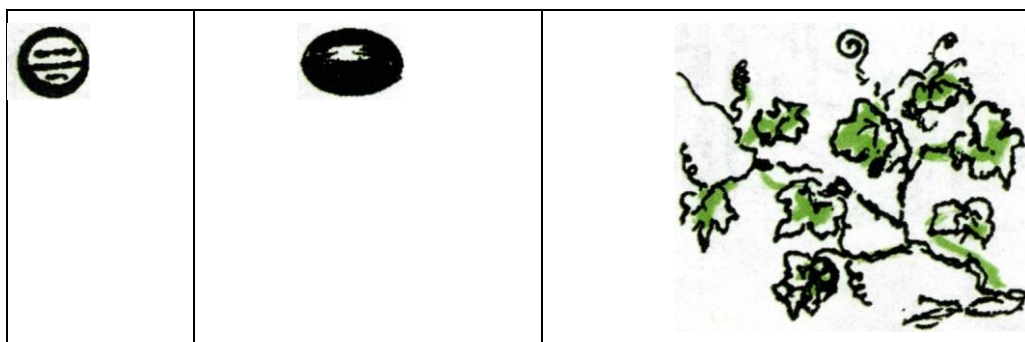
A cloth called linen is also produced from the flax plant.

Many children like to chew gum.

Do you know from where we get chewing gum? The gum is obtained from the milk of a tree. How can a chewing gum factory be of benefit to Guyana? From a rubber or bullet wood tree we get a milky substance called latex. When the latex is dried we get balata. This is used to make rubber. Name some items made of rubber. We get balata from the bullet wood tree. You may have seen balata ornaments. Find out what are some of the other uses of balata.



You may know that paper is made from the pulp of some trees. List as many items as you can that are made of paper. How can making our own paper help us and our country?

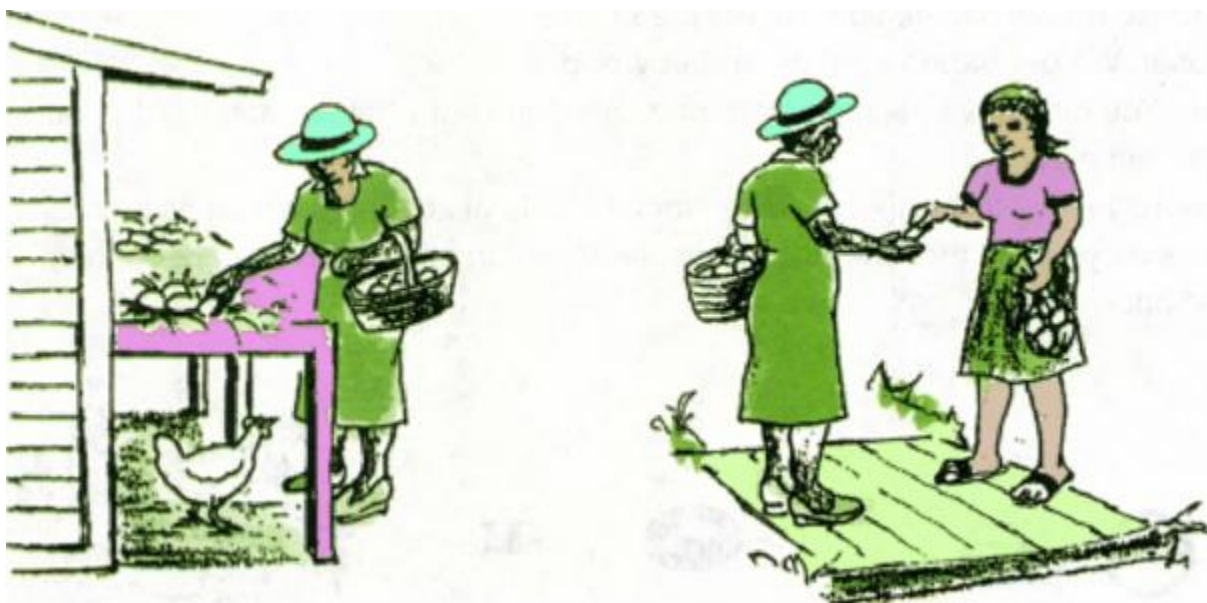


Medicine is used for healing or for the relief of pain. Some of the medicines we use come from plants.

A drug called quinine comes from a plant. Quinine helps to heal people suffering from malaria.

Aloe, a plant is also used worldwide as a medicine, and in creams for your skin.

Animals Help in Our Development



Study the pictures above. What helps the woman earn money?

Some animals are reared for food. Some of them are reared for their meat, some for eggs and some even provide us with milk.

Poultry farmers earn their living by rearing birds. What do cattle farmers rear? What other animals are reared for food? How does the rearing of animals for food help the farmers? How does it help our country? Maybe you rear a few hens at home. How does this help to save money

for other needs? Do you have a cow? What do you get from it? Let's find out about the various things we can get from the cow.

Something to do

Things you need

- cardboard
- paste
- picture of cow
- marker
- items or pictures of things we get from a cow.

1. On cardboard write the heading

What the Cow Provides

Paste a large picture of a cow under this.

2. Under this heading display items or pictures of food materials that are obtained from a cow.
3. Write in some cases what part of the animal is used.

You see that the cow is not only used for food. Have you found out that even the dung of the cow is useful? It is used as manure, as fuel and in the making of mosquito coils.



sandals




belt



purse

Look at the pictures above. They are all made from leather. You would have found out that leather can be made from the skin of the cow. Name some other animals the skins of which are used for making leather. How can developing the leather industry help our country?

 <p>Caiman</p>	<p>The skins of the caiman, alligator and snake are also used for making purses, shoes and belts. The young caiman is also caught, killed and stuffed as ornament. What would happen to the caiman if we continue to use them in this way?</p>
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Something to do

1. If possible visit a tannery. Find out how leather is made.
2. Collect pictures of items made from the skin of animals. Paste these in your Science book.



Many people earn their living by catching food from the sea. Name some animals people eat which live in water. What can be done with the excess sea food caught?

Have you ever eaten preserved shrimp?

Find out how shrimp is preserved.

How can preserving fish and shrimp benefit your family? How can developing this industry benefit your country?

Cod liver oil comes from a fish. Can you name that fish? Find out the name of any other fish from which we get oil. What is fish oil used for?

What have you learnt?

1. Give two benefits of having a kitchen garden.
2. Name two plant products which bring in foreign currency. State how your country benefits from this.
3. Complete these sentences:
 - (a) The milky substance from a rubber tree is called _____.
 - (b) We get _____ from the bullet wood tree.
 - (c) _____ is very good for constructing wharves.
 - (d) Leather is made from the _____ of some animals.
 - (e) Charcoal is made from the _____.
 - (f) Rum is made from _____.
 - (g) Quinine is used to treat _____.
 - (e) _____ is used to preserve sea foods.

Complete the table to show what we get from each animal. The first one is done for you.

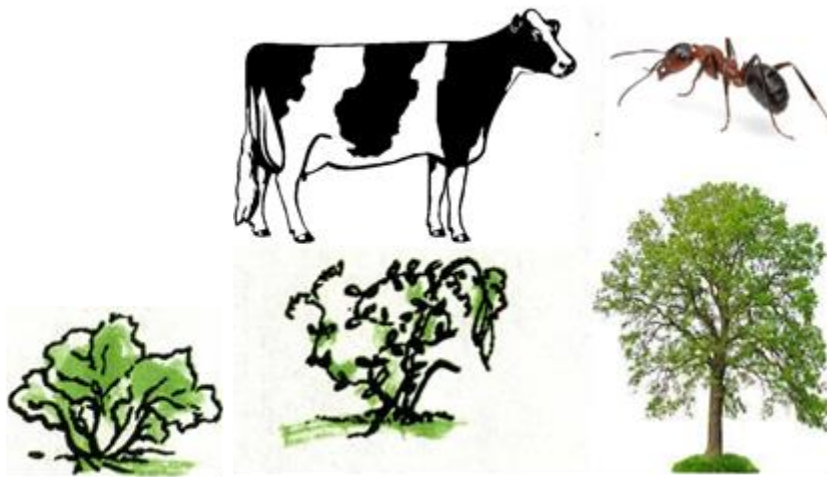
Animals	Meat	Eggs	Milk	Clothing	Medicine
cow	X		X		
goat					
duck					
hen					
sheep					
shark					

Which plant or animal products do you think could be developed in our country to bring in foreign currency?

What should we be doing to conserve those plants in our forest?

Harmful And Helpful Things In The Environment

Our environment is made up of many living things and non-living materials. Some of these materials can be helpful or harmful. Let us look at some helpful and some harmful materials around us.



Some Plants Are Helpful Too

There are many plants around us that are helpful. Can you name some of them and say how they are helpful?



Some plants like calalu, rice and orange provide us with food.

Cows, donkeys and sheep feed on grass. Sometimes when we are sick we use some plants or plant products to help make us well. We usually call these plants "bush medicine". Sweet broom, daisy, congo pump and sweet sage are examples of plants we use as medicine.

Something to do

1. Collect some plants that are used as medicine.
2. Press them between sheets of newspaper. Place a heavy object on top.
3. Paste them in your Science notebook when they are dry. Write their names.
4. Write the names of the illness or disease for which each plant is used.

HARMFUL PLANTS

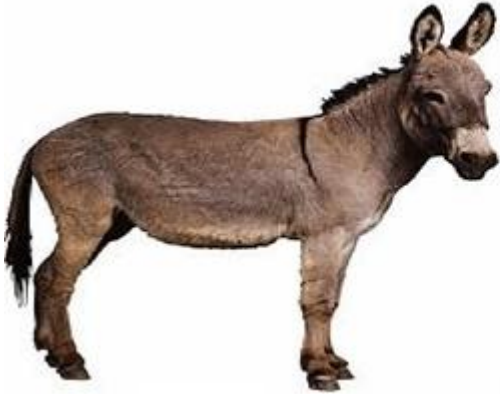
The plants in the picture below are harmful to humans. Can you tell how they are harmful? Have you ever seen a strange vine growing on your cherry or mango tree? This plant is called bird vine. This plant is a parasite. It feeds on the plant on which it is growing. If it is left there for a long time the plant may die. Razor grass will cut you if you walk among it. The stinging nettle stings. Some plants, like the cow itch, give a terrible itch.



Have you ever seen an orange coloured, stringy looking "thing" on plants? This strange "thing" is a plant that is also a parasite. It is called a dodder and it kills other plants.

Can you name other harmful plants? Make a list of them and say how they are harmful.

Some Animals Are Helpful To Us



A



B



C



D



E

Name the animals labelled A to E in the picture. We call these domestic animals. These animals are useful to humans. Can you tell in what way each helps us?




Perhaps you can make a table like the one below

Animal	How it helps
Cow	Gives us milk and meat
Horse	
Dog	
Donkey	
Cat	

You may add the names of other helpful animals to your list.

HARMFUL ANIMALS

Some animals can be harmful to humans. We must be very careful of these animals.

		
Snake	Rat	Acushi ant

Some snakes are poisonous and may kill animals they bite. Rats spread diseases. They also bite and destroy our clothes, books and furniture. The acushi ants are harmful because they destroy crops. If you live in the countryside you would have seen these ants carrying bits of leaves. You may collect pictures of other harmful animals and paste them in your Science note book.

Other Harmful Materials

The land, air and water around us can become harmful when we pollute them. We pollute them by dumping refuse and garbage all around our environment. Houseflies, rats and cockroaches breed in garbage heaps.

These creatures spread diseases that are very harmful to humans.



Sometimes we dump all kinds of refuse in trenches, rivers and lakes. When we do this we pollute the water. We make it unsafe for use. Mosquito breeds in stagnant and dirty water. The anopheles mosquito spreads malaria and filaria.



SUMMARY

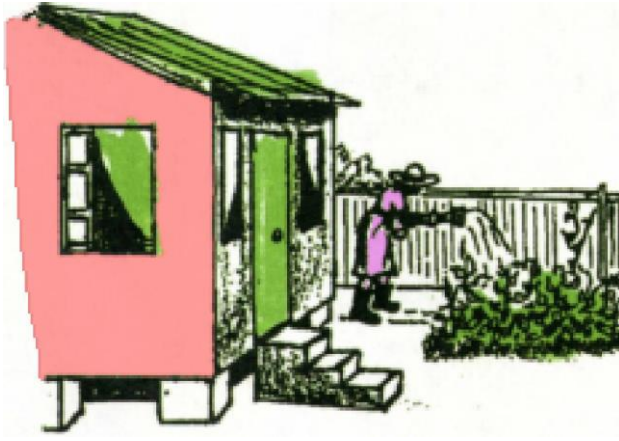
- Some materials around us can be useful and some can be harmful.
- Some animals are helpful and some are harmful.
- Some plants are helpful and some are harmful.
- Land, air and water can become polluted.
- Everyone should help to control pollution.
- Animals and plants help in the development of both people and country.
- Plants and animals provide humans with food and a means of earning a living.
- Different types of wood are used for construction and for making furniture.
- We get gum, rubber, balata, paper, charcoal (coals) and medicine from plants.
- We also get leather and oil from animals.
- We can preserve excess sea foods.

What have you learnt?

1. Make a project book and call it "Harmful and Helpful Plants and Animals". Paste pictures of harmful and helpful plants and animals and say how they are helpful and harmful.
2. What is a parasite?
3. What is pollution?
4. What is the safest way to get rid of refuse?
5. Name a disease.
6. Name a disease that is spread by mosquito.
7.
 - (a) How are trenches polluted?
 - (b) How could we prevent the pollution of trenches?
 - (c) How could we prevent the pollution of the school environment?
 - (d) How could we prevent the pollution of our:
 - I. city?
 - II. town? villages?
 - III. community?
 - IV. home?

- (e) How could we reduce the population of harmful animals in our environment e.g. rats, mosquitoes?

CHAPTER 5 THE ENVIRONMENT



The pictures above depict different surroundings. Discuss them with your teacher.

Describe your home or school environment; say how it is similar or different to the ones above.

WHY IS OUR ENVIRONMENT IMPORTANT?

The simplest explanation about why the environment matters is that, as humans, the environment-the Earth-is our home. It is where we live, breathe, eat etc. Our entire life support system is dependent on the well-being of all of the species living on earth.

The food chain is an example of this. The sun provides light and heat for plants. The plants are consumed by animals who are in turn consumed by other animals who may in turn, be consumed by humans. Or perhaps they are used for material, clothing, etc. Even insects like mosquitoes play a role and of course bees pollinate plants.

TYPES OF ENVIRONMENT

There are many types of environments:

The physical environment



Your physical environment includes both your outdoor and indoor surroundings.

Things to do:

Make a list of things found in your Physical Environment.

Indoor	Outdoor
Bed	River

Social or cultural environment



Look at the picture above. Your family and friends are also part of your environment.

They help you to make sense of everything around you.

The immediate physical and social setting in which people live or in which something happens or develops is referred to as the Social Environment.

Things to do:

With the help of your teacher, make a collage of your Social Environment.

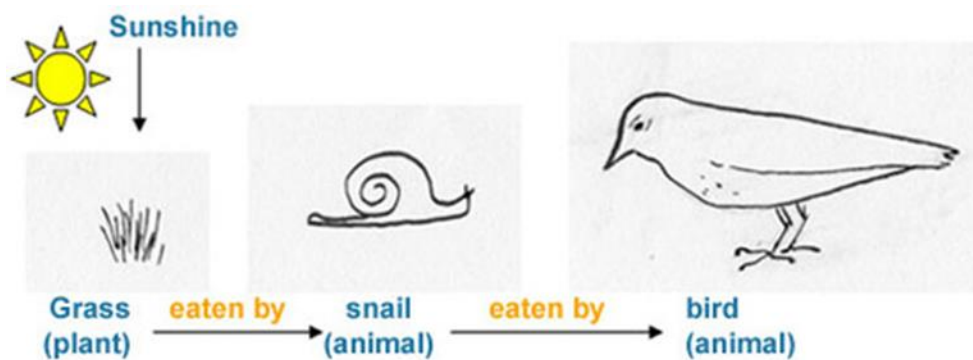
BASIC COMPONENTS OF THE ENVIRONMENT:

Environment consists of all living and non-living things which surround us. Therefore, the basic components of the environment are:

1. Air
2. Water
3. Rocks and soil
4. Living things

Animals and plants depend on each other for food.

You have learnt in Grade three that living things depend on each other for food. This relationship is called the Food Chain.



Look at the example of a simple food-chain above.

The grass uses the sun's light to make its own food. The grass is eaten by the snail. The snail is eaten by a bird.

What do you think would eat a bird?

Plants are known as food producers and animals are known as food consumers. Plants and animals that live in a particular place, for example a forest, are linked together by their food relationships. A food relationship can be simple like a food chain.

Things to do:

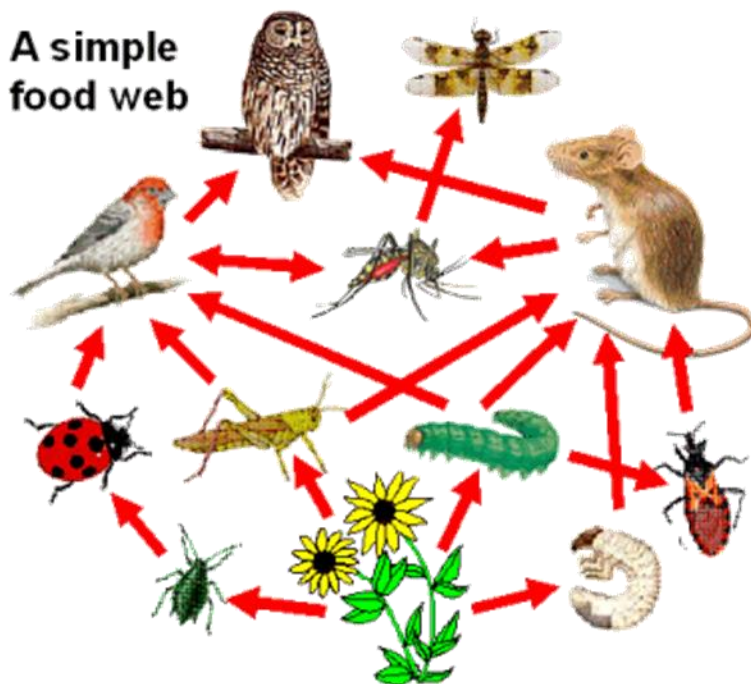
Draw a Food Chain from the living things you may find in your yard. Answer these questions to help you.

1. What kind of trees do you have?
2. Do you have a mango tree?
3. What animals have you observed feeding on the ripe fruit?

Compare your Food Chain with those of other children in your class.

FOOD WEB

Consumers get their energy from more than one type of food. This connection of food chain is called a Food Web.



Things to do:

Observe the Food Web above then use it to complete the table below.

Food Producer	Food Consumer (Herbivore)	Food Consumer (Carnivore)

THE EFFECTS OF HUMANS ON THE ENVIRONMENT

How to improve/preserve buildings.

Look around your home and school community. What are some of the buildings you see? How would you describe them?

What is a Historic Building? Discuss with your teacher how a Historic Building is preserved.



Red House: (then)



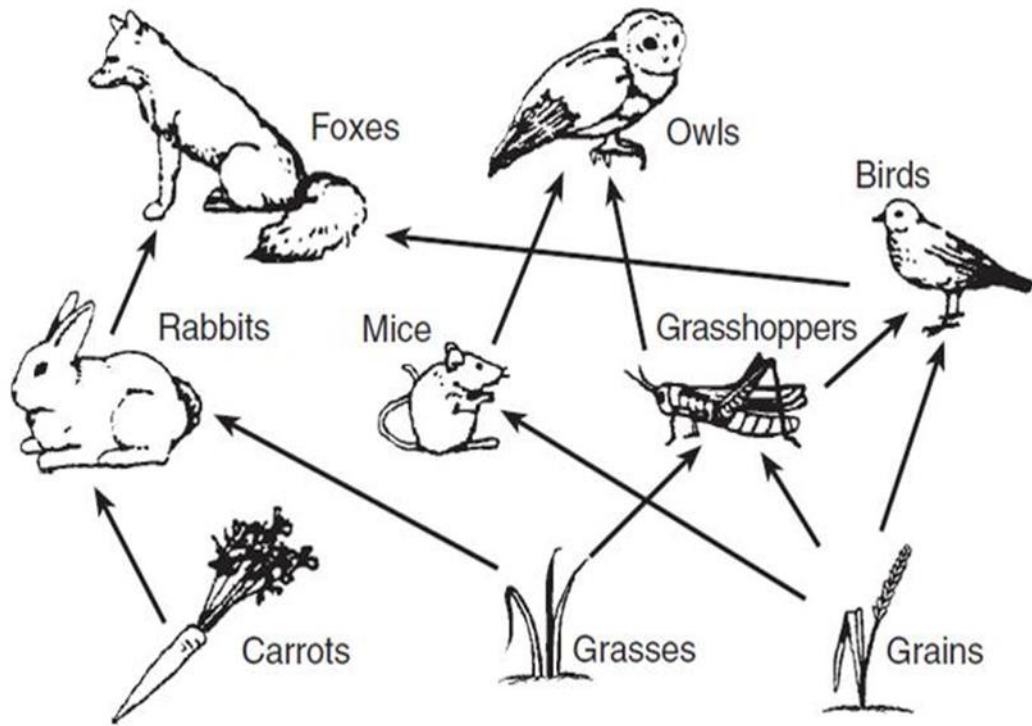
Red House: (now)

The buildings and other structures in our environment must be maintained and preserved. We should avoid defacing and damaging buildings and trees as they are important to our surroundings.

How can you help to preserve the buildings in your communities?

What have you learnt?

Name the types of environments



Study the Food Web above

- Name two producers.
- One omnivore is the _____.
- Two herbivores are the _____ and _____.

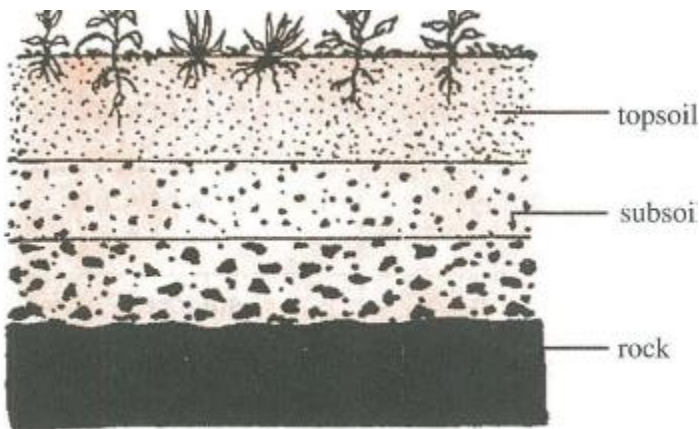
POLLUTION

Human activities are always changing the environment. These activities often cause harmful substances to be released into the atmosphere, destroying animal and plant life.

Garbage heaps and polluted trenches smell unpleasant. Have you ever passed by a garbage truck? The unpleasant smell is carried by the air around us and is harmful when breathed in over a prolonged period. How does burning garbage smell?

There are many things that we can do to reduce pollution of the environment. Recycling is one way of reducing pollution. Waste products like glass, paper and plastic can be recycled.

SOILS



A side view of soil

What is soil?

Where is it found?

Soil is that part of the earth's crust that supports plant life. Soil could be up to about thirty or forty centimeters deep. Below the soil is the underlying rock from which soil is formed. When the surface is removed a series of layers is exposed. The top layer is usually thin and is called the top soil. Under the top soil is the subsoil consisting of gravel, stones, sand and clay. Further down is the rock.

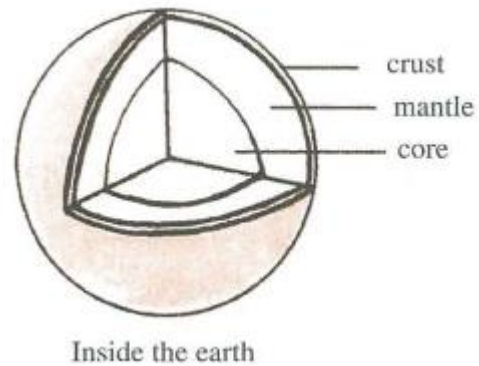
In the diagrams you can see what this layer looks like.

Is soil important to us?

Can you list some uses of soil?

Do you have a kitchen garden?

Let's take a look at the soil found in your garden.



Investigate Further:

Things you need

- trowel or small spoon
- a tray or flat container
- 1. Dig up some garden soil.
- 2. Observe it carefully.
- 3. List the things you find in the soil.

In the soil you may have found the decayed remains of animals. You may have found material like leaves, roots and barks of trees, too. This is called humus. Some soils may have lots of humus while others may have none or very little.

Types of Soil

All soils are not similar to the soil found in your kitchen garden. Soils differ in many ways. They may differ in colour, smell, size and the texture of the particles.

Investigate Further:

Things you need

Three different types of soils, A, B and C.

Examine each type of soil carefully.

Complete the table below.

Soil	Colour	Smell	Size of particles	How does it feel	Has it much, little, no humus
A					
B					
C					

Clayey Soil



The size of soil particles is very important. Clayey soil is made up of very tiny particles. It feels very sticky when wet and does not let water pass through easily. There are also few air spaces.

Rice, sugar cane, coconuts and bananas need lots of water while growing. Do you think these will grow well

in clayey soil?

However, during the dry seasons clayey soil becomes very hard and large cracks can be seen. It is now difficult for plant roots to grow through it. Can you name some areas in our country where clayey soils can be found?

Sandy Soil



Sandy soil feels quite rough and dry. Why is this so? Pour some water on some sandy soil. What do you observe? Many plants will not grow in sandy soil. The soil particles are large and water flows through quickly. There are also large air spaces. This kind of soil has little humus. Peanuts and

pineapples grow well in sandy soil.

Loam Soil

Investigate Further:

Things you need

- a container with holes at the bottom
 - sandy soil
 - clayey soil
 - Some humus or dried animal manure
1. In the container mix some sand, clayey soil and humus together.
 2. Water it. What do you observe?

Use this soil to plant a small decorative plant for your classroom.

A mixture of sandy soil and clayey soil together with humus is called loam. Our garden soil usually has lots of humus. Green vegetables like bora, calalu, lettuce and tomatoes grow best in this type of soil.

What have we learnt?

1. Complete these

- (a) Soil is used for _____ and _____.
- (b) _____ is the decayed remains of plants and animals.
- (c) The best soil for your kitchen garden is _____.

2. Match these

Soil	Crop
Clayey	Calalu
Sandy	Sugar cane
Loam	Peanuts
Ochroes	

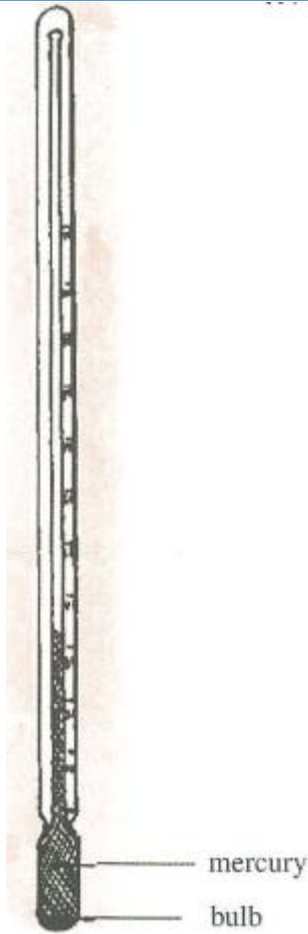
3. In which type of soil will

- (a) roots rot easily?
- (b) roots have to grow deeper in search of water?

SUMMARY

- Our environment refers to all living and non-living things in our surroundings.
- Living things depend on each other for food.
- The simple food relationship between living things is called a Food Chain.
- A Food Web is made up of several food chains.
- Plants are able to make their own food and are therefore known as producers, while animals which cannot make their own food are known as consumers.
- Our Physical Environment is important and must be maintained and protected.
- Soil is the outermost layer of the earth where plants grow.
- Humus is the decayed remains of plants and animals found in the soil.
- Some soils are sandy soil, clayey soil and loam.
- Clayey soil feels sticky when wet, does not let water pass through easily and has few air spaces. The particles are small.
- Sandy soil feels rough and dry, water passes through it easily.
- Loam is a mixture of sand, clay and humus.
- Waste products like glass, paper and plastic can be recycled.

CHAPTER 6 WEATHER



HOW HOT IT IS

WHAT IS TEMPERATURE?

Temperature is how hot or cold a thing is.

In everyday language, we can say it is warm, cold, hot, and sometimes we say it is very cold or very hot. In science, it is not enough to say warm or hot.

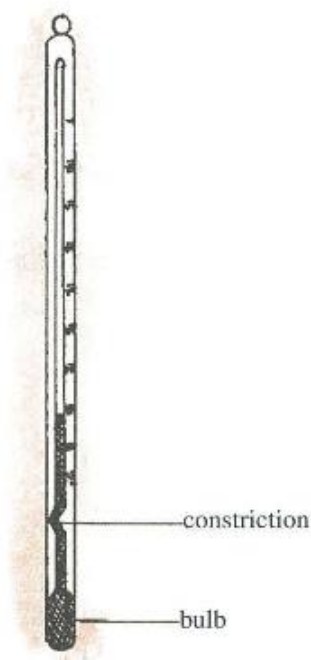
We therefore have to say directly how hot it is. The instrument we use to find this out is called a thermometer.

We often need to know how hot or cold the day is, or how hot the oven is before we put in our cake to bake. Many foods must be cooked at a certain heat. The thermometer measures

all these temperatures.

The thermometer is made up of a long narrow tube of glass with a hole passing through it. The hole is closed at one end and it widens at the other, to form a “bulb”. In the long narrow tube and bulb can be found mercury. Mercury is a metal found in its liquid state at room temperature. Mercury expands when heated and contracts when cooled. On the side of the thermometer are markings showing the exact temperature.

USING THE THERMOMETER



In the diagram on the previous page is a laboratory thermometer. Can you recall some of the places where temperature is often measured? In hospitals and clinics a special thermometer is used to measure temperature. It is called the clinical thermometer. This type is used to measure the temperature of our bodies. It is made up of the same materials as the laboratory thermometer but measures temperature from 35°C to 43°C .

Here is the diagram of a clinical thermometer.

What is your body temperature when you are quite well? The average temperature of the body of most persons is 37°C . (37°C is read thirty-seven degrees Celsius.)

Investigate Further:

Things you need

- thermometer
- water
- tin
- heat source

1. Half-fill the tin with water.
2. Place the thermometer in the container.
3. Put the container on the fire and leave it to boil.



4. Read the temperature when the water is boiling.

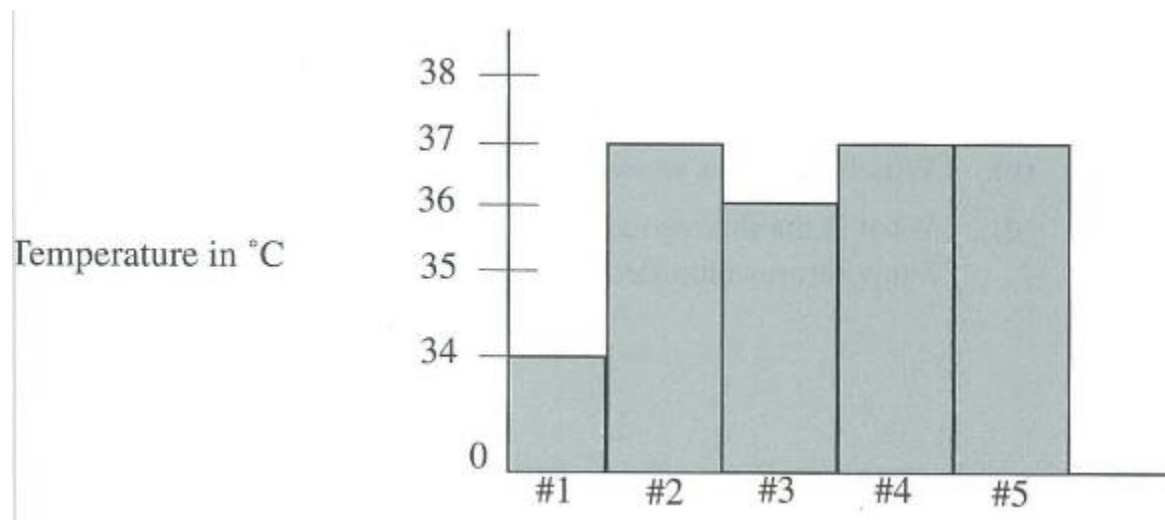
Why should the thermometer not be put into the water when it is boiling?

The temperature at which pure water boils is 100°C. At what temperature do you think water will freeze? Try to find out.

Perhaps your teacher can record the temperatures of various groups of pupils in the class. You can also draw a table or graph to represent them. Here is what your table and graph may look like.

Group A

Names of Pupils	Temperature in °C
1. Joan	34
2. Trevor	37
3. Mary	36
4. Ravi	37
5. Nevada	37



Graph showing temperatures of some pupils in the class

Investigate Further:

Things you need

- thermometer
- a sheet of cardboard
- pencil
- ruler

You can probably work in groups of five.

1. Make a chart like the one shown below and record the temperature inside and outside of school.

Days of the week	Temperature in °C	
	Inside	Outside
Monday		
Tuesday		
Wednesday		
Thursday		

2. Draw two graphs, one for inside and one for outside.
3. Answer the following questions from your table and graph.
 - (a) Which was the highest temperature recorded?
 - (b) Which day was the coldest?
 - (c) Which two days showed the same temperature?
 - (d) What is the difference between the highest and lowest temperatures recorded?

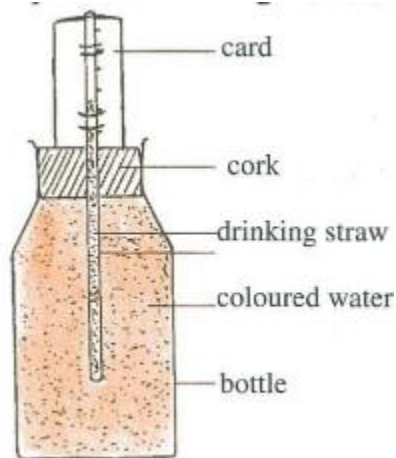
Investigate Further:

(B)Let's make a thermometer.

Things you need

- a transparent drinking straw
- cork with hole in it
- small bottle
- small piece of tape
- coloured water

1. Fill the bottle with coloured water right to the top.
2. Push the straw through the hole in the cork and put the cork into the bottle. You will notice some water will come out of the straw.
3. Tilt the bottle and pour water out of the bottle until it is half-way up- the straw.
4. Cut two slots in the cork and fit it over the straw as shown in the diagram below.
5. Check the temperature on a thermometer and mark that temperature at the water level on the card.
6. Check when the temperature changes, and do the same as was done in number 5.



A Home-made Thermometer

What have we learnt?

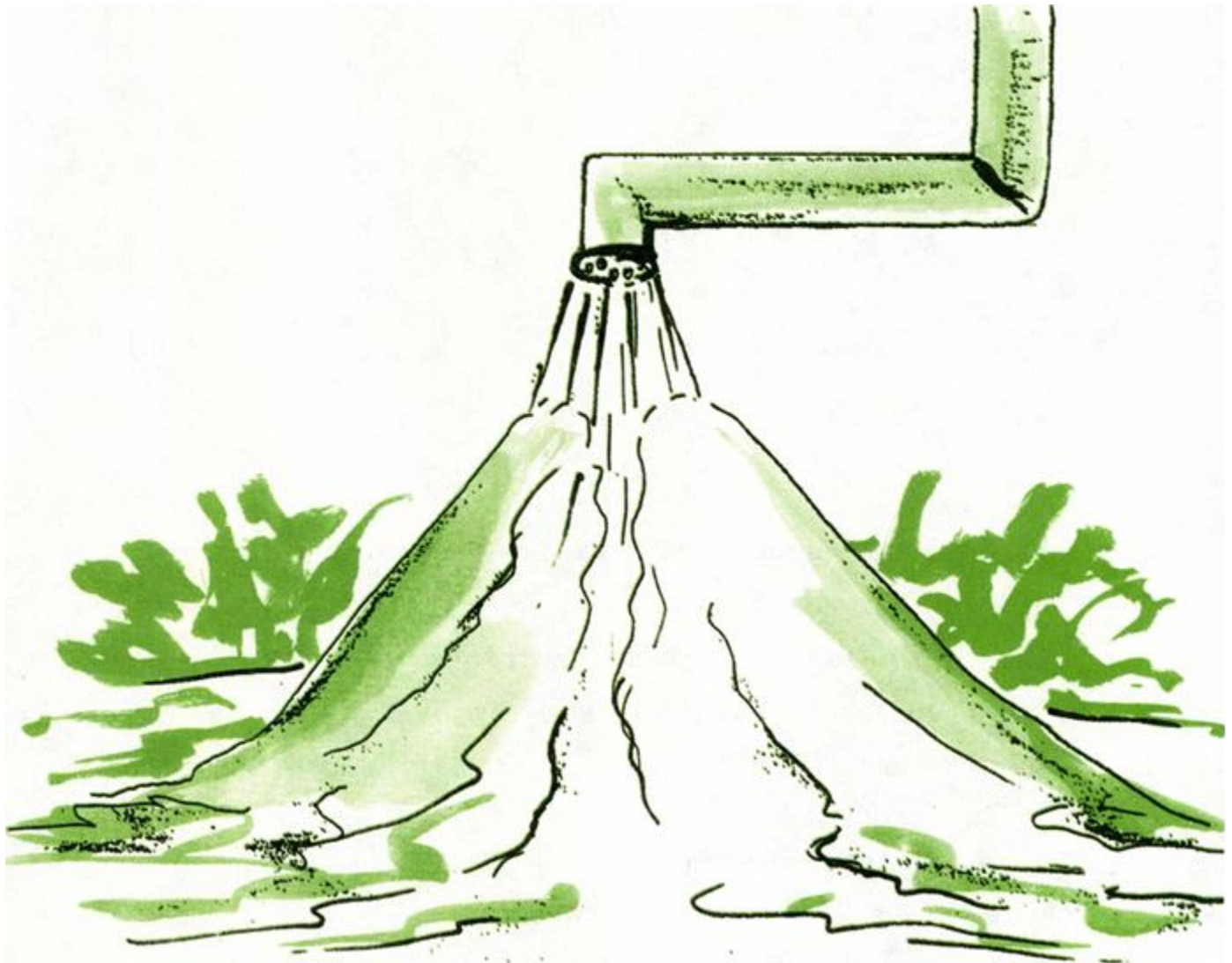
1. What does the word 'contract' mean?
2. Which type of thermometer is used in the hospitals and clinics?
3. Which has a higher temperature - boiling water or ice?
4. What liquid other than mercury can be used in thermometers?
5. The normal body temperature of human beings is _____°C.
0 37 40 100 212
6. When someone's temperature is described as being high, it means that the person may have _____.

EROSION

What is Erosion?

The surface or top layer of the earth is very important to us. On it we make our gardens, build our houses, schools, offices and other important buildings. Roads are also built. Can you think of other ways in which the surface of the earth is important to us?

Wind and water affect the surface of the earth. Let us find out how this happens.



Something to do

Things you need

Some dry sand

A hammer and nail

A container with water

Dry garden soil

A milk can

A tray

1. Make a mound with the sand in the tray.
2. Make holes at the bottom of the milk can.
3. Pour water in the milk can and hold it over the mound.
4. Observe what happens.

You will notice that the once smooth surface is now broken up. It becomes rough. Small drains are formed. Gradual wearing away of soil is called erosion. Have you ever noticed what happens on the sides of roads when there is heavy rainfall?



Something to do

Things you need

- a sheet of newspaper
- some dry sand
- some dry garden soil

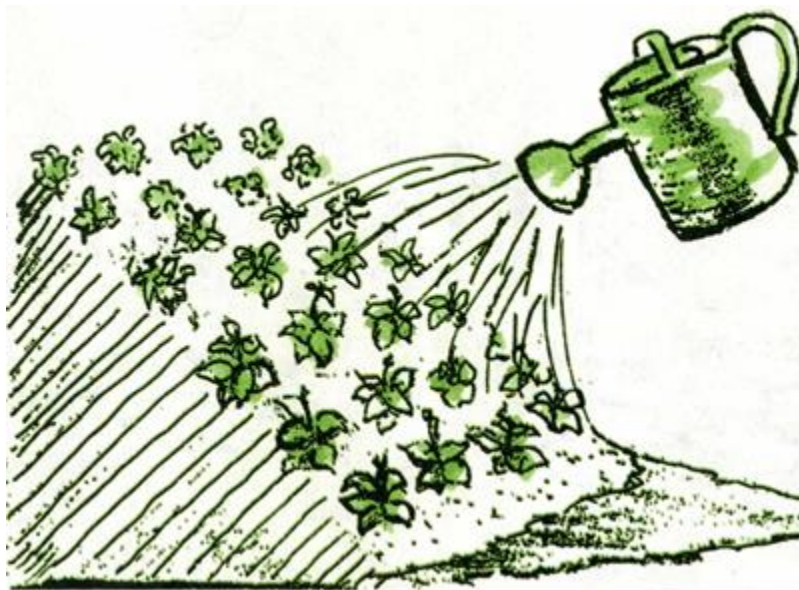
1. Place some dry sand on top of the desk on the sheet of newspaper.

Blow on it.

2. What happens to the sand?

3. What do you think will happen to dry sand if there is a strong wind blowing at it?

You will observe that wind can also move soil and break up the surface of the earth. This breaking up of the surface of the earth by wind and carrying it away is also called erosion.



Causes of Erosion

Erosion or washing away of the soil can be caused by many factors. The surface of the earth is sometimes bare or left uncovered when we clean our gardens. Water from rainfall can then wash away the soil.

Pour some water on a patch of soil covered with grass and on soil not covered with grass. Observe and record what happens.

Heat also helps in the process of erosion. During a long dry season the soil becomes very dry. Plants die and the soil becomes loose. Loose and dry soil is easily blown away by wind.

Plant roots help to hold the soil together.



Sometimes the way we make our farms can cause erosion. Look at the picture below. Can you tell which is the better way to make drains in the farm?



Controlling Erosion



Look at the pictures above. Each one shows some way in which erosion is being controlled. Discuss these pictures with your teacher. You may write sentences about how erosion is controlled.

Erosion causes damage. Water and wind remove the top soil from the surface of the earth. Farms are destroyed in this way. Roads and dams are broken up and cost a lot to repair. Water washes away foundations on which buildings are built and may cause them to fall.

What have you learnt?

Supply the missing words to complete the sentences.

1. Erosion is the _____ of the surface of the earth.
2. Erosion can be caused by both _____ and _____.
3. Trees planted in a windy area _____ the force of the wind and _____.

SUMMARY

- Temperature is how hot or cold an object is.
- The instrument used to measure temperature is called the thermometer.
- In the thermometer the liquid metal, mercury can be found.
- Erosion is the washing and carrying away of parts of the earth's surface.
- Erosion may be caused by wind and water.
- Poor farming practices cause erosion.
- Exposing the bare land surface to water and heavy wind causes erosion.
- Erosion can be controlled by covering the earth's surface and by planting trees to break the force of the wind and to hold the soil together.
- The surface of the soil can be protected by hard materials like iron-sheet.
- Erosion causes damage to land and garden areas.
- Two types of thermometers are the laboratory and clinical thermometers.
- Mercury expands when heated and contracts when cooled.

CHAPTER 7 MATTER AND ITS CHANGES



Do you remember the discussion in Book 3 about matter? Matter is anything which has mass and occupies space. Matter is all around us. Fur, flowers, the air we breathe, the water we drink, the soil and the stars are all matter.

Matter exists in three states. The states are solid, liquid and gas. Let's remind ourselves of some important facts about each state. A solid has many surfaces and a fixed shape. A liquid has one surface but no definite shape. It takes the shape of the container into which it is poured. A gas has no surface and also it takes the shape of its container. It has no definite shape. Let's look around and find examples of each state of matter. Look at the pictures below.

List all solids, liquids and gases you can find.



Solids and Heat

Have you ever put some Vaseline on the fire or near to something that is hot? What happened? Why has this happened?

Would the same thing happen to other solids if they are heated?

Solid matter can change its state. When some solids change to liquids we say that they melt. Let us find out about other changes that can take place.

Something to do

Things you need

- wooden clothes pins
- heat source
- lard
- paper
- ice
- a piece of cloth
- knife with wooden handle
- dried leaves
- butter
- a pointer
- salt
- spoon
- plastic



1. Set up the heat source as shown in the diagram.
2. Put some lard into a metal bottle top (cork).
3. Place the container on the fire and observe and record what happens.
4. Remove the container from the fire. Discuss what you observed.
5. Repeat the activity using the other materials named.

Do them one at a time. Do not mix the materials.

N.B Some of the materials can be placed above the fire while others have to be put in the fire.

6. Observe and record the many changes that take place.
7. Draw up a table like the one on the following page and complete it.

The first one is done for you.

substances	after heating		kind of change
	Change	no change	
butter	✓		melt
lard			
wood			
salt			
vaseline			
paper			
wire			
wax			
cloth			
plastic			

You have noticed earlier that heat has produced a number of changes.

Do you think that other changes will take place when solids are heated? What do you think will happen if a piece of ice is placed in a container and left on the fire for some time?

Find out what will happen.

Something to do

Things you will need

- heat source
- container
- ice

1. Put a piece of ice into a container.

2. Put the container on the heat source and leave it for a while.
3. Look at it again and answer these questions.
 - (a) Is there any water in the container?
 - (b) What do you think happened to the water? Why?

From this experiment you will notice that the ice has changed to a gas which is water vapour. The ice, which is solid, has changed to liquid and the liquid to gas because of the heat added. Do you know of any other solids which behave in this way?

Liquids Can Change

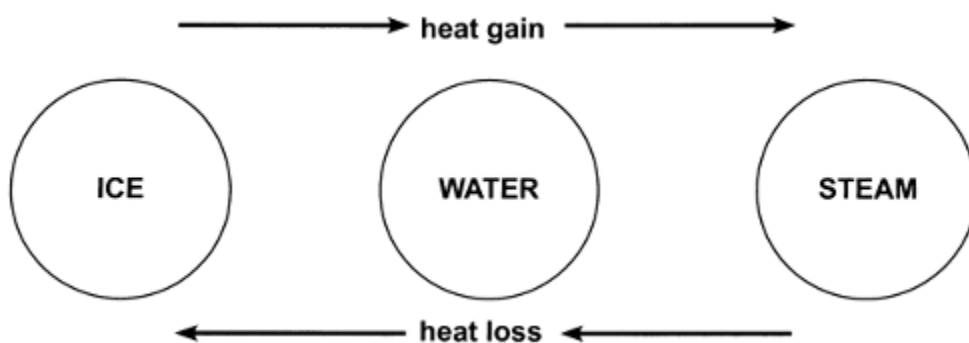
What happens when water is placed in a freezer? Does the same thing happen when other liquids are put in a freezer? Melt some butter then place it near to a piece of ice. What happens, and why? Most liquids change to solids when they are frozen. Most solids change to liquids when heated and then change back again to solids when the liquid is cooled or frozen.

Gaining and Losing Heat

We have already found out what happens to solids when they are heated. After heating, a solid may melt. When heat is applied to a solid, we say that it has gained heat. If enough heat is applied some solids will eventually melt.

Similarly some liquids change to solids when they are cooled.

When this happens, we say that there is a heat loss or the substance loses heat. When (liquid) water is placed in a refrigerator it loses heat. If enough heat is lost the water will freeze and turn to ice, which is a solid. When ice gains heat it melts and turns to a liquid. These changes are shown on the diagram below.



You will notice too that when some substances gain or lose heat a new substance is formed. What happens when a piece of paper is put into the fire? Can we get back the paper when the ash from the burnt paper loses heat? Some gases, too, change to liquid when cooled.

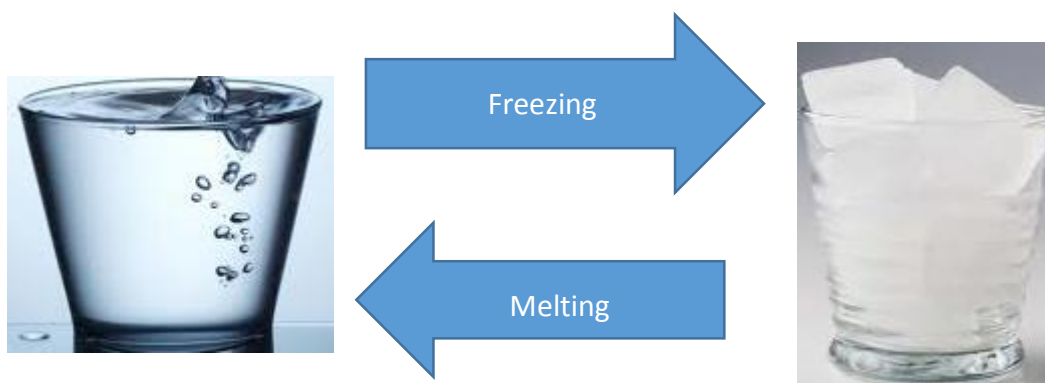
SUMMARY

- Matter is anything which has mass and occupies space.
- The three states of matter are liquid, solid and gas.
- A solid has a fixed shape.
- A liquid takes the shape of its container.
- A gas, too, takes the shape of its container and it cannot be seen.
- The work of a gas can be seen.
- Some solids change to liquids when we heat them.
- Some solids do not change to liquids, but there are other changes e.g. burning.
- Some liquids change to solids when they are placed in the refrigerator.
- Gaining and losing of heat may change the state of some substances.

CHAPTER 8 MATERIALS

PERMANENT CHANGES IN MATERIALS

Materials can undergo two types of changes, temporary changes and permanent changes. Heat and chemical reactions are responsible for these changes. A temporary change is reversible, meaning that no new material is formed and the change can be reversed. Changes of state are temporary changes e.g. water can freeze to form ice and the ice can melt to form water.



A permanent change occurs when a material changes into a different material and cannot return to the original material. The burning of paper is an example. When the paper is burnt, it becomes ash and smoke. The ash and smoke cannot be turned back into paper.



PROPERTIES OF AIR

Air occupies space and has mass. It is a mixture of gases including nitrogen, oxygen, and carbon dioxide.

Something to do

Things you need

- Two funnels
- Water
- Plasticine or clay
- Transparent plastic or ware
- Glass bottles



A



B

1. Place the funnel in the mouth of the bottle as shown at A. Seal the opening where the funnel and the bottle neck meet so that air cannot escape.
2. Pour some water into the funnel and observe what happens. Record your observations.
3. Place the funnel on the mouth of the bottle as shown at B.
Do not seal the neck
4. Pour some water into the funnel. Record and try to explain your observation.

Air is all around us. It takes the shape and volume of its container, and expands when heated or when its pressure is reduced. The volume of air decreases when under pressure or when cooled.

The air pushes on everything around us. This force is called air pressure or atmospheric pressure and it pushes in all directions.

PROPERTIES OF WATER

Water is the most common liquid known. It is matter so it has mass and volume. Some properties of water are:

- Water takes the shape of its container.



- It has the ability to flow.

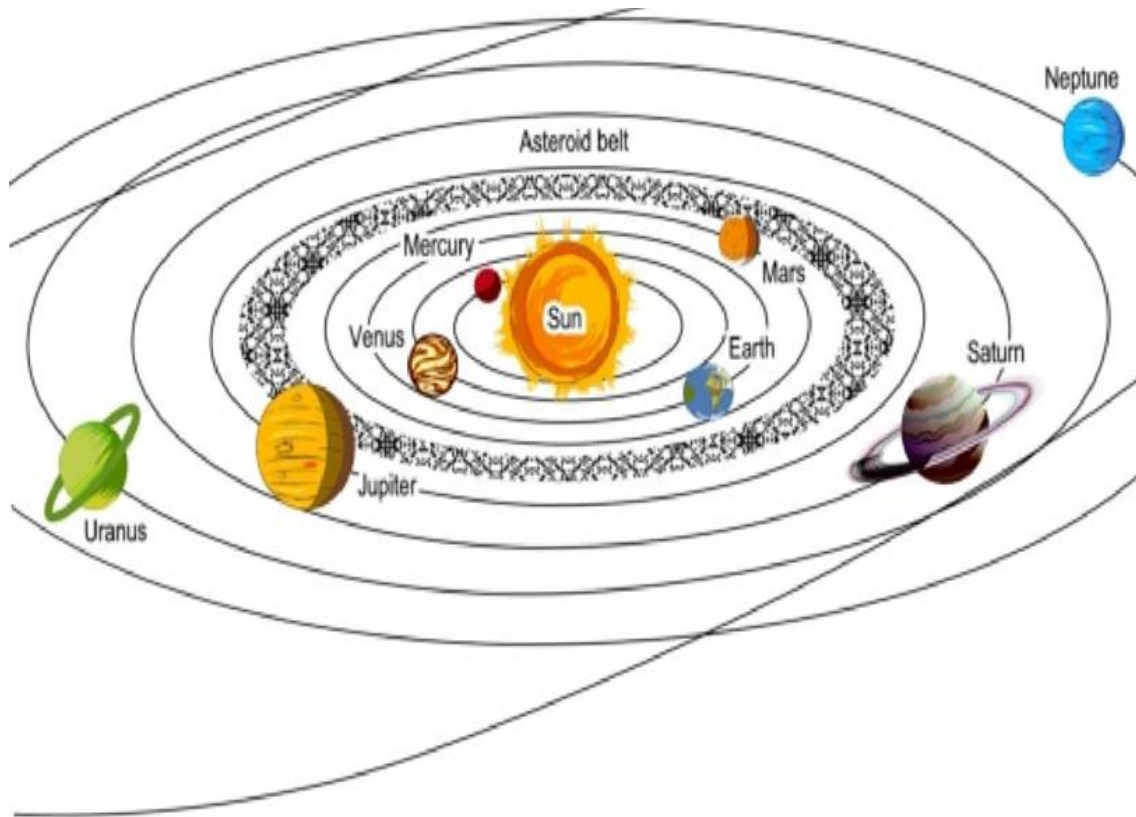


- It exerts pressure – water pressure is the force that water puts on objects in the water.
- It has a surface tension – surface tension is like a skin on the surface of the water that tends to stop the water from flowing and allows some things to ‘float’ on the surface.

SUMMARY

- Materials undergo two types of changes namely temporary changes and permanent changes.
- A temporary change is reversible.
- A permanent change occurs when a material changes into a different material and cannot return to the original material.
- Air occupies space and has mass.
- The volume of air decreases when under pressure or when cooled.
- Water pressure is the force that water puts on objects in the water.

CHAPTER 9 THE SOLAR SYSTEM



The sun is at the centre of the solar system and there are eight known planets which orbit the sun.

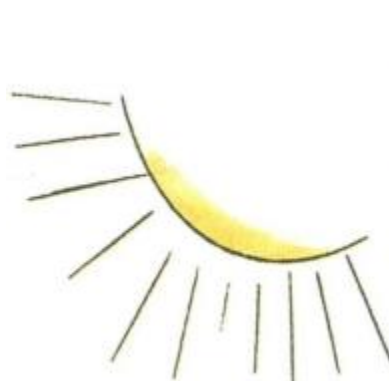
A Poem for You

You may use the 'rap' beat for more enjoyment.






The Solar System


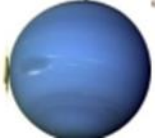
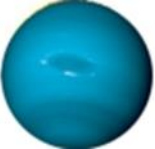
How many planets in the Solar System?
Count and you'll find eight of them
In the middle you'll see the sun
Shining her light on everyone
Mercury, Venus, Earth and Mars, too
Jupiter, Saturn to name a few
Uranus, Neptune on the move
With their moons they're in the groove.

J. Cumberbatch



THE 8 PLANETS

	Mercury	<p>Is a very small planet</p> <p>It is the closest planet to the sun. It orbits the sun quickly (88 days) but rotates slowly (once every 59 days). It has no moon (recorded in 2004)</p>
	Venus	<p>It is nearly the same size as earth. It is known as the Morning or Evening Star. It takes 243 days to rotate and it takes 225 days to revolve around the sun. (recorded in 2004)</p>
	Earth	<p>It is the third planet away from the sun. We live on Earth. It is our home. It takes 24 hours for one rotation and 365 days for one revolution. It has one moon. (recorded in 2004)</p>
	Mars	<p>A little larger than half the size of the earth. It takes 687 days to revolve once around the sun. It takes 24.6 hours to rotate. It has 2 small moons. (recorded in 2004)</p>
	Jupiter	<p>It is the largest planet in the solar system. It takes 12 years to revolve once around the sun and 10 hours to rotate. It has 63 known satellites. (recorded in 2004)</p>

	<p>Saturn</p>	<p>Saturn is well known for its three rings. It is a little smaller than Jupiter. It takes 29.5 years to revolve once around the sun and a little more than 10 hours to rotate. It has 47 moons. (recorded in 2004)</p>
	<p>Uranus</p>	<p>It is about 4.4 times the size of earth. It takes 84 years to revolve once around the sun and about 17 hours for one complete rotation. It has 27 moons. (recorded in 2004)</p>
	<p>Neptune</p>	<p>Is slightly smaller than Uranus. It revolves the sun once every 165 years and rotates in about 16 hours. It has at least 13 moons. (recorded in 2004)</p>

SUMMARY

- There are eight known planets which orbit (travel around) the sun.
- Mercury is known as the closest planet to the sun while Neptune is the farthest.
- The sun is the centre of the solar system.
- The planet Venus known as the Morning or Evening Star.
- Earth is the third planet away from the sun and has only one satellite which is known as the moon.
- Planet Earth takes 24 hours for one rotation and 365 days for one revolution.

CHAPTER 10 ENERGY

HEAT AND SOURCES OF HEAT

Heat is a form of energy. We get heat mainly from the sun. Some other sources of heat are:

- Fire (flame)



- Friction



- Electrical devices e.g. light bulb, electrical iron



Be careful not to burn yourself or cause fires!

USES OF HEAT

We can use heat for:

- Cooking food
- Generating electricity
- Ironing clothes

Plants use the heat from the sun to make food.

HOW HEAT TRAVELS

Heat travels by three methods: conduction, convection and radiation.

Conduction

Heat travels in solids by conduction. This occurs when two objects at different temperatures are in contact with each other. Heat flows from the warmer object to the cooler object. This occurs until they are both at the same temperature.

Convection

Heat travels usually by convection in fluids (liquids and gases). In this method, warmer areas of a liquid or gas rise to cooler areas and the cooler liquid or gas takes the place of the warmer areas which have risen. This cycle occurs continuously.

Radiation

Matter is required to transfer heat in conduction and convection. Radiation does not require matter to transfer heat. Heat travels across space by radiation e.g. the heat which travels from the sun to the earth, and heat which is felt away from the sides of a hot pot.

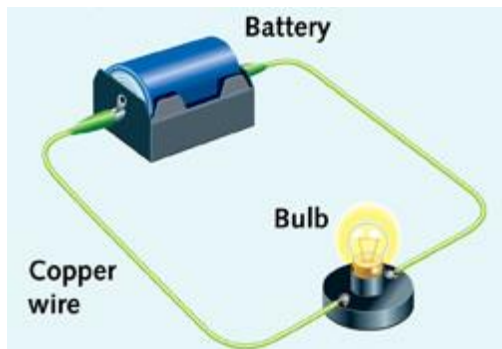
Thermal conductors and insulators

A thermal conductor is a material that allows heat to be transferred within the material without any movement of the material itself. Metals are good thermal conductors.

A thermal insulator is a material which reduces the rate of heat transfer or a material that does not conduct heat well e.g. plastics and wood. A poor **thermal conductor** is a good **thermal insulator**.

SIMPLE ELECTRIC CIRCUITS

- Electricity is a form of energy. It flows in a path called a **circuit**. A circuit is where a complete loop of electrical components are connected by wires, around which an electric current can flow.



A simple circuit

The electricity is provided by a **battery** or **generator**. The electricity flows in the **wires** and is used by **light bulbs, radios, TVs, irons and other appliances**.

Electricity only flows in a *complete* circuit. Any gap or opening would prevent its flow.

Switches open and close gaps in a circuit.

SUMMARY

- Heat is a form of energy.
- Heat travels by three methods: conduction, convection and radiation.
- Conduction occurs when two objects at different temperatures are in contact with each other.
- Heat travels usually by convection in fluids.
- Radiation does not require matter to transfer heat.
- Heat travels from the sun to the Earth by the radiation method.
- Insulators are materials or objects that do not allow heat energy or electricity to flow.
- A thermal conductor is a material that allows heat to be transferred within the material without any movement of the material itself.
- A circuit is where a complete loop of electrical components are connected by wires around which an electric current can flow.

- A thermal insulator is a material which reduces the rate of heat transfer or a material that does not conduct heat well.
- A poor thermal conductor is a good thermal insulator.

CHAPTER 11 FORCES

MASS

Matter is everything that has **mass** and takes up space. Mass is the measure of the amount of matter something is made from.

Mass is measured in **grams (g)** or **kilograms (kg)**.

1 kilogram = 1000 grams

1 kg = 1000 g

Some things are **heavy**.

For example:



A cow



A car

Some things are **light**.

For example:



A feather



A pin.

Heavier things have more **mass**, e.g. a mango has more mass than a feather.

Some pieces equipment used to measure mass are:



Scales



Spring balances



Lever-arm balances.

GRAVITY

Effects of Gravity

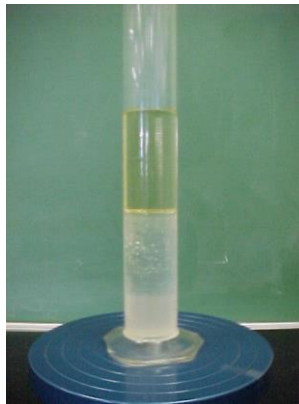
Any object thrown into the sky will fall to the ground.
This is because the Earth pulls, or attracts, everything to it.
This force of attraction is called **gravity**.

For example:

A ball is thrown up in the air and it falls back to the earth.

Sinking and Floating

Some objects **float** in water while some objects **sink**.
Some examples of objects that float in water are:



Oil floating on water.

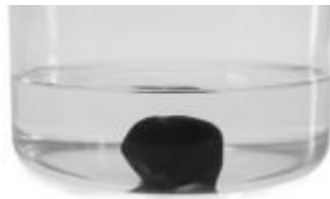


Feather floating on water

Some examples of objects that sink are:



Coin sink into water



Stone in water

Things that are light for their size usually float on water. Things which are heavy for their size usually sink.

Generally the larger the area in contact with the water, the better the object will float.

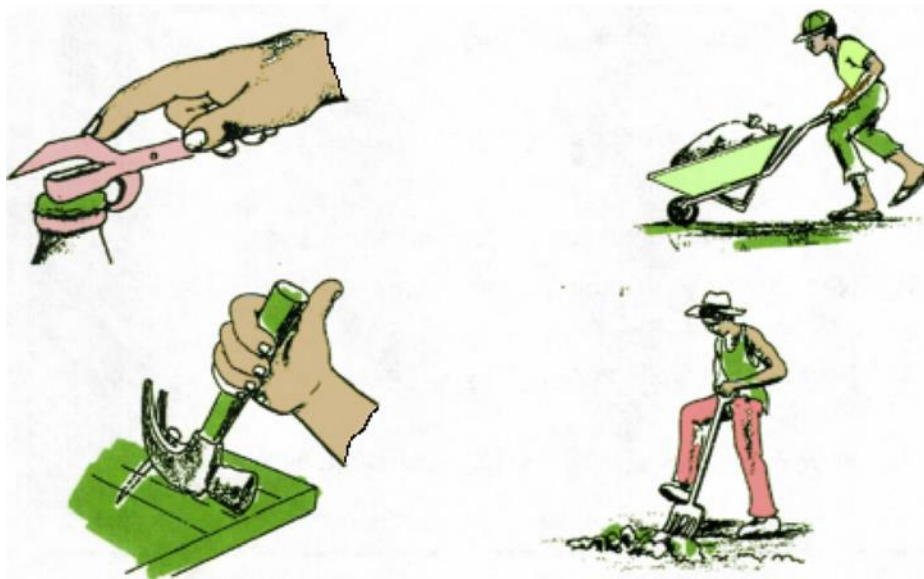
For example:



The picture above shows when the aluminium foil is placed in the water it floats but sinks after it is squashed tightly into a ball.

SIMPLE MACHINES

Looking at Machines



Look at the tools above. Let us name them. Have you ever used any of them? What are they used for? Now draw a table like the one on the following page and complete it.

Machines	What they are used for
paint brush hammer	Painting

Machines are useful

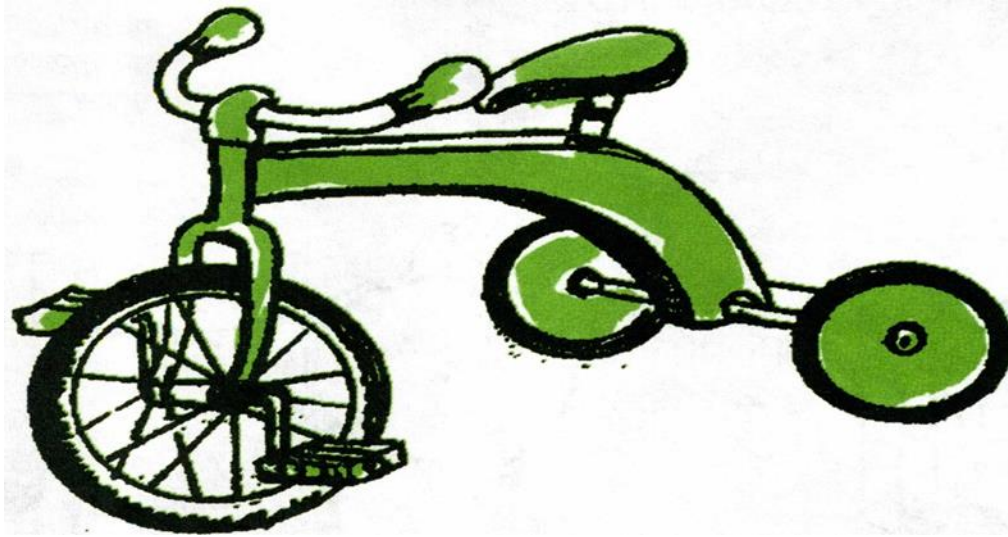
Something to do

Things you need

- a bottle of aerated drink
 - a drink opener
 - a piece of board with nails on it
 - a hammer
1. Try taking out the drink cap with your bare hands.
 2. Now try doing the same with an opener. How easily it comes out!
 3. Now try taking off the nail with your bare hands. What happens?
 4. Now use a hammer. Do you have the same difficulty?

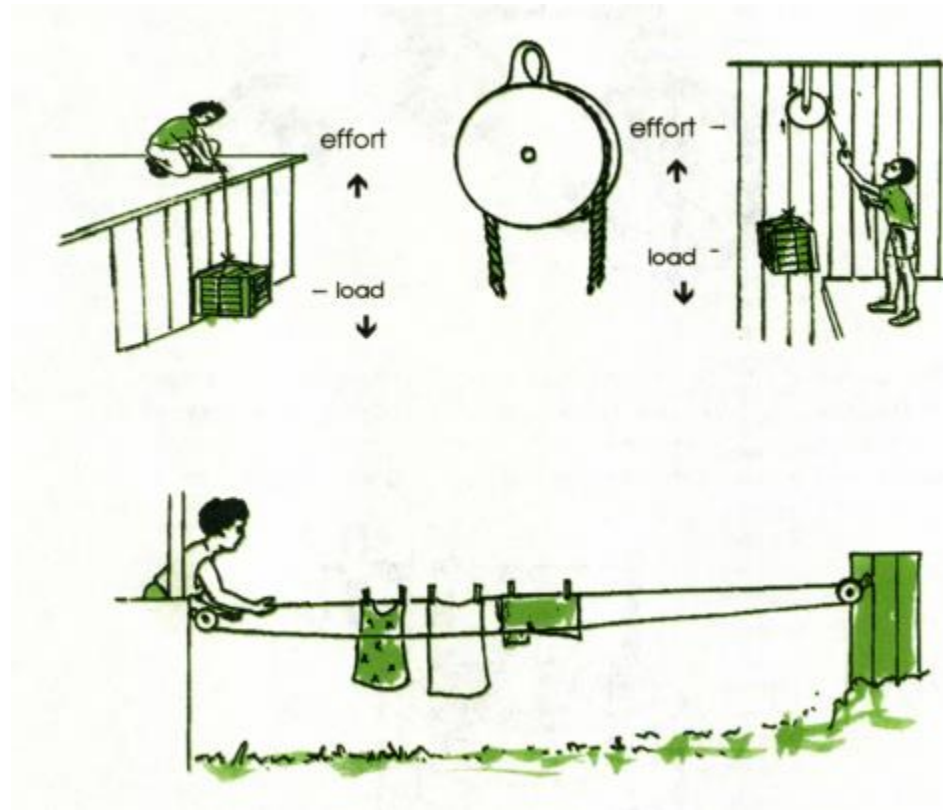
In both of the examples above you have made the work easier by using a tool. A tool that is used to make work easier is called a simple machine. A simple machine has few or no moving parts.

Wheels and Axle



The wheel and axle is another simple machine. List things in your surroundings that have wheels. If there were no wheels how would cars or cycles move? Can you imagine the world without wheels?

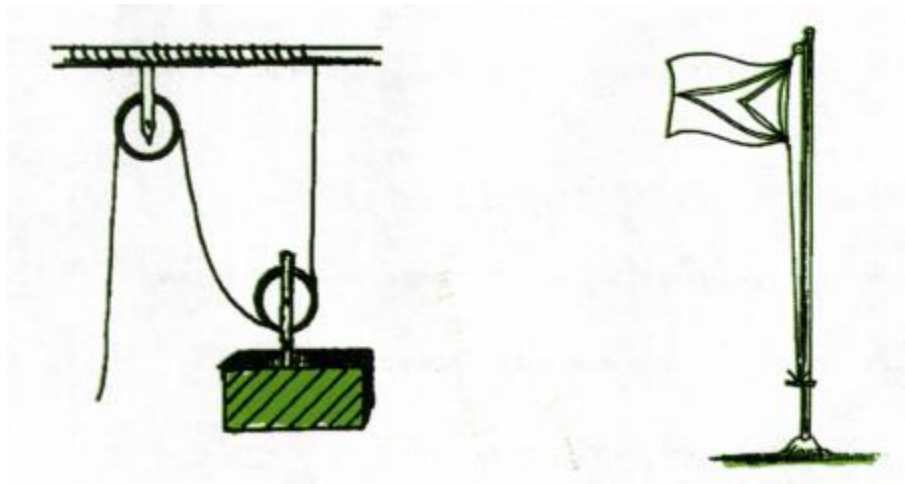
Pulley



It is easier to pull a weight down than to lift it up.

The pulley is a grooved wheel.

Pulleys are used to lift heavy loads to high places. The pulley makes work easier by making it more convenient when lifting a load. Is it not easier to pull things down than to pull them up?



Here are other examples where pulleys are used to make work easier.

SUMMARY

- Mass is the measure of the amount of matter something is made from.
- Mass is measured in grams (g) or kilograms (kg).
- Heavier things have more mass.
- The larger the area in contact with the water, the better the object will float.
- Things which are heavy for their size usually sink.
- A tool that is used to make work easier which has few or no parts is called a simple machine.
- Two simple machines are the pulley and the wheel and axle.
- The pulley makes work easier by making it more convenient when lifting a load.

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