

Science

6



What does “Progressive Science” series consist of?



Each lesson is supported by :

- Beautiful illustrations
- Learning objectives
- Fact to know
- Let's Recall
- Word power
- Train your Brain
- Cross Curriculum Connect
- Exercises with Revision and Model tasks
- Activity time
- HOTS
- Project time

Tasks for RTP and MTP include :

- Answer the questions in short
- Fill in the blanks
- Answer the questions
- True/False
- Multiple choice questions
- Answer in one word
- Match the columns

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possible.

Children are naturally curious and scientific inquiry is a part of their behaviour from birth. By keeping this point in mind, the series lays stress on learning with understanding.

The series of “**Science**” for classes 1 to 8, is strictly written in accordance with the prescribed elements and guidelines issued in the **Latest National Curriculum Framework** suitable for CBSE and other **State Board Schools**.

Vital information about the series :

- ★ Learning objectives : Recap of the chapter content.
- ★ Fact-o-scope : Which presents snippets of interesting information to take learning beyond the syllabus.
- ★ Let us Recapitulate : Which is given to recapitulate the important points learnt.
- ★ Word Power : Meaning of difficult words are given in this section.
- ★ Train your Brain : This section has been designed to develop skills of creative and critical thinking among the students.
- ★ Model Test Paper : Measures how much a student has learnt. It is included in each chapter in the form of questions and answers and fill up the blanks.
- ★ High order thinking Skills (HOTS) : Challenging opportunities given to develop analytical skills.

Four Formative and two Summative Assessments are given at the end to provide Continuous and Comprehensive Evaluation of knowledge, understanding and application of concepts learnt.

Every effort has been made to make the series fruitful. Any suggestions for the improvement of the series shall be gratefully acknowledged and incorporated in the forthcoming series.

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DETAILED CONTENTS

S. No.	Chapter Name	Introduction	Activity and Facts to know	Let's Remember and Glossary	Summary	Exercise	HOTS (Think and Answer)	Let's Recall	Group Discussion and Activity to Do	Creative Task	Work-sheet
1.	Components of Food	Brief of the main topics covered in the chapter	Activities related to the topics; Some important facts related to the chapter	Description of the difficult words	Important points of the chapter	MCQs; True/False; Fill up; One Word Question; Short Question-Answer; Question-Answer	Questions based on the thinking skill of the student	Completing the diagram related to the chapter	Topics to be discuss based on the chapter; Some fun task is given to do	A practical work to do	This extra work sheet revise the whole chapter
2.	Sorting Materials into Groups	Brief of the main topics covered in the chapter	Activities related to the topics; Some important facts related to the chapter	True/False; Description of the difficult words	Important points of the chapter	MCQs; Fill up; One Word Question; Short Question-Answer; Question-Answer	Questions based on the thinking skill of the student	Completing the diagram related to the chapter	Topics to be discuss based on the chapter; Some fun task is given to do	A practical work to do	This extra work sheet revise the whole chapter
3.	Separation of Substances	Brief of the main topics covered in the chapter	Activities related to the topics; Some important facts related to the chapter	Fill up; Description of the difficult words	Important points of the chapter	MCQs; True/False; One Word Question; Short Question-Answer; Question-Answer	Questions based on the thinking skill of the student	Completing the diagram related to the chapter	Topics to be discuss based on the chapter; Some fun task is given to do	A practical work to do	This extra work sheet revise the whole chapter
4.	Getting to know Plants	Brief of the main topics covered in the chapter	Activities related to the topics; Some important facts related to the chapter	Fill up; True/False; Description of the difficult words	Important points of the chapter	MCQs; True/False; One Word Question; Short Question-Answer; Question-Answer	Questions based on the thinking skill of the student	Completing the diagram related to the chapter	Topics to be discuss based on the chapter; Some fun task is given to do	A practical work to do	This extra work sheet revise the whole chapter
5.	Body Movements	Brief of the main topics covered in the chapter	Activities related to the topics; Some important facts related to the chapter	Fill up; Matching; Description of the difficult words	Important points of the chapter	MCQs; True/False; One Word Question; Short Question-Answer; Question-Answer	Questions based on the thinking skill of the student	Completing the diagram related to the chapter	Topics to be discuss based on the chapter; Some fun task is given to do	A practical work to do	This extra work sheet revise the whole chapter

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Components of Food

Introduction

- Nutrients
- Testing for some nutrients
- Roughage and water
- Balanced diet
- Proper cooking of food
- Deficiency diseases
- How to prevent deficiency diseases

We have seen that we eat various kinds of food almost everyday. We normally eat a cereal in every meal, along it we eat a dal or meat and some vegetable. We may also eat curd, salad, pickle with it. There may be times when there is not this much variety in our food. We eat whatever is available.

We know that food has various components that are needed by our body. These components are called **nutrients**. There are five types of nutrients. They are carbohydrates, proteins, fats, vitamins and minerals. In addition to these five nutrients our body also needs water and dietary fibre.



Facts to know

Calorie is a unit of energy. The number of calories a person needs in a day depends on his or her age, height, weight, gender and physical activity level.

CARBOHYDRATES

Sugar and starch are the two main types of carbohydrates found in our food. They are the main source of energy. Carbohydrates are of two types—simple and complex carbohydrates. Simple carbohydrates are known as **sugar**. Complex carbohydrate are known as **starch**. They need to be broken down into simple sugar.



Sources of carbohydrates



Activity - 1

Testing the presence of starch.

Take a small quantity of food or raw material which is to be tested.

Add 2–3 drops of dilute iodine solution. Do you observe any change in colour?

If the colour changes to blue black it indicates starch.



Testing for starch

PROTEINS

They are known as body-building substances. Our body needs proteins to make new cells, to replace worn out and damaged cells. This is why growing children and sick people need more proteins.



Sources of proteins



Facts to know

A person needs approx. 1g of protein/kg of body weight.



Activity - 2

Test for proteins

Take a small quantity of a food item to be tested in a test tube. In case the food is solid, powder it or make a paste of it. Then add 10 drops of water and shake the test tube.

Add two drops of copper sulphate and 10 drops of caustic soda solution using a dropper to the test tube. Shake well. Allow the test tube to stand for a few minutes. A violet colour indicates presence of proteins in the food item.



Fat

Fats are the best energy-giving foods. The amount of energy released by 1 gram of fat is more than twice the energy released by the same quantity of carbohydrates or proteins. Our body uses the fat stored under the skin and other parts. When we are short of energy. Fats are the store house of energy. Fats also provide warmth to our body.



Sources of fat



Activity – 3

Test for the presence of fat

Take a small quantity of the food to be tested. Wrap it in a piece of paper and crush it, taking care not to tear the paper. Open the paper and observe it by holding it against a source of light for a translucent spot. An oily patch shows the presence of fat.



VITAMINS

They are required in very small quantities. They are needed to protect us from disease and to keep us healthy. Vitamins are of two types — fat soluble and water soluble vitamins. Each are of several kinds.



Facts to know

Our body prepares vitamin D in the presence of sunlight.

Fat Soluble : Vitamin A, D, E and K

Water Soluble : Vitamin B and C

Vitamin A keeps our eyes and skin healthy. Vitamin C helps our body to fight against diseases. Vitamin D helps our body to use calcium for bones and teeth.



Foods rich in Vitamin D



Vitamin C



Vitamin B



Vitamin A

MINERALS

Minerals are also required by our body in very small amounts. They are required for proper growth of the body and for good health.

- ♦ Calcium and phosphorous are required for healthy teeth and bones.
- ♦ Iron is necessary for the formation of haemoglobin.
- ♦ Iodine helps in the secretion of thyroid hormone.



Sources of iodine



Sources of iron



Sources of phosphorous



Sources of calcium

Roughage:

Dietary fibre is known as roughage. Roughage has no nutritive value. It adds bulk to the food. This helps our body to get rid of undigested food. Whole grains, pulses, vegetables like fresh fruits, potato, cucumber, spinach and cabbage are the main sources of roughage.

Water:

Water helps our body to absorb nutrients from food. It eliminates waste from the body in the form of urine and sweat. Fruits and vegetables contain a large amount of water. About half the water lost is replaced from the food we eat. We also add water to food while cooking. We must drink at least 6—8 glasses of water or liquid daily.



Activity - 5

To see whether vegetables contain water

Take 100 g of potato, onion, spinach, tomato, cucumber

Spread all the items separately in the sun to dry them completely. It will take a couple of days. After they have dried, weigh them. The difference in weight is the water content of that vegetable.

Weight after drying.

Tomato

Cucumber

Potato

Onion

Spinach

vegetable which has lost the most.

weight has the highest.

amount of water.

can you think of any fruit or vegetable?

which has no water?



Facts to know

The government of India has started many programmes to combat malnutrition among children, pregnant women and nursing mothers. One such programme is the mid-day meal programme for school children.

BALANCED DIET

Different food items contain different nutrients. To remain healthy and for proper growth and maintenance, our diet should contain all the nutrients our body needs in the right amounts. No single item contains all the nutrients.

A diet which contains all the important nutrients in the right amounts is called a complete or a **balanced diet**.

The balanced diet is not the same for everyone. It depends on various factors like age, sex, physical activity of a person.

If you consume an improper diet, i.e. a person takes in more calories than are used by him he will gain weight and become **obese**. This condition is called **obesity**. Hence, we should not eat too much of fat rich foods.



Obese child cartoon



Facts to know

Obesity occurs due to improper food habits and lack of physical activity.

COOKING OF FOOD

The food we eat must be cooked properly, to avoid loss of nutrients :

- ♦ Vitamin C is destroyed by heat during cooking. Hence we should eat raw fruits and vegetables to get vitamin C.
- ♦ Do not wash fruits and vegetables after peeling or cutting them. This results in the loss of vitamins and minerals. The skin of many fruits and vegetables are rich in vitamins and minerals. Repeated washing of rice and pulses also results in the loss of these nutrients.
- ♦ Cook food in just enough water. Don't throw away the excess water used in cooking as it results in loss of many useful vitamins and minerals.

DEFICIENCY DISEASES

Deficiency diseases are caused by a lack of essential nutrients such as proteins, vitamins and

minerals that the body cannot make from other foods. The steady absence of one vitamin in an otherwise complete diet causes a deficiency disease. Deficiency of nutrients can lead to diseases or disorders in our body. The diseases that occur in our body due to lack of essential nutrients over a long period of time are called **deficiency diseases**.

◆ **Deficiency of Proteins**

Deficiency of proteins causes stunted growth, swelling of face, discolouration of face, skin diseases and diarrhoea.

◆ **Deficiency of Carbohydrates**

Causes the person to become thin and weak.

If the diet is deficient in both proteins and carbohydrates for a long time, growth may stop completely.

Diseases caused due to deficiency of Vitamins and Minerals

Vitamin/Mineral	Deficiency Disease	Symptoms
Vitamin A	Night Blindness	Loss of vision in darkness.
Vitamin B	Beriberi	Malfunctioning of the nervous system, muscle weakness.
Vitamin C	Scurvy	Swelling of the gums, bleeding gums, wounds take long time to heal.
Vitamin D	Rickets	Bones become soft and deformed.
Calcium	Rickets	Weak bones, tooth decay.
Iodine	Goitre	Swelling of the thyroid gland. mental disability in children.
Iron	Anaemia	General weakness

We can prevent deficiency diseases by taking a balanced diet. We can have a balanced diet even by eating simple inexpensive foods like pulses, soyabean, groundnuts, sprouted pulses, fermented food (Idli, Dosa, Dhokla), using a combination of flours (missiroti) bananas, spinach, khichri (combination of rice and pulses) etc. It is not necessary to eat only expensive fruits and vegetables. Besides eating the right type of food, we must also cook the food properly as explained earlier.



Glossary

nutrients	: building blocks of food are called nutrients
roughage	: indigestible cellulose that improves intestinal functions by adding bulk to food
enzymes	: certain protein that regulate chemical reactions in your body
balanced diet	: a diet which contains all nutrients in the right proportions
deficiency	: a disease caused by lack of nutrients in the diet



Summary

- ◆ A diet which contains all the nutrients in the right amount is called a balanced diet. It must contain adequate amount of water and roughage.
- ◆ A balanced diet is necessary for good health.
- ◆ Deficiency of one or more essential nutrients in our food over a long period of time can cause deficiency diseases.
- ◆ We must cook food properly to avoid loss of nutrients.
- ◆ Food is made up of several components needed by our body called nutrients.
- ◆ The main nutrients of food are carbohydrates, proteins, fats, vitamins and minerals. Food also contains water and dietary fibres.
- ◆ Carbohydrates and fats provide us with energy. Sugar and starch are the two types of carbohydrates.
- ◆ Proteins are body building foods. They replace worn out or damaged cells and build new cells. They are thus needed for growth.
- ◆ Vitamins and minerals are protective foods. They help us in protecting against disease.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

- Iodine solution is used to test the presence of
(a) starch ☐ (b) fats ☐ (c) proteins ☐ (d) vitamins ☐
- This is the quickest source of energy
(a) fats ☐ (b) sugar ☐ (c) proteins ☐ (d) starch ☐
- This is a body building food
(a) rice ☐ (b) pulses ☐ (c) apples ☐ (d) spinach ☐
- This is a water soluble vitamin
(a) vitamin A ☐ (b) vitamin B ☐ (c) vitamin D ☐ (d) vitamin K ☐

5. This is required for healthy teeth

(a) calcium ☐ (b) iron ☐ (c) iodine ☐ (d) vitamin C ☐

B. Write 'T' for true and 'F' for false statements.

1. Rice is rich in proteins. ☐
2. Fats are the store house of energy. ☐
3. We must throw away the water in which pulses are soaked. ☐
4. Most fruits and vegetables contain water. ☐
5. Chapatis alone provide our nutritional requirement. ☐

C. Fill in the blanks with the correct words.

Fats Iron balanced starch warmth

1. Sugar and _____ are the two main types of carbohydrates found in our food.
2. _____ are the best energy-giving foods.
3. Fats also provide _____ to our body.
4. _____ is necessary for the formation of haemoglobin.
5. A _____ diet is necessary for good health.

D. Give one word for each one of the following.

1. This gives more energy than carbohydrate _____
2. A vitamin required to fight against diseases _____
3. Diseases caused due to lack of nutrients _____
4. Deficiency of this mineral causes goitre _____
5. This vitamin is formed by our body in sunlight _____

E. Answer the following questions in short.

1. Name the five nutrients in food.
2. Why are proteins called body-building foods?
3. Name the two kinds of carbohydrates.
4. Why must we not wash fruits and vegetables after peeling?
5. What are the symptoms of scurvy?

F. Answer the following questions.

1. How will you test presence of starch in food items?
2. Why do children need more proteins than adults?
3. What is a balanced diet? Is it same for all? Explain.
4. What is a deficiency disease? What happens if the diet is deficient in proteins and carbohydrates over a period of time?
5. Is it necessary to eat expensive foods to have a balanced diet? Explain.



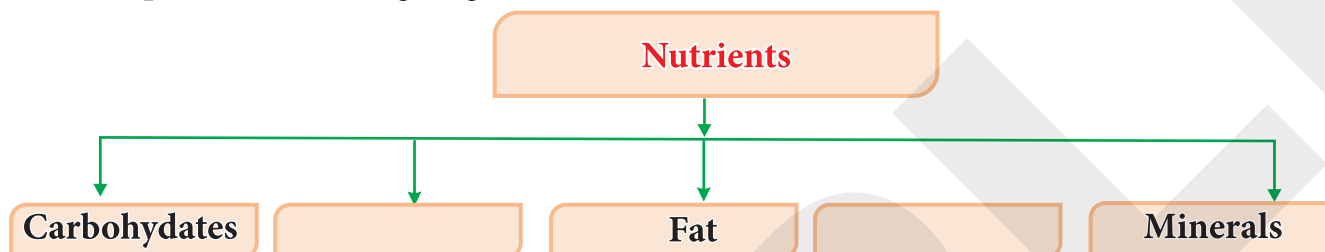
HOTS (Think and Answer)

1. Why do you think a child who eats fried foods is fatter than a child who eats roasted snacks?
2. Why do you think we must include salad in our diet?



Let's Recall

Complete the following diagram.



Group Discussion

Make a group of 5–6 students. Discuss the following points

- (i) nutrients (ii) balanced diet (iii) deficiency diseases



Activity to do

Find the nutrients in the food you eat in a day.

Meal	List of food eaten	Carbohydrate	Fat	Protein	Vitamin
Breakfast	1. 2. 3.				
Mid-morning snacks	1. 2. 3.				
Lunch	1. 2. 3.				
Evening Snack	1. 2. 3.				
Dinner	1. 2. 3.				



Creative Task

Create a recipe for a snack that you would give someone who is overweight and watching their calorie intake.



WORKSHEET-1

Find words related to food and nutrition that you have learnt in the lesson in the grid given below. Circle them.

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



Introduction

- ☞ What are things made of ?
- ☞ Properties of Materials
- ☞ Classification of materials on the basis of properties
- ☞ Need for such classification

We see many different things around us. These objects vary in size, shape, colour and uses. They are made of different materials.

We can divide various objects in various groups based on features. This is called **sorting**.

Let us have a look at things inside your school bag. You will find eraser, pencil box, water bottle, lunch box, book, pencil, pen, ruler, etc.

What are these things made of?

An eraser is made of rubber, book is made of ink, paper, and glue; pen is made of plastic and ink pencil is made of wood, paint and lead, ruler is made of wood/plastic; pencil box is made of plastic, paint; lunch box is made of steel or plastic and so on. Some things are made of one material and some more than one material. Rubber, ink, glue, wood, plastic, steel, paint and paper are all examples of materials.



Activity - 1

Write 5 objects which you use in your daily life made of different materials.

Material	Objects made from the material
Wood	
Plastic	
Steel	
Paper	
Metal	
Leather	

The same material can be used to make different things e.g. a chair may be made of plastic, metal, wood etc.



Activity - 2

Fill in the table, using some common objects used in daily life.

Objects	Material made of
1. Plate	Paper, glass, steel, plastic
2. School bag	
3.	
4.	
5.	

We have seen from the above, that objects are made of different materials. Some objects are made of a single material and some of many materials. A material can be used to make various objects and an object can be made of different materials.

How is it decided that which material should be used to make which object? To answer this question we need to know the properties of materials.

PROPERTIES OF MATERIALS

Different materials have different properties i.e. different features which distinguish them from each other. These differences in properties help us to group different materials into different classes. But remember that there are two properties which are common to all materials.

- ◆ All materials occupy space.
- ◆ All materials have mass.



Can you use paper/cloth to make a bucket? It would be silly as both paper and cloth will not be able to hold water. Buckets are usually made of plastic, or metal (steel).

We choose a material depending on its properties and use of the object.

Grouping together of things having similar properties is called **classification**, e.g. living and non-living things, natural and man-made, solids and liquids etc.

Let us study some of the properties of materials which help us to classify things.

APPEARANCE

Materials look different from each other. Plastic looks different from paper, paper appears different from wood, iron looks different from aluminum and so on. There may be certain

similarities between iron and aluminium which are not present in plastic. We can thus classify materials on the basis of appearance.

LUSTRE

Metals like silver and gold have a shine, whereas wood does not shine that much. Similarly synthetic clothes have a shine whereas woollen clothes do not have a shine. It is generally seen that metals like aluminium, iron, copper, silver and gold show lustre. Wood and paper being non metals do not show lustre.

Some materials lose their shine and appear dull when exposed to air and moisture. An iron rod appears dull, but when it is rubbed with sand paper, the top layer gets removed and it appears lustrous. Therefore to see whether a material is lustrous or not, we must observe freshly cut surface of the material. If the freshly cut surface is shiny, then the material is lustrous.

Materials can thus be divided on the basis of lustre.



Activity - 3

Divide the following materials on the basis of lustre.

Material	Lustre	Silver
Copper		Aluminium
Wood		Leather

HARDNESS

Different materials feel different when you touch them; some are hard, whereas some can be pressed easily and are soft. Some items like cotton sponge and wool which can be compressed easily are called **soft materials**. Items like iron, stone etc. cannot be compressed or pressed easily. They are called **hard materials**. Thus, materials can be classified on the basis of hardness.



Hard Material



Soft Material



Activity - 4

Scratch a candle, a piece of wood, a stone, a plastic cup, eraser and an iron rod with an iron key. What do you observe? It will be seen that materials which are soft can be scratched, whereas materials having hard surfaces cannot be scratched.

ROUGHNESS

Materials can be rough or smooth.



Activity - 5

Move your hand around petals of a flower, a window pane, a cup and a rock. Do you feel any difference? You will feel that surface of the petal, window pane and a cup are smooth, whereas the surface of a rock is rough. Can you think of more surfaces which are rough?

SOLUBILITY



Activity - 6

Take 5 beakers and mark them as A, B, C, D and E. Half fill them with water. Add one teaspoon of salt, sugar, sand, saw dust and atta to each of the beakers marked A, B, C, D and E respectively. Stir the contents with a spoon. Wait for a few minutes.

What do you observe?



A
Salt



B
Sugar



C
Sand



D
Saw Dust



E
Atta

Substance	Disappears	Does not disappear in water
Salt	Disappears	
Sugar	Disappears	
Sand	Does not disappear	
Saw dust	Does not disappear	
Atta	Does not disappear	

Some substances like salt and sugar completely disappear in the water and they are said to be **soluble** in water.

Some substances like sand, saw dust and atta do not mix with water even after stirring, they are said to be insoluble in water.



Kerosene



Ink



Milk



Oil



Lemon juice



Activity – 7

Liquid	Mixes/does not mix
Milk	
Oil	
Lemon juice	
Kerosene	
Ink	

Take a glass, half fill it with water. Add some milk to it. Stir and let the glass stand for some time. Observe whether milk mixes with water or not. Repeat the same with other liquids such as oil, lemon juice, kerosene and ink. Record your observations. It will be seen that some liquids like milk mix completely with water and are said to be **miscible liquids**. Liquids that do not mix with each other are called **immiscible liquids** like oil and water.

Some gases like oxygen are soluble in water. Plants and animals living in water breathe oxygen dissolved in water. Similarly plants living in water use carbon dioxide dissolved in water for photosynthesis. However, some gases are not soluble in water like nitrogen. Matter can be divided into categories on the basis of solubility.

DENSITY

Floating And Sinking

In activity 6, we have seen that salt and sugar dissolve in water, whereas sand sinks in water and saw dust floats on water. Similarly a piece of metal, when dropped in water will sink. However, a piece of wood or cork floats on water.

Density is the mass per unit volume of a substance. If we weigh equal volume of wood, metal (iron) and water, it will be seen that iron is the heaviest and wood is the lightest. Thus a substance like iron or sand which is denser than water will sink in water, whereas substances like wood, cork and sawdust. Which are less dense than water will float on water.



Activity – 8

Test whether the following items will float or sink in water- a dry leaf, a nail, a pebble, an eraser, a plastic ruler, a small piece of paper, cotton wool and ice cube. Note down your observations.

Substance	Will float /sink	Substance	Will float / sink
dry leaf		plastic ruler	
nail		paper	
pebble		cotton wool	
eraser		ice cube	

Matter can thus be classified on the basis of whether it floats or sinks in water. In other words on the basis of density.

Let's Remember

State Whether True (T) or False (F).

1. Paper shaving will sink in water.
2. Kerosene easily mixes with water.
3. Gold and silver have lustre.
4. Groundnut oil is immiscible in water.
5. Grocer keeps biscuits and sweets in glass containers.

☐
☐
☐
☐
☐

TRANSPARENCY



We can see through some materials like glass but we cannot see through a wooden door. This is because some materials like glass allow light to pass through them. On the basis of this property, materials can be classified into three categories—transparent, opaque and translucent.

Objects which allow light to pass through them are called **transparent**. We can see through such objects. Some examples of transparent materials are glass, water, air and some plastics. This is why biscuits, sweets and other edible items are kept in glass or plastic containers by the shop keepers, so that they are easily seen by the customers.

Materials like wood, metal, cardboard etc. do not allow light to pass through them and they are called **opaque**. We cannot see through these materials. Can you tell what is kept in a cardboard or a tin box without opening them?

There are some materials through which we can see but not very clearly. They are called **translucent**. They allow light to pass through them only partially. Some examples are frosted glass in bathroom windows, butter paper, tissue paper etc.



Activity - 9

Take a sheet of white paper. Look at a lighted bulb through it. Now spread a teaspoon of oil on one portion of the paper. Now look at a lighted bulb through the oil patch. Do you see any difference? You will see that the bulb is more clearly lighted than before. This is because the paper has now become translucent.

We can thus classify material on the basis of whether it is transparent, translucent or opaque.



We have now seen that materials can be grouped on the basis of similarities or differences in their properties. We group materials to make our work easy at home and at school. In a kitchen all the utensils are kept together, so are the spices and pulses. This makes it easier to find what we need. Similarly a grocer keep different varieties of soaps together, biscuits in one place and cold drinks and juices in another such an arrangement makes it easy to locate various items.



Glossary

conductors	: materials that conduct heat or electricity are called conductors
lustre	: shine
states of matter	: the distinct forms of matter at different phases
miscibility	: the property of liquids to mix in all proportions, forming a homogeneous solution
miscible	: liquids that are soluble in water are said to be miscible in water



Summary

- ◆ Different objects are made of different materials.
- ◆ The same material can be used to make a large number of objects.
- ◆ An object may be made of a single material or of many different types of materials.
- ◆ Grouping together things with similar properties is called classification.
- ◆ Different materials have different properties.
- ◆ There are two properties which are common to all materials – they have mass and occupy space.
- ◆ Some materials are lustrous, some are not; some are hard, whereas some are soft; some are smooth and some are rough.
- ◆ Some other properties of material which are used to classify matter are solub in water, miscibility in water, density and transparency.
- ◆ Materials can be grouped on the basis of similarities or differences in their properties.
- ◆ We group things together for convenience and for studying the properties of things.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

- When purchasing jewellery we look for this property.
(a) solubility ☐ (b) floatation ☐ (c) lustre ☐ (d) transparency ☐
- All materials have these properties.
(a) have mass ☐ (b) take up space ☐
(c) have both mass and take up space ☐
(d) have neither mass nor do they take up space ☐
- This is an opaque material.
(a) water ☐ (b) glass ☐ (c) plastic ☐ (d) cardboard ☐
- This is immiscible in water
(a) milk ☐ (b) orange juice ☐ (c) mustard oil ☐ (d) coke ☐

5. This will sink in water.

(a) cork

☐

(b) wood

☐

(c) dry flower

☐

(d) a stainless steel spoon

☐

B. Fill in the blanks with the correct words.

plants properties object plastic metals

1. A material can be used to make different _____.
2. Buckets are usually made of _____.
3. _____ like silver and gold have a shine.
4. _____ and animals living in water breathe oxygen dissolved in water.
5. Different materials have different _____.

C. Give one word for each one of the following.

1. Will the nail sink in water or not?
2. Is wood a conductor or not?
3. Name of an opaque object.
4. Name of a transparent object.

D. Answer the following questions in short.

1. Name three objects which can be made of wood.
2. In what ways is all matter alike?
3. What is the difference between miscible and immiscible liquids?
4. How can paper be made translucent?
5. Why do we need to classify things?

E. Answer the following questions.

1. Differentiate between transparent, opaque and translucent materials. Give two examples of each.
2. What is density? How is it related to the property of floating or sinking in water.
3. Write down five properties on the basis of which we can classify materials.
4. Why must we observe a freshly cut surface of a materials to see whether it is lustrous or not?
5. Given here are the names of some objects and materials — ball, eraser, chair, wheel, chapati, kite, orange, note book, moon. Classify them on the basis of shapes — round and other shapes. Which of these items can be made of
a. paper? b. wood?



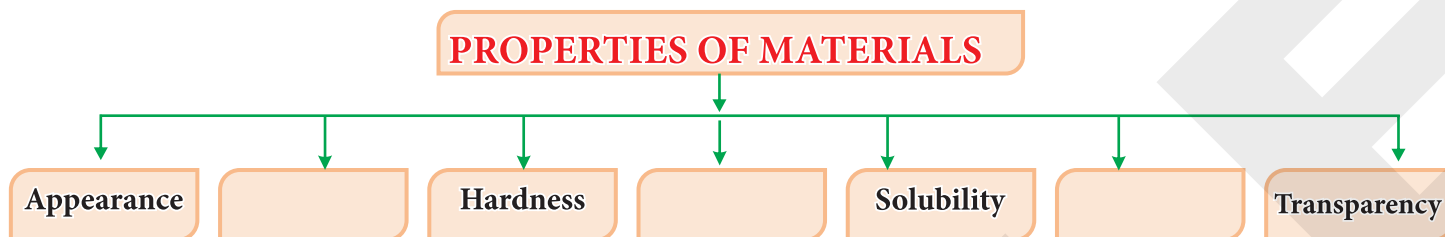
HOTS (Think and Answer)

1. Why do you think dry spices are stored in glass containers?
2. Why do you think cork floats in water?



Let's Recall

Complete the following diagram.



Group Discussion

1. Appearance of material is more significant than its use.
2. All soft materials are better for human use.
3. Discuss why switches are made of plastic or bakelite and not metals?



Activity to do

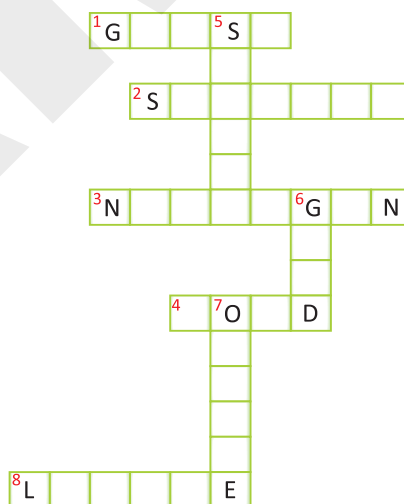
Solve the crossword:

Across

1. A transparent material
2. Salt is _____ in water
3. A gas which does not dissolve in water
4. Floats in water, chair is also made of this.
8. Shine of materials.

Down

5. A lustrous metal
6. A yellow metal
7. Materials which do not allow light to pass through



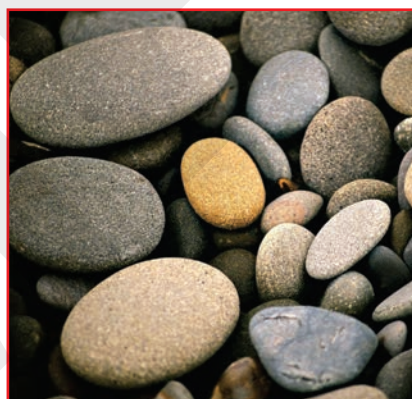
Creative Task

Design a garment with futuristic properties. Draw it and give details of the material it is made from. What properties does it have to meet the needs of the future?



WORKSHEET-2

Separate the materials given below by placing them in the following table.



Solids	Liquids	Gases



Introduction

- Mixture
- Separation of substances
- Methods of separation– handpicking, winnowing, sieving, threshing
- Sedimentation, decantation and filtration
- Condensation
- Need for separation
- Evaporation
- Solubility

We use a number of materials daily such as milk, water, sugar, salt, pulses, grains, fruits and vegetables. Some of the substances we use are **pure substances** i.e, they are made up of one kind of molecules only. Very few pure substances are found in nature. Most of the things we use in our daily lives are mixtures. A **mixture** is a combination of two or more molecules of two or more substances that mix together without any chemical reaction taking place.

Examples of mixtures are:

- ◆ Cold coffee — mixture of milk, sugar, coffee
- ◆ Air — is a mixture of several gases
- ◆ Milk is a mixture of fat, proteins, water, vitamins and minerals.
- ◆ Lemonade is a mixture of water, sugar, lemon juice and salt.



SEPARATION OF SUBSTANCES

Separation means removing one thing from the other. Sometimes we need to separate the components of a mixture.

We strain tea to remove tea leaves with a strainer. We churn milk to separate butter; we remove cream from milk to make it healthier for adults. You must have often removed green chillies or curry patta when served with poha or upma. We separate out vegetables or fruits from a basket by simply picking out one kind and placing them in separate containers. Separating out big items is easy. But what if we have to separate salt from water or mud from water. Can you remove it by picking? Impossible.

NEED OF SEPARATION

We need to separate substances from mixtures for several reasons :

- ◆ To remove undesirable constituents or non useful components e.g, removing tea leaves from tea, removing curry patta from dishes.

- ◆ To remove harmful components or impurities–eg. removing stones from pulses.
- ◆ To obtain useful components–eg. churning milk to butter, separating petrol and kerosene from crude oil.
- ◆ To get a pure substances – we need pure substances for research work, to manufacture a large number of articles which are used everyday.

The substances mixed together vary in size, shape, colour and many other properties.

METHODS OF SEPARATION

The separation of a component from a mixture is carried out on the principle that each component has a unique property which is not shared by any other component. Various methods are used for separating the components of a mixture.

Let us study some commonly used methods for separating substances that are mixed together.

Hand picking

This method is commonly used at home for separating undesirable substances from the useful ones. This is possible because the size, shape and colour of undesirable substances is different. The quantity of the impurities is not very large.

Example : Removing impurities like pieces of dirt, stone and husk from wheat, rice and pulses by hand picking. This is the simplest method of separation.



Hand Picking



Activity – 1

Take a packet of rice/pulse purchased from market. Spread it on a sheet of white paper. Do you find some small stones, husk and broken grains? Remove them. This is a hand-picking.

Sieving

You must have often seen your mother sieving atta before making chapatis. She does this to remove bran and other impurities present in atta. We use this method to separate constituents of a mixture having particles of different sizes using a sieve. A sieve is like a net or mesh which has holes of the same size. The fine particles of atta pass through the sieve while the bran remains on the sieve.



Sieving

You must have seen sieving being used in construction sites to remove pebbles from sand.



Activity - 2

Mix little besan with atta. Sieve the two. Can you separate besan and atta by sieving? What remains on the sieve? What do you infer from this?

Sieving is useful when mixture consists of components having different sizes.



Stones being removed from sand by sieving

Threshing

After harvesting of wheat or rice grains the grains have to be separated. You must have seen wheat or paddy stalks lying in the fields in bundles. The grains are separated from the stalks by a process called **threshing**. This is done by beating the stalks on a hard surface to free the grain seeds. Traditionally threshing was carried out by making oxen or donkeys or bullocks walk in circles on the stalks on a hard surface. These days machines are used to thresh large quantities.



Threshing

Winnowing

The next step after threshing is removal of grains from the husk. The grains are heavier than the husk/chaff. This property is used in winnowing. The mixture is allowed to fall from a height by standing at a height. The wind blows away the husk/chaff which are light, while the grains fall vertically down forming a heap. The chaff forms a heap at a small distance from the heap of grains. The husk separated is used as fodder for the cattle. Winnowing is used to separate heavier and lighter components of a mixture by wind or by blowing air.



Winnowing



Activity - 3

Mix saw dust and mud together. Can you separate it by hand picking or by sieving? Next go to an open place. Put the mixture on a plate and stand on a stool and hold the plate at shoulder height. Slowly tilt the plate and let the mixture slide off. What do you notice? Record your observations.

SEDIMENTATION, DECANTATION AND FILTRATION

It is not always possible to separate components of a mixture by simple methods like handpicking and winnowing. This is specially true if the mixture consists of a solid and a liquid. These methods are used to separate insoluble solids from liquids. **Sedimentation** is the process in which the heavier particles of an insoluble solid settle down in a liquid.

Decantation : The pouring out of the clear liquid after sedimentation is called decantation.



Activity - 4

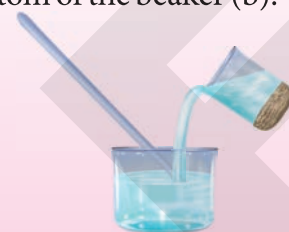
Take a beaker. Fill it with water. Add a little sand. Mix with a glass rod. (a) Let it stand for half an hour. What do you observe? It will be seen that the heavier sand particles settle down at the bottom of the beaker (b).



(a)



(b)



(c)

Now carefully tilt the beaker and pour the water into another beaker using a glass rod (c). Do not disturb the sediment.

We can separate two immiscible liquids like oil and water by the process of sedimentation and decantation. If a mixture of two such liquids is allowed to stand for some time, they form two separate layers. We can then separate the top layer carefully by decantation.

Filtration

It is another method for removing suspended impurities from a liquid. Filtration is a process by which an insoluble solid is removed from a liquid by allowing the liquid to pass through a filter paper or muslin cloth. A filter paper is a filter having very fine holes which allows water to flow but not sand or mud.

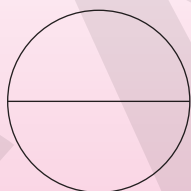
You must have seen your mother preparing tea at home. What does she do after the tea is



Activity - 5

Take a mixture of water and saw dust. You will notice that the saw dust does not dissolve in water, as it is insoluble in water.

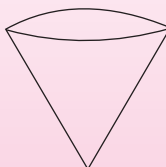
- ◆ Take a round filter paper. Fold it as shown in the figure.



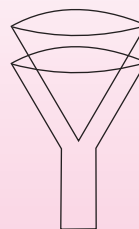
(a)



(b)



(c)



(d)



Filtration

- ◆ Place the filter paper in the funnel (d)
- ◆ Fix the funnel to a stand and place a beaker under the funnel
- ◆ Slowly pour the mixture of saw dust and water into the cone using a glass rod.
- ◆ What do you observe?

You will see clear water flowing out of the funnel and particles of saw dust remain on the filter paper. This is called the **residue**. The clear liquid which flows out is called the **filtrate**.

ready? She pours the tea through a strainer(wire or plastic mesh). The tea leaves remain in the strainer whereas the tea flows out into the cup. Here the strainer does the work of a filter.

We can use a piece of muslin cloth, cotton or a filter paper as filters. Fruit juices are usually filtered through a cloth to remove the seeds and solid particles before drinking. You must have seen muslin cloth at home. When ghee is prepared from butter or cream, your mother must be using a muslin cloth to filter the pure ghee. Paneer is made from milk by adding lemon juice/curd as it boils. The paneer is then separated by filtering the mixture through a fine cotton cloth or through a strainer.

We use water filters to remove solid impurities from drinking water. We use a ceramic porous pot as a filter.

EVAPORATION

In all the above examples, we separated various components not soluble in water. Evaporation is used to separate solids dissolved in a liquid. The process of conversion of water into water vapour on heating is called **evaporation**. Evaporation of water takes place continuously wherever it is present. This method is used on a large scale to get salt from sea water.



Activity – 6

Dissolve some salt in a little water in a beaker. Heat the beaker. Let the water evaporate completely. After the water evaporates, you will see a white residue left behind. Taste it. Is it salty?



The same matter is used to get salt from sea water. The sea water is allowed to stand in shallow pits, water gets heated up by sunlight and slowly changes into water vapour. The solid salt is left behind. The salt is further purified.

Separation of mixtures using more than one method

Very often it is not possible to separate different substances present in a mixture using a single method. In such cases we have to use more than one method.



Activity – 7

Take a mixture of sand and sugar. How will you separate them? It is not possible to separate them either by hand picking or sieving or winnowing.

- ◆ Add water to the mixture of sand and sugar. Stir well to dissolve sugar. Let the beaker stand aside for half an hour. You will notice sand settling down at the bottom.
- ◆ Separate the sand by decantation and then filtration.
- ◆ The filtrate will contain water and sugar.
- ◆ To get back the sugar, evaporate the solution as in activity 6.



Facts to know

Alum when added to a mixture of sand and water speeds up the process of sedimentation.

Let's Remember

Fill in the blanks with the correct words.

sieve grains substances decantation threshing

1. Some of the substances we use are pure _____.
2. A _____ is like a net or mesh which has holes of the same size.
3. The grains are separated from the stalks by a process called _____.
4. The _____ are heavier than the husk.
5. The pouring out of the clear liquid after sedimentation is called _____.

CONDENSATION

When steam or water vapour comes in contact with a cold surface, it changes into water droplets. The change of water vapour into water is called **condensation**.



Activity - 8

Heat the mixture of sugar and water in Activity 7 in a kettle. After sometime you will see steam coming out of the spout. Take a metal plate with ice on it. Hold it above the spout of the kettle. Do you notice something?

When the steam comes in contact with the cold plate, it condenses and forms water which can be collected in a beaker as shown in the diagram.

We can thus separate a mixture of sand, sugar and water by a combination of processes— decantation, filtration, evaporation and condensation.



SOLUBILITY

The solubility of a substance is the amount of substance that will dissolve in a given amount of solvent at a particular temperature.

Let us take some water in a beaker. Keep adding sugar to the water and stir till no more sugar can dissolve in it. You now have a saturated solution of sugar in water.

A saturated solution is one which no more solute can be dissolved. However if you now heat that beaker of solution and stir, you will observe that more sugar can be dissolved.



Activity - 9

Take two glasses of water. Add one teaspoon of salt in one glass and stir till the salt dissolves. Keep adding one teaspoon of salt at a time, till you get a saturated solution. Note down the number of teaspoons of salt that dissolved in water. Repeat the same activity with sugar. You can repeat this activity with any number of substances that are soluble in water.

Substance	Number of spoons
-----------	------------------

Salt	
------	--

Sugar	
-------	--

From this activity we can say that

- ◆ Different quantities of different substances can dissolve in a fixed quantity of water.
- ◆ The solubility of most substances increases with increase in temperature.



Facts to know

The solubility of gases in water decreases with increase in temperature.



Glossary

mixrture	: a substance that can be separated into two (or more) different substances
pure substance	: a substance that contains only one chemical substance and thus cannot be separated further
filtrate	: the clear liquid that has been filtered
residue	: the solid left behind after filtration
filtration	: the process used to separate a solid (or suspension) from a liquid
suspension	: very fine particles of solid mixed in a liquid
solvent	: the liquid that is used to make a solution
solute	: a substance that has been dissolved in a solution



Summary

- ◆ Soluble solids can be separated from liquids by evaporation.
- ◆ We need to separate substances either to remove impurities or to obtain different useful substances.
- ◆ Insoluble solid can be separated from liquids by sedimentation, decantation and filtration.
- ◆ We can separate solids from solids by hand picking, sieving, threshing and winnowing.
- ◆ A mixture contains two or more substances.
- ◆ A saturated solution is one in which no more of that substance can be dissolved.
- ◆ To separate substances from a mixture we use the principle that each substance has a property which is unique and not shared by other substances.
- ◆ Different substances have different solubility in water.
- ◆ Husk and stones are separated from grains and pulses by hand picking.
- ◆ The components of a mixture can be separated by one method or a combination of various methods.
- ◆ Winnowing is the process of separating heavier components from lighter components by wind.
- ◆ Solubility of most substances increases with increase in temperature.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

- The following is not a mixture
(a) Air ☐ (b) Water ☐ (c) Sugar ☐ (d) Lemonade ☐
- A mixture of wheat and husk can be separated by
(a) hand picking ☐ (b) sieving ☐ (c) threshing ☐ (d) winnowing ☐
- We can separate apples from guavas by
(a) hand picking ☐ (b) sieving ☐ (c) threshing ☐ (d) winnowing ☐
- The process of settling down of sand in water is
(a) decantation ☐ (b) sedimentation ☐ (c) evaporation ☐ (d) filtration ☐
- We use filter paper in
(a) filtration ☐ (b) evaporation ☐ (c) condensation ☐ (d) decantation ☐

B. Write 'T' for true and 'F' for false statements.

- A mixture of oil and water can be separated by filtration.
- We can separate sawdust and sand by winnowing.
- Milk can be separated from tea by filtration.
- Mixtures are not useful.
- Solubility of all substances in water is the same.

☐
☐
☐
☐
☐

C. Give one word for each one of the following.

- Method of separating vegetables.
- Method of separating husk from grain.
- Method of separating bran from flour.
- Method of separating sand from water.

D. Answer the following questions in short.

- What is the principle used in the separation of components in mixtures?
- What types of mixtures can be separated by hand picking?
- What is sieving? Give an example where sieving is used?
- What is a saturated solution?
- How do farmers separate husk from grain?

E. Answer the following questions.

- Why do we need to separate a mixture into its components? Give an example.
- How would you obtain clear water from muddy water?
- How will you separate wheat grains and straw pieces?
- How will you separate a mixture of sand, sugar and pebbles?
- What is a saturated solution? How will you increase the solubility of a substance in water?



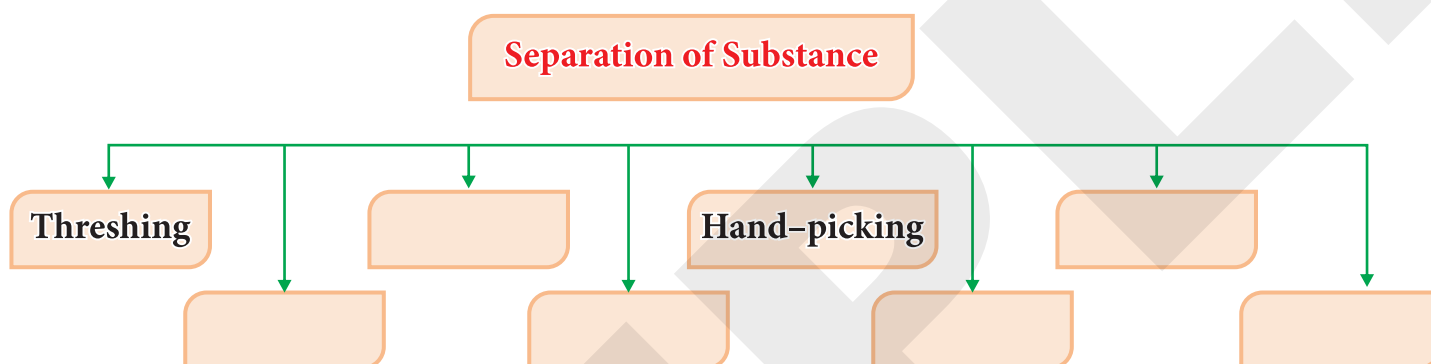
HOTS (Think and Answer)

1. Why do you think while preparing lemonade your mother dissolves sugar in little plain water and then adds cold water and ice to it?
2. Why do you think you see water droplets on the outer surface of a glass containing ice cold water.



Let's Recall

Complete the following diagram.



Group Discussion

1. Role of centrifugation in our daily life.
2. Role of evaporation to get salt from sea water.
3. Importance of filtration in getting pure water.



Activity to do

Have you seen an egg floating in water. You can do it yourself. You will need—one egg, salt, water, a tall drinking glass :

- ⦿ Pour water into the glass till half full.
 - ⦿ Stir in lots of salt to make a saturated solution.
 - ⦿ Now pour in water till glass is nearly full. (Be careful not to disturb or mix the salty water with plain water).
 - ⦿ Gently lower the egg into the water and watch what happens.
 - ⦿ You will see the egg floating in the middle of the glass. Amazing isn't it?
- Find out why this happens? (Hint —It is based on density of water).



Creative Task

Imagine you are marooned on an island sea. Design a water filter you would set up to have water to drink. You have plenty of matches and firewood.



WORKSHEET-3

Write the method of separation to separate the following.

1. Mixture of stones and rice.

2. Mixture of flour and bran.

3. Mixture of husk and grains.

4. Mixture of sand and water.

5. Mixture of salt and water.

6. Mixture of tea particle and milk.

7. Grain from crops.



Introduction

- Types of plants
- Root
- Leaf and flower
- Plant systems
- Stem

When we look outside we see different kinds of plants around us. Plants are seen practically everywhere. Plants vary in size and shape. Plants like rose, jasmine and guava which bear flowers are called **flowering plants**. Plants like ferns which do not bear flowers are called **non flowering plants**.

Plants can also be classified on the basis of size and type of stem. Based on this classification, plants are of three types — herbs, shrubs and trees.

HERBS

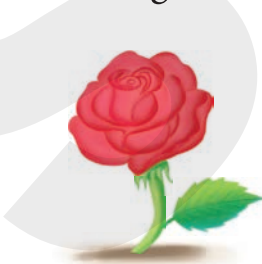
They are very small and soft plants, usually less than one metre high. They have green, soft and flexible stems. Examples of herbs are coriander, mustard, wheat, mint etc.



Herbs

SHRUBS

They are medium-sized plants (1 – 3 m high), having hard stems. They are bushy with the stem branching out near the base. Examples of shrubs are rose, lemon and jasmine.



Shrubs

TREES

Trees are tall plants (more than 3 m high) having a hard, brown, woody stem. These plants do not have branches near the ground but only in the upper part much above the ground. Trees have a long life. Examples of trees are mango, neem, teak, banyan, peepal etc.



Trees



CREEPERS AND CLIMBERS

You must have noticed that there are some plants which cannot stand erect and spread on the ground. These plants are called **climbers** and **creepers**. They are different from herbs, shrubs and trees.

Creepers are plants like watermelon, gourd and pumpkin which cannot stand erect because their stems are weak and spread on the ground. **Climbers** are plants which take the support of other trees to climb. Examples are peas, grapevine and money plant.



Creeper



Climber



Activity - 1

Take a walk to a park near your house. Study the different categories of plants. Note down the detail.

S. No	Plant Name	Height	Stem Type	Category
1.	Mango	very tall	hard, branches on the upper part	tree
2.				

PLANT SYSTEMS

All flowering plants consist of two important systems :

- ♦ The root system — part which grows below the ground.
- ♦ The shoot system — part which grows above the ground.

Root System

It consists of the main root and the branching roots. There are two types of roots – tap root and fibrous root.

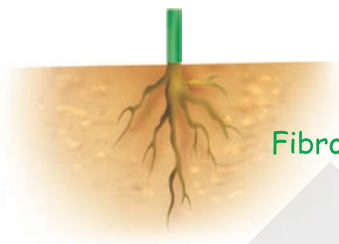


Activity – 2

Gently pull out a grass plant and a mustard plant carefully from the soil. Wash off the soil from the roots. Examine the roots. How are the roots different?



Tap Root



Fibrous Root



Facts to know

Although potato plant produces seeds but it does not grow from it.

Tap Root

Some plants like mustard, rose, neem, peas and carrot have a main root from which a number of branching roots arise. The main root is called the **tap root** and the branched out roots are called **lateral roots**.

Fibrous root

Some plants like grass plants do not have a main root. There is a cluster of roots all appearing similar and these are called **fibrous roots**. Some other examples of plants having fibrous roots are wheat, maize and barley.



Activity – 3

Try to pull out a grass plant from the soil, it is not easy to pull it out as the roots fix the plant to the ground.



Activity – 4

Dig out three weeds of the same type without damaging the roots. Cut off the roots of one plant with the help of scissors. Place the three weeds in a pot and mark them as A, B and C. Water the plants A and B regularly. Observe the plants after a week. What do you conclude from this?

FUNCTIONS OF THE ROOT

- ◆ Roots fix the plant firmly in the soil.
- ◆ Roots absorb water and minerals from the soil and help the plant to grow. Water and minerals reach the stem and the branches with the help of tiny tubes present in the roots and stems.
- ◆ Roots help to prevent soil erosion.

MODIFICATION OF ROOTS

- ◆ Roots like carrot, radish and turnip store food for the plant.
- ◆ Roots are modified in some plants to give extra support.
Banyan tree has roots growing down from its branches. These roots when they reach the ground, fix themselves in the soil. Such roots are called **prop roots**.



The shoot system

It consists of the stem, branches, leaves, flowers and fruits.

The stem

This is the main part of the shoot system. In most plants the stem is above the soil. The stem may be branched or unbranched. The point from where the branches grow is called a **node**. The portion of the stem between two nodes is called the **internode**.



Activity - 5

To show that stems conduct water.

Take a cutting of a plant with white flowers, having stem and leaves. Place it in a glass of water to which a few drops of red ink have been added. Observe after a day. You will see thin fine red lines on the stem and leaves. These lines will also be seen on flowers.



FUNCTIONS OF THE STEM

- ◆ The stem keeps the plant upright.
- ◆ Stems transport water to all parts of the shoot system.



Ginger



Potato



Onion



Bottle gourd

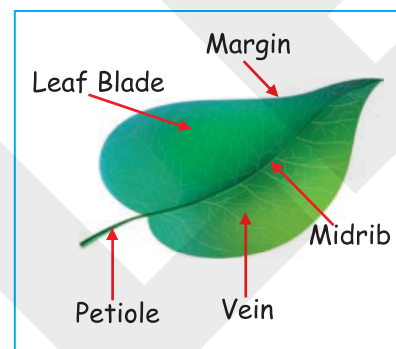
- ◆ Stems provide support to the different parts of the plant. Plants like gourd have thread like structures on the stem called **tendrils**. These tendrils wrap around a rough surface and give support to the stem.
- ◆ In some plants, the stem is underground. Examples are potato, onion and ginger. They store food prepared by the leaves.
- ◆ Stems of some plants like cactus are modified to make food. The green stem performs all the functions of the leaves.

THE LEAF

You will have seen that leaves vary in size, shape and colour.

Parts of a leaf

- ◆ **Lamina or leaf blade**: It is the flat, green portion of the leaf.
- ◆ **Petiole**: It is the part of the leaf by which it is attached to the stem.



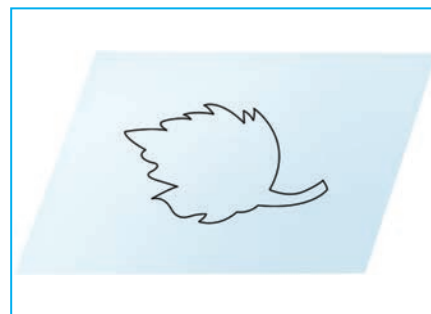
Parts of a leaf



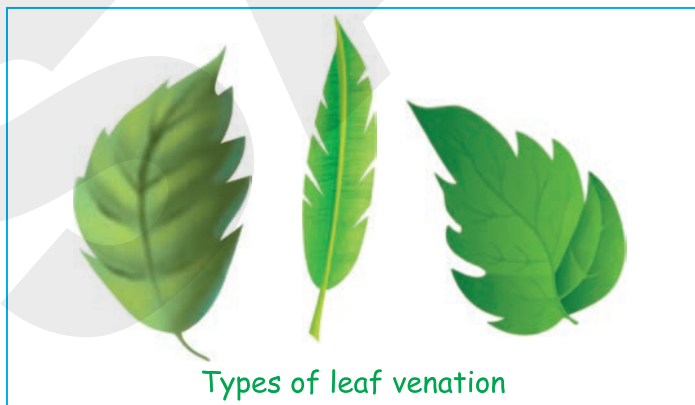
Activity – 6

Take a leaf and place it under a white sheet of paper. While holding the paper, shade the portion of the sheet above the leaf with the help of a pencil tip sideways.

You will get an impression with lines on it. These lines are called **veins**. The thick vein which runs through the middle of the leaf is called the **mid rib**. The arrangement of veins in a leaf is called **leaf venation**. In some plants the veins are parallel to each other, along the length of the plant. This is called **parallel venation**. Example : wheats grass and maize.



However, in some plants, the structure of the veins is not symmetrical on both sides. Such a venation is called **reticulate venation**. Example : mango, potato and tulsi. The veins of the leaf transport water, minerals and food.



Types of leaf venation



Facts to know

There is a special relation between the type of root and venation of leaves. Plants with tap roots have reticulate venation and those with fibrous roots have parallel venation leaves.

Let's Remember

Fill in the blanks with the correct words.

root system shape soil leaves tap root

1. Plants vary in size and _____.
2. _____ consists of the main root and the branching roots.
3. Roots fix the plant firmly in the _____.
4. The main root is called the _____.
5. _____ prepare food for the plant.

FUNCTIONS OF THE LEAF

- ◆ Leaves prepare food for the plant. Leaves are green in colour because of presence of the green pigment called **chlorophyll**. Leaves prepare food using chlorophyll, water and carbon dioxide in the presence of sunlight by the process called **photosynthesis**. The food prepared by the leaves is starch and is stored in different parts of the plant. Plants give out oxygen during the process of photosynthesis.
- ◆ Leaves also release extra water absorbed by the root through the stomata in the form of vapour. This process is called **transpiration**.

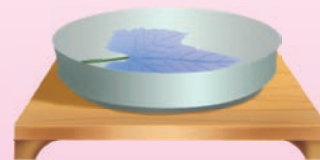


Activity – 7

To show that leaves contain starch.

Take a green leaf of a healthy plant. Place it in a test tube and cover it with spirit. Place the test tube in a beaker filled with water. Heat the beaker till the green colour of the leaf is completely leached and the leaf becomes colourless. Remove the leaf carefully and wash it in water and put it on a sheet of white paper. Pour a few drops of Iodine on it.

What do you observe? The leaf turns blue black in colour. This shows the presence of starch.



Activity – 8

To show that sunlight is essential for photosynthesis.

Take a potted plant and keep it in a dark place for a day. Now, cover one of the leaves with black paper and keep the plant in sunlight for a day. Pluck the leaf and test it for starch. What do you observe? In which portion of the leaf is starch present. If starch is not present in the covered portion, what do you conclude?



Activity - 9

To study transpiration in plants.

Take a healthy potted plant. Cover a leafy branch of the plant in a polythene bag. Take another similar polythene bag and also tie its mouth. Keep the plant and the bag in the sun. Observe after a few hours. You will see water droplets inside the inner surface of the bag covering the branch only. Why is it so?



MODIFICATION OF LEAVES

- ◆ Leaves of some plants are modified to give support. Example : pea plant
- ◆ Leaves of some plants are modified into spines which provide leaf tendril of pea plant protection to the plants from animals and reduce water loss.



Leaf tendril of a pea plant

Let's Remember

Write 'T' for true and 'F' for false statements.

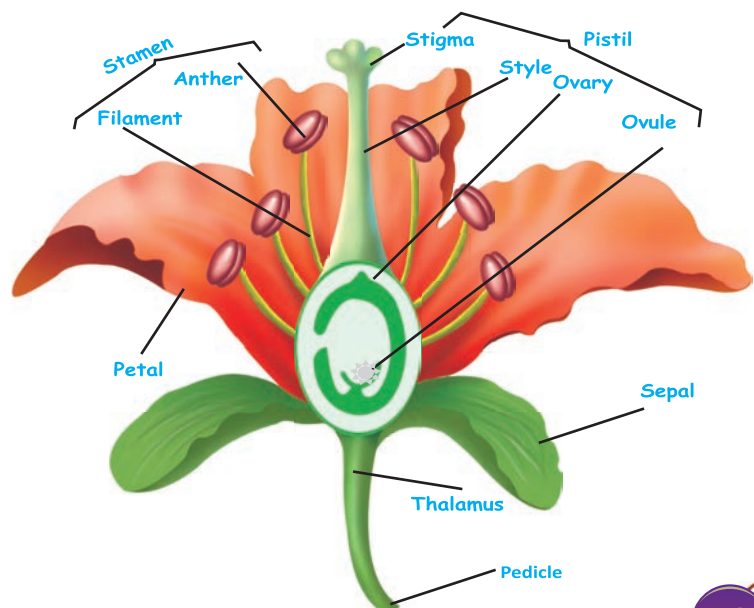
1. Plants are seen practically everywhere .
2. The main root is called lateral roots.
3. Stems absorb water and minerals from soil and help the plant to grow.
4. The stem may be branched or unbranched.
5. Flowers of some plants are modified to give support.

☐
☐
☐
☐
☐

THE FLOWERS

The flower is the most colourful part of a plant. Flowers differ in colour, size, shape and smell. We can recognise a plant by its flowers.

Parts of a flower



- ♦ **Pedice**l: The stalk of the flower is the pedicel. It joins the flower to the stem.
- ♦ **Thalamus**: The uppermost swollen part of the pedicel is the thalamus.
- ♦ **Calyx or sepals**: They are the outermost part of a flower and are green in colour. They protect the flower especially when it is in the form of a bud.
- ♦ **Petals**: These are the brightly coloured leaf like structures inside the calyx. They are the most prominent part of a flower. The petals attract insects by their scent and help in the process of reproduction.
- ♦ **The Stamens**: The stamens can be seen when the petals are removed. It is the male reproductive organ. The stamen consists of a tube like structure called **filament** and a bag like structure present on the top of the filament called **anther**. The anther contains pollen grains which are dust like particles which take part in reproduction.
- ♦ **Pistil (Carpel)**: This is the inner most part of the plant. It is the female part of the flower. It consist of three parts - the **stigma** at the top, **style** a tube like structure in the middle and a swollen structure at the base called the **ovary**. The ovary contains bead like structures called **ovules**. After fertilisation, the ovary develops into the fruit and the ovules become the seeds.



The Stamen



The Pistil



Facts to know

An average strawberry has 200 seeds. It is the only fruit that bears its seeds on the outside (external surface).



Activity - 10

Take two brightly coloured flowers like a hibiscus and rose flower. Study the various parts. Note down your observations.

Name of the flower	Rose	Hibiscus
Colour of the petals		
No. of sepals		
No. of petals		
No. of stamens		
No. of pistils		



Activity – 11

Carefully remove the pistil from the flowers. Cut the ovary with a blade. What do you see?



Glossary

petiole	:	stalk which attaches leaf blade to the stem
vention	:	arrangement of veins in a leaf
midrib	:	thick vein in the centre of a leaf
locule	:	cavity of the ovary where ovules occur
pedicel	:	stalk of an individual flower



Summary

- ◆ Plants are classified into herbs, shrubs and trees depending on their size, stem, and branches.
- ◆ Plants consist of two parts – the root system and the shoot system.
- ◆ Roots are of two types–taproot and the fibrous root.
- ◆ Roots help to fix plants to the ground and in the absorption of water and minerals from the soil.
- ◆ The stem helps in the conduction of water and mineral and to keep the plant upright.
- ◆ Leaves help in the process of photosynthesis and transpiration.
- ◆ The arrangement of veins in a leaf is called venation. It is of two types–reticulate or parallel.
- ◆ Plants which have tap roots have reticulate venation whereas plants which have fibrous roots have parallel venation.
- ◆ A typical flower consists of sepals, petals, stamens and pistil each performing different functions.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. Very soft and small plants are called.

(a) herb ☐ (b) shrub ☐ (c) climber ☐ (d) creeper ☐

2. Fibrous root is found in this plant.

(a) grass ☐ (b) pea ☐ (c) maize ☐ (d) rice ☐

3. The plant which stores food in its root.
 (a) potato ☐ (b) onion ☐ (c) carrot ☐ (d) spinach ☐
4. Reticulate venation is found in
 (a) mango ☐ (b) peepal ☐ (c) canna ☐ (d) plum ☐
5. The male reproductive part of a flower is.
 (a) ovule ☐ (b) ovary ☐ (c) stamen ☐ (d) sepal ☐
6. This part of the flower turns into a fruit.
 (a) sepal ☐ (b) anther ☐ (c) stigma ☐ (d) ovary ☐
7. This part of the plant attracts insects by its scent.
 (a) root ☐ (b) stem ☐ (c) leaves ☐ (d) flower ☐
8. This is a climber.
 (a) water melon ☐ (b) pumpkin ☐ (c) gourd ☐ (d) money plant ☐

B. Write 'T' for True and 'F' for false statement.

1. Herbs are very small plants. ☐
2. Trees are tall plants. ☐
3. Climber can stand without support. ☐
4. The stem keeps plant upright. ☐
5. Root transport water to all parts of the shoot system. ☐

C. Give one word for each one of the following.

1. Name the two systems of the plant body. _____
2. Name the verbs. _____
3. Name the shrub. _____
4. Name two plant in which root is modified to store food. _____
5. Write down the two parts of a flower. _____

D. Answer the following questions in short.

1. State there main functions of root.
2. Name the two systems in a plant.
3. What is the function of a midrib in a leaf?
4. How do prop roots help the plant.
5. Distinguish between herbs and shrubs.

E. Answer the following questions.

1. Write down the main functions of the stem.
2. Describe the process of transpiration.
3. What is the difference between tap root and fibrous root?
4. Write an experiment to show that leaves contain starch.
5. Draw and label a diagram of a flower.



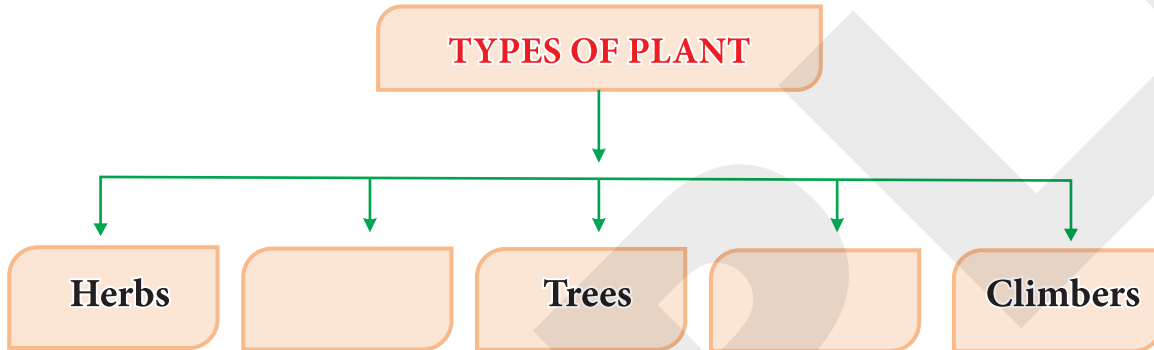
HOTS (Think and Answer)

1. Why do you think that all flowers are not pollinated by insects?
2. Why do you think banana plant is a shrub and not a tree?



Let's Recall

Complete the following diagram.



Group Discussion

Form groups of 6-7 and discuss on the following topics.

1. Plants- essential for life on earth
2. Plants release a lot of water through transpiration. Then how do the plants protect themselves from water loss? Discuss.



Activity to do

Grow a flower of two colours:

Fill two glasses with water. Colour the water of one glass red with the help of some food colouring. Divide the stem of a white flower into two parts. Put half the stem in one glass, the other half in the other glass as shown in the picture. After a few hours you will find one side of the flower has become red. You can surprise everyone by showing them your flower with 2 colours.



Creative Task

How would you sell the idea of growing vegetables through hydroponics to a farmer instead of the traditional method of using soil for growing the same?



WORKSHEET-4

Identify the following picture and write herb, shrubs tree, creeper, or climber in the box.



Body Movements

Introduction

- ☛ Movements
- ☛ Types of Joints
- ☛ Human skeletal system
- ☛ Movement in human body
- ☛ Movement in other animals – earthworm, snail, cockroach bird, fish, snake.

Even when we are sitting in one place a number of movements are taking place in our body – we are blinking our eyes from time to time, we are breathing, we may be moving our hands or legs etc. We walk from one place to another moving our legs.

Animals move from one place to another in different ways. They may walk, run, fly, jump, hop, creep, crawl, slither and swim.

How different animals move

	Animal	Body Part	Movement
1.	Horse	legs	walk
2.	Snake	whole body	slithers
3.	Fish	fins, tail	swims
4.	Bird	wings	flies
5.	Cockroach	legs, wings	walks, flies, climbs
6.	Human	legs	walks
7.	Ant	legs	crawls
8.	Grasshopper	hind legs	jumps



Facts to know

Penguin and ostrich cannot fly. They can only walk.

HUMAN BODY AND ITS MOVEMENT

We will first look at our body movements before studying in detail about the movements in animals. Some parts of our body can move more than the others. Some parts can move in more than one direction, whereas some can move in only one direction.



Activity - 1

Bend your elbow up and down. You will be able to do it easily. Now ask someone to tie a ruler lengthwise on to your elbow. Try to bend your elbow again. What do you notice? You will not be able to bend it.



JOINTS AND MOVEMENTS

We are able to bend or rotate our body in places where two parts of our body are joined together as in elbow, shoulder, knee, neck etc. The place where two bones meet or are joined together is known as a **joint**. (Bones are very hard and they cannot bend). We are able to move the bones in different ways because of joints and muscles. The bones are held together at the joints by **ligaments**.



Activity - 2

Feel the bones with your hand starting from the head, face, neck, shoulder, chest, arm, legs, fingers, toes, ear etc. You will feel some hard structures, they are the bones. Some are small, whereas others are long. They are of different shapes and sizes.

There are different kinds of joints in our body.

Ball and socket Joint

In this type of joint, the end of one of the bones is like a ball, which fits into a socket (hollow space) of the other bone. The ball can move inside the socket freely in any direction. This type of joint is found in the shoulders and in the hips.



A ball and socket joint

Pivotal Joint

Our head is joined to the neck by the pivotal joint. This joint allows movement of the head in all directions. We can move our head up and down and sideways. In this joint the rounded surface of one bone fits into a dent in the other bone. The head rests on this ring.



Pivot joint

Hinge Joint

This joint allows movement in one direction only. i.e. either up and down or backward and forward, like the hinges of the door. Such joints are found in the elbow, knee and finger.



Hinge joint

Gliding Joint

In this joint one bone glides over the other bone at the place of

the joint. This type of joint is found in the wrists and ankles. This joint allows side-way or back and forth movement.

Fixed Joint

Fixed joints do not allow any movement. Most of the bones in the skull are fixed joints. Joints in the tooth socket are also of this type.



Gliding Joint



Activity - 3

Open your mouth wide. What do you notice? You are able to open your mouth by moving your lower jaw away from the head. Try moving your upper jaw. You will not be able to move it. This is because the upper jaw and the head are joined together with a fixed joint. The lower jaw is movable.

Have you ever wondered what gives different shapes to our different body parts? The framework of bones in the human body is called the **skeleton** gives shape to our body.

We can have an idea about the shape and the number of bones in the different parts of our body with the help of X-ray photographs.



Human skeleton



X-Ray images



Facts to know

- ◆ There are 26 bones in the human foot.
- ◆ The human hand contains 56 bones.

The human skeleton consists of 4 basic parts : the skull, the back bone, the ribs and the limbs.

The Skull

The skull is made up of 22 bones. It encloses and protects the brain.



The skull

Let's Remember

Fill in the blanks with the correct words.

pivotal Hinge humerus fly 4

1. Penguin and ostrich cannot _____.
2. Our head is joined to the neck by _____ joint.
3. _____ joint allows movement in one direction only.
4. Human skeleton consists of _____ basic parts.
5. The upper arm has a long bone called the _____.

THE BACKBONE OR THE SPINE

Press and move your fingers downwards in the centre of your friend's back. You will feel a long hard bony structure. It is the backbone which is made of many small bones called **vertebrae**. The vertebrae are joined together by joints which allow only very slight movement. This is why we are able to bend. If it was made up of one long bone, we would not be able to bend our body.

The Ribs

Take a deep breath and hold it for sometime. Now feel the bones on your chest. Can you count the chest bones (ribs). They are flat curved bones. They join the backbone and the chest bone together to form a cage called the **rib cage**. The rib cage protects the heart and the lungs. There are 12 pairs of ribs. The last two pairs are not attached to the breast bone and are called **floating ribs**.

Limbs

The thigh bone called the femur is attached to the hip bone through the hip joint. The ankles and the feet also have a number of bones.

The upper arm has a long bone called the **humerus**. The lower arm has two bones. The wrist and the hand also have several bones.

The Pelvic bones

The pelvic bones enclose the portion of the body below the stomach. We sit on this.

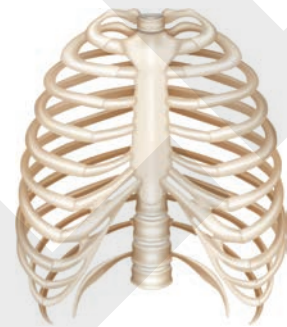
The ends of bones are covered with a **cartilage**. It acts as a shock absorber and prevents rubbing of bones against each other at the joints.

MOVEMENT IN HUMAN BODY

Bones cannot move by themselves. The muscles have the ability to move. Muscles attached to the bones make them move at the joints. The muscles work in pairs. To move a bone in one direction, two sets of muscles are needed. When one muscle contracts, the bone is pulled in that direction. The other muscle of the pair relaxes. Similarly to move the bone in the opposite direction, the relaxed muscle contracts while the



The backbone



The ribcage



Fore limb



Hind limb



Pelvic Bones



Raising an arm Lowering an arm
Muscle movement

first muscle relaxes. Thus muscles move bones only by contracting and never by relaxing. A muscle cannot push, it can only pull. Thus two muscles have to work together to move a bone.



Facts to know

All animals do not have bones.

MOVEMENT IN OTHER ANIMALS

Earthworm

An earthworm does not have bones. The body of the earthworm is made of many segments joined end to end. The earthworm moves due to repeated expansion and contraction of its muscles. The earthworm first extends the front part of its body, keeping its rear portion fixed to the ground. Next, it fixes the front portion and releases the rear portion. This shortens the body, pulling the rear portion forward. The earthworm carries out repeated muscle expansions and contractions to move forward. It moves forward each time by a very small distance.



Locomotion of earthworm

A number of tiny hair like bristles are present on the lower surface of the body which provides good grip on the ground. These bristles are connected to the muscles. Its body secretes a slimy substance, which helps in its movement.

Snail

Snails have a shell. It is the rounded structure it carries on its back. It is the skeleton which it carries outside the body. It is not made of bone.

The snail has a thick structure called a **foot** made up of strong muscles. It is situated below the belly. It produces a series of wave-like movements that push the snail's body forward. The shell does not help in movement but is simply dragged with the body.



A Snail



Facts to know

The shell of the snail is made of calcium carbonate.

Cockroach

Cockroach can walk, climb as well as fly. It has three pair of legs which help in walking. The body of the cockroach is covered with a hard outer skeleton. It has no bones. There are two pairs of wings attached to the breast. The breast muscles help to move the wings when the cockroach flies. The leg muscles move the legs for walking and climbing a cockroach.



A Cockroach

Let's Remember

Match the following.

Column A	Column B
1. horse	a. swims
2. fish	b. jumps
3. bird	c. walks
4. ant	d. flies
5. grasshopper	e. crawls

Birds

Birds fly in the air and walk on the ground. Some birds like duck can swim in water. The bones of the birds are hollow and very light. The two hind limbs are used for walking and perching. The forelimbs of the birds are modified as wings which are used for flying. They have strong shoulder bones. The whole body including wings is covered with feathers. Strong muscles in their breast bones help birds to flap their wings and fly. The bird has a streamlined body.



Skeleton of a bird

Fish

The fish also has a streamlined body i.e. the body of the fish is broader in the middle and narrow at both ends. This shape allows the fish to cut through the water efficiently as the water resistance is reduced. The skeleton of the fish is covered with strong muscles. These muscles contract on one side and expand on the other side. Thus a fish forms a curve and moves in a zig-zag manner. The tail fins also move along the body in a similar manner, pushing against the water. This makes a jerk and pushes the body forward. The fish also has dorsal, pelvic and anal fins which help to balance the fish. By moving its tail, a fish can change direction of its movement.



Fish

Snakes

The snake has a long backbone which is flexible. It has no legs. They have many thin muscles, connected to the ribs, backbone and skin. The snake can curve its body into many loops. Each loop pushes against the ground to make the body move forward. The body thus moves in a wavy manner because of the loops. The snake can move forward very fast, since its long body makes many loops.



Movement in a snake



Facts to know

Divers wear fin like flippers on their feet to help them to move in water.



Glossary

bone	: bone is formed from a tissue which forms individual structures with the body
cartilage	: flexible tissue living the joints and found in other parts of the body
cells	: building blocks of life
tendons	: strong fibres which attach muscles to the bones
pivotal joint	: the joint where our neck joins the head



Summary

- ◆ The skeleton of the human body is made up of bones and cartilage. Skeleton gives shape to the body, protects the inner organs and helps in the movement.
- ◆ The human skeleton is made up of four parts – skull, backbone, ribs and limbs.
- ◆ The place where two bones meet is called the joint. Main joints in the body are ball and socket joint (shoulder), hinge joint (knee), pivot joint (neck), and gliding joint (ankle).
- ◆ The bones move due to alternate contractions and relaxations of two sets of muscles.
- ◆ Different animals move in different ways.
- ◆ Earthworms move by repeated extension and contraction of its body muscles. Tiny bristles present on the lower side of the body help in gripping the ground.
- ◆ Snails move with the help of a foot made up of strong muscles, situated below its belly.
- ◆ Cockroaches can walk, climb and fly. The body of the cockroach is covered with a hard outer skeleton. It has two pair of wings and three pairs of legs all connected to the muscles of the breast bone.
- ◆ Fish move by moving its tail fin in a zig-zag manner.
- ◆ They have stream-lined bodies which help them to cut through water efficiently.
- ◆ Birds can fly because of their light weight.
- ◆ Snakes slither on the ground. It curves its body into many loops sideways. A large number of bones and muscles help to push the body forward.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. Ball and socket joint is found in
(a) knees ☐ (b) neck ☐ (c) shoulder ☐ (d) ankle ☐

2. The bones at the joint are held together by
 (a) cartilage ☐ (b) ligament ☐ (c) tendon ☐ (d) muscles ☐
3. A joint which allows movement in one direction only
 (a) ball and socket joint ☐ (b) pivot joint ☐
 (c) fixed joint ☐ (d) hinge joint ☐
4. This act as a shock absorber for bones.
 (a) cartilage ☐ (b) ligament ☐ (c) tendon ☐ (d) muscles ☐
5. The femur is present in the
 (a) head ☐ (b) neck ☐ (c) arms ☐ (d) legs ☐

B. Write 'T' for true and 'F' for false statements.

1. Hinge joint is found in the hips. ☐
2. Joints in the both socket are fixed. ☐
3. Muscles move the bones by pushing. ☐
4. An earthworm does not have bones. ☐
5. The cartilage is very hard. ☐
6. Snails move with the help of its shell. ☐

C. Give one word for each one of the following.

1. Name two organs protected by the rib cage.
2. Name two places where gliding joints are present.
3. Which fins help the fish to maintain balance?
4. Name the movable bone in the skull.
5. Which animal carries a shell?

D. Answer the following questions in short :

1. In which part of the skeletal system most bones are movable?
2. Name the four main parts of the skeleton system.
3. What is the function of the cartilage?
4. What helps the earthworm to grip the ground?
5. What is a joint?

E. Answer the following questions :

1. Which joint allows movement in all directions? Where is it found?
2. Why are we able to bend?
3. What is a rib cage?
4. How do muscles help to move the bones?
5. What features help the birds to fly?
6. Explain the movement of a snake.



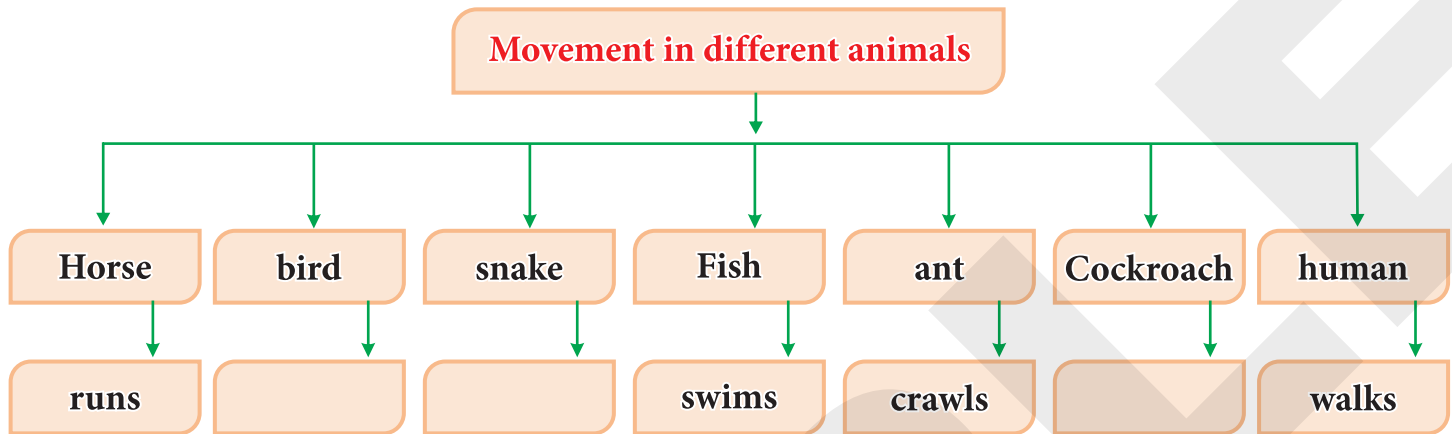
HOTS (Think and Answer)

1. Why do you think aeroplanes and boats have stream-lined bodies like that of a fish?
2. Why do you think an earthworm cannot move on a surface made of glass?



Let's Recall

Complete the following diagram.



Group Discussion

1. Significance of locomotion in man
2. Role of movable joints in human body
3. Significance of fixed joints in human body



Activity to do

- ◆ Have fun with your friends. Move different parts of your body in different ways like neck, hand, legs, elbow, knee, fingers. Note down which parts can be moved or not which can move sideways, up-down, circular etc.
- ◆ Tie a ruler under you knee – try running and climbing stairs.
- ◆ Tie a ruler under your elbow– try eating food.
- ◆ Try to eat food by holding your lower jaw.
- ◆ Make paper boats and push in water first width wise and then lengthwise? Is there any difference?



Creative Task

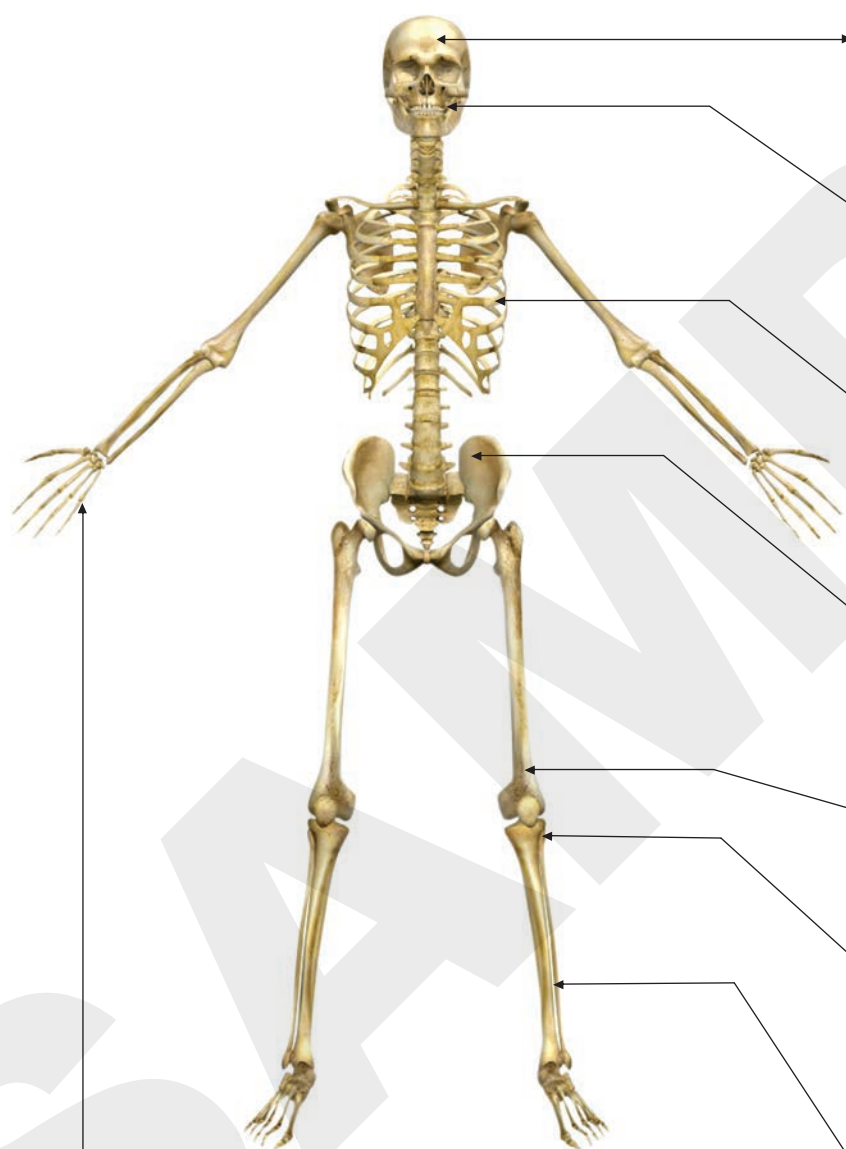
Collect information about the following:

1. Food and feeding habits of the earthworm.
2. If a person's bone gets fractured, what first aid will be before taking him to the hospital.



WORKSHEET-5

The picture of the skeleton of human body is given below. Write the names of the bones and write its function in the given box.

	Name of the bones	Function
	1	
	2	
	3	
	4	
	5	
	6	
8		
	7	



The Living Organisms and Their Surrounding

Introduction

- Our Environment
- Abiotic and biotic factors
- Habitat
- Types of habitat : Terrestrial Aquatic
- Diversity in nature
- Characteristics of living things

Living organisms live everywhere. They live on mountains, where it is very cold and they are covered with snow. They live in the deserts where it is extremely hot and dry. They live even on the ocean bed where it is completely dark. Can you think of a place on the earth where no living things live? The answer is 'no'. You will find them even in the darkest corner of your house. Plants and animals living in different places are different from each other.

HABITAT AND ENVIRONMENT

Our environment is our surrounding. It includes both living and non living things. Living things cannot live alone. They all need air to breathe, food to eat, water to drink and other materials from their surroundings. They need air, water and soil to survive. Thus a living organism is dependent on both living and non-living things. Both living and non-living things interact with each other.

- ♦ **Abiotic** or non living components of the environment include air, water, soil, sunlight, temperature, humidity etc.
- ♦ **Biotic** or living components include all plants, animals and microorganisms
- ♦ **Ecology** is the branch of science which studies the relationship between living things and their environment.

HABITAT

Habitat means the living place of an animal or plant. Organisms depend for their food, water, air and shelter and other needs on their habitat. A habitat is the natural living place of an organism.

The habitat varies from animal to animal. The habitat of a camel and cactus plant is the desert, that of a lion it is the forest and that of a frog or fish it is a lake, river or a pond. Many different kinds of plants and animals are found in a habitat. A good habitat provides an organism with food, water, shelter, suitable climatic conditions for it to survive and breeding opportunities. The conditions in a desert are totally different from those in hilly areas. Then how is the animal able to live in such conditions? The organisms have certain features that help them live in the surroundings in which they are found.



The special characteristics that enable a plant or animal to survive in a particular environment are called **adaptations**. Different animals adapt to their surroundings in different ways. Most living organisms found in one type of habitat are unable to survive in other habitats. E. g. camels live in deserts, but they cannot survive in the hills. Similarly fish will not survive on land.



Activity – 1

Make a list of plants and animals found in different surroundings.

S. No	Deserts	Mountains	Plains	Forests	In water
1.					
2.					
3.					
4.					
5.					
6.					

Types of Habitat

The two main types of habitat found on the earth are

- ◆ Terrestrial habitat and
- ◆ Aquatic habitat

Terrestrial Habitat

All plants and animals living on land are called **terrestrial organisms**. Maximum number of organisms live on land. Terrestrial habitats are divided into different types depending on the

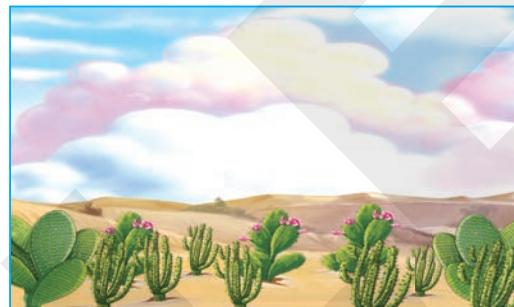
climate, temperature, rainfall, soil etc. Deserts, grasslands, mountains and forests are some of the terrestrial habitats.

DESERT

In the deserts, it is extremely hot and dry. There is very little rainfall. Organisms living in this area include camels, rats, snakes and cactus.

ADAPTATION IN PLANTS

- ◆ Most plants have long roots that can go deep inside the soil in search of water.
- ◆ Some plants have fleshy stems which store water in them e.g. cacti. The stem is covered with a thick wax which prevents loss of water.
- ◆ Desert plants lose very little water through transpiration. The desert plants have very few leaves or these are present in the form of spines. This prevent loss of water through transpiration. Photosynthesis is carried out by the stems.



Activity - 2

Take a potted cactus plant and a green plant. Tie a polythene bag to a part in each of the two plants as was done in activity 9 of chapter 7. Leave the plants in the sun for sometime. Observe after a few hours. What do you notice? Is there any difference in the amount of water collected in the two polythene bags? What does this show?

ADAPTATION IN ANIMALS

- ◆ Many animals like snakes and rats stay in burrows, deep in the sand during day time to avoid the intense heat. They come out only in the night when it is cool.
- ◆ Camels have special features to survive in the deserts.
- ◆ It has long legs to keep the body away from the heat of the sand. Its hooves are covered with a large sole which helps it to move easily on soft sand.
- ◆ The camel stores fat in its hump. It utilises this food during shortage and is able to survive without food for long periods.
- ◆ It can drink a large quantity of water at one time and then stay without water for a long time.
- ◆ It excretes a small amount of urine, its dung is dry and it does not sweat. It thus loses very little water from its body.



Grassland

It is very windy and dry in these regional. It is hot during the day and cold during the night.

Plants

Mainly grass grows here. The adaptations are:

- ◆ Strong roots to fix the plants.
- ◆ Flexible stems so that they can sway with the wind and not break.
- ◆ Small leaves to reduce water loss.

Some other plants which grow here include acacia, sunflower, clovers and sage brush.

Animals

Lions live in the grasslands and in the forests. They have the following adaptations:

- ◆ It is light brown in colour which helps it to hide in the dry grasslands.
- ◆ They have strong claws in their front legs that can be withdrawn inside the toes. This helps them to hunt without making a noise.



Facts to know

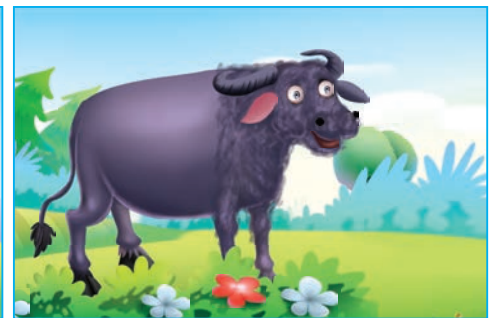
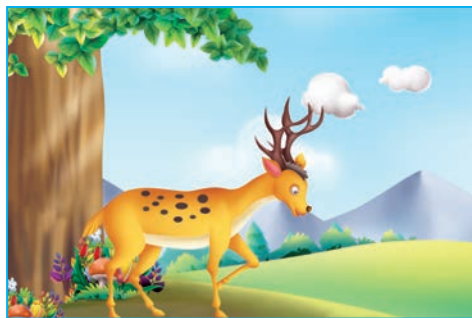
Grasslands have different names in different parts of the world. They are called Savannas in Africa and Prairies in America.

- ◆ They have eyes in front of their faces which helps them to locate their prey easily.

Deer are also commonly found in grasslands. They have the following adaptations.

- ◆ They have strong legs that enable them to run away from predators.
- ◆ They have long ears to hear the movement of predators.
- ◆ They have eyes on the sides of the head which enable them to look in all directions for danger.
- ◆ They have strong back teeth for chewing hard plant stems.

Some other animals found in the grasslands include bison, gazelles, zebras and wild horses. These animals also have adaptations similar to that of the deer.

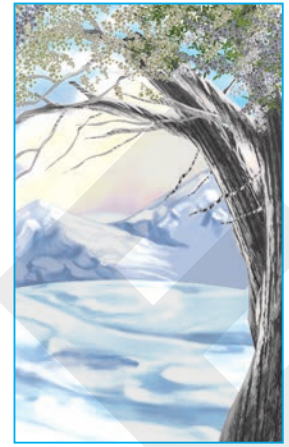
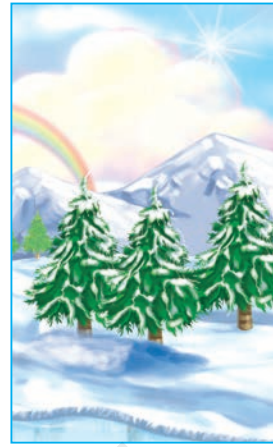


Animals living in the grassland

MOUNTAIN REGIONS

In this region it is normally very cold and windy. In winter there may be snowfall. The polar regions are covered with snow. A large number of plants grow here. Fir, pine, oak, maple, deodar, spruce and cedar are some plants which are abundantly found in the hilly areas. Some adaptations seen in these plants include:

- ◆ The trees are cone shaped having sloping branches. Some of these trees like pine have sharp needle-like leaves. This helps the rain water and snow to slide off easily.
- ◆ The plants have shorter stems so they are not broken down by the harsh winds.

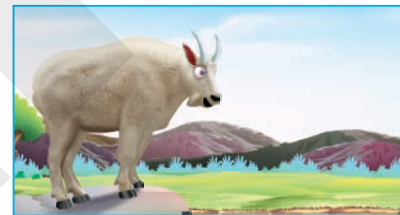


Some trees found in mountains

Animals

A number of animals like the snow leopard, yak, polar bear, mountain goat, sheep and wolf are found here.

- ◆ Animals (like the snow leopard) living in mountains, have thick skin or fur to protect them from cold. Yaks have long hair to keep them warm.
- ◆ Mountain goats have strong hooves which help them to climb rocky slopes of the mountains. Some animals go to sleep in the winter months. This is known as **hibernation**. Examples are frog, dormouse etc.
- ◆ Animals usually have shorter legs, tails and ears to reduce heat loss.



Some animals living in mountains

Facts to know



Snow leopard has fur on its feet and even toes to protect it from the cold when it walks on snow.

Next time you go to the hills for a vacation, observe the trees and plants there.

AQUATIC HABITATS

They are further divided into sea water and fresh water habitats.

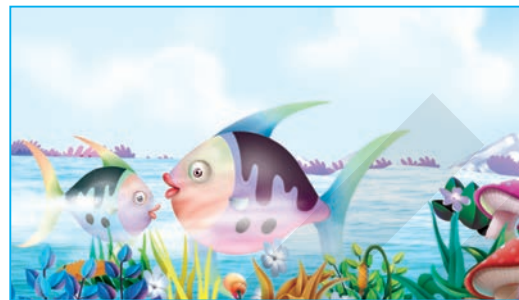
Sea water habitats

The sea water is salty. A large number of organisms live in it.

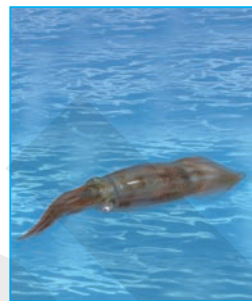
- ◆ Fish have a streamlined body (studied in the previous chapter). This shape allows them to move in water. The body is covered with scales and mucous, making it water proof. The scales protect the fish and also help in the easy movement through water. Fish have

fins which help them to maintain their balance in water. The tail fin helps them to change direction in the water. Fish breathe through gills.

- ◆ Some sea animals like the squid and octopus do not have streamlined bodies. They stay deeper in the ocean, near the ocean bed. They wait for the prey and catch it when it moves towards them.
- ◆ Whales and dolphins do not have gills. They breathe through the nostrils or blowholes located on their head. Some aquatic animals have to come to the surface of the water from time to time. They can stay in water for a long time without breathing.



Fish



Squid



Octopus

Fresh water

Lakes, rivers, ponds and streams are fresh water habitats. Frogs, some fish, etc. stay here.

Aquatic plants

Plants living in water are called **aquatic plants**. In aquatic plants the roots are small in size and their main function is to hold the plant in place, unlike in terrestrial plants where they play an important role in the absorption of water and nutrients from the soil. The stems are usually long and hollow.

Aquatic plants may be either fully submerged, partially submerged or floating.

In fully submerged plants, all parts of the plant are under water. The leaves are narrow, thin and long so as to resist water currents. They can bend easily in the water. Example tapegrass.

In partially submerged plants the roots are fixed but the leaves and flowers are floating on top of the water. Example – water lily. The leaves are flat and have stomata on the upper surface of the leaves to allow exchange of gases.

In floating plants like water lettuce, plants float in water and their roots hang submerged in water. Their leaves are broad and round.



Facts to know

Dolphins can swim up to 35 miles/hour.



Some aquatic plants



Facts to know

Frogs never close their eyes even when they sleep. They can see forward, sideways and upwards at the same time.

CHARACTERISTICS OF LIVING THING

Take Food

All living things need food to survive. We have already learnt how food is important to us. Green plants prepare their own food, through the process of photosynthesis. They are therefore called **autotrophs**. Animals depend on others for food and hence are known as **heterotrophs**. Organisms use the energy obtained from plants for growth as well as for other life processes that go on inside them.

Grow

Living things grow in size. You must have noticed that you are also growing taller and bigger. The clothes you were wearing a few years ago must have become smaller. A puppy grows into a dog, a kitten into a cat, a chicken into a hen etc. Similarly plants also grow.

Small seedlings grow into a new plant. Trees go on growing throughout its life. If you see plants of the same type, for example rose, you will notice that some are very small and young and some are big and grown up.

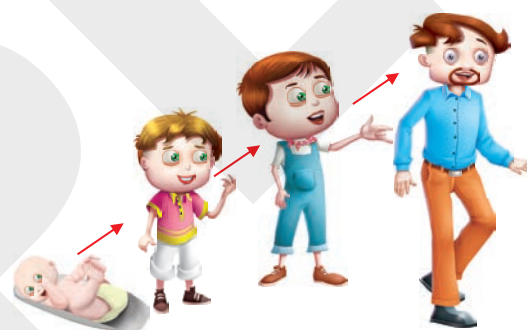
Therefore, it can be said that all living things grow.

Respire

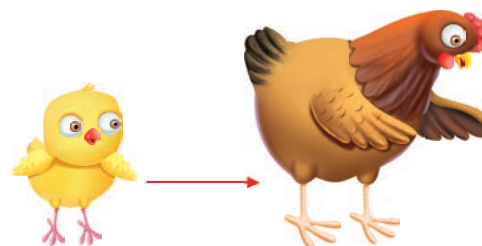
When we inhale the air we take in—from the outside passes into our lungs. The oxygen in the air is absorbed and used by the body. Carbon dioxide from the body is given out when we breathe out. This process is known as **respiration**.

Land animals like cows, horses, dogs and cats breathe like us. Water animals like fish breathe the oxygen dissolved in the water. They breathe through the gills. Earth worms breathe through their skin.

Plants also breathe by taking in oxygen and giving out carbon dioxide. The exchange of gases takes place through tiny holes present on the surface of the leaves called **stomata**. Respiration takes place day and night, whereas plants take in carbon dioxide for photosynthesis during day time only and give out oxygen. The amount of oxygen given out during photosynthesis exceeds the amount of oxygen used by the plants in respiration.



Growth in a child



Growth of a chick



Activity - 3

Take lime water in a test tube. Fit a cork with 2 holes in it. Insert glass tubes in the holes as shown in the diagram. Now breathe out into a tube. What do you observe? The lime water in the test tube turns milky, showing the presence of carbon dioxide in the air breathed out.



Response to stimuli

What happens when you touch a hot iron? You immediately withdraw your hand. All living things respond to a stimulus. The change in our surroundings that produces a response in an organism is called **stimulus**. The reaction of an organism to a stimulus that brings about a change in its behaviour is called a **response**. The main stimuli to which living organisms respond are touch, chemicals, heat, light and sound. Examples:

- ◆ The bird flies away when you move towards it.
- ◆ A turtle can contract itself into its shell.
- ◆ Animals become excited when food is served to them.
- ◆ When we feel thirsty we drink water.
- ◆ Our eyes shut when we move from dim light to bright light.

Similarly, plants also respond to stimuli. The leaves of touch-me-not plant fold when someone touches them.



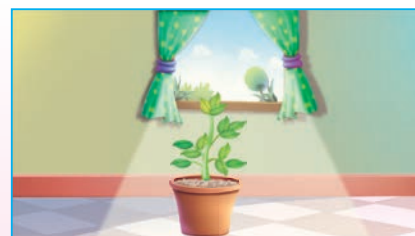
Facts to know

The fastest nerve signal travels at 400 km/hr.



Activity - 4

Take a potted plant and place it near a window through which light enters. Continue to water the plant. After a few days you will see that the plant bends towards the direction from which light is coming.



EXCRETE

A number of waste products are produced in our body due to various life processes such as digestion and respiration. The process by which living organisms get rid of the waste and other harmful substances formed in their body is called **excretion**.

Plants also excrete. They excrete carbon dioxide and water vapour from small pores called **stomata** present in the leaves. Some plants store their waste products in the plant itself in a way that they do not harm the plant. Some waste products of plants are gums and resins.

REPRODUCE

Living beings are capable of creating more of their own kind. Different animals reproduce in different ways. Some living beings give birth to young ones.



Young one of human being



Some animals which give birth to young ones



Hatching of an egg

Some animals like birds, frogs, snakes and fish produce their young ones from eggs.

Plants also reproduce. Most plants reproduce from seeds. Seeds germinate into new plants. Some plants reproduce from other parts like stem, leaf, root or cutting.

Non living things cannot reproduce.



A seed germinates into a new plant



Activity - 5

Take a cutting from a coleus plant. Fix it in the soil and water it regularly. After few days you will find that the cutting grows into a new plant.

Move

In the previous chapter we have studied how animals move from one place to another. This is called **locomotion**. Do plants also move? No, they do not move in search of food and shelter, but plants do show some movements. Roots grow towards the soil and shoots away from it, sunflower turns its face toward the sun, the touch me not bends when touched. You can see similar types of movements in flowers of lotus and water lily.

Non-living things like car, scooter, train and bus also move. But they do so with the help of an outside force and not on their own.

Decay

All living organisms have a fixed life span. They die after a fixed time. Different organisms

have different life spans.

Thus, we have seen that all living things have some common characteristics. They take food, grow, respire, excrete, respond to stimuli, reproduce, move and die. Do all living thing show all these characteristics? A seed can stay as it is without growing or showing other characteristics associated with living beings if kept as such. However, if the same is planted in soil and watered, it germinates into a new plant.

Thus there are cases when things do not possess all the characteristics of a living thing, though they may be living.



Facts to know

The bristlecone tree can live for 5,500 years. It has the longest life span.



Glossary

habitat	: the surroundings where organisms live
teric habitat	: the habitat which is hot and dry with scarcity of water
hydrophyte	: the plants which are adopted to live in water
deciduous trees	: trees that shed their leaves once a year are called deciduous tree



Summary

- ◆ The surrounding where plants and animals live, is called their habitat.
- ◆ Our environment is made of biotic and abiotic components.
- ◆ Biotic factors are living things and includes all plants, animals and microorganisms.
- ◆ Abiotic factors are non-living things and include air, water, soil, temperature, rainfall etc.
- ◆ The special characteristics that enable a plant or animal to survive in a particular environment is called adaptation.
- ◆ The two main types of habitat present on the earth are terrestrial and aquatic.
- ◆ Different organisms live in different habitats.
- ◆ Desert animals and plants have adaptations to reduce water loss.
- ◆ Those living in grasslands and mountains, are adapted according to the conditions prevailing there.
- ◆ Organisms living in water have adaptation to breathe and move in water.
- ◆ Living things have certain common characteristics – they take food, respire, excrete, respond to stimuli, reproduce, grow and show movement.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

- This is not an abiotic component
(a) air ☐ (b) water ☐ (c) plants ☐ (d) rainfall ☐
- This is not a terrestrial habitat
(a) desert ☐ (b) grassland ☐ (c) mountain ☐ (d) pond ☐
- Conifers are found in the
(a) desert ☐ (b) grassland ☐ (c) hilly areas ☐ (d) forests ☐
- Choose the incorrect pair
(a) camel-desert ☐ (b) lotus-water ☐
(c) cactus-hills ☐ (d) snow leopard- polar region ☐
- Some animals hibernate in
(a) summer ☐ (b) winter ☐
(c) rainy season ☐ (d) autumn ☐

B. Give one word for each one of the following.

- The study of the relationship between living and non-living things is the branch of science called. _____
- Biotic components of the environment are living or non-living. _____
- Aquatic habitat means land or water. _____
- Whales are found in sea water or ponds. _____
- Camel stores fat in this part. _____

C. Answer the following questions in short.

- What is adaptation?
- Why does a squirrel hibernate in winter?
- What is the difference between terrestrial and aquatic organism?
- What is the basic function of the roots in an aquatic plant?
- How do plants breathe?

D. Answer the following questions.

- List four adaptations of the camel to survive in the desert.
- List the special features of a pine tree growing in hilly areas. Why is it called a conifer?

3. It is very windy and dry in the grasslands. How has grass adapted itself to these conditions?
4. Lions have eyes in front and deer in the sides. How is this beneficial to both?
5. List the common characteristics of living things.



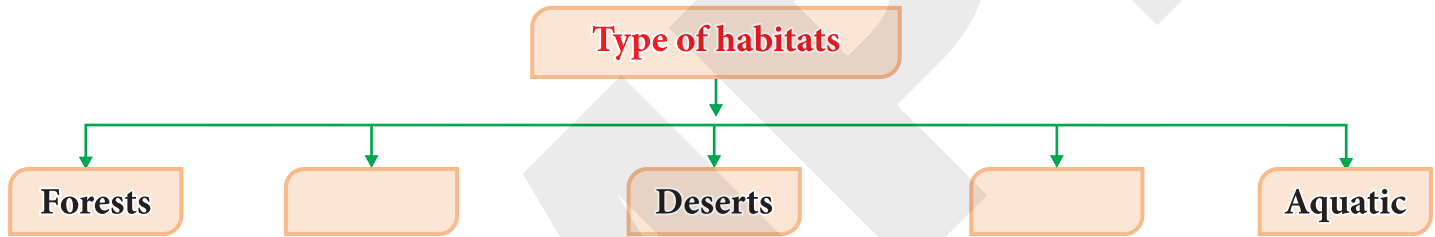
HOTS (Think and Answer)

1. Why do you think it is said that plants supply oxygen to the air?
2. Why do you think the trees in the hilly areas are called conifers?



Let's Recall

Complete the following diagram.



Group Discussion

Form group of 5-6 students. Select one animal or plant from each habitat. Discuss about its adaptations that enable it to survive in its habitat.



Activity to do

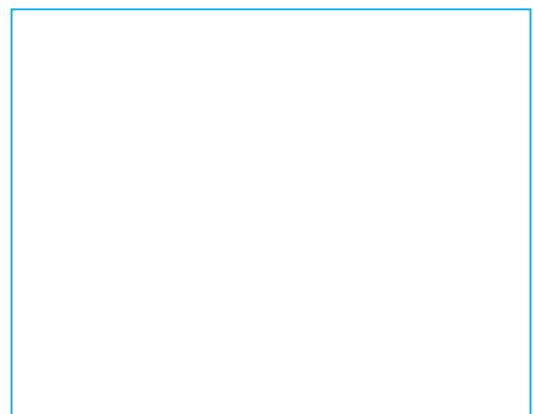
Make the squares as big as possible.

I.



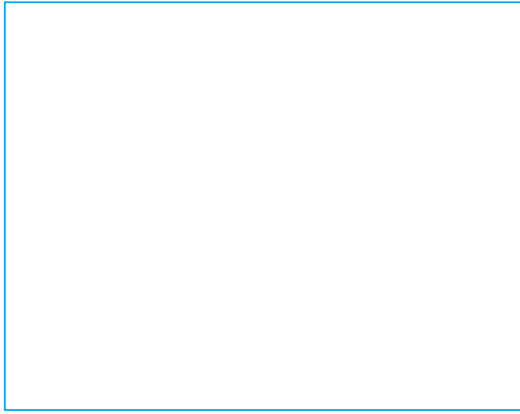
Colour the square blue

II.



Colour the square green

III.



Colour the square grey

IV.



Colour the mountain green

- ⦿ Colour the squares as indicated.
- ⦿ In square I – stick pictures of aquatic organisms
- In square II – stick pictures of organisms found in grass lands
- In square III – stick pictures of organisms found in deserts
- In square IV – stick pictures of organisms found in mountains



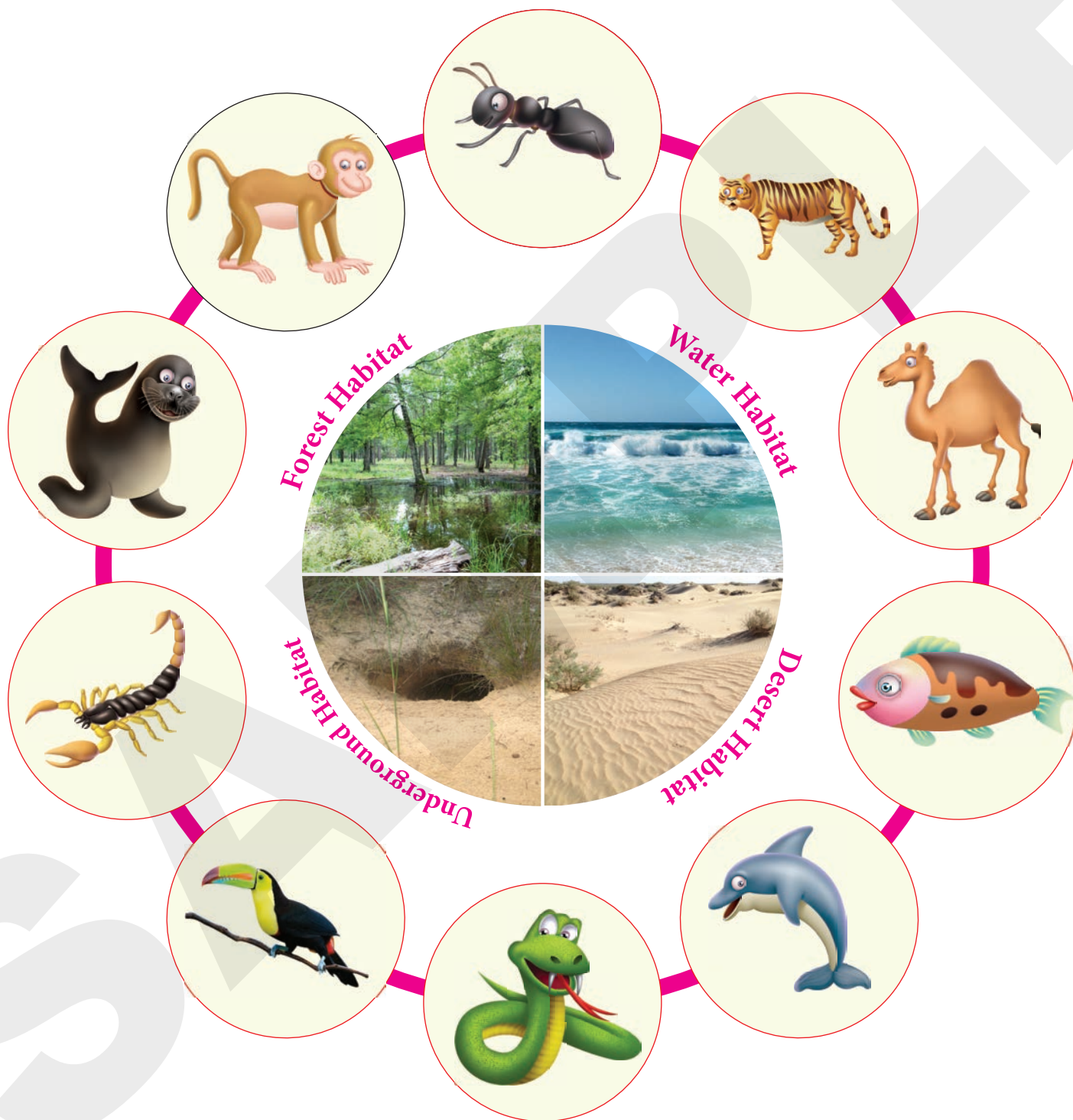
Creative Task

Collect pictures of at least four plants and animals from different habitats. Make a scrapbook and paste these pictures in it. Write two adaptive features of each plant and animal below their pictures.



WORKSHEET-6

Some animal habitats are given below. Help these animals to find their homes.



Motion and Measurement of Distance

Introduction

- History of transport
- Types of motion Translational Rotational Periodic
- Measurement
- Correct measurement of length
- Motion and rest
- Standard unit of measurement

HISTORY OF TRANSPORT

In olden days people used to travel from one place to another by foot. There were no other means of transport. Later on people started using animals both for travelling as well as carrying goods on their back. It used to take a long time for people to reach to their destination.

Boats were used to travel across water. The idea must have struck the people when they saw logs of wood floating in water. Early boats were made by simply hollowing out logs of woods. Later, people learnt to make boats by joining different pieces of wood to make proper boats having streamlined bodies.

Revolutionary change in transport was brought about by the invention of the wheel. Carts and chariots pulled by animals came into existence. This resulted in a faster mode of transport.



Means of Transport

Facts to know

Steam engine was introduced by George Stephenson for carrying passengers in 1830, he opened the worlds first passengers rail line.

A major change in the means of transport was brought about by the invention of the steam engine. Trains pulled by steam engines were introduced, in the beginning of the 19th century. Ships using steam engines were also made. Gradually, steam engines were replaced by efficient engines which used petrol, diesel and electricity. Aeroplanes came into existence in the early part of the 19th century. Today, we have electric trains, mono rails, supersonic aeroplanes and spacecrafts. They are the gifts of the 20th century. These modes of transport which are now available help us to travel faster.

MOTION

Just take a look around standing outside your house. You will see many things moving around. People walking on the road, birds flying, dogs moving around, leaves falling from the tree, a driver driving a bus, ant crawling on the ground, butterfly flying, clouds moving in the air etc. All the things mentioned above show motion.

Thus, it can be said that when a body changes its position with respect to stationary things in its surroundings, with time, the body is said to be in **motion**. When considering whether a body is in motion or not, we take stationary objects such as houses, trees, poles etc on the surface as reference. A body is said to be in **rest** when it does not change its position with respect to the surrounding objects with time.

Different objects show different types of motion. A clock, a sewing machine, an electric fan or a swing do not move from place to place. Only the parts of these bodies show motion. Let us now study the types of motion.

TYPES OF MOTION

Translatory motion

Translatory motion is that motion in which all the parts of an object move the same distance in a given time. Example car, bus or a train move as a whole. Translatory motion is of two types — rectilinear or curvilinear motion.

Rectilinear motion

When an object moves in a straight line, for example a train moving on track, a car moving on a straight road or children running on a straight track, it is said to be in rectilinear motion.

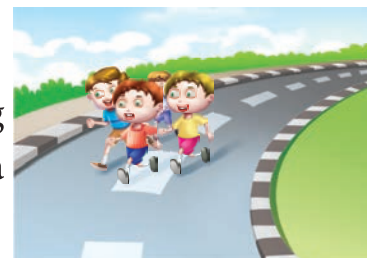
Curvilinear motion

When an object moves along a curved path eg. a stone tied to a string



Facts to know

An odometer is a device used for indicating distance travelled by an automobile.



Children running in a straight track

and whirled along or a car moving along a curved path, it is said to be in curvilinear or circular motion.

Rotational Motion

When all points on a moving object move about a fixed point or axis of rotation, it is said to have rotational motion.

Example: motion of the blades of a fan, a spinning top, rotation of the earth on its axis, the hands of a clock, merry go round etc.

Periodic motion

In some cases the object repeats its motion after a fixed time. This is called periodic motion. **Examples:** motion of a clock pendulum, motion of the earth, motion of a swing, motion of the needle of the sewing machine, a branch of a tree moving to and fro, string of a guitar or tabla being beaten.



Circular Motion



Rotational Motion

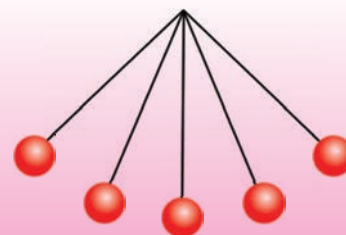


Periodic Motion



Activity - 1

Take a ball or a heavy object. Tie a thread to it. Hold the free end of the thread and let the ball hang down. Give the ball a gentle push. Observe what happens. The ball will continue to move to-and-fro from its position of rest.

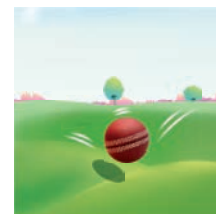


The object which do not repeat their motion after a fixed interval of time are said to have **non-periodic** motion.

MORE THAN ONE KIND OF MOTION

In olden days, people used different parts of the body such as a hand span, a foot arm's length etc to measure length.

Measurement means the comparison of an unknown quantity with some known quantity. Similarly, the wheels of a bike undergo both rotational and translatory motion. In a sewing machine, the wheel moves with a circular motion (rotational motion), while the needle moves up and down. The needle undergoes periodic motion.



More than one kind of motion

The change in the position of an object with time can be measured through distance measurements.

Let's Remember

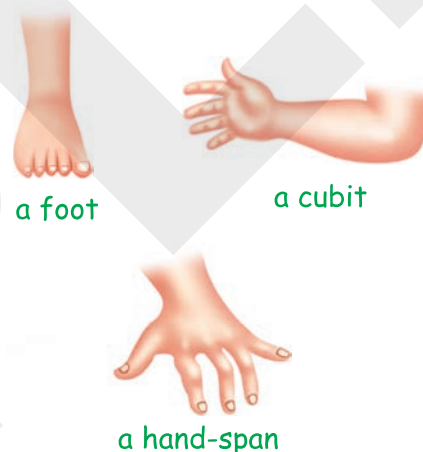
Convert the following.

1. 300 cm = _____ mm
2. 2000 m = _____ km
3. 300 km = _____ cm

MEASUREMENTS

We all make measurements in our daily life. When we go to buy cloth, we need to know how much is required, we need to know how far the school is from the home to decide on whether we need to take a bus, a rickshaw or we can simply walk down. We need to know how much time it will take for us to complete our work. Our body temperature indicates whether we have fever or not. If you have to travel say Agra, you need to know the distance between Delhi and Agra so that you can estimate the time required to reach there. Thus, measurement is an important part of our daily life.

In olden days, people used different parts of their body such as a hand span, a foot arm's length etc to measure length.



Activity - 2

Measure the length of your desk with the help of your palm (hand span). Write down the length. Also let your friends to measure the same using hand-span. Are the measurements of all of you the same or do they vary?

Measurement means the comparison of an unknown quantity with some known quantity. This known fixed quantity is called a **unit**.

In activity 2 you would have noticed that different results are obtained. This is because the length of the hand span of your friends and that of yours may not be the same. Similarly, the foot length and the cubit length may also vary from person to person. Therefore, it was felt that there is a need to have a standard set of units which do not change from person to person.

STANDARD UNITS OF MEASUREMENT

To overcome the above problem, the French created a standard set of measurements called the metric system. Different countries had their own units of measurement. So for the sake of

uniformity and convenience, scientists all over the world decided to accept a basic set of units for the measurement of physical quantities. This, set of units now used is known as the **International system of units (SI units)**. In this system the standard units of length, mass and time are:

Metre : It is the standard unit of length. It is written as 'M'.

Kilogram : It is the standard unit of mass, written as 'Kg'.

Second : It is the standard unit of time, written as 'S'.

If you look at a metre scale or your scale in the geometry box, you will notice a number of divisions in them.



A metre scale and a 15 cm scale

MULTIPLES AND SUB-MULTIPLE UNITS

Making calculations with very large or very small numbers is difficult. So, multiples of standard units are used to make large measurements.

Similarly, sub multiples are used to make small measurements.

1000 mm	=	1 m	m	=	metre
100 cm	=	1 m	mm	=	millimetre
1000 m	=	1 km	cm	=	centimetre
			km	=	kilometre

CORRECT MEASUREMENT OF LENGTH

We use different measuring devices in our daily life. A metre scale is used to measure the length of a cloth whereas a tailor uses a measuring tape. Therefore, for measuring length, we must use a suitable device depending on the object whose length is to be measured. To measure the diameter of a tree or to measure the chest, we have to use a measuring tape, we cannot do it by a metre scale. The following steps need to be followed while measuring length :

- ❖ The measuring instrument must be placed exactly along the length to be measured. It must be kept parallel to the body.
- ❖ At times the end of the ruler may be broken and the zero mark may not be clearly visible. In such cases use any other major mark of the scale like 1 cm or 2 cm. Subtract this reading from the final reading to get the length of the object.



Example : If you start measuring length at 1 cm, and the reading at the other end is 12 cm the length of the object will be $12 - 1 = 11$ cm.

- ❖ Position your eye exactly above the point where measurement is being taken.



Activity - 3

Measure the length of your teacher's table first with hand span then repeat the measurement using a scale or measuring tape. Compare the two results. Ask your friend to repeat the 1, 2, activity.

Length in hand span	—	1	2	Activity
Length in cms	—			

You will see that length in centimetres will be the same in both the cases. Length in hand span may vary because length of hand span can vary from person to person.

Let's Remember

Fill in the blanks with the correct words.

motion daily life woods Trains needle

1. Early boats were made by simply hollowing out logs of _____.
2. _____ pulled by steam engines were introduced.
3. Different objects show different types of _____.
4. The _____ undergoes periodic motion.
5. We use different measuring devices in our _____.

MEASURING THE LENGTH OF A CURVED LINE

We can measure the length of a curved line using a thread.



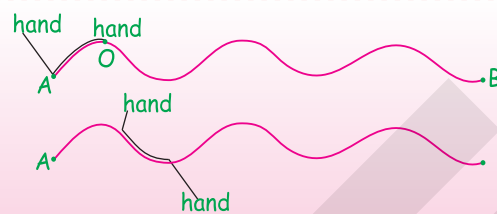
Activity - 4

Using a thread measure the length of a curved line (AB).



1. Tie a knot at one end of the thread.
2. Place the knot near one end of the curved line i.e at point A. Press it down with your fore finger.

3. Place a small portion of the thread along the length of the line. Press the other end of this portion with your hand at point O.
4. Using the other hand, stretch a little more portion of the thread, along the curved line.
5. In this way, cover the entire length of the curved line using the thread, till point B is reached.
6. Make a mark on the thread where it touches point B.
7. Stretch the thread along the metre scale and measure the marked portion.
8. The length of this portion is the length of the curved line.



Glossary

measurement	: measuring anything.
units of measurement	: the standard of measuring a quantity
SI units	: a system of measurement
distance	: path covered by an object
periodic motion	: a motion which repeats itself
circular motion	: a motion which takes place along a current path



Summary

- ❖ Different modes of transport are used for carrying goods and travelling from place to place.
- ❖ An object is in motion if it changes its position with time, in relation to a stationary object in its surroundings.
- ❖ When all parts of an object move by the same amount in the same direction, it is said to have translational motion.
- ❖ An object has rotational motion when it moves around an axis with its different parts moving through different distances at a given time.
- ❖ When a motion repeats itself at regular intervals of time it is said to be in periodic motion.
- ❖ An object can have more than one kind of motion at the same time.
- ❖ Measurement means comparison of an unknown quantity with some known quantity.
- ❖ In olden days length of the foot, hand span, arms length were used as measurement units.
- ❖ These days International system of unit (SI unit) is used. In this system the standard units are metre for length, kilogram for mass and second for time.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

- | | | | | |
|--|---|--------------------------------------|--|--|
| 1. This is a translatory motion | | | | |
| (a) rotation of the earth | ☐ | (b) a spinning top | ☐ | |
| (c) a boy sliding down a slope | ☐ | (d) a merry go round | ☐ | |
| 2. This is periodic motion | | | | |
| (a) a pin wheel | ☐ | (b) ball falling on the ground | ☐ | |
| (c) beating of a drum | ☐ | (d) car on the road | ☐ | |
| 3. The motion of a drawer of a table is | | | | |
| (a) rectilinear motion | ☐ | (b) curvilinear motion | ☐ | |
| (c) rotational motion | ☐ | (d) periodic motion | ☐ | |
| 4. The standard unit of length in SI unit is | | | | |
| (a) cubit ☐ | (b) centimetre ☐ | (c) metre ☐ | (d) hand span ☐ | |
| 5. 1 m is equal to | | | | |
| (a) 10 cm ☐ | (b) 100 cm ☐ | (c) 1000 cm ☐ | (d) 0.1 cm ☐ | |

B. Write 'T' for true and 'F' for false statement.

- | | |
|--|--------------------------|
| 1. There were no other means of transport. | ☐ |
| 2. Boats were used to travel across land. | ☐ |
| 3. Ships using steam engines were also made. | ☐ |
| 4. Kilogram is the standard units of length. | ☐ |
| 5. Metre is the standard unit of mass. | ☐ |

C. Write two examples for each of the following.

- | | |
|------------------------|-------|
| 1. Rectilinear motion | _____ |
| 2. Curvilinear motion | _____ |
| 3. Rotational motion | _____ |
| 4. Periodic motion | _____ |
| 5. Non-periodic motion | _____ |

D. Answer the following questions in short.

- Which two inventions brought about revolutionary changes in the field of transport?
- When is an object said to be in motion?
- What is translatory motion?
- If the length of the table is 125 cm, what will its length be in metre?
- Name the different types of motion.

E. Answer the following questions:

- Explain with examples what is periodic motion.
- Why did the International system of units come into existence?

3. What precautions will you take when measuring a pencil with a scale?
4. Give three examples of objects having more than one type of motion.
5. How will you measure the length of the branch of a tree?



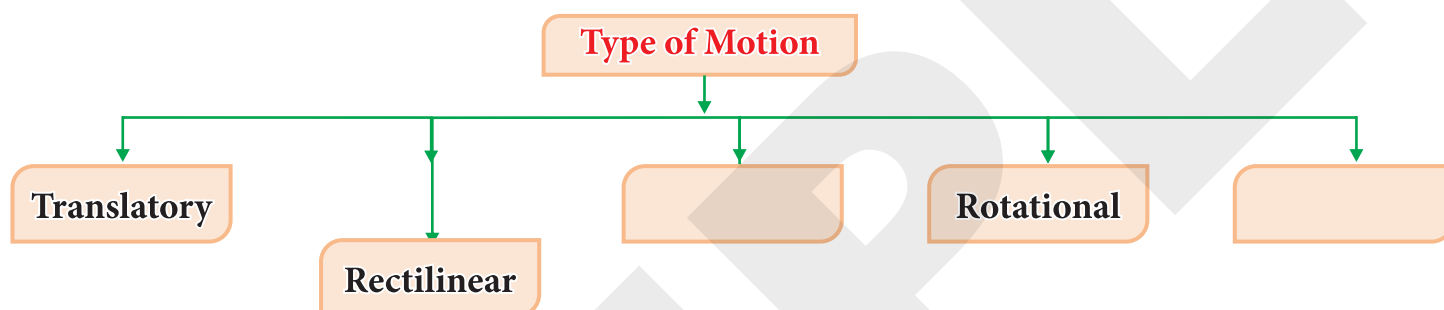
HOTS (Think and Answer)

1. What type of motion does the earth show?
2. Why do you think that hand span is not a reliable system of measurement?



Let's Recall

Complete the following diagram.



Group Discussion

1. Transportation using hydrogen gas.
2. Oscillatory and vibratory motion.



Activity to do

Make a simple pendulum at home.

You will need 1 m long string, 1 piece of metal wire, some nuts from the tool box, a hook, tape, a pencil.

1. The pencil should be taped on the table leaving about 4 cm hanging over the edge.
2. Make a loop with the string to fit on the end of the pencil.
At the other end of the string tie the hook and slide one of the nuts on to it.
3. Swing the pendulum. You can count the oscillations it makes in two minutes.
4. Next you can add another nut onto the hook. Swing the pendulum to the same distance as before and count the number of oscillations.

Is there any difference with increase in weights?

Note: Remember to swing the pendulum to the same distance in step 3 and step 4.



Creative Task

1. Take measurement of your desk by taking different units of measure and compare.
2. Make a list of the various types of motions taking place around you.



WORKSHEET-7

1. Explore different types of motion in the following puzzle:

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

2. Identify the types of motion in the following.

(a) A drilling machine.

(b) Movement of lips while speaking.

(c) A speeding car on a curved road.

(d) Movement of a football player on the field.

(e) Revolution of the earth.

(f) Bullet fired from a gun.



Light, Shadows and Reflections

Introduction

- Light
- Non-luminous objects
- Shadow
- Reflection of light
- Luminous objects
- Transparent, translucent and opaque objects
- Pinhole camera

Can you imagine the world without light? We cannot see anything in a dark room. We can see objects around us only when there is light, without light we cannot see anything. We need light in our daily life to perform most of our activities like reading, playing, cooking, eating, jumping, driving, studying, etc. **Light** is a form of energy that gives us the sensation of sight. Light itself is not visible.

LUMINOUS AND NON-LUMINOUS OBJECTS

Objects like the sun, the tube light, bulb and torch which emit light of their own are called **luminous objects**. Objects which do not emit light of their own like chair, table, pen, moon, earth, etc. are called **non-luminous objects**. We are able to see these objects when light from a luminous body falls on them and then travels towards our eye. Most of the objects are non-luminous.



Luminous objects

TRANSPARENT, OPAQUE AND TRANSLUCENT OBJECTS

Non-luminous objects are of three types— transparent, opaque and translucent objects.

Opaque objects are those objects which do not allow light to pass through them. Some examples are wood, door, brick etc.

Transparent objects are those which allow light to pass through them and we are able to see through them like a glass pane, water and air.

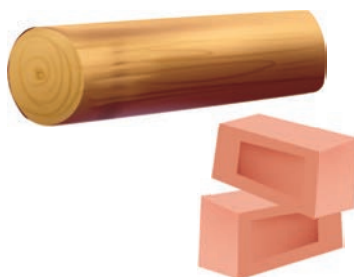


Non-luminous objects

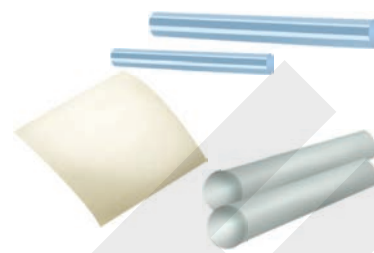
Some objects through which we can see but not very clearly are called **translucent objects**. These objects allow light to partially pass through them. Examples are tissue paper, butter paper, cellophane paper and plastic.



Transparent Objects



Opaque Objects



Translucent Objects



Activity - 1



Take 10 items like a cardboard, notebook, a cellophone sheet, plastic scale, eraser, hankey, a glass, tracing paper, pencil box and place them in front of your eyes one by one and look through them at a far away object with light behind you. What do you observe? Is there any difference between the various objects. Note down your observation? What do you infer?

S. No.	Object	Full view/partial view/ no view	Transparent/Translucent/ Opaque
1.	Card board		
2.	Notebook		
3.	Cello phone sheet		
4.			
5.			
6.			
7.			

SHADOWS

When walking in the sun you must have seen shadows of plants, trees, houses and even your own self. You must have wondered what is a shadow and how is it formed? When light falls on an opaque object, the rays of light cannot pass through the object and the area behind the object appears dark as this area does not receive any light from the source. This area of darkness behind an object where the light is not able to reach is known as the **shadow**.



Activity - 2

Take a few opaque objects in the sunlight, hold them one by one slightly above the ground. You will see dark patches formed by each on the ground. These are the shadows. Can you identify the object by simply looking at the shadow? Sometimes it may be possible and sometimes it may not be possible.

Let's Remember

Match the following

Column A

1. butter paper
2. firefly
3. mirror
4. shadow
5. bulb

Column B

- (a) reflects light
- (b) an artificial source of light
- (c) translucent
- (d) luminous
- (e) dark outline of an object



Activity - 3

Stand in the open field in the night where there is no light along with your friend. See that there is no tree or building behind your friend. Shine a torch on your friend's face. Do you see a shadow of your friend? Now ask another friend to hold a sheet of cardboard or paper behind him. What do you see? You will see your friend's shadow. This shows that you need a screen to form a shadow.



No shadow is seen



A shadow is seen

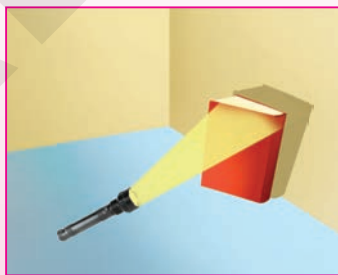


Activity - 4

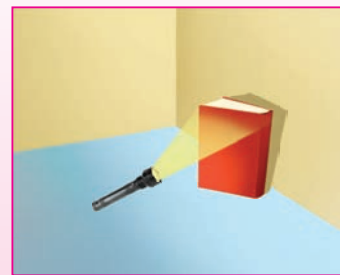
Place a book near a white wall. Direct a beam of light on the book from a distance. Observe the shadow on the wall. Now move the torch closer to the book. Observe what happens?



A



B



C

Note down your observation size of the shadow

- A
B
C

What do you understand from this?



Facts to know

Light is the fastest thing to travel in the universe. It travels at 3,00,000 km/s.

The size of the shadow varies depending on the size of the source of light and the distance between the object and the source of light. The shadow gets smaller as the distance between the object and the source of light increases. No shadow is seen at a stage, when the distance between the screen and the object becomes too big.

Our shadow changes in length and direction during the day as the sun changes its position in the sky.



Morning



Noon



Evening



Activity - 5

Take two cardboard boxes (shoe boxes) so that one can slide, inside another with no gap between them. Cut one side of each box. Make a small hole in the centre of the bigger box opposite the cut side (fig A). In the second box, cut a square about 5×6 cm and cover this with a tracing paper (fig B). Now slide the smaller box in the larger box so that the side with the tracing paper is inside (fig C). The pin hole camera is ready for use.



Fig A



Fig B

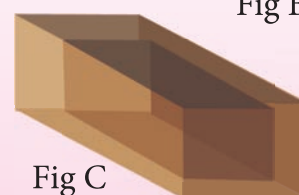


Fig C

Pin Hole Camera

Place a source of light like a torch or a candle in front of the camera and look at the screen. You will see the image of the candle on the screen. However, the image will be inverted.



Pin Hole Camera

You can try looking at distant objects like a tree or a building through your pinhole camera. It must however be made certain that the objects you wish to see are in bright sunlight. You will have to slide the inner box backward or forward till you get a picture on the tracing paper. Remember to cover your head and the camera with a black piece of cloth.

Let's Remember

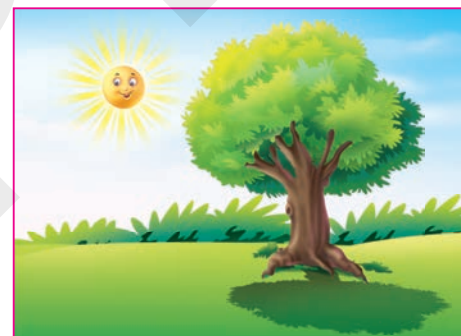
Fill in the blanks with the correct words.

straight Reflection three Light opaque

1. Non-luminous objects are of _____ types.
2. _____ is the fastest thing to travel in the universe.
3. Pinhole camera is based on the principle that light travels in _____ lines.
4. _____ objects reflect maximum light.
5. _____ of light causes the formation of images.

PinHole Camera in Nature

Do you know that a pin hole camera exists in nature also. Have you seen circular images of sunlight when passing under a tree covered with a large number of leaves. These images are actually the pinhole images of the sun. The gaps between the leaves act as pinholes.



Pin hole camera is based on the principle that light travels in straight lines. You must have seen while watching a movie in a theatre that light from a projector travels in straight lines to the screen.



Activity - 6

Take a straw. Place a lighted candle on a table. Look at the candle through the straw while standing at the other end of the table. Can you see the candle? Now bend the straw slightly. Again look at the candle. Can you still see the candle? You will not be able to see the candle. This shows that light travels in straight lines (Rectilinear propagation of light).



Thus, when opaque objects obstruct light, shadows are formed.

REFLECTION OF LIGHT

When light falls on a polished surface like glass, it bounces back. This phenomenon is

referred to as a **reflection of light**. The amount of light reflected from an object depends on the surface of the object—whether it is smooth or rough. Opaque objects reflect maximum light. We can see ourselves in the mirror because of reflection. We can also see the reflection of objects in water like plants, trees, buildings, etc. The Reflection of light causes the formation of images.



Activity – 7

Ask one of your friends to stand in a corner of a dark room holding a mirror in one hand. You stand on the opposite side of the room with a torch. Switch On the torch and adjust its beam so that it falls on the mirror which your friend is holding. What do you observe? You will see a patch of light on the other side. Now adjust the direction of the torch so that the patch of light falls on another friend standing in the room as shown in the figure. What do you conclude from this? This shows that a mirror changes the direction of light that falls on it. A mirror reflects the light travelling in a straight line to a different direction.



Reflection of a beam of light by a plane mirror



Activity – 8

Take a big thermocole sheet. Fix a comb on one side and a mirror on the opposite side. Place a sheet of black paper between the comb and the mirror. Now, direct a beam of light from a torch through the comb as shown in the figure. You will observe a pattern as shown in the figure. This shows that light travels in straight lines and is reflected by the mirror.



Facts to know

An image provides all the details of the object such as its size, color etc.
Light is an invisible form of energy.



Glossary

luminous	:	objects which have light of their own
non-luminous	:	objects which do not have light of their own
transparent	:	on object which allows light to pass through it
shadow	:	region of absence of light
reflection	:	bouncing back of light into the same medium
mirror	:	a surface which can reflect light



Summary

- ◆ Light is a form of energy.
- ◆ Luminous objects have light of their own. Non-luminous objects do not produce light of their own.
- ◆ Non-luminous objects are of three kinds – transparents, translucent and opaque.
- ◆ Transparent objects allow light to pass through them.
- ◆ Opaque objects do not allow light to pass through them.
- ◆ An object that allows light to pass through it partially is called translucent.
- ◆ Light travels in straight lines.
- ◆ A shadow is formed when an opaque object comes in the path of light. A shadow is always black in colour.
- ◆ The shape of the shadow depends on the shape of the object, the position of the source of light and size of the source of light.
- ◆ A pin hole camera is based on the principle that light travels in straight lines. The image formed on the screen is inverted.
- ◆ Mirror reflects light and gives us clear images. It changes the direction of light falling on it.
- ◆ A shadow and an image are very different from each other.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. This is an opaque object
(a) glass ☐ (b) plastic ☐ (c) wood ☐ (d) butter paper ☐
2. This is non-luminous
(a) earth ☐ (b) sun ☐ (c) tubelight ☐ (d) torch ☐
3. The colour of the shadow is
(a) black ☐ (b) white ☐
(c) colourless ☐ (d) colour of the object ☐
4. A pin hole camera is based on the principle of
(a) rays ☐ (b) reflection ☐
(c) rectilinear propagation ☐ (d) refraction ☐
5. This is a transparent object
(a) cardboard ☐ (b) steel ☐
(c) pencil ☐ (d) glass ☐

B. Write 'T' for true and 'F' for false statements.

1. Shadows can be seen even in dark.
2. Sun is a luminous object.
3. Image formed by a pin hole camera is erect.
4. Light travels in straight lines.
5. Shadow is exactly the same shape as the object.
6. Glass is a translucent object.

☐
☐
☐
☐
☐
☐

C. Give one word for each one of the following.

1. Are there more luminous or non-luminous objects around us?
2. Is image and shadow the same thing?
3. Oiled paper is opaque or not?
4. Light can travel through a curved tube. Yes/ No
5. A body which allows light to pass through it is called.
6. Can you see a shadow without a screen? Yes/ No
7. What colour will be the shadow of a red chair?
8. You can see your face in the mirror due to what?
9. Mirror changes the direction of light that falls on it. Yes/ No
10. Moon is a luminous or non-luminous object.

D. Answer the following questions in short.

1. What are translucent objects? Give two examples.
2. When is a shadow formed?
3. What do you mean by rectilinear propagation of light?
4. On what principle is the pin hole camera based?
5. Name the kinds of non-luminous objects.

E. Answer the following questions.

1. It is said that a pin hole camera exists in nature. Explain.
2. With the help of an experiment show that light travels in straight lines.
3. Write down two differences between an image and a shadow.
4. What do you understand by reflection of light?
5. Write down four characteristics of a shadow.



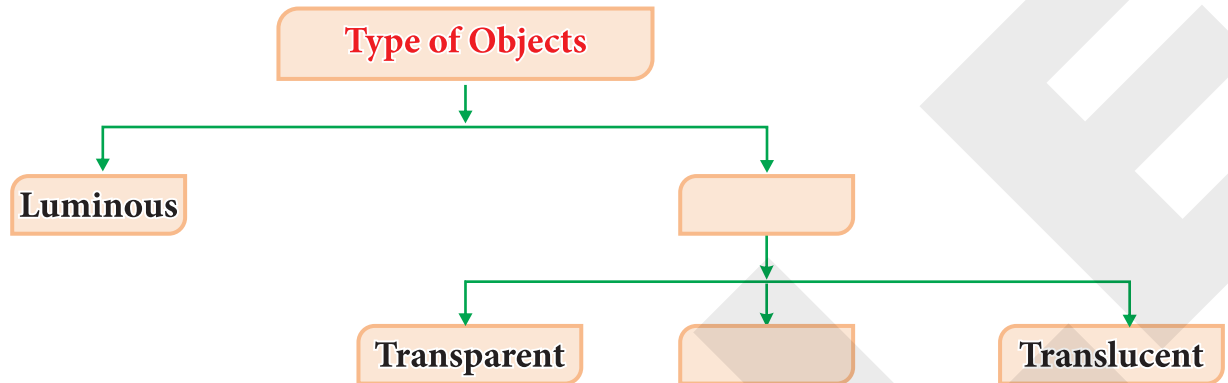
HOTS (Think and Answer)

1. You are holding a pen in your right hand. If you were to watch your reflection in the mirror which hand do you think will be holding the pen.
2. Do you think you will be able to see a reflection of yourself in a mirror in a dark room.



Let's Recall

Complete the following diagram.



Group Discussion

1. Light is the greatest gift of God to mankind.
2. Formation of umbra and penumbra.



Activity to do

- Try to form shadows by your hands to resemble birds/animals like a butterfly, bear, dog, deer etc.



- Make a simple periscope**: What is a periscope? Periscope helps us to see something that is not in direct sight but is around a corner.
- Find out what exactly is a periscope and where and how it is used. Try to make a simple periscope at home.



Creative Task

1. Make a project on at least 5 different types of stars in the universe. Compare the different stars with sun in relation to its size shape temperature, distance from the earth. etc.
2. Make a Power Point presentation on lunar and solar eclipses.



WORKSHEET-8

Comparison between speed of light and speed of other things.

Using the Internet or resources in the library, find out the approximate speed of the various things given.

Compare the speed of light with the various speeds you have found by tabulating them in the table.

Calculate and find out how many times faster is light than each speed. Put that in the third column.

Speed of	Speed in m/s (s)	Speed of light 's'
Sound		
Earth's rotation		
Cheetah		
Garden snail		
Sprinters		
Fighter aircraft		
Signal in a cable		
Shatabdi express		
Wind during a storm		

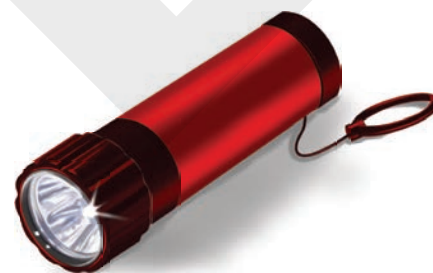


Electricity and Circuits

Introduction

- Uses of electricity
- Electric current
- Electric switch
- Conductors and insulators
- Electric cell
- Electric circuit

These days we make use of electricity extensively in our daily lives. We use electricity throughout the day. We use electricity to light our homes, offices, shops etc. Fans, mixies, toasters, washing machines, juicers, televisions, computers, microwaves all run on electricity. At times the electric supply may fail or there may be power cut in certain areas. In this situation we use a torch to provide light. When we switch it ON, the bulb present in the torch lights up. How does the bulb light up? The torch has an electric cell which provides electricity to the bulb.



An Electric Torch

ELECTRIC CELL

Electric cell is used in alarm clocks, watches, cameras, etc. Electric cell is a source of current. It has a small metal cap on one side and a metal disc on the other side. A cell has two terminals marked as (+) and (-). The metal cap is the positive terminal and the metal disc is the negative terminal. All electric cells have two terminals — positive terminal and negative terminal. The chemicals stored in the cell produce electricity. A cell produces electricity by a chemical reaction that changes chemical energy into electrical energy. When the chemicals in the cell are used up, it stops working and we need to replace it with a new one.



An electric cell



Activity - 1

Take a torch. Remove the cells. Switch ON the torch. Does the torch glow? No. The cells are necessary to make the torch glow. Remove the bulb from the torch. You will see a thin wire fixed in the middle of the glass bulb. When you switch ON the torch, you will find that it is this wire

which glows. This is called the filament of the bulb. You will notice that the filament is fixed to two thicker wires, which provide support to it. One of these wires is connected to the metal case of the bulb and the other is connected to the metal tip at the bottom. The base of the bulb and the metal tip of the base are the two terminals of the bulb.



Torch bulb

All electric bulbs have the same design.

The torch has a bulb, electric cells, a switch and the body.

When a torch is switched On the metal strip moves beneath the switch and the torch glows.

ELECTRIC CIRCUIT

A cell kept close to a bulb will not make it glow. So, to light up a bulb we need a connecting medium. When we connect the two ends of a cell to a bulb using copper wires, the bulb glows. This happens because the copper wires provide the electric current to flow from the positive terminal of the battery to the negative terminal through the bulb. The complete path of the flow of electric current from one terminal to the other terminal cell through the bulb is known as a **closed electric circuit**.

What happens if we disconnect or cut off one of the wires? The bulb will not glow. This is because the current is not able to flow through the wires? The circuit is said to be **broken or open**.

In an electric circuit, the direction of current is taken from the positive to the negative terminal of the electric cell.



Facts to know

The electric cell used in torches, watches etc. is known as dry cell.



Bulb connected to two wires



closed circuit



open circuit

Let's Remember

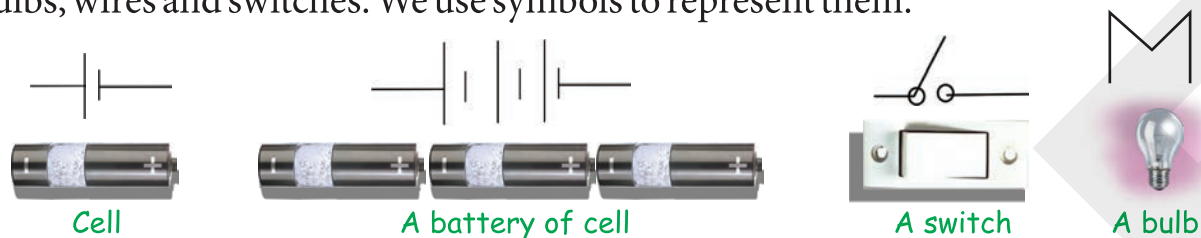
Write 'T' for true and 'F' for false statements.

1. The torch has an electric cell which provides electricity to the bulb.
2. The chemicals stored in the cell produce electricity.
3. All electric bulbs have the same design.
4. The main reason for the bulb fusing is that the filament may break.
5. Bird body is a conductor of electricity.

☐
☐
☐
☐
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ELEMENTS OF AN ELECTRIC CIRCUIT

The components of an electric circuit are known as the elements of a circuit. They include cells, bulbs, wires and switches. We use symbols to represent them.



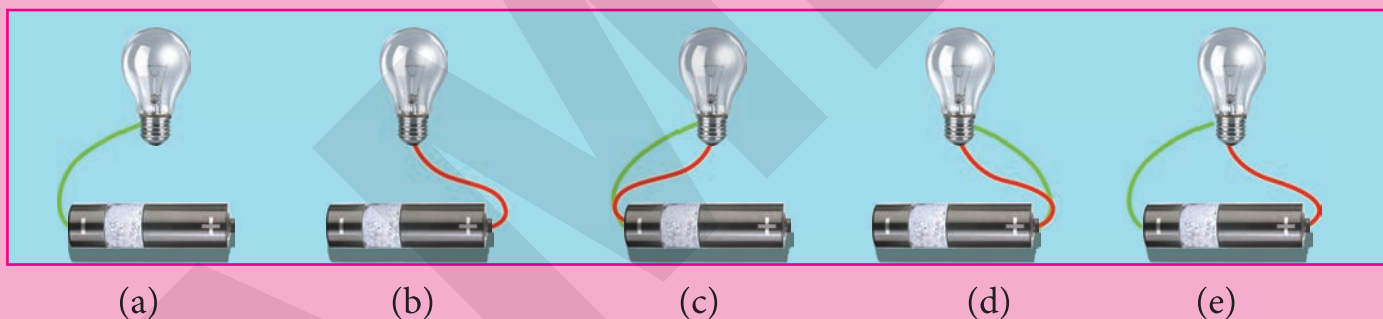
You must have seen that sometimes a bulb does not glow even if it is connected to a cell. This happens when the bulb is fused. The main reason for the bulb getting fused is that the filament has broken. This means that there is a break in the path of the current between the two terminals of the electric cell.



Activity - 2

You will need two pieces of plastic coated wires with a little bit of plastic removed from the ends a screw driver, a tape, battery, bulb with holder.

- Procedure:**
1. Tape one end of the wire to a battery terminal.
 2. Connect the other end of the wire to the bulb holder. What happens? Does the bulb glow?



Connect the wires in different ways as shown in the diagram.

It will be seen that the bulb lights up only when the circuit is complete.

ELECTRIC SWITCH

Switches help to control stopping and starting of current flow in a circuit.

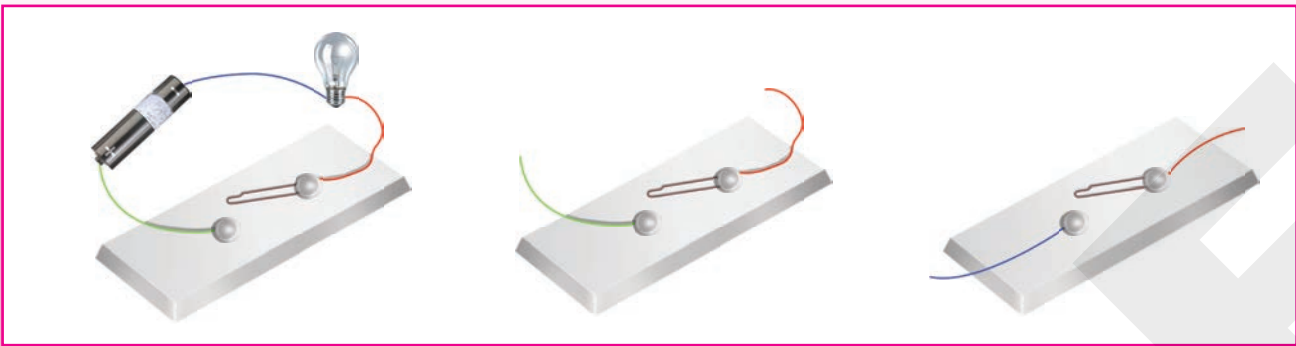


Activity - 3

Making your own switch

You will need two board pins, paper clip, cardboard/ thermocol, two wires.

Take the cardboard /thermocol and insert a board pin into the ring of a paper clip as shown in the diagram. Ensure that the safety paper clip is free to move around. Now, fix the other board pin in such a way that the free end of the paper clip can touch it.



The paper clip acts as the switch. Complete the current by connecting an electric cell and a bulb. When the end of the paper clip touches the board pin, the bulb will glow. Now rotate the paper clip so that its free end does not touch the board pin. Does the bulb still glow? No.

When the paper clip touched the two pins the circuit was closed. In this position, the switch is said to be 'ON'. When we rotated the clip so that it did not touch the pin there was a gap between the two pins and the circuit was not complete. The switch is said to be 'OFF'.

Thus, we can say that **switch** is a simple device that completes the circuit or breaks it. All the switches that we use in the house work on the same principle.

When a torch is switched ON, the metal strip moves beneath the switch and the torch glows.



Facts to know

The fish electric eel is capable of generating a powerful electric shock.

Let's Remember

Sort out the conductors and insulators from the following list.

- | | | | |
|---------------|-------------|------------|----------|
| 1. Graphite | 2. Plastic | 3. Silver | 4. Glass |
| 5. pure water | 6. Aluminum | 7. Dry air | |



CONDUCTORS AND INSULATORS

Some materials allow electricity to pass through them whereas some do not. The materials that allow electricity to flow through them are called **conductors**. The materials which do not allow electricity to flow through them are called **insulators**.

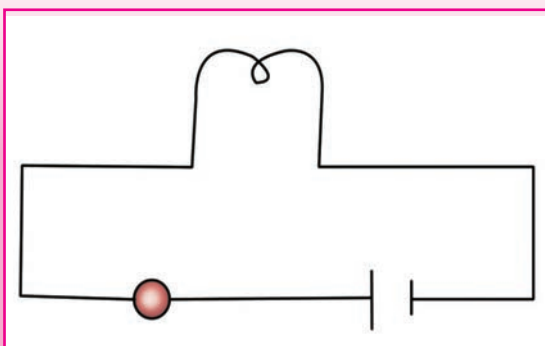


Facts to know

Electric cell was invented by Alessandro Volta and the electric bulb was invented by Thomas Alva Edison.



Activity - 4



Material being tested

To test which substances allow electricity to pass through them. Take different substances/materials like match sticks, thread, nail, steel spoon, cloth, eraser, scale, coin, an iron nail, aluminum spoon and glass bangle. Connect the material to be tested between two broken ends of the wire. If the bulb glows, the substance is a conductor. Note down your observations.

S.No	Object	Material made of	Bulb glows Yes/No
1.	Eraser	Rubber	
2.	Nail	Iron	
3.	Scale	Plastic	
4.	Spoon	Metal	
5.	Key	Metal	
6.	Match stick	Wood	
7.	Pencil lead	Graphite	
8.	Cloth	Cotton	
9.	Notebook	Paper	
10.	Glass bangle	Glass	

When the bulb glows. It indicates that the material being tested allows electric current to pass through it and is known as **conductor** of electricity. The bulb does not glow when materials being tested do not allow electric current to pass through them. They are known as **insulators**. From the findings in the above activity classify the materials as conductors or insulators.



Facts to know

Human body is a conductor of electricity.

All non-metals except graphite are insulators.

Some conductors of electricity are silver, gold, aluminium, iron, acids and tap water. Some insulators are cotton, wood, rubber, plastics, paper, glass and dry air.

Conductors and Insulators are both important to us. Switches, electrical plugs and sockets are made of conductors. The outer coverings of switches, plugs, sockets and other parts of electrical appliances which we may touch are made of insulating materials such as plastic or bakelite. The wires we use in our lives to run a fan, a toaster, a mixie, a washing machine or an oven are all coated with an insulating materials, such as plastic. This saves us from getting an electric shock.



Glossary

electric cell	:	an arrangement used to convert chemical energy into electrical energy
electric circuit	:	an arrangement in which electric current flows.
conductors	:	objects which easily allow the flow of electric current
bulb	:	an arrangement to convert electric energy into light energy
switch	:	an arrangement to open or close a circuit.



Summary

- ◆ There are many uses of electricity in our daily lives. It is used in many household appliances.
- ◆ Electric cell is a source of electricity.
- ◆ An electric cell has two terminals — positive and negative.
- ◆ An electric cell converts chemical energy into electric energy.
- ◆ Electric circuit may be closed or open. A closed circuit allows a continuous path of an electric current to flow from positive terminal of the electric cell to the negative terminal.
- ◆ A switch is a device which enables us to make or break the electric circuit.
- ◆ An electric bulb has a filament connected to its terminals.
- ◆ The elements of an electric circuit include cell, wires, bulbs and switches.
- ◆ A substance that allows electricity to flow through it is a conductor of electricity. All metals and graphite are conductors.
- ◆ An insulator does not allow the flow of current through them. Plastics, paper, rubber, wood etc. are insulators.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. Which of the following conducts electricity

(a) an eraser

☐

(b) a plastic ruler

☐

(c) an iron nail

☐

(d) a plastic jug

☐

2. Which of the following is an insulator

(a) steel	☐	(b) silver	☐
(c) wood	☐	(d) iron	☐
3. In an electric cell chemical energy is converted into

(a) electrical energy	☐	(b) mechanical energy	☐
(c) kinetic energy	☐	(d) sound energy	☐
4. Electric wiring is usually made of

(a) copper	☐	(b) rubber	☐
(c) plastic	☐	(d) cotton	☐
5. This is the symbol of a bulb

(a) 	☐	(b) 	☐
(c) 	☐	(d) 	☐

B. Fill in the blanks with the correct words.

source broken torch glow electricity

1. We use _____ throughout the day.
2. The _____ has an electric cell which provides electricity to the bulb.
3. Electric cell is a _____ of current.
4. A cell kept close to a bulb will not make it _____.
5. The circuit is said to be _____ or open.

C. Give one word for each one of the following.

1. We can use a cotton thread to make a circuit. Yes / No _____.
2. The thin wire inside a bulb is called what? _____.
3. Will current flow in a circuit when there is a gap between the two wires? _____.
4. A cell produces electricity by physical / chemical reaction _____.
5. The device used to make or break a circuit is called _____.
6. Graphite is a metal / non-metal _____.
7. Rubber is an example of insulator / conductor _____.

D. Answer the following questions in short.

1. What is an electric circuit?
2. What do you mean by a closed circuit?
3. What is a switch?
4. Name the elements of an electric current.
5. What is the role of a cell in a torch?

E. Answer the following questions.

1. When is a bulb said to be fused and why?
2. Draw an electric circuit and explain its working.
3. What is the difference between insulators and conductors? Give three examples of each.
4. What is the basic difference between a cell and a battery? Draw their symbols.
5. Why do we need to change a battery after long use?



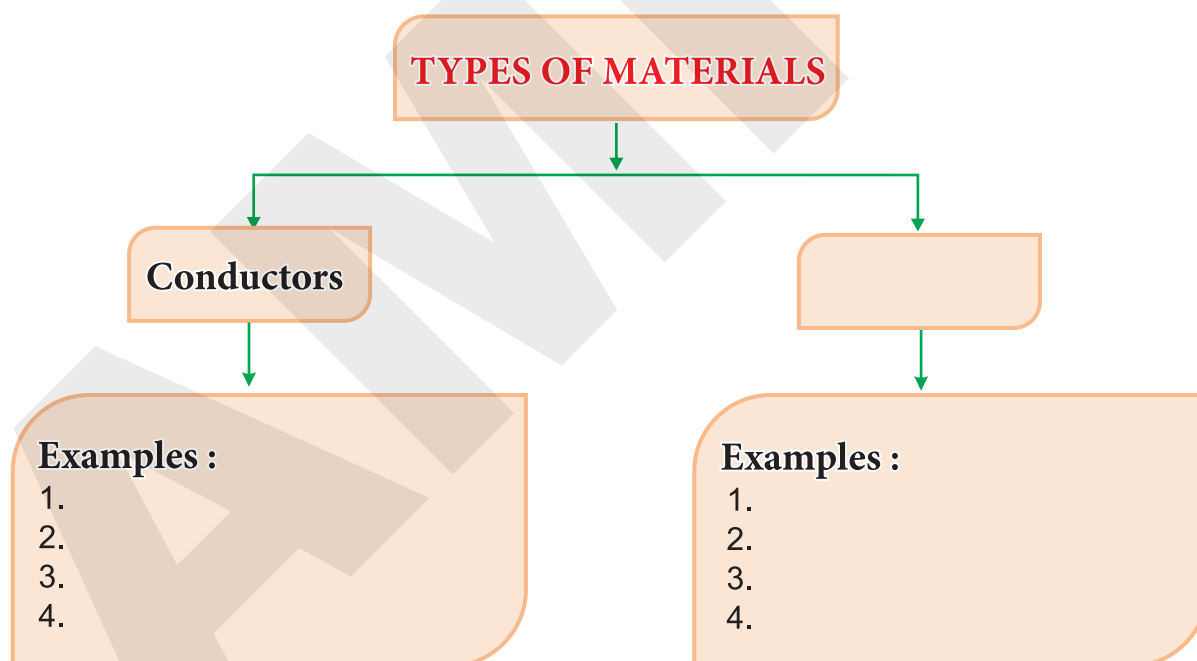
HOTS (Think and Answer)

1. Why do you think an electrician wears rubber slippers/shoes when repairing switches?
2. What would happen if you touch a bare wire with your hand?



Let's Recall

Complete the following diagram.



Group Discussion

1. Conductors and insulators.
2. Primary and secondary cells.

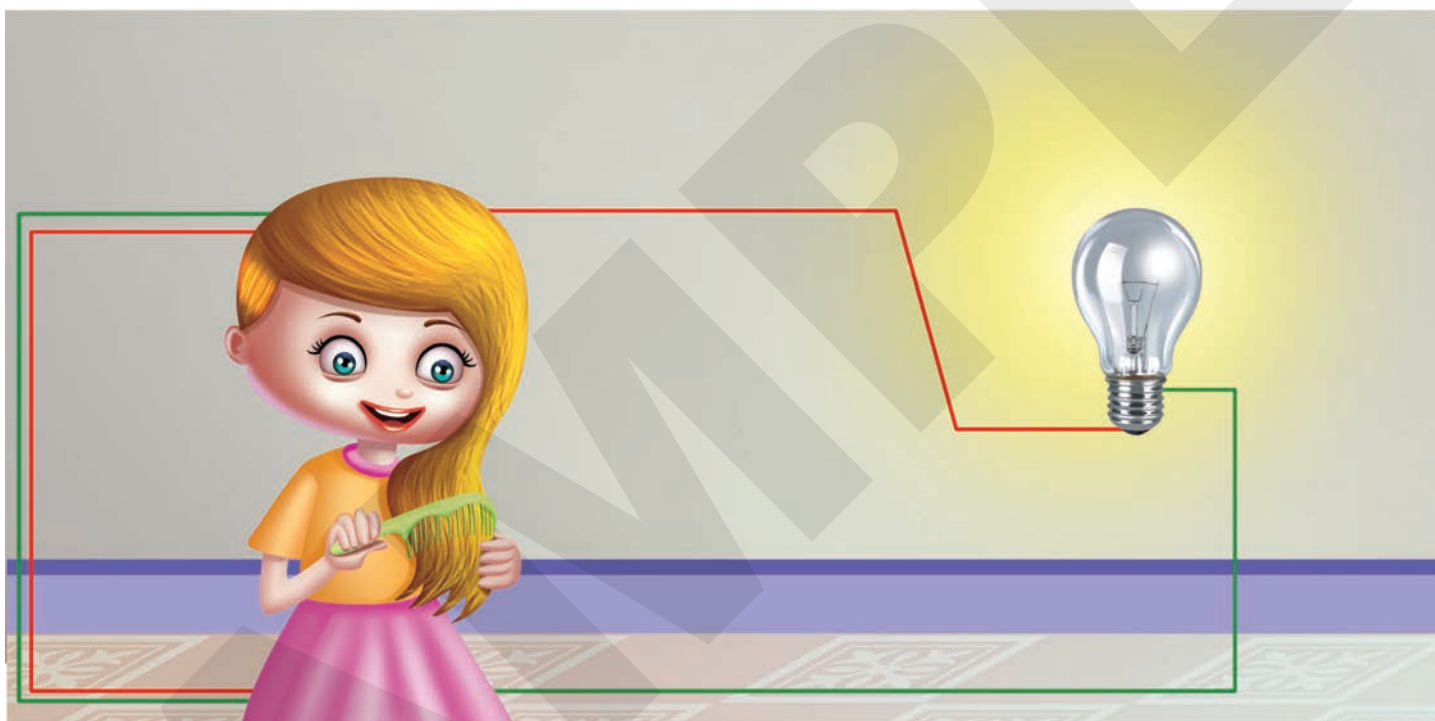


Activity to do

1. Go into a dark room with a bulb and a comb.
2. Rub the comb through your hair— 20 times.
3. Place the comb on the metal end in the light bulb.
4. Watch as the filament in the bulb lights up.

This is because the friction between your hair and comb causes electrons to travel from your hair to the comb. This causes our body to become positively charged and the comb negatively charged.

With comb being charged, it discharges the light bulb, causing the bulb to emit light.



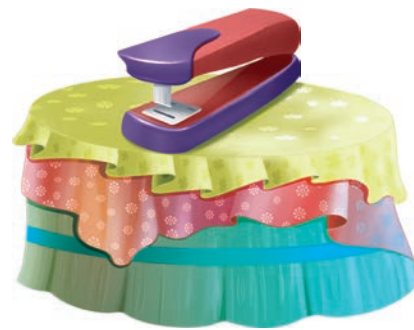
Creative Task

1. Draw a well labelled diagram of an electric cell.
2. Make an electric switch with the help of insulators and conductors.



WORKSHEET-9

Look at the pictures given below. Tick (✓) the pictures that at run can electricity.

☐☐☐☐☐

Introduction

- Discovery of magnet
- Poles of a magnet
- Storing of magnet
- Magnetic Compass
- Magnetic and non-magnetic materials
- Properties of a magnet
- Uses of magnets

DISCOVERY OF MAGNETS

It is believed that Greek discovered magnet some thousands of years ago. A shepherd, Magnes used to herd his sheep in Magnesia, (in Greece) in the mountains. He used to carry a stick having a piece of iron at one end to control his sheep. One day the metal tip of his stick and the nails in his shoes got stuck to a large piece of black rock and he had to pull hard to free himself from the rock. It was seen that the rock was attracting iron. The Greeks named the rock **magnetite**. It is made up of mainly iron oxide.

It was also seen that when the stone was suspended freely, it came to rest in a particular direction (north-south). It was named **lodestone**, meaning stone as it used to do give an idea of the direction to the people.

The substances having the property of attracting iron are known as **magnets**. The name is derived from magnetite.

Magnets can be made in many shapes as given in the diagram. But the main shapes are the bar and the horse shoe.

Loadstone is a natural magnet as it is found in nature. These days artificial magnets having stronger properties than natural magnets have been made by man.



Different shapes of magnet

MAGNETIC AND NON-MAGNETIC MATERIALS



Activity - 1

Take a few things like paper clips, nails, coins, sewing needle, eraser, spoon, cork, matchstick, pencil and cloth. Bring them one at a time close to the magnet. See which items are attracted to the magnet. Note down your observations.

Object	Material	Whether attracted or not
Paper cup	steel	Yes
Nail	iron	Yes
Ruler	plastic	No
Eraser	rubber	

You will notice that things made of iron and steel are attracted by the magnet. Items like wood, plastic, glass and copper are not attracted.

The materials which get attracted towards a magnet are called **magnetic**. Examples are iron, nickel or cobalt.

The materials which are not attracted towards a magnet are called **non-magnetic**. Examples are stainless steel, silver, gold, wood, plastic, glass, rubber etc.

POLES OF A MAGNET

A magnet has two poles. The two ends of a magnet are called the poles.

Let's Remember

Write 'T' for true and 'F' for false statements.

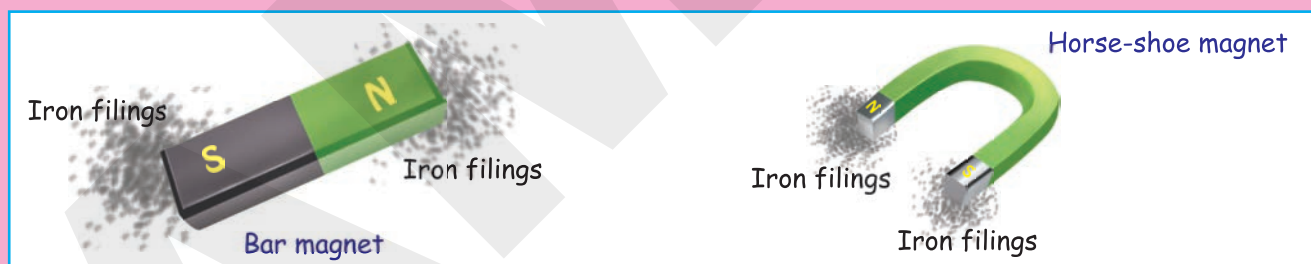
1. Magnetite is a natural magnet. ☐
2. Wood is an example of magnet. ☐
3. The two ends of a magnet are called the poles. ☐
4. Magnets were used by ancient people for showing directions. ☐
5. A horse shoe magnet needs keeper at two end. ☐



Activity - 2

Take a sheet of white paper. Spread some iron filings on it. Now, roll a magnet in the filings and lift it up. Observe how the iron filings are distributed all over the magnet. What do you observe?

You will notice that most of the iron filings cling near the ends of the magnet. There are very few iron filings near the middle. Repeat this experiment with a horse-shoe magnet.



In the horse shoe magnet also, you will see a similar arrangement.

This experiment shows that magnetism is strongest at the two ends of the magnet. These are called the **poles of a magnet**.



Activity - 3

Take a magnet and suspend it freely with the help of a string or place a magnet on a piece of wood or cork and float it in a basin of water. The magnet will come to rest in the north-south direction in both the cases. Shake the magnet a little and again watch. What do you notice?

It will be seen that one end of the magnet always points towards the north.

This is called the **north pole of the magnet**. The other end points to the south and is called the **south pole of the magnet**.

All magnets have two poles irrespective of the shape. Usually, North (N) and South (S) poles are marked on the magnet.

Have you ever thought, what would happen if a magnet was to be cut into two pieces. We will get two separate magnets each having a north pole and a south pole. **We can therefore never get an isolated north pole or south pole magnet.**

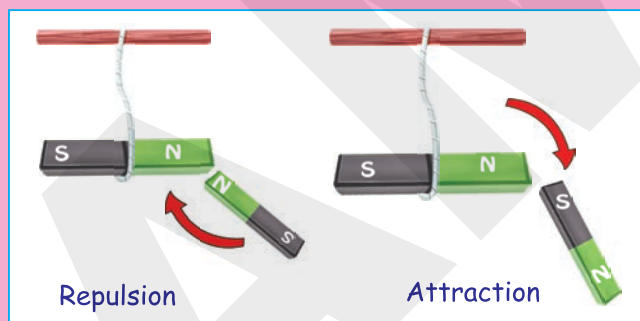


ATTRACTION AND REPULSION BETWEEN MAGNETS



Activity - 4

Take two magnets. Suspend one of them with the help of a string. Now bring the north pole of the second magnet near the north pole of the suspended magnet. What do you observe? Now bring the north pole of the second magnet near the south pole of the suspended magnet. What do you observe?



Observation		
Magnet 1	Magnet 2	Observation
N	S	Attract
N	N	Repel
S	N	Attract
S	S	Repel

When like poles of a magnet are close together they repel each other i.e, they push apart. In other words north pole repels north pole but attracts a south pole. Similarly, south pole will attract a north pole and repel a south pole.

Unlike poles attract and like poles repel each other.

TEST FOR MAGNETISM

Repulsion and not attraction is a sure test for magnetism. This is used to test whether a bar of metal is a magnet or not.

THE MAGNETIC COMPASS

Magnets were used by ancient people for showing directions. Travellers used to find directions simply by suspending magnets from threads. Later on a device called **compass** was used to determine directions.

A compass is a flat, circular glass box with a glass cover. A magnetised needle (free to rotate) is pivoted inside the centre of the box. The box has directions marked on it such as north, south, east, west, north-east, north-west, south-east and south-west. The needle points in the north-south direction. It is used by navigators and sailors to determine directions. The compass is kept in the place where we wish to know the directions.



A Compass



Facts to know

Hans Christian Oersted discovered electromagnetism which means producing magnetism with electric current.

STORING OF MAGNETS

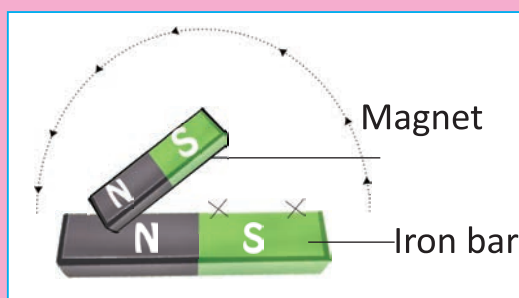


Activity - 5

Place an iron bar on a table. Take a strong magnet. Place one end of its poles near one edge of the bar. Move the magnet along the iron bar to the other end, without lifting the magnet. Raise the magnet and bring it back to the starting position. Repeat the process at least 30 times. Remember to move the magnet in the same direction every time. Test the iron bar if it has become a magnet by bringing a pin near it. If not, repeat the process.

In this way, you can convert an iron nail, a needle or a blade into a magnet. This method is known as **single touch method of making magnets**.

The starting point of the iron bar acquires the same pole as the end of the magnet from which stroking was started.



Activity - 6

Magnetise a needle as done in the above previous activity. Place the needle on a piece of wood. Place the wood in a basin of water (activity 3). See whether the needle points in the north-south direction or not?

Let's Remember

Match the following

Column A

1. temporary magnet
2. magnetic compass
3. poles of magnet
4. wood
5. horse-shoe Magnet

Column B

- (a) helps to find direction
- (b) maximum magnetic strengths
- (c) non-magnetic material
- (d) artificial magnet
- (e) lose magnetism

- ♦ Magnets tend to lose their properties if heated strongly, hammered or handled roughly.
- ♦ Magnets become weaker after sometime if their poles are left free. This is called **self-demagnetisation**. To keep them safe, magnets must be stored in pairs in wooden boxes, with unlike poles on the same side. The two magnets must be separated by a piece of wood. Pieces of iron called **keepers** are placed across both ends. A horse shoe magnet needs keeper at one end only.
- ♦ Magnets should be kept at a distance from objects with magnetic components like computer, cassettes, television, audio tape, cell phones, CD's etc.



Storing a magnet

SOME USES OF MAGNETS

Magnets have a number of uses. Some of them are :

- ♦ They are used to pick iron pieces from waste.
- ♦ They are used in pin holders, in some pencil boxes magnets are fitted to close the lids tightly, they are used in magnetic stickers, in closing mechanism of refrigerator doors etc.
- ♦ In audio and video tapes and computer hard disks to store information.
- ♦ In credit cards, ATM cards and metro smart cards the information is stored in a magnetic strip.
- ♦ Magnets are also used in a number of electronic goods.



Facts to know

The region round the magnet where its magnetic influence is felt is called the magnetic field of the magnet.



Glossary

lodestone	: a naturally occurring magnet
compass	: an arrangement to detect magnetic field
magnetite	: an ore of iron which has magnetic properties
north pole	: the pole of a magnet which points towards the north pole of the earth if a magnet is suspended freely
pole	: one of the two regions in a magnet where the magnetic field is concentrated



Summary

- ◆ Magnetite is a natural magnet.
- ◆ Magnetics are materials which get attracted to a magnet, e.g. iron, nickel and cobalt.
- ◆ Materials like gold, silver, wood, plastic etc which do not get attracted to a magnet are called non-magnetics.
- ◆ A magnet has two poles– north pole and south pole.
- ◆ Unlike poles attract each other and like poles repel each other.
- ◆ In a freely suspended magnet, north pole points to the north direction and south pole towards the south.
- ◆ A piece of magnetic material can be magnetised by rubbing it with a magnet.
- ◆ A magnetic compass is a device having a magnetised needle which helps to indicate direction.
- ◆ Magnet must be stored carefully.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. A magnet always rests in this direction
(a) north south ☐ (b) south north ☐ (c) east west ☐ (d) west east ☐
2. This is a magnetic material
(a) silver ☐ (b) gold ☐ (c) wood ☐ (d) iron ☐
3. The magnetic strength of a magnet is
(a) uniform throughout the body ☐ (b) maximum at the north pole ☐
(c) maximum at the south pole ☐ (d) maximum at both the poles ☐
4. Magnets must not be placed near a
(a) book ☐ (b) computer ☐ (c) pencil ☐ (d) table ☐
5. A magnet is made of
(a) steel ☐ (b) iron ☐ (c) aluminium ☐ (d) wood ☐
6. This will get attracted to a magnet
(a) eraser ☐ (b) ruler ☐ (c) paper clip ☐ (d) match stick ☐

B. Fill in the blanks with the correct words.

magnetic Repulsion magnets loadstone two

1. The substance having the property of attracting iron are known as _____.
2. _____ is a natural magnet as it is found in nature.

3. The materials which get attracted towards a magnet are called _____.
4. A magnet has _____ poles.
5. _____ and not attraction is a sure test for magnetism.

C. Give one word for each one of the following.

1. In which country was magnet discovered? _____.
2. Nickel is magnetic or non-magnetic? _____.
3. The magnet becomes weak if their poles are left free. Yes/No _____.
4. A cylindrical magnet will have how many poles? _____.
5. Maximum iron filings will stick at the _____ of a magnet.
6. Magnets must be stored in boxes made of _____.
7. Can a magnet have only one pole? Yes/No _____.
8. Iron pieces used for storing magnets are called _____.
9. Magnet can lose its magnetism if dropped from a height. Yes/No _____.
10. Magnet will not attract copper. Yes/No _____.

D. Answer the following questions in short.

1. What is a magnet?
2. What will happen if we break a magnet into two pieces?
3. Where are the poles of the magnet located?
4. Write any two properties of a magnet.
5. What is self-demagnetisation?

E. Answer the following questions.

1. Name and describe the instrument that uses a magnet to find direction.
2. Give three uses of magnets.
3. Explain with the help of an experiment that like poles repel and unlike poles attract each other.
4. How will you magnetise an iron piece?
5. How should magnets be stored?



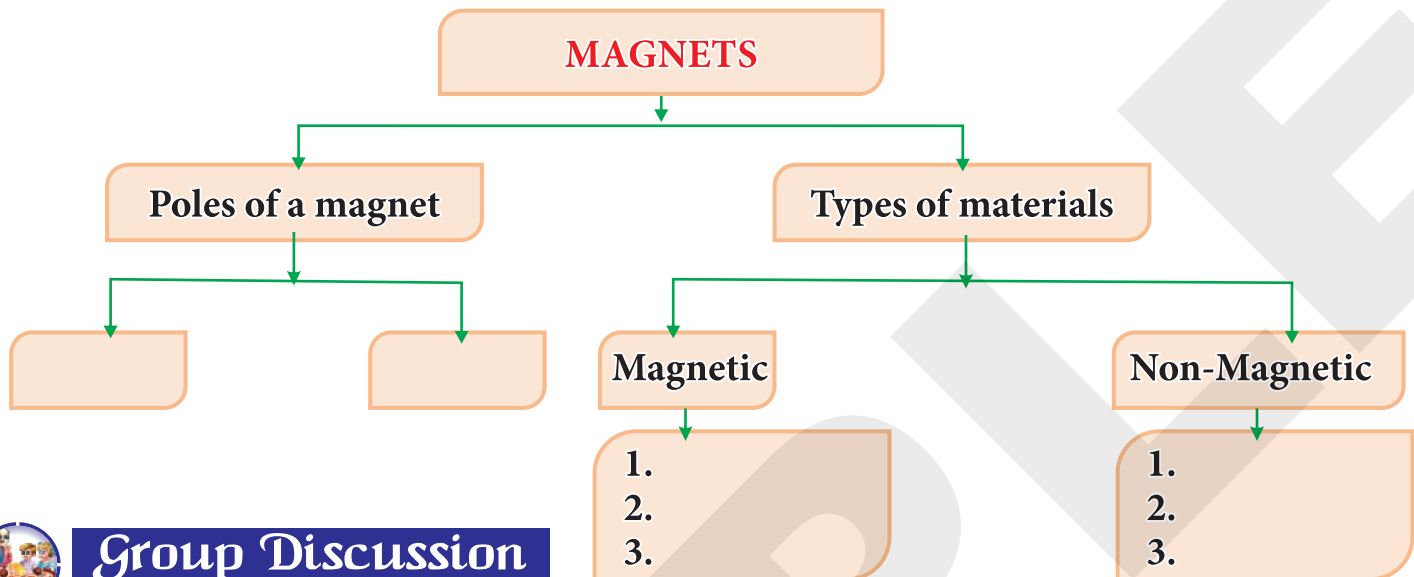
HOTS (Think and Answer)

1. Why do you think magnets are fitted onto the sticks used by rag picker?
2. Do you think you will be able to keep two equal sized bar magnets one on top of the other in such a way that their north poles are on the same side? Why?



Let's Recall

Complete the following diagram.



Group Discussion

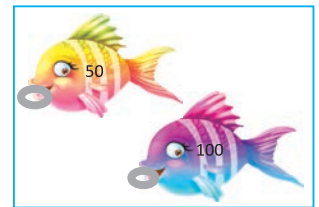
1. Use of magnets.
2. Magnets do not really point in the North south direction.



Activity to do

Play this fishing games with your friends.

1. Cut 10 different types of fishes from card paper. Colour them and fix a paper clip on their face as shown below. Write any number on the fish. These are the points.
2. Take a string, tie a magnet on one side and a hook on the other side — your fishing rod is ready.
3. Place the fishes you have painted in a box (you can use a shoe box).
4. Ask your friend to close his eyes. Give him the fishing rod. Let him fish, on holding the hook. The magnet will fix itself on the paperclip.
5. Then you try fishing. Play turn wise.



When all the fish are over. Count the points on the fish each has collected. The player who gets the most points is the winner.



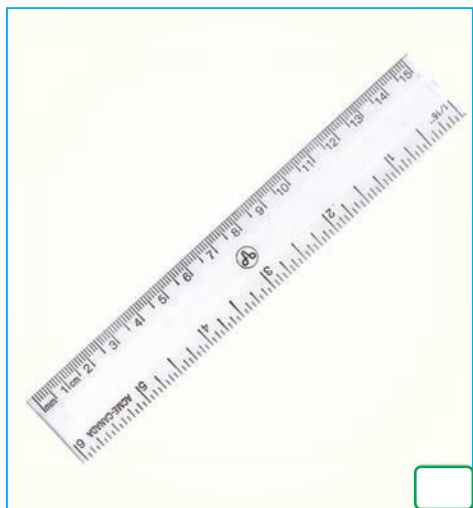
Creative Task

1. Make a magnet from a piece of iron.
2. Take a hand ful of sand and mix some iron nails, stapler pins and pins and mix them thoroughly. Using a magnet, try to separate these from the help of sand and note where do maximum pins stick.

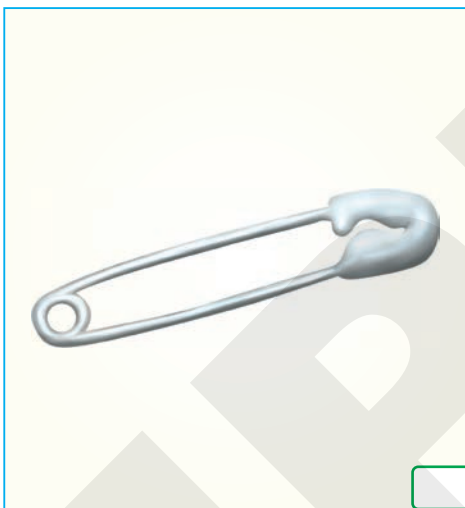


WORKSHEET-10

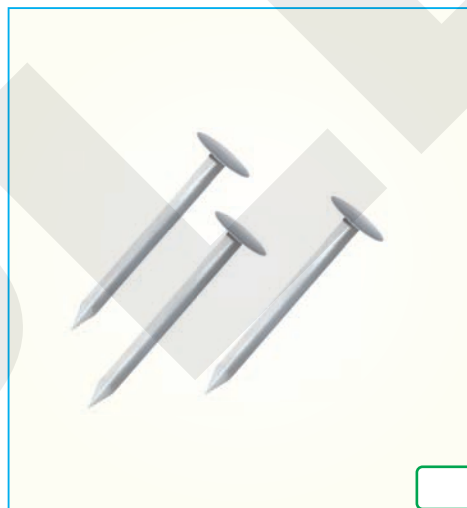
Look at the following pictures. Tick (✓) against the object that you think would stick to a magnet and (✗) against the objects that would not stick to a magnet.



Plastic rulers



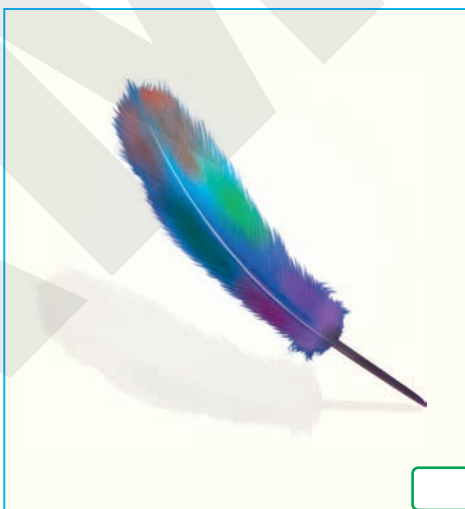
Safety pin



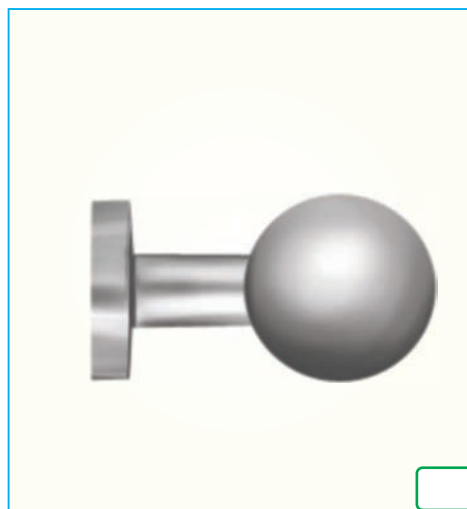
Nails



Papers



Feather



Metal door knob

Air Around Us

Introduction

- Presence of air
- Air occupies space
- Oxygen cycle
- Composition of air
- All living beings respire
- Uses of air

Air is found every where. We all need air to live. But we cannot see it but only feel it. Rustling of leaves, swaying of clothes when hanging on the clothes-line, movement of kite and clouds in the sky are all made possible due to moving air called **wind**. When the wind blows very strongly i.e at a very high speed, it is called a **storm**. Storms can up root trees or even blow off the root tops.



A weather cock

Have you seen a weather cock? It indicates the direction in which the air is moving at that place. Wind helps in the movement of aeroplanes, helicopters, sail boats and wind mills.

AIR IS PRESENT ALL AROUND US



Activity - 1

Take an empty glass. Hold it upside down. Dip it in a bucket or basin of water as shown in fig (a). Do you see water entering the glass? Now tilt the glass slightly in the water tub. Do you see bubbles of water coming out of the glass? The bubbles are of air. This shows that air was present in the empty glass. The glass was filled with air. When you turned it upside down water could not enter the glass as there was no space inside the glass. When the glass was tilted the air inside the glass escaped out and water could then enter the glass.



Figure (a)

Figure (b)

This activity shows that air occupies space. We cannot see air, though it is present all around us. We can see through it because it is transparent.

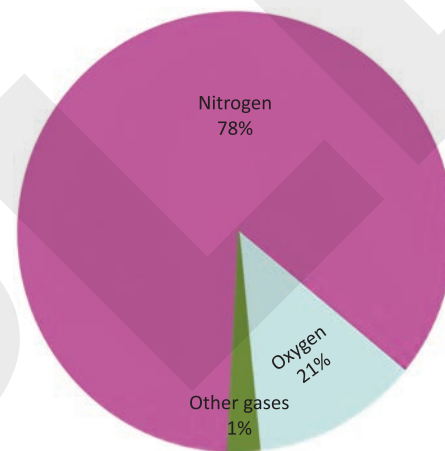
Our earth is surrounded by a layer of air called the **atmosphere**. However, the air gets thinner as we go up. This is the reason mountaineers carry oxygen cylinders while climbing high mountains. The atmosphere is held in place due to the earth's gravity.

COMPOSITION OF AIR

Joseph Priestley in 1774 discovered oxygen and showed that it was a part of air. This led to the conclusion that it is a mixture of many gases and not just one substance. The main gases present in the air are nitrogen (about 78% by volume) and oxygen (about 21% by volume). The remaining 1% approx consists of carbon dioxide, water vapour, helium, argon, smoke and dust particles. The amount of these vary from place to place.

Let us study about the main components in detail.

AIR CONTAINS NITROGEN AND OXYGEN



Composition of air



Activity - 2

Take two shallow containers. Fix two small candles in each container.

Fill the containers with some water. Light both the candles and cover both of them separately with two inverted glasses of unequal sizes as shown in the figure. Observe what happens to the burning candles as well as the level of water in the glasses. The candles burn till there is oxygen in the glass and then they blow out. The candles inside the bigger glass burn for a longer time as it contains more air and hence more oxygen. Once the candles blow out, water rises in both the glasses. This rise in water should not be associated with the fact that water rises to replace the amount of oxygen used up in the burning of the candles. During burning carbon dioxide is also released into the air.



Air has Oxygen

Nitrogen

In the above activity it is seen that a large part of the air is still present in the glasses even after the candles stopped burning. This indicates that there is some other gas in the air which does not support burning. This gas is nitrogen. It is four-fifths of the total air.

You can remove the glass in the above experiment keeping its mouth closed with a plate. Drop a burning match stick into it. It gets extinguished. This shows that remaining four-fifths of the air does not support combustion.



Activity - 3

Take a glass of water. Add few ice cubes in it. Let it stand for some time at room temperature. What do you observe after a few minutes? You will see small drops of water on the outer surface of the glass. This is because of the water vapour present in the air that condenses on the cold surface of the glass and forms the drops of water.

Water vapour

As we have already learnt in the previous chapter, the water vapour in the air plays an important role in the water cycle in the air.

The amount of water vapour in the air is called **humidity**. It varies from place to place and also from time to time. The level of humidity is highest in the monsoon season. Cities situated near the sea like Mumbai have higher humidity than Delhi throughout the year.

Let's Remember

Fill in the blanks with the correct words.

0.03% storms humidity smoke Nitrogen

1. _____ can up root trees or even blow off the root tops.
2. _____ is four-fifths of the air.
3. The amount of water vapour in the air is called _____.
4. Air contains _____ of carbon dioxide.
5. Dust and _____ are harmful to us.

Carbon dioxide

Air contains 0.03% of carbon dioxide. Human beings, animals and plants take in oxygen and give out carbon dioxide during respiration. During burning also, oxygen is used up and carbon dioxide is given out. This is the reason, we may feel suffocated if some material is burning in a closed room with no ventilation.



Activity - 4

Take some lime water in a dish and keep it uncovered. Observe after 4–5 hours. What do you notice? You will see a milky crust on the surface of the lime water. This is because the carbon dioxide present in the air turns the lime water milky.



Dust and Smoke

They are dust particles. This shows that air contains dust particles. The amount of dust

particles varies from place to place and from time to time. Air also contains smoke. This smoke comes from the vehicles and factories and burning fire. (This is the reason policeman wear mask when regulating traffic especially in crowded crossings).



Activity – 5

Have you examined a beam of light entering your room in the morning? You will see tiny shiny particles dancing in the beam of sunlight.



- ◆ Dust and smoke are harmful to us.
- ◆ We must always breathe through the nose. In the nose there are fine hair and mucus which act as filter and prevent the dust particles from getting into our respiratory system.

Thus we have seen that air contains some gases, water vapour, dust and smoke.



Facts to know

Some aquatic animal like dolphin and what, breathe with the help of lungs. So, they come to the surface of water to take in air.



Activity – 6

Take some water in a beaker. Heat it gently. Observe the 'inner' surface of the vessel. Do you see tiny bubbles on the inside of the vessel? These bubbles are of air that was dissolved in water. Initially when we heat water, air dissolved in it escapes. On further heating, water begins to boil and starts evaporating. The bubbles now formed are of steam and not of the air dissolved in water.



ALL LIVING BEINGS RESPIRE

Animals and plants living in water also breathe. How does oxygen become available to them? Thus plants and animals living in water, use the oxygen dissolved in water.



Activity – 7

Take some dry soil in a beaker. Add some water to it. Note what happens. You will see tiny bubbles coming out of the soil. This show the presence of air in the soil.



Organisms living in soil also need oxygen to respire. How do these animals get it?
Many animals live in the soil by making burrows and holes deep in the soil. During heavy



Facts to know

We can see dust and smoke particles present in the polluted air.

rains and in rainy seasons, we see earthworms coming out of the soil. This is because when it rains heavily, water fills up all the spaces occupied by air in the soil. This makes it difficult for them to breathe and they have to come out of their burrows for respiration.

THE OXYGEN CYCLE

How is that the percentage of oxygen in the air remains the same, though a lot of it get removed from the air during respiration and combustion?

This is because plants produce oxygen during photosynthesis which is added to air. Plants also use oxygen for respiration. However, the amount of oxygen produced during photosynthesis is much more than that used up in respiration.

The balance of oxygen in the air is maintained by consumption of oxygen through respiration

Let's Remember

Write 'T' for true and 'F' for false statements.

1. Plants respire only at night.
2. Aquatic animals do not require oxygen.
3. We cannot feel air.
4. Air blowing at very high speed is called wind.
5. Humidity in Delhi is more than that in Mumbai.

☐
☐
☐
☐
☐

in plants and animals and by its release during photosynthesis. This is called the **oxygen cycle**. This also shows that plants and animals are inter dependent on each other.

USES OF AIR

Air is useful to us in many ways :

- ♦ Aeroplanes, sail boats, balloons, parachutes, gliders work in air.
- ♦ Birds, insects and bats fly due to air.
- ♦ Air helps in the dispersal of seeds.
- ♦ It helps in the pollination of several flowers.
- ♦ Air helps in winnowing.
- ♦ Air plays an important role in the water cycle.
- ♦ Tubes, balloons, tyres are all filled with air.
- ♦ The wind makes the windmill rotate. The windmill is used to draw water from tube wells and also to run flour mills. These days windmills are used to generate electricity.



A wind mill



Glossary

atmosphere	: the gaseous envelope surrounding the earth
composition of air	: components of air
oxygen	: a colourless, odourless and tasteless gas essential for breathing and burning
nitrogen	: an inert gas which makes up major part of the air
smoke	: composition of gases and dust particles
windmill	: an arrangement which runs on air



Summary

- ◆ Air is found every where. We cannot see it, but we can feel it.
- ◆ Moving air is called wind.
- ◆ The layer of air surrounding the earth is known as atmosphere.
- ◆ Air is a mixture of gases. Besides gases, water vapour and dust are also present in it.
- ◆ Air is present in water and soil.
- ◆ Air occupies space.
- ◆ Oxygen helps in burning. It is necessary for living organisms.
- ◆ Aquatic animals use dissolved air in water for respiration.
- ◆ Plants and animals depend on each other for supply of oxygen and carbon dioxide.
- ◆ Air is useful to us in many ways.



Exercise

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. This gas supports burning
(a) oxygen ☐ (b) nitrogen ☐
(c) carbon dioxide ☐ (d) methane ☐
2. The amount of this varies from place to place
(a) nitrogen ☐ (b) oxygen ☐
(c) argon ☐ (d) water vapour ☐
3. Air is present in
(a) soil ☐ (b) water ☐
(c) air ☐ (d) all of these ☐

4. The percentage of oxygen in the air is approximately
 (a) 78% ☐ (b) 21% ☐
 (c) 2.1% ☐ (d) 0.03% ☐
5. Lime water turns milky due to
 (a) oxygen ☐ (b) nitrogen ☐
 (c) carbon dioxide ☐ (d) methane ☐

B. Match the following.

Column A

1. nitrogen
2. compressed air
3. water vapour
4. diver's oxygen cylinder contains
5. skin cancer

Column B

- (a) humidity
- (b) oxygen and helium
- (c) automobile tyres
- (d) ultraviolet radiations
- (e) 78 percent

C. Give one word for each one of the following.

1. A gas that supports burning
2. A gas that does not support burning
3. Addition of harmful gases and substances in air
4. A thick blanket of air
5. Special organs for respiration in fish

D. Answer the following questions in short.

1. Why are plants called producers of oxygen?
2. What is air made of?
3. From where does smoke in the air come from?
4. What is humidity?
5. What do you mean by atmosphere?
6. Which are the main gases present in air?

E. Answer the following questions.

1. How will you show that air is dissolved in water?
2. How will you show presence of water vapour in air?
3. Why do you see earthworms in rainy season?
4. Why do policemen wear masks while regulating traffic?
5. What is oxygen cycle?
6. List five uses of air.



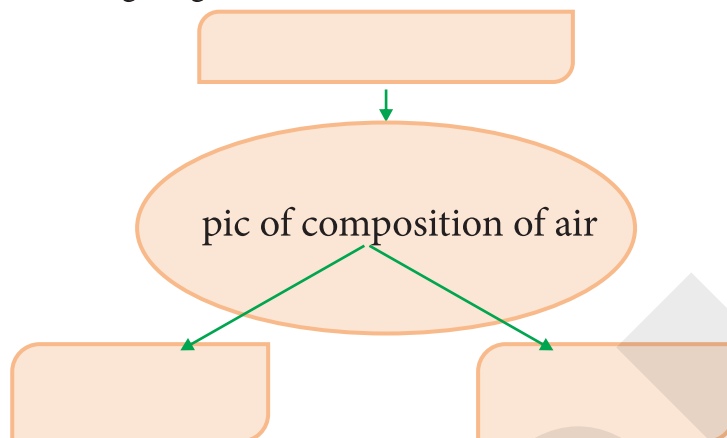
HOTS (Think and Answer)

1. Why do you think that plants appear more green after rains?
2. Which gas do you think is used in fire extinguishers?



Let's Recall

Complete the following diagram.



Group Discussion

1. Cause of air pollution.
2. Wind energy : future source of energy.



Activity to do

Make a fire extinguisher at home.

- Take a plastic bottle with cap. Make a hole in the centre of the cap and insert a drinking straw in it, so that it can bend. Seal the hole by pressing some plasticine around the straw.
- Light a candle and fix it in a bowl.
- Remove the cap from the bottle. Pour 1/2 l vinegar and add 1 table spoon of baking soda into the bottle. Immediately put on the cap and screw it tightly.
- Face the straw towards the lighted candle. The candle will be extinguished because of vinegar.



Creative Task

1. Write a report explaining the possible consequences if the following gases were absent from the Earth's surface : (a) carbon dioxide (b) oxygen
2. Make a weather cock like the one in the picture. Put it up at the highest point in your school. Mark the direction of the wind on different days.





WORKSHEET-11



Can you think of some uses of air? List any three.
Take clues from the pictures given below.



(a) _____

(b) _____

(c) _____





Revision Test Paper -1

(Based on chapters 1 to 4)

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. Which of the following is not obtained from plants/animals?
a. milk ☐ b. salt ☐
c. wheat ☐ d. honey ☐
2. Which is a water soluble vitamin?
a. vitamin B ☐ b. vitamin D ☐
c. vitamin K ☐ d. vitamin A ☐
3. Cotton is obtained from _____.
a. stem ☐ b. seed pods ☐
c. roots ☐ d. leaves ☐
4. Which of the following is an opaque material?
a. water ☐ b. glass ☐
c. plastic ☐ d. card board ☐
5. Which of the following is immiscible in water? .
a. milk ☐ b. orange juice ☐
c. mustard oil ☐ d. cock ☐

B. Write 'T' for true and 'F' for false statements.

1. We eat the stem of cabbage. ☐
2. Fats are the store house of energy. ☐
3. Fibre is the single hair like cotton. ☐
4. Paper shaving will sink in water. ☐
5. Gold and Silver have lustre. ☐

C. Give one word for each one of the following.

1. Which part of the potato is eaten? _____
2. Is a bear herbivores, carnivore or omnivore? _____
3. A vitamin required to fight against diseases _____
4. A simple device used for spinning _____
5. Name of an opaque object _____



Revision Test Paper -2

(Based on chapters 5 to 8)

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. The process of settling down of sand in water is _____.
a. decantation ☐ b. sedimentation ☒
c. evaporation ☐ d. filtration ☐
2. Chemical changes are _____.
a. reversible ☐ b. irreversible ☐
c. both reversible and irreversible ☐ d. none of these ☐
3. The male reproductive part of a flower is _____.
a. ovary ☐ b. ovule ☐
c. stamen ☐ d. sepal ☐
4. Reticulate venation is found in _____.
a. mango ☐ b. peepal ☐
c. canna ☐ d. plum ☐
5. Ball and socket joint is found in _____.
a. knees ☐ b. neck ☐
c. shoulder ☐ d. ankle ☐

B. Write 'T' for true and 'F' for false statements.

1. The cartilage is very hard. ☐
2. Milk can be separated from tea by filtration. ☐
3. Changes can take place on their own. ☐
4. Herbs are very small plants. ☐
5. Hinge joint is found in the hips. ☐

C. Give one word for each one of the following.

1. Method of separating vegetables _____
2. Name a herb _____
3. Name a shrub _____
4. Changing of water to vapour _____
5. Name the movable bone in the skull _____



Model Test Paper -1

(Based on chapters 1 to 8)

A. Answer the following questions in short.

1. What are the functions of food?
2. Name the two kinds of carbohydrates.
3. What do you mean by spinning?
4. Name the two processes of converting yarn to fabric.
5. How can paper be made translucent?
6. Why do we need to classify things?
7. What is a saturated solution?
8. What are the functions of a midrib in a leaf?
9. What is a reversible change?
10. What is the function of the cartilage?

B. Fill in the blanks.

1. Animal can be _____ as food directly or indirectly.
2. Fats also provide _____ to our body.
3. A _____ diet is necessary for good health.
4. India is the _____ producer of jute in the world.
5. A material can be used to make different _____.
6. Buckets are usually made of _____.
7. The _____ are heavier than the husk.
8. The main root is called the _____.
9. The metal rim is slightly smaller in _____.
10. The human skeleton consists of _____ basic parts.

C. Match the column.

Column A

1. Horse
2. Fish
3. Bird
4. Ant
5. Grasshopper

Column B

- (a) swims
- (b) jumps
- (c) walks
- (d) Flies
- (e) crawls

D. Answer the following questions.

1. What are the sources of food?
2. How is honey made?
3. How will you test presence of starch in food items?
4. What are the ideal conditions for growing jute?
5. What down five properties on the basis of which we can classify materials.
6. How would you obtain clear water from muddy water?
7. How will you separate wheat grain and straw pieces?
8. Describe the process of transpiration.
9. What is a chemical change? Explain with an example.
10. Explain the movement of a snake.

E. Maintain a record for one year of the seasonal change in vegetables, clothing, nature and events around you. Identify the change that can or cannot be reversed.



Revision Test Paper - 3

(Based on chapters 9 to 12)

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

1. Conifers are found in the _____.
a. desert ☐ b. grassland ☐
c. hilly areas ☐ d. forests ☐
2. Some animals hibernate in _____.
a. winter ☐ b. summer ☐
c. rainy season ☐ d. autumn ☐
3. 1 m is equal to
a. 10 cm ☐ b. 100 cm ☐
c. 1000 cm ☐ d. 0.1 cm ☐
4. A pin hole camera is based on the principle of _____.
a. rays ☐ b. reflection ☐
c. refraction ☐ d. rectilinear propagation ☐
5. Which of the following conducts electricity?
a. an eraser ☐ b. a plastic ruler ☐
c. an iron nail ☐ d. a plastic jug ☐

B. Write 'T' for true and 'F' for false statements.

1. All living things need food to survive. ☐
2. Boats were used to travel across land. ☐
3. Sun is a luminous object. ☐
4. Light travels in straight lines. ☐
5. Electric cell is a source of electricity. ☐

C. Give one word for each one of the following.

1. Camel stores fat in this part _____
2. Aquatic habitat means land or water _____
3. Is image and shadow the same thing? _____
4. Oiled paper is opaque or not. _____
5. We can use a cotton thread to make a circuit. Yes/No _____



Revision Test Paper -4

(Based on chapters 13 to 16)

A. Multiple Choice Questions (MCQs)

Tick (✓) the right option.

- Magnets must not be placed near a _____.
a. book ☐ b. computer ☐
c. pencil ☐ d. table ☐
- Which is a source of ground water?
a. river ☐ b. pond ☐
c. well ☐ d. ocean ☐
- Ultimate source of water is _____.
a. lake ☐ b. river ☐
c. tap ☐ d. ocean ☐
- Lime water turns milky due to _____.
a. oxygen ☐ b. nitrogen ☐
c. methane ☐ d. carbon dioxide ☐
- We can make compost from _____.
a. glass ☐ b. plastic ☐
c. metal ☐ d. kitchen waste ☐

B. Write 'T' for true and 'F' for false statements.

- Magnetite is a natural magnet. ☐
- The two ends of a magnet are called the poles. ☐
- The farmers are the worst sufferers. ☐
- Plants respire only at night. ☐
- Round worms help in vermi composting. ☐

C. Give one word for each one of the following.

- Can a magnet have only one pole? Yes/No _____
- Magnet will not attract copper. Yes/No _____
- The purest form of natural water _____
- A gas that supports burning _____
- A person who picks reusable things from the garbage dump _____



Model Test Paper -2

(Based on chapters 9 to 16)

A. Answer the following questions in short.

1. What is adaptation?
2. How do plants breathe?
3. What is translatory motion?
4. Name the different types of motion.
5. When is a shadow formed?
6. What is a magnet?
7. How does temperature affect evaporation?
8. What do you mean by atmosphere?
9. What is humidity?
10. What do you mean by land fill?

B. Fill in the blanks.

1. Lions live in the grasslands and in the _____.
2. The _____ undergoes periodic motion _____.
3. We use different measuring devices in our _____.
4. _____ objects reflect maximum light.
5. A magnet has _____ poles.
6. Water is used as a medium of _____.
7. About _____ of the earth is covered with water.
8. Dust and _____ are harmful to us.
9. Air contains _____ of carbon dioxide.
10. _____ is rich in carbon and nitrogen.



C. Match the column.

Column A

1. Nitrogen
2. Compressed air
3. Water vapour
4. Diver's oxygen cylinder contains
5. Skin cancer

Column B

- (a) humidity
- (b) oxygen and helium
- (c) automobile tyres
- (d) ultraviolet radiations
- (e) 78 percent

D. Answer the following questions.

1. List four adaptations of the camel to survive in the desert.
2. List the common characteristics of living things.
3. Explain with examples what is periodic motion?
4. Why did the International system of units come into existence?
5. What do you understand by reflection of light?
6. Give three uses of magnets.
7. Why does drought occur?
8. What is oxygen cycle?
9. List five uses of air.
10. Why is plastic viewed as a menace?

E. Make a project on least five different types of stars in the universe. Compare the different stars with Sun in relation to its size shape temperature, distance from the earth.