



Interactive **SCIENCE**

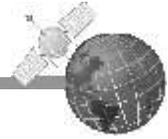
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Help Kit : 6-8





1 Sources of Food



Exercises

Section I

A. Select and tick (3) the correct option :

Ans. 1. a. 2. c. 3. b. 4. c.

B. Fill in the blanks :

- Ans. 1. Organisms require food for **growth** and **development** of the body.
 2. **Plants** are called producers of food for other organisms.
 3. Many plants store **carbohydrates** or **fats** in their stems.
 4. Milk producing animals are **milch** animals.
 5. **Decomposers** play a very important role in nature.

C. Write true or false :

Ans. 1. true 2. true 3. false 4. true 5. false

Section II

A. Very short answer questions :

- Ans. 1. Most ingredients used to prepare our food are obtained from plants.
 2. Water and salt.
 3. Herbivores are those organisms that eat only plants and plant products.
 4. Carnivores are those organisms that only eat the flesh of other animals.
 5. Decomposers are those organisms that feed on and destroy (or decompose) dead plants and animals.

B. Short answer questions :

- Ans. 1. We food for the following reasons :
- to provide energy for various activities of the body
 - for growth and development of the body
 - to protect the body from diseases and keep it healthy.
2. Milk, eggs, butter, cheese and honey are the five food products we get from animals.

C. Long answer questions :

- Ans. 1. Five plant parts that we eat are as follows :
- a. **Root** : In some plants, the roots or parts of the root system are enlarged in order to store large quantities of starch and other carbohydrates. A tuberous root or storage root is enlarged to function as a storage organ. Examples of plants with notable tuberous roots include sweet potato, carrot.
 - b. **Seed** : Seeds of plants are a good source of food for animals, including human beings because they contain nutrients necessary for the plant's initial growth. Edible seeds include cereals (such as maize,

wheat and rice).

- c. **Stems** : Stems of certain plants are eaten. Many plants store carbohydrates or fats in their stems. Potato, garlic, cinnamon and sugar cane are few examples of edible stems.
 - d. **Fruits** : We eat fruits of certain plants as our food. They provide us with necessary vitamins and minerals. Apple and tomato are two of the numerous fruits of plants eaten by us.
 - e. **Flowers** : Flowers of certain plants are also a source of food for us. they flowers of plants that we include cauliflower and broccoli.
2. **Special Characteristics of Herbivores**
- Herbivores like cow, horse, and goat have wide, blunt teeth. Such teeth are suitable for pulling plants off the ground and grinding them.
 - Herbivores like cow and camel have the ability to bring back previously swallowed food to the mouth for chewing it the second time. This helps them to absorb most of the nutrients from hard-to-digest food like grass.

Special Characteristics of Carnivores

- Carnivores like lion and tiger have sharp and pointed front teeth (canines). They also have sharp claws and powerful jaws which help them to tear flesh.
- Carnivorous birds like eagle have curved, pointed beaks that allow them to tear flesh.
- Carnivores like chameleon and frog have a long, sticky tongue that they use to catch insects.

Special Characteristics of Omnivores

- Omnivores like bear and human beings have different types of teeth that help them to eat both plants and flesh of other animals.
- Omnivorous birds like crow have sharp and pointed beak to help them eat a variety of food.

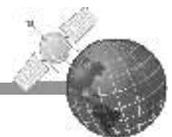
D. Higher Order Thinking Skills (HOTS) :

- Ans. 1. **A A P P P A A**
Egg, butter, spices, sugar, curry leaves, honey, milk.
2. a. Omnivore; Man
b. Herbivore; Goat
c. Carnivore, Lion
d. Producers; Green plants
e. Photosynthesis.



2

Components of Food



Exercises

Section I

A. Select and tick (3) the correct option :

- Ans. 1. c. 2. d. 3. a. 4. d.

B. Fill in the blanks :

- Ans.** 1. The **nutrients** are chemical substances needed by our body for proper growth and functioning.
2. Fats are the **energy** reservoirs of the body.
3. There are about 20 known **vitamins**.
4. **Children** and **office-going** people need less carbohydrates.
5. **Kwashiorkor** is a disease which occurs in children due to protein deficiency.

C. Write true or false :

- Ans.** 1. false 2. true 3. false 4. true 5. true

Section II

A. Very short answer questions :

- Ans.** 1. The function of carbohydrates is to give us energy.
2. Butter and fish.
3. Proteins replace old and damaged cells.
4. Milk and green vegetables.
5. Absence of sufficient water intake causes dehydration.

B. Short answer questions :

- Ans.** 1. Carbohydrates, proteins, fats, vitamins and minerals are the five major groups of nutrients.
2. The two types of fats are as follows :
i. **Vegetable fat**, which is found in oils made from plants such as coconut, mustard and groundnut.
ii. **Animal fat**, which is found in milk products such as butter and meat and fish.
3. Vitamins are a group of nutrients that our body requires in small quantities. They are essential for the proper working of the body. If our diet is lacking in any vitamin, we suffer from certain diseases called deficiency diseases.
4. Soluble roughage are soluble in water whereas insoluble roughage are not. Apple, strawberry, peach, and rice are examples of food items rich in soluble roughage that help in blood circulation. Whole grain, carrot, cabbage, turnip, and cauliflower are examples of food items rich in insoluble roughage.
5. We need to eat a balanced diet because in it energy giving foods, body-building foods and protective foods are present in proper quantities. A balanced diet, thus, provides the body with :
• all the essential nutrients.
• energy required by the body for its growth and maintenance.
6.

Vitamins	Deficiency diseases
Vitamin A	Night blindness (Poor night vision)
Vitamin B ₁	Beri-beri (Nervousness, loss of appetite, paralysis)
Vitamin B ₂	Skin diseases
Vitamin C	Scurvy (Bleeding of gums, swelling of joints)

Vitamin D	Rickets (Weak bones, decaying teeth)
Vitamin K	Haemorrhage (Clotting of blood affected)

C. Long answer questions :

Ans. 1. Three nutrients present in our food are as follows :

- (i) **Carbohydrates** : Carbohydrates are the energy giving nutrients. Carbohydrates consist of carbon, hydrogen and oxygen. We get carbohydrates from foods like rice, bread, potato, rotis and sugar. Glucose, fructose and starch are some forms of carbohydrates. The biggest portion of our regular diet consists of carbohydrates. Carbohydrates burn to give us energy.
- (ii) **Proteins** : Our body is made up of billions of cells. These cells are made mainly from proteins. When we grow, our body needs proteins to make new cells. Our body also needs proteins to replace old and damaged cells. Our diet should have enough proteins for this. Growing children and sick people require more proteins in their diet. Proteins are of two kinds—animal proteins and plant proteins.
 - **Animal proteins** are obtained from animal foods such as milk, egg, cheese, meat or fish.
 - **Plant proteins** are obtained from soyabeans, pulses, groundnuts, barley, whole wheat, corn and dry fruits.
- (iii) **Minerals** are nutrients that contain certain elements. All of them have particular functions to perform in the body. They are required by our body in small quantities in the diet to maintain good health. Their deficiency in our diet leads to deficiency diseases.

Iron, calcium, phosphorus, iodine are the main minerals present in our food.

2.

Vitamins	Best Food Sources	Importance
Vitamin A	Milk, butter, eggs, cod liver oil, tomatoes, green leafy vegetables	Keeps the eyes and skin healthy.
Vitamin B	Seafood, milk, meat, pea, cereals, liver, fish.	Normal growth and development, healthy skin, growth of nervous and digestive system.
Vitamin C	Tomatoes, green leafy vegetables, citrus fruits, amla.	
Vitamin D	Milk, butter green vegetables, cod liver oil, sunlight.	Helps in the formation of teeth and bones and keeps them healthy.
Vitamin E	Vegetables oils, milk, butter, whole grains and vegetables.	Strengthens the muscles and bones, fights against toxic substances in the body.
Vitamin K	Green vegetables like spinach, cabbage and soyabean	Helps in the clotting of blood.

3. A balanced diet is the diet which contains all the necessary nutrients in adequate amounts, needed for the proper functioning of healthy body. In a balanced diet, energy giving foods (carbohydrates and fats), body-building foods (proteins) and protective foods (vitamins and minerals) are included in right amounts. Sufficient quantities of water and roughage should also be present.

Daily Balanced Diet of a 12-Year-Old Child

Food stuff	Quantity (Vegetarian)	Quantity (Non-vegetarian)
Cereals	320 gm (160 gm wheat + 160 gm rice)	320 gm (160 gm wheat + 160 gm rice)
Pulses	70 gm	60 gm
Green vegetables	75 gm	100 gm
Other vegetables	75 gm	75 gm
Fruits	50 gm	50 gm
Milk	250 gm	250 gm
Fat	35 gm	35 gm
Sugar	50 gm	30 gm of meat/fish or 1 egg

4. *Kwashiorkor* is common in underdeveloped countries.

Its symptoms include

- stunted growth,
- swelling of face and ends of limbs (especially the feet).
- skin diseases,
- a large pot-like belly,
- mental retardation, and
- diarrhoea.

Improving calorie and protein intake may correct kwashiorkor, provided that treatment is not started too late. However, full height and growth potential will never be achieved in children who have had this condition.

Marasmus is more common among infants and children under five years of age.

Its symptoms include

- thin physique,
- slow body growth,
- lack of energy,
- loss of appetite,
- mental retardation,
- weak legs,
- poor muscle development,
- poor resistance to diseases, and
- slow pulse and breathing rates.

D. Higher Order Thinking Skills (HOTS) :

- Ans.** 1. i. Iron
ii. Vitamin D (Milk, butter, green vegetables, cod liver oil, sunlight).
iii. Vitamin A (milk, butter, eggs, cod liver oil, tomatoes, green leafy vegetables).
2. i. Iodine
ii. Thyroid gland
iii. Goitre
iv. Because coastal people eat a lot of sea food like sea fish which contains good amount of iodine.
- v. Cretinism



3

Fibre to Fabric



Exercises

Section I

A. Select and tick (3) the correct option :

- Ans.** 1. d. 2. c. 3. d. 4. b.

B. Fill in the blanks :

- Ans.** 1. **Animals** do not need clothes to protect their body from heat and cold.
2. Synthetic fibres are mainly made from **petroleum** by complex chemical processes.
3. Weaving of fabric is done by weavers using machines called **looms**.
4. **Retting** is soaking of stems in water.
5. Rayon is made from cellulose obtained from **wood pulp**.

C. Match the following :

- | | |
|-------------------------------|--|
| Ans. 1. Natural fibres | c. Obtained from plants or animals |
| 2. Cotton | e. Suitable for hot and humid climate |
| 3. Jute fibre | a. Durable and strong |
| 4. Nylon | b. Wrinkle resistant |
| 5. Polyesters | d. Used for making sails |

D. Write two examples for each of the following :

- | | | |
|-----------------------------|---------------|-----------------------|
| Ans. 1. Plant fibres | Cotton | Jute |
| 2. Animal fibres | Silk | Wood |
| 3. Synthetic fibres | Rayon | Polyester |
| 4. Jute growing countries | India | Bangladesh |
| 5. Things made of coir | Mats | Floor covering |
| 6. Things made of hemp | Ropes | Carpets |

E. Circle the odd one. Give reason for your choice :

- Ans.** 1. **Rayon** : It is a synthetic fibre. Rest are natural fibres.
2. **Terrysilk** : It is not a polyester. Rest are.
3. **Forming** : It is not involved in the process of cloth making. Rest are.

4. **Jute** : It is a natural fibre. Rest are synthetic fibres.

Section II

A. Very short answer questions :

- Ans.**
1. Sheep
 2. Jute
 3. Synthetic fibres
 4. Some man-made or synthetic fibres are :
Rayon, Nylon, Polyester, Acrylic
 5. Acrylic fibre is used for making sweaters and shawls.
 6. Weaving is the process in which two sets of yarn are interlaced at right angles to form a fabric.
 7. Jute is cultivated in alluvial soil or clayey soil in the river valleys and coastal areas that receive annual floods, as the Sunderban delta. Warm and humid climate is best suited for its cultivation.
 8. Rayon is used
 - in the textile industry for making fabrics.
 - in the manufacture of carpets.
 - for the manufacture of tyre cord.
 - for making bandages and surgical dressings.

B. Short answer questions :

- Ans.**
1. We wear clothes to cover our bodies. Clothes protect our bodies from heat, cold, dust and insects. They also make us look good.
 2. Human beings use various kinds of materials to make cloth, for example, cotton, silk, jute, leather and fur, depending upon the climate, availability and occasion.

C. Long answer questions :

- Ans.**
1. **Aim** : To compare the water-absorbing capacity of cotton and nylon
Materials required : Pieces of cotton and nylon cloth (having almost the same thickness), a bangle, dropper, water and a stopwatch.



A piece of
cotton cloth



A piece of nylon cloth



Bangle



Dropper



Stopwatch

Procedure : Spread the piece of cotton cloth on a table and place the bangle over it. Mark the centre position of the bangle with ink. Now, add 4-5 drops of water above the marked centre with the help of a dropper. Record the time. When the water drops get absorbed, add more. Continue till water spreads to the rim of the bangle. Record the time once again.



Testing the water absorbing capacities of
cotton and nylon

Repeat the same procedure with the piece of nylon.

Conclusion : Cotton soaks greater number of drops compared to nylon. This activity proves that different kinds of cloth materials have different absorbing capacities.

2. There are two main processes by which yarn is made into a fabric—weaving and knitting.

Weaving : Weaving involves making fabric by arranging two sets of yarn.

Weaving of fabrics is same as to weaving two sets of strips of paper, only difference is that the yarns are much thinner than the strips. Weaving of fabric is done by weavers using machine called looms. The looms are either hand operated or power operated.

Knitting : In knitting, a single yarn is used to make a fabric. Many a times, many yarns are joined one-to-one lengthwise. Knitting can be done by hand and also on machines. Socks, sweaters etc. are knitted from the suitable yarn clothing items.

3. Coir is the fibre found covering the coconut shells. The fibres are separated after putting the coconut in water. The husk is then separated from the nut and beaten with wooden mallets to get the fibre.

The fibre thus separated is washed, dyed and then woven as per the needs. Coir is used to make mats, durries, floor coverings, stuffing in mattress and for many other things.

4. **Wool** is obtained from the hair on the body of sheep or goat. The process of removing hair from these animals is called shearing. The wool is processed to make yarn which can be either weaved or knitted to make woollen clothes like coats, sweaters, mufflers, etc.

Silk or *Resham* is a fibre used widely in India and other Asian countries. Silk is a natural protein fibre obtained from a protective covering called cocoon made by silkworm around itself. The process of growing silkworms on mulberry trees and obtaining silk from them is called 'sericulture'. China, Japan, Thailand are main producers of silk.

5. Nylon resembles silk and wool.

Properties :

- Nylon fibres are very strong.
- Nylon fibres are elastic.
- Nylon can be drawn into very thin fibres.
- Nylon does not absorb water.
- Nylon is wrinkle resistant.
- Nylon is abrasion resistant.
- Nylon is not attacked by fungus, moth etc.
- Nylon is insoluble in all common solvents.

Uses : Nylon is used for :

- the manufacture of tyre cords, fabrics and ropes.

- making fishing nets and parachute ropes.
- fabricating sheets, bristles for brushes.
- making sarees, socks, neckties.
- making synthetic/elastic hosiery.
- making machine parts.

D. Higher Order Thinking Skills (HOTS) :

Ans. Fibre X is jute; Fibre Y is flax.



4

Grouping Materials



Exercises

Section I

A. Select and tick (3) the correct option :

Ans. 1. a. 2. c. 3. a. 4. c.

B. Fill in the blanks :

- Ans.**
1. The things used to make other things are called **materials**.
 2. **Classification** is to group together things which have similar properties.
 3. Rough materials have **bumps or ridges** in their surface.
 4. Materials that allow light to pass through them are called **transparent**.
 5. **Magnets** attract iron and steel substances.

Section II

A. Very short answer questions :

- Ans.**
1. We need to group or classify things around us because it makes it easier for us to locate them and work with them.
 2. Man-made materials— car, television
Natural materials— River, tree
 3. Luster is the shine of a material.
 4. Nitrogen
 5. Conductors allow electricity to pass through them whereas insulators prevent it to pass through.

B. Short answer questions :

- Ans.**
1. The things used to make other things are called materials. Wood, steel and glass are examples of materials. Things may be made of one or more than one material.
 2. The things which are not found in nature but are manufactured by man are called man-made or artificial things. For example, plastic, glass and steel.
 3. Materials like salt and sugar which dissolve in water are said to be soluble in water.
Materials like sand, saw dust and wheat flour (atta) do not dissolve in water even after stirring, they are said to be insoluble in water.
 4. Some materials float in water where as some materials sink. A pencil, ice, brush, plastic bottle, etc. Float on the surface of water. A coin, an iron nail, a stone etc. sink.

5. Materials can be hard or soft which can be pressed easily. Some items like cotton, sponge and wool which can be compressed easily are called soft materials. Items like iron, stone, etc. which cannot be compressed or pressed easily are called hard materials.

C. Long answer questions :

Ans. 1. Materials that allow light to pass through them are called transparent materials. We can see through such objects. Some examples of transparent materials are glass, water, air and some plastics.

Materials that do not allow light to pass through them are called opaque. Wood, metal, cardboard etc. are opaque materials. We cannot see through these materials.

Materials that allow some light to pass through them are called translucent materials. They allow light to pass through them only partially. Some examples are frosted glass in bathroom windows, butter paper.

2. A substance with a density higher than that of water floats on it, whereas the substance with a density lower than water sinks to the bottom.

Density of a substance is defined as mass per unit volume. For example, the mass of a 1 cm³ of water is about 1 g. So, the density of water is about 1 g/cm³. The mass of 1 cm³ of iron is about 7 g. So, its density is about 7 g/cm³. The density of wood is less than 1 g/cm³. (Note : There are some woods that are denser than water.)

You can see that iron has a higher density than water, whereas wood has a lower density than water. That is why a metal coin sinks while a piece of wood of the same shape and size floats in water.

3. We can classify on the basis of following five properties.

Appearance : Each and every materials look different from each other. Plastic looks different from paper, paper appears different from wood, iron looks different from aluminium 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 : Lustre is the shine of a material. 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. Materials like aluminium, iron, copper, silver and gold have lustre. Wood and paper being non metals do not have lustre.

Texture : Materials can be rough or smooth. Rough materials have bumps or ridges in this surface, which can be felt by touching them. Smooth materials lack these bumps.

Transparency : Different materials allow different amounts of light to pass through them depending on a property called 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 transparency property, materials can be

5. **Condensation** is the change of water vapour into water.

C. Write true or false :

Ans. 1. true 2. false 3. false 4. true 5. true

Section II

A. Very short answer questions :

- Ans.** 1. Materials which contain two or more substances in any proportion are known as mixtures.
2. We need to separate different materials to remove undesirable substances from the useful ones.
3. Decantation is the method by which the liquid is poured out without disturbing the sediments.
4. We use the method of loading when we have to settle down the fine particles quickly.
5. Solute is a substance that dissolves whereas solvent is the substance in which the solute dissolves.

B. Short answer questions :

- Ans.** 1. Hand-picking is a method of separating unwanted substances from a mixture by picking them carefully with hand. The impurities differ in shape, size, colour and appearance from the grain, and can easily be seen among the grain particles. The quantity of the ingredient to be separated is in lesser amount.
2. Sieving is preferred when a mixture contains particles of different sizes.
3. In our homes, rice is washed in water before being cooked. In this process, tiny bits of straw, husk, dirt and other impurities float on the top of water whereas heavier rice grains settle at the bottom of the container. This is how process of sedimentation is used while cleaning food at home.
4. Centrifugation is a method in which mixture containing suspended particles is rotated at a high speed in a centrifuge machine. The denser particles settle down at the bottom of the container and the lighter ones stay at the top.
5. Evaporation is a method used to recover a dissolved solid component from a solution. This method utilises the difference in boiling points of different components of the mixture. In this process, the solution is heated. This causes the liquid to evaporate leaving behind the solid component.

C. Long answer questions :

- Ans.** 1. The components of a mixture are separated for the following reasons:
- To obtain two different but useful components of a mixture (e.g., butter is a useful component which is separated from milk by churning).
 - To remove harmful components or impurities of a mixture (e.g., small pieces of stones and husk are separated from rice or dal before cooking).

- To remove useless components of a mixture (e.g., tea leaves are separated from tea).
 - The substances mixed together vary in size, shape, colour and many other properties.
2. **Sedimentation and Decantation** : It is a common practice in homes that pulses, rice etc. are washed before they are cooked. How it is done? The pulse or rice to be washed is placed in a container and water is poured in it. They are rubbed with hands so as to remove dirt and dust and foreign particles attached to them. The dirt and dust get dissolved in water and the lighter foreign particles remain floating over the water. They are removed. The pulses being heavy, settle down at the bottom of the container. The process of settling of heavy material at the bottom is called sedimentation and the collected material is called sediment. The water which forms the upper layer is slowly removed by tilting the vessel (decanted). The process of pouring away of water (liquid) from the container is called decantation.
- This method is also used for separating two liquids which are not miscible. The two liquids are either separated by decantation or using a separating funnel.
3. We can obtain clean water from muddy water from a pond by the following activity.

Aim : To obtain clean water from muddy water from a pond.

Materials required : A beaker containing water from a pond, glass rod, an empty beaker.

Method : Allow the water in the beaker to settle down for an hour or so. Observe the water in the beaker. The mud has settled down at the bottom of the beaker by the process of sedimentation. The mud collected at the bottom is called sediment.

4. To separate common salt and chalk powder from their mixture we can do the following :

Take some mixture of common salt and chalk powder.

Dissolve the remaining mixture in water and stir the solution well. In this way, salt gets dissolved but not the chalk powder. Filter the solution using filter paper and collect the filtrate in a beaker. The chalk powder is left on the filter paper. The filtrate so obtained is a clear solution of common salt. Transfer the filtrate in a china dish. Heat it over a flame. The water evaporates and the common salt is left in the dish.



Obtaining pure salt using different methods of separation.

type of change, the initial substance can be obtained back by reversing the action.

3. Change of milk into curd is an example of irreversible change.
4. Changes in which no new substances are formed are called physical change. The molecules of the substance remain exactly the same as before.
5. Rusting is the process of forming rust on iron.

B. Short answer questions :

- Ans.**
1. Burning of paper is an irreversible change because we cannot get back the paper in its original form.
 2. Rolling out the dough into balls is a reversible change. It can easily be reversed. But frying of the poories is not reversible. We cannot get back the dough.
 3. Cutting a potato is a physical change. In it no new substance is formed. Cooking a potato is a chemical change. In it a new substance is formed in the form of curry.
 4. Contraction is decrease in size of an object on cooling.

C. Long answer questions :

- Ans.**
1. Physical changes are the changes in which the molecules present in the substance remain the same but the shape, size or position of the substance changes. For example, tearing of paper is a physical change. A chemical change occurs as a result of a chemical reaction between the molecules of substances, and a new substance is formed. Thus, in chemical change, the molecules of original substances undergo changes to form molecules of new substances. For example, cooking of food is a chemical change.
 2. Most of the physical changes are reversible. Glowing of an electric bulb, melting of ice and inflation of a hot-air balloon are some common examples of physical changes that are reversible.
However, not all physical changes are reversible. For example, breaking of glass, tearing of paper and bursting of balloon are some of the physical changes that are irreversible. Some common methods that bring about physical changes are heating, cooling (freezing), cutting, reduction in size due to repeated use, pushing or pulling to change position, etc.
 3. The changes in which new substances are formed which have properties that are different from the original substances are called chemical changes. In all these changes, new types of molecules are formed from the combination of the molecules of the original substances.
Mostly chemical changes are irreversible changes as the new substances formed have different properties than the original substances.

An example of chemical change is as follows :

Cooking food : Cooking vegetables, rice, pulses and making rotis/breads from wheat flour are all chemical changes in which new substances are formed with different new properties. Once you boil an egg you cannot

revert it back to raw stage.

4. The concept of expansion and contraction is utilised to fix wooden handles into iron blades; to form tools which are used to dig the soil and for various other purposes.

The iron blade of these tools has a ring, into which the wooden handle is fixed. Normally, the ring is slightly smaller in diameter than the wooden handle.

While fixing the handle, the ring is heated. It becomes slightly larger in size, i.e., expansion takes place. The wooden handle is now fixed easily in the ring. On cooling, the ring attains its normal size, i.e., contraction takes place. The wooden handle fits tightly in the ring.

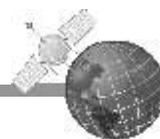
D. Higher Order Thinking Skills (HOTS) :

- Ans.** 1. A blacksmith change a piece of iron into different tools by changing its size and shape. It undergoes various chemical changes.
2. Chopping of wood is an irreversible physical change. Burning of chopped wood is a chemical change.



7

Things Around Us



Exercises

Section I

A. Select and tick (3) the correct option :

- Ans.** 1. d. 2. b. 3. a. 4. c.

B. Fill in the blanks :

- Ans.** 1. A **cell** is the smallest unit of living things.
2. An organism's reaction to a stimulus is called **response**.
3. **Barks** of trees are also a waste product deposited outside by them.
4. Saprophytes derive nutrition from **dead** and **decayed** matter.
5. Green plants absorb **carbon dioxide** to make food.

C. Match the following :

- | | |
|-----------------------|----------------------------------|
| Ans. 1. Amoeba | c. Unicellular organism |
| 2. Response | e. Reaction to a stimulus |
| 3. Biotic | a. Living |
| 4. Animals | b. Heterotrophic |
| 5. Earth | d. The blue planet |

Section II

A. Very short answer questions :

- Ans.** 1. Organisms that are made up of two or more cells are called multicellular organisms.
2. All living beings increase in size with their age. This is known as growth. Growth is one of the basic features of all living things.

3. All living things have the ability to produce more of their own kind. The ability to produce young ones of their kind is called reproduction.
4. Evolution is the process by which living things gradually change and develop over millions of years. During evolution, organisms develop abilities to cope with their environment that their ancestors did not have.
5. Scavengers are those animals that feed on dead bodies of other animals. Such as vultures.

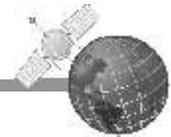
B. Short answer questions :

Ans. 1. Three differences between living things and non-living things are as follows :

- Living organisms show movement; non-living things do not. Thus, a tiger moves, but a stone does not.
 - Living beings respire; non-living things do not.
 - Living beings eat food and excrete the wastes; non-living things do not.
2. Living things move in search of food and shelter and to escape from their enemies.
 3. Plants do respond to certain stimuli, but much more slowly than animals. They respond by growing in a particular direction. For example, most plants grow towards light. There are a few plants which respond quickly to touch, sunflowers always moves towards the sun. For example, the leaves of touch-me-not (mimosa) plant close up when touched.
 4. Excretion is the process of removal of waste products. For example, urea is produced in liver as an excretory waste by animals and is removed as urine. Barks of trees are also a waste product deposited outside by them.
 5. Animals whose body temperatures do not fluctuate with environment changes are known as warm-blooded animals. For example, human beings, polar bear, etc. Animals whose body temperature changes with the outside environmental temperature are known as cold-blooded animals. For example, lizards, snakes, etc.

C. Long answer questions :

- Ans.** 1. All living organisms grow. Growth is the increase in size and volume of the body. When cells present in an organism divide, their number increases. This increase in the number of cells is responsible for increase in size. In unicellular organisms, the single cell grows in size as the organism develops and matures. Human beings grow from babies to adults, puppies become dogs, kittens grow into cats, and seeds grow into plantlets that grow into bigger plants and trees. Animals stop growing in size after sometimes. During this time, their body undergoes the process of development that makes their bodies more complex and mature. Plants, however, keep on growing throughout their entire life. In living things, growth is a result of internal division of cells.
2. All living organisms reproduce, that is, they produce new organisms of



Exercises

Section I

A. Select and tick (3) the correct option :

Ans. 1. a. 2. b. 3. b. 4. d.

B. Fill in the blanks :

- Ans.** 1. **Habitat** provides an organism with everything it needs to survive.
2. Plants growing in water are called **hydrophytes**.
3. **Tundra** habitats are always covered with snow.
4. The ability to blend with the surroundings is called **adaptation**.
5. Dolphin and whale have **blowholes** located at the upper part of their heads.

C. Write true or false :

Ans. 1. false 2. false 3. false 4. false

Section II

A. Very short answer questions :

- Ans.** 1. Everything that surrounds living things and affects their growth and development is called environment.
2. Ponds, rivers, forests, trees, deserts are some of the common habitats.
3. Oceans, seas, rivers, ponds, lakes, pools, etc. are examples of aquatic habitat.
4. Plants living near seashores in saline conditions are called halophytes.
5. Blubber is the thick layer of fat under the skin of polar bear.
6. Grassland plants usually have flexible stems, which bend instead of breaking when the wind is strong.

B. Short answer questions :

- Ans.** 1. The natural surroundings where a living organism lives is called its habitat or in simple words, home. Habitat provides an organism with everything it needs to survive—food, shelter and proper climatic conditions.
Forest, grasslands, deserts, mountains and aquatic habitat are the five major habitats on Earth.
2. The three major types of forests on Earth are as follows :
- Tropical rainforests :** These are evergreen forests. These are found between the Equator and the two tropics. The temperature of these regions ranges from 20°C to 35°C and the annual rainfall exceeds 200 cm.
 - Temperate deciduous forests :** Temperate forests occur in eastern North America, north eastern Asia, and Western and Central Europe. The temperature of these regions varies from 30°C to 30°C.
 - Boreal forests :** These forests are also called taiga. These forests are found in Canada, Russia, Scandinavia, China,

Mongolia and northern Japan. These forests have short summer and a long winter.

3. Grassland habitats are hot and partly dry areas where grasses are the main plants, and trees and shrubs are few. Here, the annual rainfall varies from 50 to 90 cm.

The differences between a grassland and a desert are as follows :

- In grasslands many types of grass, trees and shrubs grow.

In deserts many cactus plants grow.

- In grasslands rainfall varies from 50 to 90 cm.

In deserts rainfall is less than 25 cm.

4. Changes in the structure or behaviour of an organism that allow it to survive in a particular habitat are called adaptations.

The different means by which organisms adapt to their habitat are as follows :

a. Changes in body b. Changes in behaviour c. Changes in location

5. The ability of certain animals to blend with the surroundings, making them difficult to spot is called camouflage. This adaptation enables them to hide from predators. Leaf insects and stick insects show camouflage.

6. The trees on mountains are cone-shaped. Their leaves are needle-like so that snow can just slide off.

7. The yak has many adaptations to survive in the mountains such as:

- Its mouth is adapted for grazing a variety of plants.

- Its big chest and lungs are adaptations to low content of oxygen in the mountains.

- It uses its strong hooves to crush ice from frozen ground and graze on the grass below.

8. Some small changes that take place in the body of a single organism over short periods to overcome small problems due to changes in the surroundings are called acclimatisation. These changes are different from adaptations that take place over thousands of years.

C. Long answer questions :

Ans. 1. Following are the adaptations shown by plants in boreal forests:

- Boreal forests receive heavy snowfall. Trees have a conical shape which allows the snow to slide off easily.

- Most trees found in boreal forests are evergreens. Trees have narrow, needle-like leaves. This kind of structure protects the leaves from damage.

- Growing new leaves requires a huge amount of energy. The soil found in boreal forests does not contain many nutrients. Also, these regions do not receive much sunlight. Boreal forest plants are able to conserve energy by not shedding their leaves. They also avoid growing new leaves.

- Boreal forests are so cold that the ground freezes during winter

months. Because of this, the trees are not able to get water. Narrow, needle-like leaves of these trees help to conserve water.

2. The adaptations shown by grassland plants and animals can be summarised as under :

Plants :

- Grassland plants usually have flexible stems, which bend instead of breaking when the wind is strong. These plants also have strong roots that prevent winds from uprooting them.
- Plants have narrow or tiny leaves to reduce water loss. The baobab tree can survive periods of low water availability by storing water in its huge trunk.
- Some plants have roots that extend deep into the soil to absorb as much water as possible. This also prevents grazing animals from pulling the roots out. Long roots of the acacia tree allow it to access water that is very deep in the ground.

Animals :

- Animals like bison, zebras and gazelles have strong legs to run fast which help them to protect from their predators like lions. They have long ears to hear movement of predators. They move in herds which helps them to protect from hunting animals.
- Grasses in dry grasslands are brown most of the time. Animals like lions are light brown in colour. Light brown colour of a lion helps it to hide in grasslands when it hunts for prey. The eyes in front of the face allow it to have a correct idea the location of its prey.

3. **Plants :** Plants in deserts have developed adaptations to survive in the hot and dry climate of the desert. Most plants have long roots that go deep into the soil in search of water.

A cactus has the following modifications:

- The leaves are modified as spines to minimize water loss.
- The stem is green, to make food for the plant.
- The stem is swollen and fleshy to store water.
- Cactus has a thick, waxy coating that prevents water loss and helps it to retain water.

Animals :

- a. Desert animals have thick skin to stop the loss of water from the body.
- b. Most of the desert animals have the capacity to store water and food, e.g., a camel can tolerate extreme temperature due to the stored water in its body, which helps in cooling the body.
- c. Most of the small desert animals live in burrows to save themselves from fluctuation of temperature.
- d. Reptiles are well-suited to the desert climates. They get most of the water through their food and lose hardly any moisture from their skin.

4. **Plants :** Freshwater plants show the following adaptations.

- Plants that live in flowing water have long, narrow stems. This prevents the plants from being carried away with water currents.
- Stems have air chambers that allow the aquatic plants to float in water.
- Leaves of plants like lotus and water lily have a waxy covering that prevents them from rotting.
- Leaves have a waxy coating that makes them waterproof.

Animals : Aquatic animals show a variety of adaptations to survive in water.

- Ducks have webbed feet that help them in swimming. They also have hollow bones that help them to stay afloat. Oil produced from under their tails makes their feathers waterproof.
- Fish have the following modifications to live in water. Gills are special organs that help fish to breathe underwater.
- Fins help them to swim and maintain the body balance.
- Their streamlined body allows them to swim fast by reducing resistance due to flowing water.
- Some sea animals like octopus and squid do not have streamlined shape. However, while they move in water, they make their body streamlined.

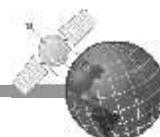
D. Higher Order Thinking Skills (HOTS) :

- Ans.** 1. Fish have streamlined body to minimise the friction of the water and easily cut through it.
 2. It is so because so little light reaches the floor that very few plants can grow there.



9

Plants— Form and Functions



Exercises

Section I

A. Select and tick (3) the correct option :

- Ans.** 1. a. 2. c. 3. b. 4. c.

B. Fill in the blanks :

- Ans.** 1. **Money plant** is an example of climber.
 2. **Taproot** and **fibrous root** are two main types of roots.
 3. Stem conducts **water** and **minerals** from the root to its leaves.
 4. The stalk of the flower is the **pedicel**.
 5. A seed has an **endosperm** and a **seed coat**.

C. Write true or false :

- Ans.** 1. false 2. true 3. true 4. false 5. true

Section II

A. Very short answer questions :

- Ans.** 1. Very small plants are called herbs. These plants are usually green and

- have delicate and tender stem.
2. There are two important systems of all flowering plants.
 - The root system — part that remains under the ground.
 - The shoot system — part which grows above the ground.
 3. Roots like carrot, radish and turnip store food for the plant.
 4. In some plants,, the veins are parallel to each other, along the length of the plant. This is called parallel venation.

B. Short answer questions :

- Ans.** 1. Three main functions of root are as follows :
- a. **Anchoring the plant** : Roots help to anchor the plant firmly into the ground.
 - b. **Absorption of water and nutrients from the soil** : Roots help plants to absorb water and nutrients from the soil, which are essential for their survival.
 - c. **Preventing soil erosion** : Roots help to bind the soil particles together, thereby preventing them from being carried away by water or wind.
2. All parts of a plant that are above the ground form the shoot system. It includes stem, branches, leaves, flowers and fruits.
 3. The leaves of plants have three main functions :
 - a. The leaves make food for the plant (by photosynthesis).
 - b. The leaves get rid of excess water from the plant through transpiration.
 - c. The leaves carry out the process of respiration in plants (which is the production of energy from food).
 4. Roots help the plants in the following ways :
 - Roots help to anchor the plant firmly into the ground.
 - Roots help plants to 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.
 5. Herbs are small plants having a soft and delicate stem. They do not have woody stem. We can easily bend the stem of a herb. Shrubs are medium-sized plants with a hard woody stem, prancing out near the base. The stem of a shrub is hard but it is not very thick.

C. Long answer questions :

- Ans.** 1. The main functions of stem are as follows :
- Stem keeps the plant erect and bears the leaves, flowers and fruits. It is the main organ of support.
 - Stem conducts water and minerals from the root to its leaves.
 - Stem conducts food from the leaves to the storage organs and to the growing parts of the plants.

- Green stems can also manufacture food for the plants.
 - In some plants, stems are modified to perform special functions like storage of food, photosynthesis, etc.
2. **Tap Root** : Some plants 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. Some examples of plants having tap roots are mustard, rose, neem, peas, carrot.

Fibrous Root : Fibrous roots which grow from the base of the stem have a bushy appearance. Some examples of plants having fibrous roots are wheat, maize and barley.

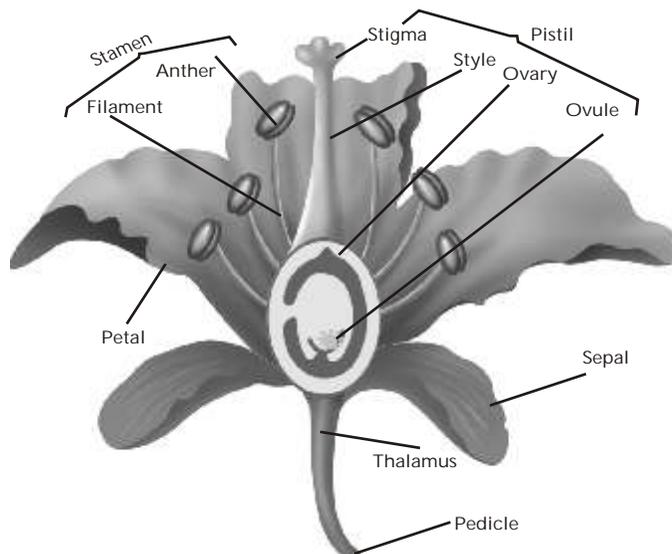
3. **Aim** : To show that leaves contain starch.

Take a green leaf . 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.

- 4.

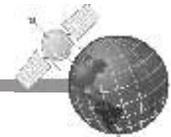


D. Higher Order Thinking Skills (HOTS) :

Ans. • This is so because some of them do not have fragrance to attract insects.



10 Body Movement



Exercises

Section I

A. Select and tick (3) the correct option :

Ans. 1. d. 2. c. 3. b. 4. b.

B. Fill in the blanks :

- Ans. 1. **Circulatory** system supplies blood to all parts of the body.
2. The bones are held together at the joints by **ligaments**.
3. Movable joints of the **backbone** are gliding joints.
4. Snails move using a muscular organ called the **foot**.
5. Most fish have a **streamlined** body.

C. Write true or false :

Ans. 1. false 2. true 3. false 4. true 5. true

Section II

A. Very short answer questions :

- Ans. 1. Tissue is a group of similar cells that performs a particular function.
2. Movement is an important characteristic of the living organisms. The act or capacity of moving from one place to another is known as locomotion.
3. The four major movable joints in our body are as follows :
a. Ball-and-socket joint b. pivotal joint
c. Hinge joint d. Gliding joint
4. The lower jaw is the only movable bone in our skull.
5. Mucous is a slimy substance produced by the foot of a snail.

B. Short answer questions :

- Ans. 1. Different organ systems in our body are:
- **Skeletal system** : It gives support to the body and protects the internal organs.
 - **Muscular system** : It helps in movement.
 - **Circulatory system** : It supplies blood to all parts of the body.
 - **Respiratory system** : It involves inhalation of oxygen and exhalation of carbon dioxide.
 - **Digestive system** : It helps to digest and absorb nutrients essential for the growth of the body.
 - **Excretory system** : It helps to remove the undigested waste material from the body.
 - **Reproductive system** : It produces young ones.
2. Skeleton is the general framework of the body.
3. **Pivotal Joint** : The ball on a stick type of joint is called pivotal joint. A pivotal joint allows movement in many planes—up and down, side-to-side etc.
The joint of skull to the first two vertebrae of the backbone is a pivotal

joint.

Hinge Joint : The joint which allows movement only in one plane and only up to 180° is called a hinge joint.

4. Functions of the pectoral girdle are as follows :
 - (i) It allows free movement of arms.
 - (ii) It protects and supports the internal organs in the upper part of the body.
 - (iii) It provides surface for the attachment of muscles.
5. Cockroaches walk, climb as well as fly in the air. They have three pairs of legs which help them in walking. They also have two pairs of wings attached to the breast muscles that help them in flying.

C. Long answer questions :

- Ans.**
1. The joint in which the rounded end of one bone fits into the cavity (hollow space) of the other bone is called ball-and-socket joint.
Ball-and-socket joint permits movement of the bones in all directions.
The joints between the shoulder and the upper arm, and between thigh and hip are ball-and-socket joints.
 2. Limbs allow us to perform various types of movements. We have two pairs of limbs—the fore limbs (arms) and the hind limbs (legs). Almost half of our bones are found in the limbs. There is one long bone in the upper arm called humerus. The lower arm has two bones called radius and ulna. The humerus is attached to the vertebral column by the collar bone and the shoulder blade. The longest bone in our body is the thigh bone or the femur. The lower leg consists of two bones the tibia and the fibula. The pelvis or hip bone that supports the legs is attached to the lower end of the backbone. The wrists, fingers, ankles and feet have a large number of small bones.
 3. Have you ever felt the bones on your chest when you inhale air? If not, then take a deep breath. Hold it for a moment and feel the bones present on your chest. Can you feel the shape of these bones? These are curved and are called the ribs. There are 12 pairs of ribs, that is a total of 24 bones, forming a cage-like structure called the rib cage. The ribs are flat, thin and curved bones these are joined with the backbone at the back and with the breast bone in the front. The last two pairs of ribs are not attached in front and are hence called floating ribs. The rib cage protects important organs such as the heart and lungs as well as parts of the stomach and kidneys.
 4. Muscles have the property of contraction and relaxation. It is this property of muscles which is responsible for the movement of bones. When muscles make themselves shorter (contract), they pull on the bones and move them. Muscles cannot make themselves longer (relax) again on their own. They need another muscle close by to stretch them. This second muscle does this by shortening (contracting) itself. The second muscle which stretches the first muscle (called the biceps) is called the

triceps.

If you raise your hand, you can feel the biceps getting shorter and harder. The triceps becomes longer and softer. When you lower your hand, your triceps becomes shorter and harder, and the biceps becomes longer and softer.

Thus, muscles work in pairs to bring about the movement of a bone.

5. Most birds are capable of flying. 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.
6. Snakes do not have limbs (legs, arms, or wings). The snake has a long backbone which is flexible. 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.

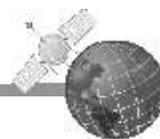
D. Higher Order Thinking Skills (HOTS) :

- Ans. 1. Aeroplanes and boats have streamlined bodies because such bodies offer very little resistance to the flow of air or water around them.
2. An earthworm cannot move on a surface made of glass because it needs to grip the surface for moving. This is not possible on glass, so it is unable to



11

Sources of Food



Exercises

Section I

A. Select and tick (3) the correct option :

Ans. 1. a. 2. a. 3. c. 4. d.

B. Fill in the blanks :

- Ans. 1. Invention of the **wheel** led to the development of different modes of transport.
2. When a body moves along a straight line, its motion is called **rectilinear**.
3. A train moving in a particular direction at a constant speed show **uniform** motion.
4. **Measurement** means the comparison of an unknown quantity with some known quantity.
5. The distance of something from one end of the other is called **length**.

C. Write true or false :

Ans. 1. false 2. false 3. true 4. false 5. true

D. In each of the following cases, do you think it is enough to make an estimation or do you need an exact answer?

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Section II

A. Very short answer questions :

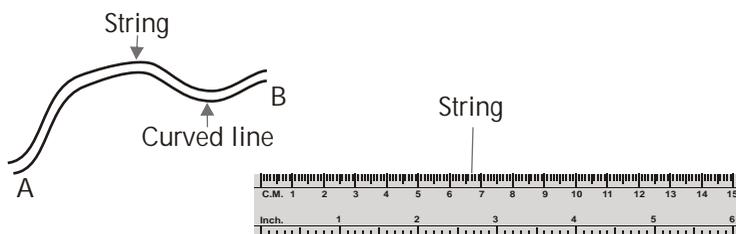
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C. Long answer questions :

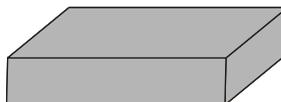
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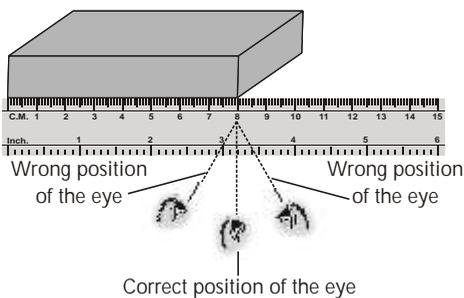
Measuring the length of a curved line

3. **Precautions while Taking Measurement :** While measuring length using a ruler, we should take the following precautions:

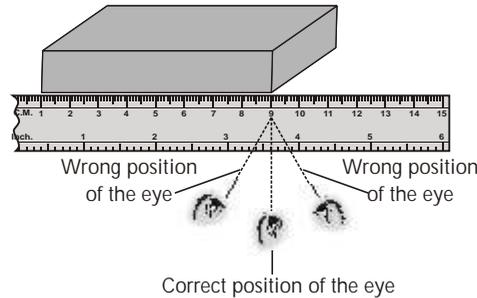
- (i) Care should be taken to keep the ruler along the length of the object.
- (ii) If the edge of the ruler is worn out or broken, the measurement should be started from any other mark that is fully clear. For example, if you measure from 2 cm mark to the 7 cm mark, the length is 5 cm ($7\text{ cm} - 2\text{ cm} = 5\text{ cm}$)
- (iii) Eyes should be exactly above the point where the measurement is to be taken. If your eyes are at different wrong positions, you might get wrong readings.



Measurement should only be started from a mark that is fully clear.



Position of the eye for proper reading of the scale



Proper placement of the scale with a broken edge

4. **Standard Unit :** For uniformity and convenience, a common unit is necessary for measurement of a physical quantity. For accurate measurement, we need some standard representation of very physical quantity. Such a chosen standard is called a standard unit.

“A standard unit is a standard measure that has some definite and convenient quantity, so that it remains the same under all conditions.”

In the old days, the length of body part of the king was taken as the standard to maintain uniformity. Still, it was not enough. Till the nineteenth century various countries devised and used their own system of units. So there were many such units for the same physical quantity. This was quite confusing as it had no uniformity all over the world. In 1960 it was recommended that a common system called the International

system of Units (or SI unit system) should be used all over the world.

Under this system, units are divided into two types :

Fundamental Units : There are seven basic units for physical quantities. A few of them are :

Quantity	Unit	Symbol
Length	Metre	m
Mass	kilogram	kg
Time	second	s
Temperature	kelvin	K

Area of a square = side \times side (or length \times length)

Volume of a cube = length \times breadth \times height (all measurements of length)

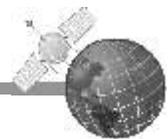
Derived Units : The units which are derived from these fundamental units are called derived units. For example, area and volume are derived from length.

D. Higher Order Thinking Skills (HOTS) :

- Ans.** 1. The Earth show three types of motion at the same time : circular motion, periodic motion and rotational motion.
2. This is so because every person has a hand-span of different length.



12 Fun with Magnets



Exercises

Section I

A. Select and tick (3) the correct option :

Ans. 1. a. 2. d. 3. d. 4. b.

B. Fill in the blanks :

- Ans.** 1. The first magnet was discovered by a shepherd named **Magnes**.
2. **Artificial** magnets can be used at any time and at any place.
3. A freely suspended magnet always aligns itself in the **north-south** direction.
4. **Repulsion** and not **attraction** is a sure test for magnetism.
5. Magnets tend to lose their properties if **handled** roughly.

C. Write true or false :

Ans. 1. true 2. false 3. true 4. false 5. true

D. Match the following :

- Ans.** 1. Lodestone c. **Natural magnet**
2. Horseshoe magnet a. **Artificial magnet**
3. Like poles e. **Repulsion**
4. Unlike poles b. **Attraction**

5. ATM cards

d. Magnetic strip

Section II

A. Very short answer questions :

- Ans.** 1. The phenomenon of attraction of a magnetic material is called magnetism.
2. The most common of artificial magnets are the horseshoe magnet and the straight bar magnet.
3. The two ends of a magnet where the magnetic force is the greatest are known as the poles of a magnet.
4. A magnetic compass is a small instrument having a freely rotating magnetised needle pivoted at its centre that indicates the direction of the Earth's magnetic poles.
5. Magnets are used to separate magnetic ores from non-magnetic rocks.

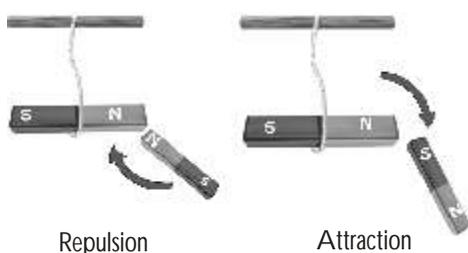
B. Short answer questions :

- Ans.** 1. If we break a magnet into two pieces, we will get two magnets having their own north pole and south pole.
2. The poles are found in the regions of a magnet where its magnetic power is the strongest.
3. The two most important properties of magnets are :
- (i) A freely suspended magnet always points in the north-south direction.
 - (ii) Like magnetic poles repel each other; unlike magnetic poles attract each other.
4. Magnets become weaker after sometime if their poles are left free. This is called self-demagnetisation.
5. a. Magnets will repel each other. This is so because like poles (S-S) are facing each other.
- b. Magnets will attract each other. This is so because unlike poles (S-N) are facing each other.
- c. Magnets will repel each other. This is so because like poles (N-N) are facing each other.

C. Long answer questions :

- Ans.** 1. 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.
2. Like poles of any two magnets repel each other, while unlike poles attract each other.
- This can be shown by the following activity.
- 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.

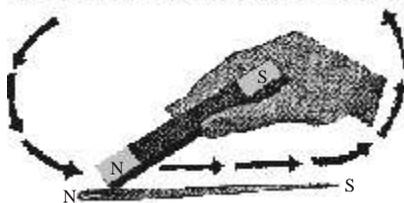
- We can magnetise an iron piece by the method of stroking. Do the following activity.

Aim : To magnetise a needle by the method of stroking.

Materials required : A steel or iron needle, bar magnet, magnetic compass and some iron pins.

Procedure : Place the needle on a table. Take the bar magnet and hold it over one end of the needle. Next, rub the entire length of the needle with the magnet. When you reach the other end, lift the magnet, hold it again over the first end and rub again. Repeat this process around 30-40 times. This method is called stroking.

Bring a magnetic compass near the needle. If the compass needle deflects, this means the needle has been magnetised. If the compass needle does not deflect, repeat the process of stroking. Now, bring some iron pins near the magnetised needle. Observe what happens.



Conclusion : The needle has become a magnet and it is found to attract iron pins.

- 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.

5. Some of the more common applications of magnets and magnetic materials are mentioned below:

- The door of a refrigerator has a weak magnetic strip all round it to ensure that it remains firmly shut. Magnetic latches or 'catches', are used in windows, cupboard doors, and so on. Magnetic stickers, magnetic clasps in handbags and magnetic pin/paper clip holders are some other examples of everyday uses of magnets.
- Magnets are used to separate magnetic ores from non-magnetic rocks, magnetic substances from a mixture, and things made of magnetic materials during the recycling of waste. Raggickers often use a long stick with a magnet attached to it to pick up scraps of iron from garbage dumps.
- Motors and generators use powerful magnets. Loudspeakers also have a powerful magnet inside them.
- Data, sound and images are stored on special surfaces coated with magnetic material in computer hard disks, floppies, and audio and video tapes. Information is also stored on the magnetic stripe on credit cards, ATM cards, airline tickets and so on.
- Magets are used in magnetic toys and stickers.
- These are used for making magnetic compass.
- These are used in cycle-dynamos, loudspeakers, motors and telephones.
- Magnetic taps are used in tape-recorders and video-recorders.
- These are used for recording computer programmes in the shape of magnetic discs.
- Used in separating magnetic materials (iron, nickle etc) from dumping grounds.
- Used by surgeons to extract iron pieces from wounds.

D. Higher Order Thinking Skills (HOTS) :

- Ans.** 1. Raggickers often use a long stick with a magnet attached to it to pick up scraps of iron from garbage dumps.
2. (c)



13

Light, Shadows and Reflection



Exercises

Section I

A. Select and tick (3) the correct option :

- Ans.** 1. c. 2. a. 3. b. 4. d.

B. Fill in the blanks :

- Ans.** 1. **Natural** sources of light occur in nature.
2. The objects which give out their own light are called **luminous bodies**.
3. Light always travels in a **straight** line.
4. A pinhole camera is based on the principle of **rectilinear** propagation of light.
5. **Plane** mirrors are used in signalling by armed forces.

C. Write true or false :

- Ans.** 1. false 2. true 3. true 4. false 5. false

Section II

A. Very short answer questions :

- Ans.** 1. Light is a form of energy. It is an invisible form of energy which stimulates the sense of vision.
2. Some objects through which we can see but not very clearly are called translucent objects. These objects allow light partially to pass through them.
3. A pinhole camera is a simple device to show that light travels in a straight line.
4. Anything which gives out light rays (either its own or reflected by it) is called an object.
5. Plane mirrors are used as a looking glass.

B. Short answer questions :

- Ans.** 1. Those objects which allow only some amount of light to pass through them are called translucent objects. Butter paper, oiled paper, smoked glass, tissue paper etc. are translucent objects. We cannot see clearly through these objects.
2. If an opaque substance is kept between the source of light and a screen, the light does not pass through it. We can say that the shadow of the substance on the screen remains unlighted. The unlighted portion is the shadow.
3. The property of light of travelling in straight line is rectilinear propagation of light.
4. A pinhole camera is based on the principle of rectilinear propagation of light.
5. Chair, car, tree, man, moon, Earth are some non-luminous objects.

C. Long answer questions :

- Ans.** 1. A pinhole 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 pin holes.
2. It can be shown by the following activity :
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).



3. Some differences between an image and a shadow are given in the following table:

Image	Shadow
1. An image of the same colour as the object.	1. A shadow is always black. Some part of it may be of grey colour.
2. It has all the details that the object has.	2. It is similar in shape of the object and does not give any other detail about the object.
3. It undergoes lateral inversion.	3. It does not undergo lateral inversion.

4. We see objects, because they reflect light. When light falls on the surface of an object, it may be (i) absorbed, (ii) transmitted or (iii) reflected. If an object absorb all the light which falls on it, then it will appear perfectly black. For example, a black-board appears black because most of the light falling on the black-board is absorbed, very little light is reflected from it.

If an object transmits the light, that is, if the object allows the light to pass through itself, the object is said to be transparent. For example, an ordinary glass transmits most of the light that falls on it, hence appears transparent.

Most of the objects, however, reflect some of the light which falls on their surface. For example, a polished silver mirror reflects back more than 95 per cent of the light falling on it. From this we conclude that when light falls on the surface of an object, some of it is sent back.

The process of sending back the light, rays which fall on the surface of an object, is called reflection of light.

5. A periscope works on the reflection of light from two plane mirrors arranged parallel to one another. The working of a periscope will become clear from the following example : In the figure there is a tree behind a high wall which we cannot see directly. We can, however, see this tree by using a periscope as follows : The upper hole of periscope is turned towards the

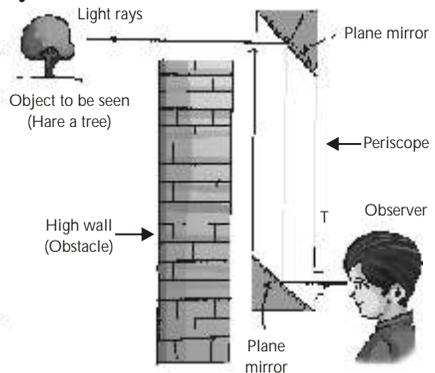


Diagram to show the working of a periscope

object to be seen (here a tree) so that mirror M_1 faces the object. And we look into the periscope from the bottom hole in front of lower mirror M_2 . The light rays coming from the tree fall on the plane mirror M_1 . Mirror M_1 reflects these rays of light towards the mirror M_2 . The mirror M_2 then reflects the light towards the eye of the person looking into periscope through the lower hole. Since the light ray coming from the tree enter the eye, it is possible to see the image of the tree in the lower mirror M_2 (even though the tree cannot be seen directly).

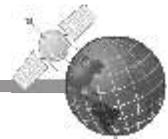
D. Higher Order Thinking Skills (HOTS) :

- Ans.** 1. Left hand
2. No



14

Electricity and Circuits



Exercises

Section I

A. Select and tick (3) the correct option :

- Ans.** 1. c. 2. b. 3. a. 4. d.

B. Fill in the blanks :

- Ans.** 1. Electricity in **motion** is called current.
2. **Bulb** is an electrical appliance which **glows** on passing electric current.
3. The pathway through which electrons move is called **electric circuit**.
4. An **electric switch** is a device that is used to open close an electric circuit.
5. **Rubber** and **plastics** are used to cover electric wires.

C. Match the following :

- | Ans. | Column A | Column B |
|-------------|------------------|---|
| 1. | Electric cell | c. Source of electrical energy |
| 2. | Battery | a. Combination |
| 3. | Human body | e. Conductor of electricity |
| 4. | Flow of charge | b. Current |
| 5. | Electric circuit | f. Complete the path for the flow of current |
| 6. | Wood | d. Insulator |

Section II

A. Very short answer questions :

- Ans.** 1. Electric current is a pollution free and very useful form of energy.
2. A torch is a portable electric lamp that has a bulb that lights up when it is switched on.
3. When the current is not able to flow through the wires, the circuit is said to be open.
4. An insulator is a material that do not allow electricity to flow through it.

B. Short answer questions :

- Ans.** 1. The movement of electrons makes electric current flow, and the pathway through which electrons move is called electric circuit.

- 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.
- A battery is a combination of two or more cells that are arranged in a way that an electric circuit is completed.
- The components of an electric circuit are known as the elements of a circuit. They include cells, bulbs, wires and switches.
- A bare copper wire carrying current, if touches, gives an electric shock. Such wires may also cause the fire due to short-circuiting. To prevent short-circuiting and electric shocks, copper wires are covered with rubber/plastic covering.

C. Long answer questions :

Ans. 1. Aim : To study the working of a bulb

Materials required : Electric wire (with plastic coating removed at the ends), an electric cell, a bulb and cellotape.

Take an electric cell and fix the exposed ends of two wires, one on each of its terminals. Proceed by fixing one exposed end of a wire to the cylindrical metal base of the bulb and of another wire to the base of the bulb with cellotape. Connect the bulb to the cell as shown in the given figures.

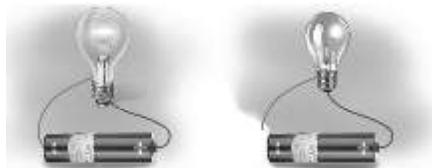


Observe the positions in which the bulb lights up and the positions in which it does not.

Which part of the bulb glows?

You will observe that the bulb does not glow when the path of electricity from one terminal of the cell to the other terminal as broken. When there is a connection between one terminal and the other making a complete path, current flows and the bulb lights up. When the wires of the bulb are joined to the same terminal of the cell, the bulb does not glow because no current flows in such a situation. This shows the working of an electrical bulb with a cell.

- Electric current needs a closed or complete path to flow. This closed path along which electric current flows is called an electric circuit. The electric circuit in the above activity has various elements such as the cell, bulb and switch. These elements are



Closed circuit

open circuit

connected together through wires. The wires connecting two elements provide the path for the flow of the electric current.

- If there is no break anywhere in the circuit, it is called a closed circuit or complete circuit. Current flows easily in a closed circuit. For example, when a torch is switched on, the circuit becomes closed. Current flows in the circuit and the torch glows.
 - If there is a break anywhere in the circuit, electric current stops flowing. Such a circuit is called an open circuit or broken circuit. For example, when a torch is switched off, the circuit becomes open. There is no flow of current in the circuit and the torch stops lighting.
3. Material which allow electricity to flow through them are called conductors (or good conductors). Silver, Copper, Aluminium, Iron, Brass, Graphite etc., are conductors.
- Materials which do not allow electricity to flow through them are called non-conductors or insulators. Dry wood, Sulphur, Plastics, Glass, Quartz, Dry piece of cloth are some common insulators.

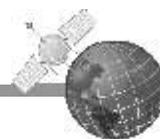
D. Higher Order Thinking Skills (HOTS) :

- Ans. 1. A screw-driver is made of steel. Steel is a good conductor. So electricity can easily flow through it. Plastic is an insulator and does not allow electricity to pass through it. So, the electrician's screw-driver has a plastic handle to protect him from any electrical shock while working with live wires.
2. a. (i) Insulator (ii) Conductor
b. (i) Rubber eraser (ii) Paper clip (of steel)
c. (i) Plastic case (ii) Metal pins



15

Water and Its Importance



Exercises

Section I

A. Select and tick (3) the correct option :

- Ans. 1. b. 2. a. 3. c. 4. d.

B. Fill in the blanks :

- Ans. 1. Water in the oceans is too salty to be used for **drinking** and **irrigation**.
2. **Farmers** rely on water to sustain their agricultural crops.
3. Evaporation also depends upon **humidity** and **surface area**.
4. **Water cycle** plays an important role in global climate.
5. We should **conserve** water wherever possible.

Section II

A. Very short answer questions :

- Ans. 1. About three-fourth of the Earth's surface is covered with water. That is

- why it is also called the watery planet.
2. We use water for drinking.
 3. Water cycle is the circulation of water in nature where the water from earth evaporates, forms clouds and falls back to the earth as precipitation.
 4. We can conserve water by preventing leakage of water from the taps.
 5.
 - Flood causes great damage to crops, animals and human life.
 - Flood water can damage structures such as buildings.

B. Short answer questions :

- Ans.**
1. Evaporation directly depends on temperature. The higher the temperature the more is the rate of evaporation. In other words the rate of evaporation increases with the increase in temperature.
 2. Puddles of rainwater dry up because the heat of the sun evaporates the water.
 3. Clothes dry faster on a windy day because wind increases the rate of evaporation.
 4. We need water for drinking, washing, irrigation etc.
 5. We need to conserve water because it is very precious and available in limited quantity.
 6. Water enters the air through the processes of evaporation and transpiration.

C. Long answer questions :

- Ans.**
1. Water is essential for us in the following ways :

Agricultural needs : Our country depends a lot on agriculture. Farmers rely on water to sustain their agricultural crops, e.g., wheat, paddy etc. Many a times, rainfall is not sufficient to water these crops, and farmers have to use artificial watering systems, referred to as irrigation.

Industrial needs : Factories use a large amount of water every day—as raw material, for cleaning, heating, cooling, generating electricity (e.g., water turbines), etc. The amount of required depends on the kind and size of the factory, and water.

Personal/domestic needs : We need water to drink. Water that is suitable for drinking is called potable water. We also need water to bathe, wash clothes and dishes, clean our house, and to water plants. (Apart from these uses, water is also used for transportation and recreation.) It also regulates the climate of a place and provides homes to many animals.
 2. Water present on the earth, in oceans, seas, rivers, lakes and other water bodies evaporates due to the heat of the sun and moves to the atmosphere. Also, water in the form of vapour goes to the atmosphere through transpiration. It gets cooler when you go higher-up from the surface of the earth. The air moving up gets cooler and cooler. While moving up at sufficient heights, air becomes so cool that the water vapour present in it gets condensed into

tiny water droplets on dust particles. These water droplets remain floating in the air and appear as clouds.

Many water drops, under suitable conditions, come together to form large-sized water drops. Some water drops become so heavy that they begin to fall on the ground as rain, hail or snow.

This way there is a continuous exchange of water among land, water bodies and atmosphere. This cyclic exchange of water is called water cycle.

Water cycle maintains the water balance on land, water bodies and atmosphere. It also controls weather patterns and sustains plant and animal life on the earth.

3. Water enters into the air through the process of evaporation and transpiration.

The water vapour being lighter than air rises up. The higher air is cooler. As water vapour rises up it begins to cool. When it cools down it condenses to form water droplets.

Condensation plays an important role in bringing water back to the surface of the Earth. The tiny drops of water join together to form clouds. Some drops of water become heavy and they fall on the earth as rain. This is called precipitation. If the air is very cold, the water drops freeze and fall down as hail or snow. Rain water is the purest form of natural water.

4. If it does not rain in a particular region for a long time, it may lead to a condition called drought.

A drought is an extended period of months or years when a region does not receive any rainfall. A drought can cause a lot of damage and harm to life.

5. One of the methods of conserving water is to collect rainwater and store it for later use. This is called rainwater harvesting. The idea behind rainwater harvesting is 'Catch water where it falls'.

Rainwater does not seep in the ground in places that are covered with concrete roads and buildings.

The following techniques are applied to collect rainwater in such places:

Rooftop rainwater harvesting : It is a traditional technique in which rainwater is collected from the rooftop and allowed to go into a storage tank through pipes. Water from the roof may contain soil and should be filtered before use.

Rainwater can be directed through pipes from the rooftops to the storage pipe in the ground. From here it seeps into the soil to recharge or refill the groundwater.

Rainwater from the roadsides goes directly into the ground into pits, trenches, dug wells, recharge wells, recharge shafts, etc. This can be used later.

6. Some of the steps by which we can conserve water at home are :

- Avoid wastage of water and use it judiciously. Recycle water wherever possible.
- Prevent leakage of water from the taps.
- Turn off the taps when not in use.
- Use a bucket and mug, instead of shower to have a bath.

D. Higher Order Thinking Skills (HOTS) :

Ans. • This is so because a shower wastes a lot of precious water.



16

Air Around Us



Exercises

Section I

A. Select and tick (3) the correct option :

Ans. 1. a. 2. c. 3. b. 4. d.

B. Fill in the blanks :

- Ans.** 1. **Plants** and **animals** use air to remain alive.
 2. Wind ensures the **dispersal** of seeds and fruits.
 3. **Oxygen** is required for the process of respiration.
 4. **Industries** often create serious problems through polluting air.
 5. Smoking should be **banned** completely.

C. Write true or false :

Ans. 1. true 2. true 3. true 4. false 5. false

Section II

A. Very short answer questions :

- Ans.** 1. Atmosphere is a thick blanket of air surrounding the Earth's surface.
 2. Weather cock is a devices used to find out the direction of blowing wind.
 3. Carbon dixodie.
 4. Oxygen

B. Short answer questions :

- Ans.** 1. Wind is helpful to us in many ways:
- It makes us feel cool.
 - It helps in drying wet clothes faster.
 - It helps in pollination.
2. Composition of air is as follows :
 Nitrogen— 78 per cent; oxygen— 21 per cent; carbon dioxide, water vapour, other gases and dust particles— 1 per cent.
3. Air is important for us because it contains oxygen and carbon dioxide. Oxygen is required for respiration and carbon dioxide is essential for photosynthesis.
4. Industries exit smoke that causes air pollution.

C. Long answer questions :

- Ans.** 1. We can show this with the help of following activity.

Aim : To show that air is present everywhere.

Take an empty glass bottle. It is really empty? Let us see. Invert the bottle for some time to ensure that whatever is in the bottle comes out. Did anything fall from it? Now, dip it in inverted position in a bucket full of water. What happens? Does water enter into the bottle? No, it doesn't. Now, tilt the bottle. What happens? Lot of bubbles come out of the bottle and then with a peculiar sound water enters into the bottle.

Conclusion : The bottle was not empty.

Air was in it. When bottle was tilted inside water, air of the bottle came out and water rushed to fill up the vacant space.



Bubbles were caused due to air escaping out of the bottle. We conclude that air occupies all the available space and is present everywhere.

2. Air contains varying amounts of water vapour depending on the weather of a place. You have learnt about the water cycle. The Sun heats up the water in seas and oceans. This water evaporates and forms water vapour. You can verify the presence of water vapour in air by observing wet clothes drying on a clothesline. Where does the water from these wet clothes disappear? The water from the wet clothes forms water vapour and mixes with the air.
3. Effects of air pollution are as follow :
 - (i) Excess of carbon dioxide causes suffocation.
 - (ii) Carbon monoxide, the deadly poisonous gas released from automobiles, aircraft engines and space rocket engines reduces oxygen carrying capacity of blood.
 - (iii) Sulphur dioxide released from coal and oil combustion causes headache, chest constriction, causes headache, chest construction, irritation in the respiratory tract, vomiting, etc.
 - (iv) Nitrogen oxides released from automobiles affect respiratory system in animals and defoliation leading to death of some plants.
 - (v) Photochemical smog causes eye irritation, loss of vision, abdominal pain and also cancer.

D. Higher Order Thinking Skills (HOTS) :

Ans. We should keep air around us pure and clean because impure air can cause many types of respiratory diseases.