# Science Quest

A Textbook of Science

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## Help Kit : 6-8

# 1 Food : The Need of Us

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. **Eggs** and **meat** are rich in proteins.
2. Honey is rich in **sugars**, **minerals** and **enzymes**.
3. Cooking makes food items **soft** and easily **digestible**.
4. All green plants can make their by the process of **photosynthesis**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | | |
|---|---|---|
| 1. | Dinner | • **Evening or Night** |
| 2. | Stem | • **Potato** |
| 3. | Milk | • **Dairy** |
| 4. | Rice | • **Pulses** |

**E. Answer the following questions in short :**

**Ans.** 1. An individual eats food three times in a day.
2. Lunch.
3. Potato and onion.
4. Milk, butter and cheese.

**F. Answer the following questions in brief :**

**Ans.** 1. Cereals are the most important sources of food for man and animals. They are rich sources of carbohydrates. Three most important cereals are wheat, rice and maize.
Pulses or legumes (commonly called 'dals') are rich in proteins and are obtained from seeds of leguminous plants. Common pulses include pea, bean, groundnut, soyabean and gram.

2. Spices are those edible materials which are sued more for their aromatic flavour than for their food value.
The major spices produced are pepper (*kali mirch*), cardamom (*ilaichi*), ginger (*adrak*), turmeric (*haldi*) and chillies (*mirch*).
Other spices of importance are cloves (*loung*), saffron (*kesar*), fennel (*saunf*), cumin (*jeera*), coriander (*dhania*), asafoetida (*heeng*), fenugreek (*methi*), nutmeg (*jaiphal*) and thyme (*ajwain*).

3. Heterotrophs are those animals that directly or indirectly depend on green plants for theeir food requirements. They cannot make their own food.

4. Animals that eat both plants and animals are called omnivores. Human beings, bears and crows are examples of omnivores. They feed on both plants and animals.

**G. Answer the following questions in detail :**

**Ans.** 1. Milk, Eggs, Meat, Honey and Fish are some food ingredients we get from animals.

**Milk, Butter, Cheese :** Milk is an important food material for us. We obtain milk from animals such as Cow, Buffalo, Goat and Sheep. Buffaloes and cows are the major source of milk in our country.

Milk, curd, cheese, butter, ghee, khoya, ice-cream, kulfi are called milk (or dairy) products.

**Eggs and Meat :** Eggs and meat are rich in proteins. These are obtained from poultry. Poultry includes birds like, Chicken, Hen, Ducks, Geese and Turkey. These birds are good source of animal food in the form of eggs and meat.

**Fish :** Fish is an aquatic animal. Fish and sea-food are rich in proteins and iodine. Fish is the major part of food for people living in the coastal regions. The fish which breeds in sea-water is termed as marine fish. These are found in the coastal areas, such as sea water around Kerala, West Bengal, Bombay, etc.

The fish which breeds in water bodies such as ponds, rivers, lakes is called fresh water fish. Rohu and Catla are fresh water fish.

**Honey :** Honey is rich in sugars, minerals and enzymes. It is used in Ayurvedic medicines. Honey is produced by honey-bee from the nectar of flowers.

2. Living organisms are grouped into following classes on the basis of their food habits.

**Autotrophs :** Living organisms which can make their own food are called autotrophs. All green plants can make their food by the process of photosynthesis, i.e., they can make their food from carbon dioxide and water in the presence of sunlight and are also called producers as they produce food for themselves and for others.

**Heterotrophs :** Living organisms which depend an autotrophs for their food directly or indirectly are called heterotrophs. They are also called consumers, e.g., animals, human beings etc.

On the basis of their eating habits heterotrophs can be divided into various categories :

**Herbivores :** Animals that eat plant are called herbivores, e.g., cow, buffalo, rabbit, deer, horse, giraffe etc.

**Carnivores :** Animals that eat flesh of other animals are called carnivores, e.g., lion, snake, eagle, cheetah, vulture, kingfisher, wolf etc.

**Omnivores :** Animals that eat both plants and animals are called omnivores, e.g., crows, cockroaches, bears, human beings etc.

3. Foods obtained from plants are of different types–cereals, pulses, vegetables, fruits, oils, sugar, tea, coffee and spices.

(i) Cereals are the most important sources of food for man and animals. They are rich sources of carbohydrates. Three most important cereals are wheat, rice and maize.

Pulses or legumes (commonly called 'dals') are rich in proteins and are obtained from seeds of leguminous plants. Common pulses

include pea, bean, groundnut, soyabean and gram.

Vegetables are rich sources of vitamins, minerals and roughage. Water content is high (70 to 90 per cent) and their food value is low. The following list gives some common vegetables along with the part used.

| **Common** | **Part used** |
|---|---|
| Carrot, Radish | Roots |
| Sweet potato | Root |
| Potato, Onion | Stems |
| Cabbage, Spinach | Leaves |
| Methi Stem and | Leaf |
| Tomato | Fruit |

(iv) Fruits have high water content, low food value, but are rich in minerals and vitamins. In common usage, the term 'fruit' is used for those which are usually eaten without cooking.

Common fruits are banana, mango, apple, grapes, pineapple, guava, orange, litchi, and so on.

(v) Sugars are produced by the green plants through photosynthetic activity. Chief sugar producing plants are sugarcane and sugarbeet.

In case of sugarcane, the plant part used is the stem, while in sugarbeet, it is the root.

(vi) Tea and coffee are common beverages. Tea is obtained from leaves, while coffee is obtained from seeds.

(vii) Spices have no food value and are used for adding flavour to food. Before the advent of refrigeration, spices were also used for preserving foods.

The major spices produced are pepper (*kali mirch*), cardamom (*ilaichi*), ginger (*adrak*), turmeric (*haldi*) and chillies (*mirch*).

Other spices of importance are cloves (*loung*), saffron (*kesar*), fennel (*saunf*), cumin (*jeera*), coriander (*dhania*), asafoetida (*heeng*), fenugreek (*methi*), nutmeg (*jaiphal*) and thyme (*ajwain*).

(viii) **Oils :** Major oil yielding plants are cotton, groundnut, mustard, coconut, soyabean and sunflower.

**H. HOTS**

**Ans.** 1. We make our food tasty by cooking it and adding flavours in its.

2. Tea and coffee.

## 2 Components of Food

### Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. a. 3. b. 4. c. 5. d.

**B. Fill in the blanks :**

**Ans.** 1. Common carbohydrates present in our food are in the form of **sugar** and **starch**.

2. **Fats** are energy giving food components and make the body strong.

3. Fats feel **greasy** to touch.

4. Deficiency of vitamin A causes a disease known as **loss of vision**.
5. Our food contains several components known as **nutrients**.

**C. Write true or false for the following statements :**

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

**D. Match the following :**

**Ans.**

| | | |
|---|---|---|
| 1. | Carbohydrates | • **Provide energy to our body** |
| 2. | Fats | • **Make the body strong** |
| 3. | Animal proteins | • **Better than plant proteins** |
| 4. | Vitamin A | • **Keeps skin and eyes healthy** |
| 5. | Roughage | • **Undigestible food material** |

**E. Answer the following questions in short :**

**Ans.**
1. Protein is a body building substance whichis persent inure food.
2. We use a variety of food so that not only does it satisfy our appetite and keep us healthy but also give us different nutrients for proper growth of our body.
3. We include carobhyrrat inure for to get energy
4. Absence or deficiency of vitamins in our regular diet may result in diseases called deficiency diseases.
5. Scurvy and rickets.

**F. Answer the following questions in brief :**

**Ans.**
1. (i) Energy-giving food – Wheat, sugar, honey etc.
   (ii) Body-Building food – Milk, eggs, pulses etc.
   (iii) Protective food – Fish, fruits, vegetables etc.
2. Proteins are the chemical substances of our body. They also help to carry oxygen from one part of the body to another.
3. Undigestible fibrous materials of food is known as roughage. It helps in the proper functioning of digestive system.
4. Protective foods are vitamins & minerals which helps to keep our body healthy e.g. carrot, tomato, milk, egg etc.
5. Water is essential for human survival. It helps our body to absorb nutrients from food. Water helps to keep our body cool and healthy, keeps our skin smooth and glowing and helps in removal of waste in the form of sweat and urine.

**G. Answer the following questions in detail :**

**Ans.**
1. A diet which contains all nutrients in proper amount/proportion as is required by our body for normal growth and functioning is called balanced diet. A balanced diet includes energy giving food, body building food, minerals, vitamins, oughage and water. Lack of any nutrient in our food causes abnomalities or diseases. Should take balanced diet in our food to remain healthy.
2. Lack of any of the nutrients, can cause abnormalities or diseases. Lack of proteins in food for a long time may lead to stunted growth, swelling of face, discoloration of hair, skin diseases and diarrhoea. If food has deficiency of proteins and carbohydrates both, (called PEM, Protein Energy Malnutrition) it causes a disease called marasmus in which the growth stops completely. Some deficiency diseases are caused due to lack of vitamins inour food.

3. Minerals perform important functions such as strengthening the bones and maintaining a normal heartbeat.
Diseases caused by the deficiency of minerals are Goitre, Anaemia, Weak bones & teeth.

**H. HOTS**

**Ans.** 1. This is so because sea food contains iodine naturally.
2. Vitamin E protects body tissue from damage caused by substances called free radical, which can harm cells, tissues and organs.

## 3 Fibre to Fabric

### Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. We use various types of **fabrics** for making our clothes.
2. Cotton fibres separated from cotton are called ginning.
3. Retting means loosening the **fibres** from the jute stalks.
4. The trade route between Europe and Asia was once called **Silk Route**.
5. The woolly coat of a sheep is called **fleece**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.** 1. i. Ropes ii. Mats.
2. Silk and cotton are natural fibres and Rayon and nylon are man-made fibres.
3. A device for making fabrics by weaving yarn or threads is called a loom.
4. Jute is obtained from the stem of the jute plant called patsun.
5. Man-made fibre is called synthetic fibre.

**E. Answer the following questions in brief :**

**Ans.** 1. Cotton is also used in the following process–
   a. Cleaned and carded raw cotton is used as bandage for covering wounds.
   b. It is filled in pillows, quilts and mattresses.
   c. The superior grade cotton is used to manufacture rayon and superior grade paper which is used to make currency notes and government stamps papers.
2. a. Cotton seeds (commonly called binola)
   b. Lint (cotton fibre) or deseeded cotton.
   Lint is tied and pressed in the form of bales which are easily transported to mills where the cotton fibre is processed to make cloth.
3. The fabrics are made from fibres in the following two steps :
   i. Fibres are first converted to yarn by the process of spinning.
   ii. Fabric is made from yarn by the process of weaving or knitting.
4. Yarn is made from fibres by the process of spinning. In the process of spinning, fibres from a mass of cotton (wool or silk, etc, drawn out and

twisted. This brings the tiny fibres together to form long and twisted the called 'yarn'. Thus, spinning converts fibres into yarn.

**F. Answer the following questions in detail :**

**Ans.** 1. i. The cotton fibres firstly seprated from cottan balls after that cotton fibres dry up in the sun and become fluffy:

ii. **Ginning :** The process of removing seeds from the cotton fibre is called ginning. Special machines called roller gins are used for this purpose. This machine separates harvested cotton into:

a. Cotton seeds seeds (commonly called binola)

b. Lint (cotton fibre) or deseeded cotton.

Lint is tied and pressed in the form of bales which are easily transported to mills where the cotton fiber is precessed to make cloth.

In Indian villages, lint (desceeded cotton) is spun tito yarn on a spinning wheel or charkha. Yarn is used to weave khadi (a rough dress material).

iii. In the mills yarn is placed leagthwise on the frame of the loom. It is called warp. Then on more yarn is wound on wooden eels and placed i the shuttle of the machine. The thread in the shuttle moves back and forth with the help of the machine and this is called weft.

During weaving the weft threads cross over and under the warp threads alternatively. The cotton fabric thus produced is of the natural colour of cotton. Hence, it is called grey fabric.

To change this grey fabric into a white one, it is bleached with bleaching powder. The white fabric is then dyed into various colours.

iv. After completing this process fabric is used to weaving to form clothes of different types.

2. The conditions necessary for the growth of the jute are as follows :

i. **Soil :** Jute grows best in the alluvial soil of the delta regions of the rivers like Ganga and Brahmaputra.

ii. **Climate :** The jute plant requires a warm and humid climate to grow. Optimum temperature for its growth is around 34°C and the desired annual rainfall is 150 cm or more.

iii. **Sowing and Harvesting :** Jute is sown during the rainy season. When the plant is 3-4 months old, it bears yellow flowers. The stem is cut at the flowering stage because at this stage, its stem is tender and yields good-quality fibre. On maturation, the stem becomes too hard and it is difficult to remove the fibre from it.

iv. **Retting :** The harvested plants are spread in the fields for a few days for drying. Most of the leaves dry and fall off. The dried stalks of jute are tied into bundles and soaked in water for a few days. This process is called retting. Retting separates the fibres by softening the tissues between them.

Jute fibres are extracted from the retted jute by jerks and pulls of the hand. These fibres are then dried and sent to mills in bundles where they are woven to form yarns of varied thickness.

**G. HOTS**

**Ans.** 1. They are called so as they are obtained from animals & plants, which are natural sources.

2. Do it yourself.

# 4 Sorting Materials into Groups

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. d. 2. d. 3. a.

**B. Fill in the blanks :**

**Ans.** 1. Hard substances are used to make **cutting tools**.

2. The role of water as a **solvent** is very important in our lives.
3. Aquatic plants and animals survive in water on **dissolved** air.
4. **Property** of objects helps their identification.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Give one example of each of the following :**

**Ans.** 1. A soft substance **cotton**.

2. A liquid which dissolved in water **milk**.
3. A solid which dissolves in water **sugar**.
4. A transparent solid **glass**.
5. A translucent liquid **water**.

**E. Answer the following questions in short :**

**Ans.** 1. In order to understand the things around us, it is necessary to classify them into groups.

2. Window panes in houses and offices are generally made of glass because the light can easily pass through glass and we can see through it.
3. Sugar and salt are soluble substances and sand and oil are insoluble substances.
4. The properties of wood are as follow :
   i. Hard and Rough
   ii. Insouble & dull appearence

   Two properties of glass are as follow :
   i. Transparent.
   ii. Hard and smooth.
5. The objects which have less density than water, float on the surface of water.

**F. Answer the following questions in brief :**

**Ans.** 1. Some liquids mix with water completely. These said to be miscible with water e.g., milk or lemon juice. Other liquids like mustard oil, petrol, hair oil etc. do not mix with water and are called immiscible with water.

2. Some materials allow the light to pass through it, known as transparent materials and this property of materials is known as transparency. Glass is the best example of trasparent materials.

3. Some materials cannot be pressed with hands or scratched or cut easily. Such materials are hard. For example, wood, glass, etc.
Materials, which can be compressed with hands or scratched or cut easily, are soft. For example, cotton and sponge.

**G. Answer the following questions in detail :**

**Ans.** 1. Properties of material are as follows :

**i. Appearance :** Some materials have a shine or lustre on them, e.g. gold, aluminium foil, steel etc. materials don't have shine or lustre on them, e.g. wood, stone, plastic etc.

**ii. Hardness :** materials can be compressed by hand or scratched easily are soft materials e.g. cotton & sponge.
Some materials cannot be compressed by hand or scrateched easily are hard materials. e.g. iron, wood, glass etc.

**iii. Transparency :** On the basis of transparency materials can be classified into three types :

**a. Transparent :** Some materials allow light to pass through them completely e.g. water, air etc.

**b. Opaque :** Some materials do not allow light to pass through them e.g. wood, metals etc.

**c. Translucent :** Some materials which allow to pass through them only partially e.g. thin cloth, oil-spread paper etc.

2. Some materials cannot be pressed with hands or scratched or cut easily. Such materials are known as hard materials. For example, wood, glass, etc.
Some Materials, which can be compressed with hands or scratched or cut easily, are known as soft materials. For example, cotton and sponge.

3. **a.Transparent :** Materials which allow light to pass through them completely e.g. water, air etc.

**b. Opaque :** Materials which do not allow light to pass through them e.g. wood, metals etc.

**c. Translucent :** Materials which allow to pass through them only partially e.g. thin cloth, oil-spread paper etc.

**H. HOTS**

**Ans.** Wood has lower density than water, so it floats on water.

# 5 Separation of Substances

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. The method of separating a mixture into its components by hand is called **Hand Picking**.

2. A mixture may contain two or more substances in any ratio. These substances are called **components of a mixture**.

3. **Winnowing** is the method of separating husk from grains with the help of wind.
4. The substance that flows through the filter paper is called the **filtrate**.
5. Water can dissolve many substances : solids, liquids and even gases. It is, therefore, known as a **universal solvent**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.**
1. Husk & grains, rice and stone, sand & water.
2. A mixture may contain two or more substances in any ratio. These substances are called components of a mixture.
3. The process used to separate grain seeds from stalk is threshing.
4. Winnowing is the method of separating husk from grains with the help of wind. We used it after threshing to remove husk or chaff from grains.

**E. Answer the following questions in brief :**

**Ans.**
1. Filtration is a method of separating insoluble solid components from a liquid by passing them through a filter. The substance that remains in the filter is called the residue. The substance that flows through the filter paper is called the filtrate.
2. The process of changing water into its vapour on heating is known as evaporation.
3. The process of changing water vapour into water on cooling is called condensation.
4. A solution in which no more solute can be dissolved at a given temperature is called a saturated solution.

**F. Define these terms :**

**Ans.**
1. **Sieving :** A method of seaprating fine particles from bigger particles.
2. **Sedimentation :** The process of settling down of a solid at the bottom of a liquid is called sedimentation.
3. **Decantation :** To separate the sand from water by slowly tilting the test tube and pouring the water into another test tube, without disturbing the sand. This process of pouring out the liquid (water) is called decantation.
4. **Filtration :** A method of separating insoluble solid components from a liquid.
5. **Winnowing :** A method of separating husk from grains using wind.
6. **Handpicking :** A method of separating of a mixture of solids into its components by hand.

**G. Give reasons for the following :**

**Ans.**
1. The farmer cannot separate husk from grains by handpicking because weeds are so small that it is not easy to remove their husk by hands.
2. Sugar cannot be separated by filtration because sugar become soluble in water and can be separated by evaporation.
3. Water is called a univeral solvent because it can dissolve many substances like solid, liquid and gases.
4. Filtration is a better method because it can even separate the small

particles of solid from the liquid but with decantation some small particles still suspend within the liquid.

**H. Answer the following questions in detail :**

**Ans.** 1. Sieving is a method used to separate the components of a mixture which are of different sizes. The fine components pass through the sieve, and the bigger components remain on the sieve.
For separating bigger particles in wheat flour, a sieve with fine pores is used. At construction sites, a sieve with bigger pores is used.

2. i. Dirt or stone from rice and wheat. ii. Separating green grapes from black grapes.

3. Salt is obtained from sea water by collecting sea water in shallow pits & allowed to evaporate in sunshine. In a few days, the water evaporates, leaving behind salt.

4. We separate impurities & bran from flour by sieving. The fine components pass through the sieve & the bigger components remain on the sieve. It is separated to make it pure so that it can be properly used.

5. We may need to separate components of a mixture for various reasons, such as :
   i. To remove the undesirable or harmful components. For example, small pieces of stones and unwanted seed grains are removed from rice and pulses before cooking.
   ii. To remove the impurities so as to obtain pure sample of a substance. Pure substances are needed in medicines, research, industries and also in daily use.
   iii. To separate useful components of a mixture so that each component can be properly used. For example, petrol, diesel, kerosene, etc. are all useful components of crude petroleum and need to be separated.

**I. HOTS**

**Ans.** 1. No, more sugar can't be added in a saturated solution but if Ria heats this solution, more sugar will dissolve.

2. Sugar & salt are soluble to water, it cann't be sepearated by filtration but can by evaporation. In filtration, sugar and salt can also pass through the filter as they have been broken down into tiny particles.

## 6 Things Around Us

### Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. b. 2. a. 3. a. 4. a. 5. c.

**B. Fill in the blanks :**

**Ans.** 1. The living things, which consists of a single cell, are called **unicellular**.

2. The sunflower always faces the **Sun**.

3. **Non-living** things cannot move on their own.

4. **Stimuli** is the ability of an organism to react to a change in the environment.
5. All livig things take in oxygen from air and give out **carbon dioxide**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Give one word answer :**

1. A living thing that continues to grow throughout its life.**Plants**
2. A unicellular organism.**Amoeba**
3. A gas produced during respiration.**Carbon dioxide**
4. An animal which does not exhibit locomotion.**Sponges**
5. The living thing whose bodies consist of more than one cell. **Multicellular**
6. The process in which wastes are removed from the body.**Excretion**
7. The bending of the stem towards sunlight. Phototropism.
8. The capacity of an organism to produce its own kind.**Reproduction**

**E. Answer the following questions in short :**

**Ans.** 1. Green plants make their own food by the process of photosynthesis. They are called autotrophs.
2. The living things, which consist of a single cell, are called unicellular organisms.
3. Taking in oxygen from the air and giving out carbon dioxide is called breathing.
4. An agent, action or condition that stimuli a physiological or psychological activity or response is known as stumulus.

**F. Answer the following questions in brief :**

**Ans.** 1. **Living Things**
   i. Mode of cells and show cellular organisation.
   ii. Need food to grow and develop.
2. **Non-living Things**
   i. lock of cells and to not show cellular organisution.
   ii. Do not need food.
2. Oxygen is used by the cells to produce energy by the oxidation of food in the body. This energy is utilised by living things for various activities like heart beat, thinking, reading and playing.
3. The period during which an organism completes its life cycle is called life span. A tree may have a life span of hundreds of years, while the life span of bacteria is of a few minutes only.
4. Grass, fish, earthworm and mosquito are living things.

**G. Differentiate between the following :**

**Ans.** 1. Growth of plants:
   i. Their cell become large.
   ii. They grow continuously. A seer to tree.
   Growth of Animals:
   i. They grow to a maximum size.
   ii. They do not grow countinuously.
2. When you happen to touch a hot pot, your hand is pulled away immediately. Here, the heat of pot is stimulus and pulling away of

hand is response.

3. Production of energy by oxidation of food in living cells is called respiration.
   Taking in oxygen from the air and giving out carbon dioxide is called breathing.
4. Living things:
   i. Made of cells and show cellular organistion.
   ii. They need food to grow and develep.
   iii. They use oxygen to produce cnergy and give out carbon dioxide.
   Non-living things:
   i. They do not show cellular organisation.
   ii. They do not need food to grow and develop.
   iii. They do not need oxygen becouse they to not respire.

**H. Long Answer Questions :**

**Ans.** 1. Five differences between living and non-living things are as follow :
   i. Living things include birds, insects, animals etc while non-living things include car, pen, table, stone etc.
   ii. Living things are made up of cells.
   iii. Living things show growth while non-living things don't show.
   iv. Living things need food for energy while non-living things do not need food.
   v. Living things born, grow, reproduce & die while non-living things are broken down or destroyed.
2. All living things produce young ones. The process of producing babies or young animals and plants is known as reproduction. For example, human beings give birth to bobies cats protuce kittens pigeons lag eggs ant plants produce see.
3. Organisms get rid of waste products produced inside their bodies through a process called excretion. Such waste products are called excretory products. Some plants remove waste products in forms such as gums and resins, while othe store them in such a way that the plant is not harmed. Carbon dioxide, produced during respiration, in also an excretory product.
   Many animals, including human beings, remove wastes in the form of urine. Other excretory products of animals include sweat and carbon dioxide (which is produced during respiration).
4. Plants are fixed in the soil. They can exhibit only sight movements, for example the touch-me-not plant (mimosa pudica) curls up its leaves when it is touched. Flowers like daisy and lily close at night and open in the morning. The sunflower always faces the sun.
5. Excretion is an important process because it remove out the harmful wastes form the body. Without it, the toxins accumulate in the body and could harm & fatality to the organism.

**I. HOTS**

**Ans.** 1. Clouds moving in the sky and growing in size. They are non-living things as they are made of chemicals of water vapour, gas and mist.
2. Because it doesn't have a characteristics that a living thing possess.

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. b. 3. c. 4. a. 5. c.

**B. Fill in the blanks :**

**Ans.**
1. Plants with soft green stems are called **herbs**.
2. Roots take in **water** and **minerals** from the soil.
3. **Stem** is the part of the plant which we see above the ground.
4. **Ginger**, **potato** and **onion** are modified stems.
5. Pedicel attaches the flower to the **branch** or **stem**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.**
1. Chlorophyll
2. Through stomata plants take in gases for respiration and photosynthesis.
3. The places on the stem where leaves are borne are known as nodes.
4. Root Shoot a leaf and flower.

**E. Answer the following questions in brief :**

**Ans.**
1. Plants with weak stems that cannot stand upright and spread on the ground are called creepers.
2. Do it yourself
3. Pedicel, sepals, petals, stamen and carpel are the parts of the flower.
4. Do it yourself
5. (i) A flower is the reproductive part of a plant.
   (ii) It has brightly coloured petals which attract insects that help in pollination.
   (iii) After being pollinated, the flower produces seeds.

**F. Define the following terms :**

**Ans.**
1. Pollination is the transfer of pollen grains from the anther to the stigma of a flower.
2. The plants give out extra amount of water through stomata, in the form of water vapours. This process is known as transpiration.
3. In Fertilization male and female reproductive cells fuse together and formed zygote.
4. Plants that take support on neighbouring structures and climb up are called climbers.
5. The portions of the stem between the nodes are called internodes.

**G. Answer the following questions in detail :**

**Ans.**
1. Taproot When a seed germinates, a root emerges from the seed. This is called the main root. From this root branctes emerge. The main root grows deep into the soil. Such a root system is seen in plants like bean, mango and pea.

   Fibrous root heating a cluster of roots arises from the base of the stem. The root formed first, dies. The cluster of roots is thin and

fibrous. There is no main root. Fibrous roots spread out in the soil giving support to the plants. Wheat, maize, millet, etc., have this type of root system.

2. i. Leaves manufacture food for the plant body. The process of manufacturing food by the leaves is called photosynthesis. Leaves require water, carbon dioxide, sunlight and chlorophyll for making food.
   ii. The leaves on their surfaces carry tiny pores called stomata. Through these pores, plants take in gases for respiration and photosynthesis. The gases produced during these processes are also given out through stomata.
3. Pollination is the transfer of pollen grains from the anther to the stigma of a flower. This can be done by wind water, pirts and insects.
4. **Trees :** Plants that are tall and have thick and hard.
   **Fertilization :** In this process male and fenole reprotuctive cells fuse together. Stems are called trees. Their stems branch out and spread above the ground, for example, guava tree, neem tree and mango tree.
   **Shrubs :** Plants with hard stems which branch near the surface of the soil are called shrubs. For example, lemon and rose are shrubs.
   **Herbs :** Plants with soft green stems are called herbs. They are generally short in height and have no branches, for example, basil and coriander.

**H. HOTS**

**Ans.** 1. Food come from the roots they store in it.
2. Some flowers produce nector as a reward to insects that pollinate these flowers.

# 8 Form and Movement in Animals and Human Beings

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. The shape of a fish is like that of a **boat**.
2. Birds fly in the air by spreading their **wings**.
3. The **backbone** protects the spinal cord.
4. The skull is made up of **22 bones**.
5. An earthworm has a **long tube** like body.
6. The places where two or more bones are joined together are called **joints**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Give one word for the following :**

**Ans.** 1. Joint found in tooth sockets. **Immovable**
2. The place where two or more bones are jointed together. **Joints**

3. Body shape found in fish and birds. **Streamlined Shape**
4. Hard outer skeleton found in a cockroach. **Exoskeleton**
5. The long bony structure that runs along the back of your body. **Backbone**

**E. Answer the following questions in short :**

**Ans.** 1. Streamline shape
2. The backbone (or the vertebral column) extends from the base of the skull to the hip. It consists of 33 small ring-like vertebrae joined end-to-end.
3. The bones are held together at the joints. The pones are mild together at the joints by strong structures called ligaments.
4. The places where two or more bones are joined together are called joints.

**F. Answer the following questions in brief :**

**Ans.** 1. Muscles persent in our body that help in movement of bones are known as skeletal muscle. The contraction and relaxation of skeletal muscles move the bones.
2. Our elbows not move backwards because it has a hinge joint and hingn joint allows movement in one direction only.
3. A framework of the body formed by the bones and cartilage is called Skeleton.
4. The contraction and relaxation of muscles move the bones.
5. Birds can walk on any surface with their legs. The bones of the hind limbs are fit for walking and perching.
   The body of birds is streamlined and suitable for flying. Their bones are hollow and light in weight. The boney parts of the forelimbs are modified as wings.

**G. Answer the following questions in details :**

**Ans.** 1. **a. Cockroach :** Cockroaches walk, climb as well as fly in the air. They have three pairs of legs which help in walking. They also have two pairs of wings attached to the breast muscles that help in flying. In cockroach outer skeleton is made of different units joinet together and it helps in movement.

**b. Earthworm :** During movement, the earthworm first extends the front part (anterior part) of the body, keeping the remaining part (the rear part or posterior part) of the body fixed to the ground. Then it fixes the front part and releases the rear part. It then shortens the body and pull the rear part forward. In this matter, the earthworm moves forward.

**c. Snail :** It moves very slowly using a muscular structure called foot. A slimy substance produce by the body helps in smooth movement.
The snail moves by creating a wave-like motion along the length of the foot.

**d. Fish :** The shape of a fish is like that of a boat. It is narrow in the front (head) and the tail and broader in the middle. The body thus tapers at the two ends. This body shape is called

streamlined. Fish also has various types of fins that help it to swim.

**e.** **Bird :** Birds can walk on any surface with their legs. The bones of the hind limbs are fit for walking and perching.
Birds fly in the air by spreading their wings. They use their chest muscles to flap their wings.
The body of birds is streamlined and suitable for flying. Their bones are hollow and light in weight. The boney parts of the forelimbs are modified as wings.

**f.** **Snake :** Snakes move very fast by crawling on their bellies. Special structures called scales are present on their bodies. The scales help in crawling. During movement, the body curves into many loops. Each loop gives the snake a forward push by pressing against the ground.

2. **Functions of the Skeletal System :**
   i. It forms framework of the body.
   ii. It helps to protect and keep the delicate organs of the body in their proper positions.
   For example, the bony cage made by breast bone, ribs and the backbone protects heart and lungs.
   iii. The brain is protected by the bones in the skull.
   iv. The backbone protects the spinal cord.
   v. It provides support and gives shape to the body.
   vi. With the help of muscles, it helps in the movement of the various parts of our body.
   For example, any movement of our arms or legs is supported by the muscles in these parts of the body.

**H. HOTS**

**Ans.** 1. No, movement is not the same as locomotion. Locomotion is the movement from one place to another, whereas movement is only the change in position of a part of the body.
2. They wear fin like flippers to help them move around easier and quicker without getting tired & to protect feet from objects in the sea.

# 9 The Habitat

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. b. 3. b. 4. a. 5. c.

**B. Fill in the blanks :**

**Ans.** 1. The degree of hotness or coldness is called **temperature**.
2. The animals which consume both plants and animals are called **omnivores**.
3. Animals living in water are called **aquatic** animals.
4. The animals which are adapted for surviving both on land and water are called **amphibian**.

5. Animals living in very cold regions have a thick layer of fat called **blubber**.
6. Animals which are adapted for the aerial mode of life (flying animals) are known as **volant animals**.

**C. Write 'true' or 'false' for the following statements :**

**Ans.** 1. false 2. true 3. false 4. true 5. false
6. true 7. true 8. false 9. true 10. true

**D. Answer in one word only :**

**Ans.** 1. Fungi 2. Cactus 3. Cold Climate
4. Hibernation 5. Grapes 6. Clay
7. Asexual Reproduction
8. Hydrilla 9. Lily and lotus

**E. Answer the following questions in short :**

**Ans.** 1. Hydrophytes are plants that grow in excessively wet conditions or completely in water.
2. Adjustment of an organism better than other organisms in a habitat is its adaptation.
3. The animals which are adapted for surviving both on land and in water are called amphibians.
4. Camel is known as ship of the fesert.
5. Mesophytes are the plants growing in habitats which have a moderate climate.

**F. Answer the following questions in brief :**

**Ans.** 1. **(i) Roots :** Roots and root hairs are poorly developed as water is not a problem.
**(ii) Stem :** Stem is thin and flexible so that it can sway (or bend) along with the water movement and pressure.
**(iii) Leaves :** Leaves in submerged plants like Hydrilla are long and thin so that the strong water currents are not able to tear them apart.
2. **Herbivore :** The animals which obtain their food directly from plants are called herbivores.
**Carnivores :** The animals which feed on the flesh of other animals are called carnivores.
**Omni vores :** The animals which consume both plants and animals are called omnivores.
3. Without soil, most of the plants would not exist. And in the absence of plants, other forms of life would also not exist.
4. A thick blanket of air, called the atmosphere, surrounds or Earth.
5. Animals like squirrel, bear and dormouse store food as fat in their body during summer. In winter, when food is not available, they simply go off to sleep. This is known as hibernation.

**G. Differentiate between each of the following :**

**Ans.** 1. **Heterotrophs :** Heterotrops can not manufacture its own food. they obtain food from autotrophs or producers. Some hetcrotops can make their foods but they needet some organic mother which they get from autotrophs or lrna other sources eg. All animals, protozcuns, fungi and most bacteria.

**Decomposers :** Decomposers feed on the dead boties of plants and animals. De composers are usually microorgaisus eg Bactria and femgi are decomposers.

2. **Aquatic habitat :** It consists of various water bodies like ponds, lakes, rivers, seas and oceans. These aquatic habitats can be divided into the following groups :
   - **i. Marine habitats :** Marine habitats include salt water habitats, for example seas and oceans. The animals or organisms living in such habitats are called marine organisms. Shark, whale, sea turtles, etc., are examples of such animals.
   - **ii. Fresh water habitats :** Fresh water habitats refer to lakes, ponds, rivers and steams. The organisms living in these habitats are called fresh water organisms, for example fish, water bugs and lily.
   - **iii. Terrestriol Ahabitats :** It comprises various land habitats which have the best living conditions due to grcat variations in abiotic factors, many temperature and availability of water. Terrestrial habitats can be further divided into various habitats :
   - **a. Desert :** Deserts receive little gain and are hot and try cacti and camels are the major faun a and flora in desert regions.
   - **b. Grasslands :** Grasslands receive noderate rain. The main flora and fauna which are found in this habitat are grasses, zebra, deer and giraffe.
   - **c. Rain forests :** Rainforests are hot and wet. They receive plenty of rain. Monkey, snakes, lizards and various animals surivive in rain forests.
   - **d. Tundra :** The tundra region is extremely cold and is covered with snow throughout the year. The main organisms which occupy this habitat are polar bear, rcintecr and plngcins.
3. **Biotic components :** Living organisms in the environment.
   **Abiotic components :** Non-living and physical factors in the environment.
4. The animals which obtain their food directly from plants are called herbivores or primary consumers, for example, cow, goat, deer, monkey and elephant.
   The animals which feed on the flesh of other animals are called carnivores or secondary consumers, for example, tiger, lion, and wolf.
5. **Adaptation :** Adjustment of an organism better than other organisms in a habitat is its adaptation. Thus, an organism which is adapted to a habitat will :
   i. live successfully in that habitat
   ii. have modified features that help it to survive.
   **Hibermtion :** Animals like squirrel, bear and dormouse store food as fat in their body during summer. In winter, when food is not available, they simply go off to sleep. This is known as hibernation.
6. Hydrophytes (meaning water plants) are plants that grow in excessively wet conditions or completely in water. eg : lotus and lily.

Xerophytes are the plants which survive in desert habitats on dry places where there is scarcity of water, for example cactus, asparagus, euphoria and yucca.

**H. Answer the following questions in detail :**

**Ans.** 1. **a. Fish :**

i. Fins in fish help in swimming.

ii. To prevent rotting and decay, the animals develop special covering like scales, waxy coating, etc.

iii. Special breathing organs like the gills in fish are present.

**b. Camel :**

i. A camel does not sweat.

ii. Its feet have thick pads which protect it from the hot desert sand.

iii. A camel has long eyelashes which do not allow flying sand to reach its eyes in a sandstorm.

**c. Cactus :**

i. The stem is fleshy and green to store water and make food by the process of photosynthesis as in cactus.

ii. Leaves get modified into spines to reduce loss of water through transpiration.

iii They have long and extensive root systems which separate deep into the soil to absorb water.

**d. Lotus :**

i. Root and root hairs are poorly developed.

ii. Stem is thin and flexible so that it can sway (or bent) along with the water movement and pressure.

iii. Leaves are large and circular, and keep floating on the surface of water.

2. Loamy soil is the best soil for growing plants. Loamy soil is a mixture of clay, silt and sand. because day soil has ability to retain a lots of water in it but it not has air sufficent for plants. But sandy soil has sand particles which have sufficient air for proper grawth of plants, So a mixture of day, silt air sand becomes a good sources for plant growth.

3. **Producers :** Green plants are called producers as they have the ability to make food for all organisms by the process of photosynthesis. They make use of carbon dioxide, water, sunlight and their green pigment, as chlorophyll, in this process. Besides producing sugar, plants also release oxygen during the process of photosynthesis.

**Consumers :**

The organisms, which depend on food prepared by plants, are called consumers or heterotrophs. All animals including human beings are consumers. Camel, also known as the ship of the fesert, has several ataptations that help it to survive in a fesert.

4. • A camel has long legs which help to keep the upper part of the body away from the heat of the sand on the ground.
   • After drinking water once, it can live for many days without water.
   • A camel excretes a small amount of urine and its dung is dry.

- A camel does not sweat.
- Its feet have thick pads which protect it from the hot desert sand.
- A camel has long eyelashes which do not allow flying sand to reach its eyes in a sandstorm.
- A camel can close its nostrils, so that sand does not enter the respiratory system during a sandstorm.
- Fat stored in its hump acts as a food reserve.

5. A habitat has two main components
   i. Abiotic or non-living components
   ii. Biotic or living components

**Abiotic Components**

Non-living or abiotic components include a number of factors like sunlight, temperature, water, air and soil. They influence living things in various ways.

**Biotic or living components**

Living things such as plants, animals and microbes present in a particular habitat constitute its biotic components, for example the habitat of a tiger must have a number of small animals so that it can feed on them.

**I. HOTS**

**Ans.** 1. If there were no microorganisms, humans, animals & plants woudn't be able to live. Bacteria help our bodies & they do a process of nitrogen fixation to help plants give us oxygen. Therefore, without bacteria a nothing on earth would be able to live.

2. Lions have eyes in the front to help them see their pray which enhances their hunting & whereas the deer has their eyes at the side so that they can watchout their predators attacking from their back, that had come.

## 10 Measurement and Motion

### Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. d. 3. a. 4. c.
5. a. 6. e. 7. b. 8. c.

**B. Fill in the blanks :**

**Ans.** 1. **Measurement** is the process of finding out the dimension accurately using scientific instruments.
2. **Metre** is the standard unit of length.
3. Earth revolves round the Sun on a circular path so it shows **circular motion**.
4. Motion along a straight line is called **Linear motion.**

**C. Write 'true' or 'false' for the following statements :**

**Ans.** 1. false 2. false 3. false 4. false
5. false 6. true 7. true

**D. Give the proper terms for following :**

**Ans.**
1. Oscillatory Motion
2. Periodic Motion
3. Oscillatory Motion
4. Linear Motion
5. Periodic
6. Periodic
7. Non-uniform
8. Rotatry motion

**E. Answer the following questions in short :**

**Ans.**
1. Scale used to measure the length a line.
2. If we measure the length using different positions of the eye over the scale, we shall get different measurements each time. This type of error in reading measurements is called parallax error.
3. Second is the standard unit of time.
4. The motion in which a body moves about a fixed axis without changing its position is known as rotatory or circulor motion eg : amoving fam, spining topex.

**F. Answer the following questions in brief :**

**Ans.**
1. Measurement is the process of finding out the dimension accurately using scientific instruments.
2. Motion along a straight line is called linear or rectilinear motion.
   When an object moves along a curved line, it is said to be in curvilinear motion.
3. Metre is the standard unit of length. In India, standard units are maintained by the National Physical Laboratory (NPL) in New Delhi. A standard metre rod and standard kilogram weight is kept at NPL. Standard clocks are also maintained there. The metre rods and kilogram weights used in the market are copies of these standards.
4. To avoid parallax error, we should keep our eye vertically above the point where the measurement is to be taken.
5. The 'zero' marking of the ruler coincides with one end of the box as shown in the figure given alongside. The position of the eye at the time of taking the measurement must be at the top of the point being measured.

**G. Define each of the following :**

**Ans.**
1. **Circular motion :** The motion in which a body moves about a fixed axis without changing its position is known as rotatory or circular motion.
2. **Periodic motion :** When the same motion repeats itself after equal intervals of time, we call it periodic motion.
3. **Vibratory motion :** When you pluck the string of a guitar or sitar, it moves to and fro very fast. Such fast or rapid oscillatory motion is called vibratory motion.
4. **Oscillatory motion :** When you swing, you move to and from on the same path, over and over again.
   This to and fro motion of an object about a mean position along the same path is known as oscillatory motion.
5. **Motion :** When the position of an object changes with time with respect to the other surroundings objects, it is said to be in motion.

**H. Distinguish between each of the following :**

**Ans.**
1. **Oscillatory motion :** This to and fro motion of an object about a

mean position along the same path is known as oscillatory motion.
Vibratory motion : When you pluck the string of a guitar or sitar, it moves to and fro very fast. Such fast or rapid oscillatory motion is called vibratory motion.

2. **Motion :** An object is said to be in motion if its position changes with time with respect to its surroundings.
**Rest :** An object is said to be at rest if its position does not change with time with respect to its surroundings.
3. **Translatory motion :** The motion in which all the particles of a body move the same distance in the same interval of time is known as translatory motion.
**Rotatory motion :** The motion in which a body moves about a fixed axis without changing its position is known as rotatory or circular motion.
4. **Periodic motion :** When the same motion repeats itself after equal intervals of time, we call it periodic motion.
**Uniform motion :** When a body covers equal distances in equal intervals of time along a straight line, it exhibits uniform motion, for example, an aeroplane flying in a particular direction at a constant speed and a train moving in a particular direction at a constant speed show uniform motion.

**I. Answer the following questions in detail :**

**Ans.** 1. All physical quantities have their own standard units. Measurement allows you to compare a particular dimension of a given quantity. It also involves the comparison of a physical quantity with the help of a standard unit. For example, if you say you have covered 225 m then it means that you are two hundred twenty-five times more than the standard unit of distance, metre. Similarly, if you say your classroom is 5 m long then it would mean that the length of the room is five times of the standard unit of length, metre. Thus,
Measure of physical quantity = Numerical value of physical quantity × Size of the standard unit
The above relation shows that the presence of the standard unit is must in measurement.

2. When you are travelling in a bus, you feel that the trees are moving in the opposite direction, though they are at rest. inside a bus, you are in a stationary state with respect to the other passengers travelling with you but you are in a state of motion when compared to people and vehicles outside the bus.
An object is said to be at rest if its position does not change with time with respect to its surroundings.
3. Rest and motion are relative terms, though they seem to be opposite to each other.
When you are travelling in a bus, you feel that the trees are moving in the opposite direction, though they are at rest. Inside a bus, you are in a stationary state with respect to the other passengers travelling with you but you are in a state of motion when compared to people and vehicles outside the bus.

4. Oscillatory Motion : When you swing, you move to and from on the same path, over and over again.
   This to and fro motion of an object about a mean position along the same path is known as oscillatory motion. A child on a swing, the pendulum of a clock and the needle of a sewing machine exhibit this type of motion.
5. When the same motion repeats itself after equal intervals of time, we call it periodic motion.
   The oscillations of a pendulum, the revolution of Earth around the Sun. I the move ment of hands of clock, movement of hands while beating a trun are wxaufles of periotic motion.

**J. HOTS**

**Ans.** 1. While measuring a body the shape is different of every part so tape is more suitable than a meter scale.
2. More than one type of motion
   Consider the movements of the Earth :
   i. Earth revolves around the Sun on a circular path so it shows circular motion or revolution.
   ii. With revolution, Earth also moves around on its axis which is called Rotation. So Earth shows two types of motion at the same time circular and rotational motion.

   At the same time it repeats its motions (revolution and rotation) at fixed interval of time. So its motion is also termed as periodic motion.
   A spinning top spins on its axis. It also moves on a curved line as a whole. So it shows rotatory as well as curvillinear motion.

# 11 Fun with Magnets

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. Magnetite was discovered in the town of **Magnesia**.
2. Magnets pull or push objects made of **steel**, **cobalt** and **nickel**.
3. The power of a magnet is the **strongest** at its ends.
4. A **compass** is a device used to determine the direction.
5. The phenomenon of producing magnetism from electric energy is called **electromagnetism**.

**C. Answer the following questions in short :**

**Ans.** 1. Steel and nickel
2. Yes
3. Fertile a mixture of barium oxide and ferric oxide is used to make or tificial magnets.
4. A material which attracts magnetic materials like iron, cobalt, nickel is known as magnet.
5. Same pole of two magnets will be repel each other.

**D. Answer the following questions in brief :**

**Ans.** 1. When we suspended any magnet freely than its north polo get attracted by Earth magnet's south pole. But Earth's magnetic south pole is near the geographical north pole. Is a result, north pole of any magnet aligns itself in north dircction.

2. A magnetic compass is a device used to determine the direction.

3. It lose its magnetism. It is made up of a magnetic needle which is free to swing about a pivot at its ceutre. The needle always comes to rest pointing towarts the earth's north south direction.

4. (i) Never heat a magnet, it may lose its magnetism.
   (ii) Keep magnetic materials away from hot objects.
   (iii) Do not hammer magnets with other objects.

5. They will attract each other.

**E. Answer the following questions in detail :**

**Ans.** 1. On cutting a magnet into two, each half becomes a complete magnet. This means on cutting the magnet from the middle you get a new pair of north and south pole at the broken ends such that each broken piece is a complete magnet. Now, if you further break these pairs into two, even then each piece will be a complete magnet. If you continue this process, you will get smaller and smaller magnets each with a north pole and a south pole.
   Thus, you can conclude that the magnetic poles always exist in pairs and a separate or an isolated pole, either north pole or south pole, cannot exist.

2. The Earth behaves as a huge magnet. The Earth is round in shape but its magnetic field can be represented by a huge bar magnet. We know that unlike poles of magnets attract each other, so when we suspend any magnet free, its north pole gets attracted by Earth magnet's south pole. But Earth's magnetic south pole is near the geographical north pole. As a result, north pole of any magnet aligns itself in north direction. It happens when the magnet is suspended freely, and it is not near any magnetic material or in any other magnetic field. This is the reason the north pole of the magnet is called north-seeking pole.

3. The materials which are affected by magnets are called magnetic materials. e.g. Needle, Can, Iron I steel. Those materials which are not affected by magnets are called non-magnetic materials.
   e.g. Eraser, Thread, plastic etc.

4. • The edges of the fridge, almirah and door contain magnet inside them. This is why the door of the fridge closes on its own.
   • Televisions, computers, music systems, watches, magnetic buttons in dresses and carry bags etc. all contain magnets of some or the other shape. Magnets are also used to make self closing pencil boxes, pin holders, etc.
   • America has developed Maglev trains, which have no wheels. The trains are pulled by magnetic force acting on the rails. These trains can move at very high speeds.

**F. HOTS**

**Ans.** 1. He can find if magnets attract each other that meas they are opposite pole, so he can find the poles.

2. Take an iron nail, a dry cell (1.5 V), copper wire.
   **Now :** Wind a copper wire around a nail and connect it with an electric cell. The nail will behave as a magnet as long as current flows through the circuit. So it is called a temporary magnet. With the help of this expriuent you can make a magnet.

3. When a magnet is brought near a compass the needle of compass gets deflected due to the magnetic field of the magnet.

# 12 Light

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. **Light** is a form of energy.
2. The Sun is a **main** source of light.
3. **Transparent** objects allow light to pass through them fully.
4. **Transparent** objects do not cast any shadow at all.
5. Pinhole camera is based on the principle that light travels in a **straight** line.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Butter paper | • **Translucent** |
| 2. Mirror | • **Reflection** |
| 3. Moon | • **Non-luminous** |
| 4. Opaque objects | • **Shadow** |
| 5. Firefly | • **Luminous** |

**E. Answer the following questions in short :**

**Ans.** 1. Sun, stars, meteros and firefly are the main natural sourcols of light on th eEarth.

2. An object which does not give out its own light is called non-luminous object. eg : Wood, plastic and Iron.

3. Fire fly is the living organism that emits light.

**F. Answer the following questions in brief :**

**Ans.** **A shadow has two regions :**

1. **i.** **Umbra :** Region of total darkness where no ray of light enters.
   **ii.** **Penumbra :** A region of partial darkness surrounding the umbra. Some light reaches this region.

2.

| | | |
|---|---|---|
| i. | Sun | Natural |
| ii. | stars | Natural |
| iii. | torch | Man-Made |
| iv. | tube light | Man-Made |
| v. | burning candle | Man-Made |

3. Transparent objects allow light to pass through them fully. For example glass, air and water are transparent objects. Translucent objects allow light to pass through them only partially. For example oily or butter paper, muddy water and smoked glass are translucent objects. Opaque objects do not allow any light to pass through them. For example wood, wall, book and some plastics are opaque objects.
4. **Construction of a pinhole camera :** Take a cardboard or wooden box having a pinhole in its front face and a translucent ground glass/waxed paper screen at the back. The distance between the pinhole and the screen may be fixed or adjustable. The distance between the pinhole and the screen can be adjusted by moving the screen towards or away from the pinhole.
   **Working :** When the pinhole of the camera is turned towards a bright object, a real, inverted image of the object is formed on the screen.
5. Three necessary conditions for the formation of shadow are:
   i. There must be a source of light.
   ii. There must be an opaque object which obstructs the path of light.
   iii. There must be an opaque screen on which a shadow can be formed, as it cannot form in air.

**G. Answer the following questions in detail :**

**Ans.** 1. The dark patch formed in the space behind the opaque object where the light is partially or wholly cut off is called a shadow.
   **Characteristics of a shadow are as follows :**
   - There must be a source of light.
   - There must be an opaqce screen on which a shadow can be formed, as it cannot form in air.
2. You might have observed that your shadow is always black. Moreover it changes its length and direction during the day. This is because the position of the Sun changes with time during the day.
   The formation of shadow is a direct result of the rectilinear propagation of light.
   You might have observed that when the object moves closer to the source of light, size of its shadow increases and when it moves away from the source of light, size of its shadow decreases.
3. **Image Formation in a Plane Mirror and Shadow**

| Image Formation in a Plane Mirror | Shadow |
|---|---|
| The length of the image in a mirror always remains the same as equal to the size of the object at all positions.<br><br>The image in a mirror of the same colour as the object. | The length of a shadow changes with the change in the position of the object with respect to the source of light.<br>The shadow is always black in colour irrespective of the colour of the object and the colour of the light. |

| | |
|---|---|
| The image in a mirror is laterally inverted, as there is an interchange of right and left between the object and its image in a mirror. | The shadow has no such lateral inversion. |
| The image in a mirror can only be seen and cannot be formed on a screen. | A shadow is formed on a screen. |

4. Light travels in straight lines. This property of light is called rectilinear of light. It is only because of this that light produces shadows of opaque objects and inverted images of objects in a pinhole camera.
   Taken lighted candle on a table.
   Take a piece of pipe.
   Close on eye and look at the lighted candle through the pipe.

You will be able to see the lighted candle clearly.

- Now bend the pipe in the middle while looking at the lighted candle.
- What do you observe now?

Now, you will not be able to see the lighted candle.

- Straigthen the pipe and now turn the pipe the your right or left.
- Can you see the lighted candle?

You will not be able to see the lighted candled candle if your right or left.
From all this experiment you can conclude that light travels in a straight line.

**H. HOTS**

**Ans.** Yes, number of shadows formed will change, provided light is falling from different directions.

# 13 Electricity and Circuits

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. c. 3. b. 4. c. 5. b.

**B. Fill in the blanks :**

**Ans.** 1. The conductor of two or more cells is called a **battery**.
2. **Electric current** is a very dangerous energy.
3. The complete path of an electric circuit is sometimes called **closed electric circuit**.
4. Materials, which do not allow the flow of electric current through them, are called **Insulators**.
5. A circuit with an open switch is called an **incomplete electric circuit**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Give one word for the following :**

**Ans.** 1. Complete electric circuit 2. Terminals
3. Torch 4. Filament 5. Solar cells

**E. Answer the following questions in short :**

**Ans.** 1. A source which produce electricity known as source of electric current.

2. The combination of two or more cells is called a battery.

3. Steel, salt water, iron, sliver, copper, etc.

4. A closed path for current to flow through an electric device is called electric circuit.

**F. Answer the following questions in brief :**

**Ans.** 1. Electric wires covered with plastic because plastic is a insulator of current due to which user cannot receive the electric shock.

2. The source of electric current which can provide small current continuously for some time is called electric cell.

3. An electric circuit in which the path of electricity is broken at some point is called incomplete electric circuit or open electric circuit.

4. A bulb in which the filament is broken for some reason. A fused bulb placed in a circuit not glow because the filament is broken, so the electric current will not pass through terminals and not get hot to produce light.

**G. Answer the following questions in detail :**

**Ans.** **1.** We should follow some precautions while hand ling electricity :

(i) Never play with sockets or electric wires.

(ii) Never touch an electric switch, plug or device with wet hands.

(iii) If you need to operate an electric iron or an electric juicer, be sure that you wear dry, rubber slippers or stand on a dry wooden or plastic base.

(iv) Never switch on a off geyser while barefoot, especially, if the floor of the bathroom is wet.

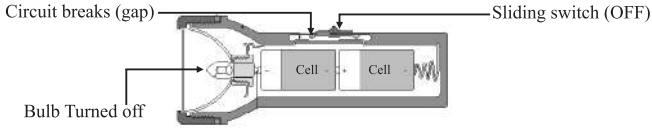
**2.** The conductors are used to make those parts of an electric device from which the current must flow.

Almost all the metals are good conductors of electricity, for example, gold, silver, copper, aluminum, etc. That is why we use metal wires for making electric circuits.

Insulators are used to cover the conductors, so that the user does not receive an electric shock.

Dry air, pure water, dry wood, glass, dry clothes etc. are some other examples of insulators.

3. A torch gets electricity from the cells inside it.




4. An electric cicuit in which the path of electricity is broken at some point then it form the incomplete electric aruit and the electric current does not flow through this ciruit and do vice which 13 attacher to this aircuit also not recieve electric current. So device stop its proper working.

5. If the electric circuit is broken at any point in its path, then the bulb does not glow. Such an electric circuit in which the path of electricity is broken at some point is called incomplete electric circuit or open electric circuit.
   When the electric circuit is complete, the electricity starts flowing from the positive terminal of the electric cell to the filament of electric bulb and from there to the negative terminal of the electric cell.
   Due to the flow of electricity the filament of the bulb becomes white hot and starts giving light.

**H. HOTS**

**Ans.** 1. Because he has connect wire with the same terminal and the other terminal is opened and current cannot flow in open circuit.
2. When switch is open, a wire is disconnected due to this open electric circuit foned air no current can flow in the circuit.

# 14 Water

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. b. 3. a. 4. d. 5. b.

**B. Fill in the blanks :**

**Ans.** 1. Water exists in three states-**solid**, **liquid** and **gas**.
2. **Rain** is our main source of fresh water.
3. Boiling occurs at a particular temperature called **boiling point**.
4. Condensation takes place at a particular temperature called **condensation point**.
5. **Evaporation** takes place in plants in the form of transpiration.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Melting point of ice | • **0°C** |
| 2. Gaseous state of water | • **Steam** |
| 3. Loss of water from plants | • **Transpiration** |
| 4. Boiling | • **Fast vaporization** |
| 5. Water falling from clouds | • **Rain** |
| 6. Evaporation | • **Slow vaporization** |

**E. Answer the following questions in short :**

**Ans.** 1. When water slowly gets converted into its vapour state and these vapours disappear into the surrounding air. This is called evaporation.
2. The process of conversion of a liquid into its solid state is called freezing.
3. Solid, liquid and gas.
4. The process of conversion of a liquid into its gaseous state is called vaporization.
5. The process of conversion of a solid into its liquid state is called melting.

**F. Answer the following questions in brief :**

**Ans.** 1. Boiling is a fast conversion of water into its vapour state.
Boiling occurs at a particular temperature called boiling point.

2. It is required for important processes such as photosynthesis (the process by which plants prepare food) and digestion.

3. Freezing of a liquid into its solid state occurs at a fixed temperature, called freezing point.

4. Water is present on the Earth in rivers, lakes, ponds, oceans and soil. Some water is also present under the ground.

5. Melting of ice (solid state of water) into water occurs at a fixed temperature, called melting point. Melting point of ice is also 0c.

**G. Answer the following questions in detail :**

**Ans.** 1. Conversion of water form one state to another :
Water exists in three states- solid, liquid and gas.
In solid state, water exists as snow or frost. When snow gets compact, it forms ice. When you put water (liquid) in the feezer compartment of a refrigrator, you get ice after some time.
Similarly, at very cold places on the surface to the Earth, water in rivers, lakes and oceans gets rozen into ice. We also get snowfall and hailstorm during very cold winter days.
In liquid state, water exists as you normally see it at room temperature.
In gaseous state, water exists as water vapour or steam.
**Water Cycle :**The continuous circulation of water from the Earth's surface to atmospher, and from the atmosphere to Earth, is called water cycle in nature.
The water cycle in nature can be described as follows. Water is present on the Earth in rivers, lakes, ponds, oceans and soil. Some water is also persent under the ground.

i. Heat from the Sun evaporates water from rivers, lakes, ponds, oceans and soil to form water vapour. This water vapour goes into the air. The plants and trees absorb water from the soil through their roots. The plants and trees lose water as water vapour by the process of transpiration (through the pores of their leaves). The water vapour also goes into the air.

ii. The air containing water vapour is heated by the Sun. Hat air, being lighter, rises high in the sky. It is cold at high altitudes in the sky. So, when the air containing water vapours rises to a high altitude, the water avpour present in it get cooled. The cold water vapour condense to form tiny droplets of water. These tiny droplets fo water form clouds in the sky. The tiny droplets of water in the cloud join together to form bigger drops of water. These drops of water fall down on Earth in the form of rain. In very cold regions, the water drops in the sky free to form snow (ice). So, water slso falls doen to Earth in the frozen state called snow.

iii. Water formed by the melting of snow and some of the rain water flows into rivers and finally goes into oceans. The rain water also fills

the lakes and ponds, and gets absorbed by the soil. Some of the rain water seeps through the soil and goes under the ground.

In this way, water which was taken from the Earth, returns to the Earth and hence the water cycle is completed.

**H. HOTS**

**Ans.** As, too much salt will be poisonous to plants as well as animals. The excessive salt will react with cells which plants use for food & growth. As a result, the plants growth stop or even they will die. Same condition done with animals.

## 15 Air Around Us

### Exercise

**A. Tick (1✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.**
1. **Air** is all around us.
2. Air contains mainly **nitrogen** and **oxygen**.
3. Plants and animals take in oxygen and give out carbon dioxide during **respiration**.
4. Most aquatic animals like fish, tadpole, crab and shrimp have special organs for respiration called **gills**.
5. Living organisms cannot survive without **oxygen**.
6. **Air** is needed for breathing.

**C. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Air | • **Present everywhere** |
| 2. Carbon dioxide | • **0.03%** |
| 3. Smoke | • **Air with ash particles** |
| 4. Wind | • **Moving air** |
| 5. Nitrogen | • **78%** |

**D Write 'true' or 'false' for the following statements :**

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

**E. Answer the following questions in short :**

**Ans.**
1. Nitrogen, oxygen, carbon dioxide, water vapour and other gases.
2. A thick blanket of air, called the atmosphere.
3. With the help of wind vane we can find the direction of wind.
4. To breathing living bodies need air.
5. Oxygen and carbon dioxide are compents of breathing and roopiration.
6. It shows air occupies space.

**F. Answer the following questions in brief :**

**Ans.**
1. Most aquatic animals like fish, tadpole, crab, and shrimp have special organs for respiration called gills. Gills help to take in oxygen and give out carbon dioxide.
2. When air moves, we feel the air.
3. **Importance of the water vapour :**
   Water vapour is formed due to evaporation and heating of water. On

coming in contact with a cool surface, water drops appear on the colr surface. This water vapour also coneuse to form cour and help in the rain. So water vapour is important for the water cycle in incitace.

4. Smoke and dust consist of a fine dust particles harmful these are for living orgenisns. Dust and Smoke also our respirarory system.
5. Air containing carbon dioxide and oxygen enters the plant through thing pores openings where it gets used in photosynthesis and respiration.

**G. Answer the following questions in detail :**

**Ans.** 1. Human beings and animals take in oxygen from the atmosphere and release carbon dioxide during breathing. During burning also oxygen is used up and carbon dioxide is released. Presence of oxygen is necessary for our survival as it breaks food into simpler substances in our body and provides us with energy.

On the other hand, plants take in carbon dioxide present in the air to manufacture food by the process of photosynthesis and release oxygen in the atmosphere.

Thus, a balance of carbon dioxide and oxygen is maintained in the nature. The refore, plants and animals are inter depentent.

2. Air has many uses. We use air without knowing that we are using it. Some of the uses of air are as following. Air aids burning. Oxygen, one of the gases present in air helps to burn things.

Air is needed for breathing. Almost all living things need air to breathe. Oxygen present in the air assists in the process of respiration in plants and animals.

Plants need air to make food. Plants need carbon dioxide, sunlight and water to make their food. Carbon dioxide is also a part of air. We all depend on plants for food.

Birds fly in air. It helps them to fly higher into the sky. The pressure of air along with other forces lets from float. Aeroplanes also go up in the air because of air pressure.

Air propels various objects like boats, ships, gliders, kites, etc.

3. **Aim :** To show oxygen present in air supports burning

**Materials Required :** Three candles, two glass jars that can cover two candles but of different sizes and a watch.

**Method :** Light all the three candles at one time after fixing them on the table. Cover two candles with the jars. Leave one candle uncovered. Switch off the fan and close doors and windows. This will stop wind from blowing off the candles.

With the help of a watch, note the time taken for each candle to stop burning.

**Result :** The candle covered with the small jar goes off first. Then the one with a bigger jar goes off. The candle in the open continues to burn.

**Reason :** The oxygen present in the air inside the jar gets used up to light the candle. When no oxygen is left, the flame goes off. The one kept in the open has a regular supply of air and thus keep burning till the end.

**H. HOTS**

P : Caustic Soda (Sodium hydroxide);
Q : Carbon dioxide;
R : Nitrogen

# 16 Waste Management

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. b. 2. b. 3. d. 4. a. 5. d.

**B. Fill in the blanks :**

**Ans.**
1. **Solid waste** is a term used to describe non-liquid waste materials.
2. **Household wastes** are the wastes produced from our households in our daily activities.
3. **Paper** can be recycled.
4. Biodegradable waste is taken to a low lying open area called **landfill**.
5. Earthworms need **moisture**, **shade** and **moderate temperature** to survive.

**C. Answer the following questions in short :**

**Ans.**
1. Wastes that decomposes by microorganisms and get mixed up in the soil is called biodegradable wastes.
2. Household, Agriculture and Industriies are the souces of wastes.
3. The method of using waste and converting into useful items is called recycling.
4. Biodegradable waste is taken to a low lying open area is called landfill.
5. The best way of waste management is to generate the minimum of it and follow the golden 3R's rule (Reduce, Reuse and Recycle).

**D. Answer the following questions in brief :**

**Ans.**
1. (i) Leftover, useless and unwanted by-products from an industrial, commercial, domestic or any other activity known as waste.
   (ii) Solid waste is a term used to describe non-liquid waste materials. Municipal Solid Waste (MSW), commonly called garbage.
2. Fruits, vegetable peels, bones, skin and wood.
3. On the point of the tecomposins wastes can be classified into Biodegradable and Non- Biodegradable.
4. Degradation of garbage by the action of microorganisms to convert it into manure is called composting. A better way to get rid of biotegratabe wastes of animals plants is to make compost out of it.
5. When the composting is carried out by eathworms or redworms, we call it vemicomposting. These worms can eat the biodegradable waste and convert it into manure. Each worm can eat food equal to its body weight in a day.

**E. Differentiate between :**

1. **Biodegradable :** Dead plants and animals and their products decompose (break down int fine particles by microorganisms) and get

mixed up in the soil. they degrade with the passage of time and do not accumulate in the environment. Such wastes are called biodegradable wastes.

**Non-biodegradable :** These wastes are those which do not decompose in the environment. These include polythene, plastic, rubber and metal.

2. **Recyclable wastes :** Recycling of certain wastes like paper from newspaper, magazines and old notebooks and using them for varied purposes. This method of using waste and converting it into useful items in called recycling.

   Such wastes, that can be used again, are called recyclable wastes.

   Some metals and a variety of plastics can also be remoulded to get new substances. This procedure is larger and difficult.

   **Non-recylable wastes :** Except them some poisonous materials such as led con not be recycle. Atomic rays causing matrials also can not be recycled. So these materials are know as non-recylable wastes.

3. **Composting :** Degradation of garbage by the action of microorganisme to convert it into manure is called composting. Composting can be done at homes, in parks or in fields. When crop residue, leaves, dried grass, etc. are burnt, they give out thick smoke causing pollution. Burning also spoils a part of the land makes it unfit for growth of plants. Abetter way to get rid of plant waste in to make compost out of it.

   **Vermicomposting :** When the composting is carried out by eathworms or redworms, we call it vemicomposting. These worms on eat the biodegradable waste and convert it into manure. Each worm can eat food equal to its body weight in a day. Earthworms need moisture, shade and moderate temperature to survive. Vermicomposting is dome on a large scale in fields as it as a cheap and easy method to obtain manure and at the same time get rid of biodegradable waste.

**F. Answer the following questions in detail :**

**Ans.** 1. Waste is anything which you throw away. Everyday we throw away many things. We throw them away because we do not need or use them anymore. All human activites produce waste. Waste comes form our houses, schools and colleges, from markets, industries and commercial places.

   This was to causes some hurnfull effects on our survival and can harm the human life. Wastes cause air. Water and soil pollution. There are many diseases which produce due to the effect of these pollation. So it 13 necessary to mangement of these wastes for our better life and to save our Earth.

**Waste can also be managed following methods :**

a. Sorting or segregating them before giving them to a garbage collector. Most cities and town municipalities provide separate dustbins for ollecting these two kinds of wastes. you must have seen blue coloured dustbins and green coloured dustbins in your city road sides.

b. Recycling of certain wastes like paper from newspapers, magazines and old notebooks and using them for varied purposes. This method of using waste and converting it into useful items is called recycling. Such wastes, that can be used again, are called recyclable wastes. Some metals and a variety of plastics can also be remoulded to get new substances.

2. Make your own compost pit. Dig a pit in your kitchen garden. Take kitchen waste like vegetable and fruit peels, egg shells, leaves, old newspapers, cardboard pieces etc.. and bury them in the pit. Take care not to throw, foodstuff wrapped in polythene bags as it would not decompose easily. Cover it with soil. Leave it undisturbed for ten to fifteen years days. Open the pit. You will find the garbage has turned into compost which is now an excellent manure for your plants.

3. i. Newspaper, Magazine
   **Use :** We can make grocery bags, baskets or any creative pots.
   ii. Clothes, Towels
   **Use :** Give old clothes to someone else, use for cleaning as rags.
   iii. Old Furniture
   **Use :** Use wood to create shelves, boards.
   iv. Glass Jars, Cans or Containers.
   **Use :** They can be use to make containers after extra items, bathroom items etc.
   v. Plastic Bags
   **Use :** Reuse to carry grocery store. You can use for packing waste in it.

4. Burning plastics causes emission of poisonous gases which cause health problems.
   Food thrown in plastic bags in after eaten by stray animals like cows. Swallowing of such bags for food in them can result in the death of the animal.
   Carelessly thrown plastic bags find their way into drains and choke the sewer system, this results in water spills on the road.
   Plastics bags are often used to store cooked food items. It is possible that the plastics used for this purpose may not be of good quality and may prove harmful for the store food.

**H. HOTS**

**Ans.** 1. If there is no decomposition of dead bodies the world would be crowded place full of fond smell all the nutrients would remain inside the body itself & the nutrients are wasted.
   If we need to solve this problem, we need decomposers because burning will also harm environment.

2. Degradation of garbage by the action of microorganisms to convert it into manure is called composting. Composting can be done at homes, in parks or in fields. When crop residue, leaves, dried grass, etc. are burnt, they give out thick smoke causing pollution. Burning also spoils a part of the land and makes it unfit for growth of plants. A better way to get rid of plant waste is to make compost out of it.

# 1 Nutrition in Plants

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. b. 2. c. 3. a. 4. b. 5. d. 6. d.

**B. Fill in the blanks :**

**Ans.**
1. All green plants prepare food as **glucose**.
2. The plant that derives nutrition is called a **parasite**.
3. Fungal spores are always **floating** freely in the air.
4. **Chlorophyll** is the green pigment found inside chloroplasts.
5. **Chlorophyll** is a thing that makes leaf green.

**C. Write 'true' or 'false' for the following statements :**

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

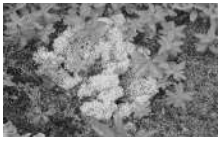
**D. Give one word for the following :**

**Ans.** 1. Nutrients 2. Autographs 3. Heterotrophs
4. Chloropyll 5. Symbionts

**E. Name the following organisms and write their category according to their food habits :**

**Ans.**

Name **Rafflesia flower**
Category **Parasitic plant**



Name **Lichen**
Category **Symbiotic plant**

Name **Pitcher plant**
Category **Insectivorous plant**

Name **Mushroom**
Category **Saprophytic plant**

**F. Answer the following questions in short :**

**Ans.**
1. Venus fly trap.
2. Rafflesia flower and mistletoe
3. Lichen
4. Autotrophs are these organisms which make or synthesisc their own food from simple raw materials.
5. These organisms who do not prepare their own food but are directly or indirectly dependent on plants for food are called heterotrophic.

**G. Answer the following questions in brief :**

**Ans.**
1. Some plants feed on insects by trapping and digesting them. Such plants are called insectivorous plants.

Examples of insectivorous plants are pitcher plant, Venus fly tap, sundew and bladderwort.

2. The organisms which make their own food from simple substances present in the environment are called autotrophs. Autorophs are the producers of food, sothey are also called producers.
   Plants which do not contain chlorophyll (non-green plants) depend on other living organisms for their food. Thus, the plants which do not contain chlorophyll are called heterotrophic. As they consume food make by other they are also called consumers.
3. Nutrition is the act of providing nutrients to the body cells of living organisms so that they can carry out activities to keep themselves alive.
   There are two types of nutrition—autotrophic nutrition and heterotrophic nutrition.
4. Photosynthesis is important in the following ways :
   - It is ultimate source of food and energy for all living organisms.
   - Oxygen, released into the atmosphere is a life supporting gas.
   - The process helps in maintaining balance between oxygen and carbon dioxide in the atmosphere.
5. Saphrophytic plants are those plants who fed on decaying organic matter of dead plants and animals.
   Examples of saprophytes are mushrooms, bread moulds and yeast. The saprophytes release digestive juices outside their bodies on the dead and decaying matter. These juices act on the organic matter and convert it into liquid form (simpler substances). These organisms then absorb this liquid and obtain their nutrition form it.

**H. Answer the following questions in detail :**

**Ans.** 1. **Autotrophic Nutrition :** Green plants make their own food through a process called photosynthesis.
   The mode of nutrition in which an organism make its own food is called autotrophic nutrition.
   Organisms that follow the autotrophic mode of nutrition are called autotrophs. eg : All green plants, fungi and some bacteria.
   **Heterotrophic Nutrition :** Some plants do not contain chlorophyll; some grow in places where they do not get enough light. Such plants are not able to carry out photosynthesis and depend on other organisms for nutrition.
   The mode of nutrition in which an organism cannot make its own food and depends on other organisms for food is called heterotrophic nutrition. Organisms that follow heterotrophic mode of nutrition are called heterotrophs.
   **example of heterotrophic plants are :**
   - Parasitic plants, Saprophytic plants,
   - Insectivorous plants, Symbiotic plants.

2. Plants cannot utilise the atmospheric nitrogen in its gaseous form. However, if this gaseous nitrogen is converted to a soluble form, plants can use it. This conversion cannot be brought about by plants the selves. Certain microbes like Rhizobium can convert atmospheric nitrogen

into a form that can be easily used by plants. The plant, in turn, provides food and shelter to the bacterium. This bacterium gets associated with the roots of leguminous plants such as peas, beans and gram. Hence, these plants are good sources of protein, which contains nitrogen. Rhizobium fixes nitrogen for the plant and, thus, helps in replenishing the lost nutrient in the soil. That is why farmers grow a leguminous crop in between two main crops to maintain the fertility of the soil.

**I. HOTS**

**Ans.** No, humans are heterotrophs as the food they cook is obtained from other sources i.e., plants and animals.

# 2 Nutrition in Animals

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. b. 2. c. 3. c. 4. a.
5. a. 6. a. 7. a. 8. a.

**B. Fill in the blanks :**

**Ans.** 1. The process by which food is taken inside the body of an organism is called **ingestion**.
2. A frog uses its **tongue** to catch its food.
3. The alimentary canal and the associated glands together constitute the **digestive system**.
4. The inner wall of intestine contains numerous finger-like projections called **villi**.
5. The mouth contains the tongue, **teeth** and salivary glands.

**C. Write 'true' or 'false' for the following statements :**

**Ans.** 1. true 2. false 3. true 4. false 5. true
6. true 7. false 8. true 9. false 10. true

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Deer | • **Ruminant** |
| 2. Amoeba | • **Food vacuole** |
| 3. Humans | • **Omnivore** |
| 4. Mouth cavity | • **Saliva** |
| 5. Liver | • **Bile juice** |
| 6. Stomach | • **Hydrochloric acid** |
| 7. Small intestine | • **Villi** |
| 8. Large intestine | • **Absorption of water** |

**E. Answer the following questions in short :**

**Ans.** 1. The food taken in is solid and complex. The process of converting complex food into simple and soluble froms is called digestion.
2. Finger-like projections formed by an amoeba to engulf the food particle is know as pseudopodia.

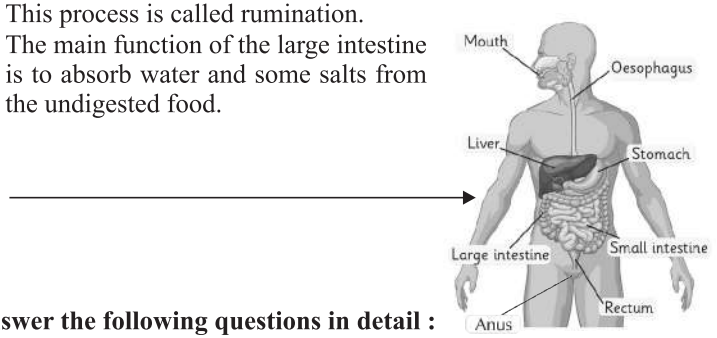
3. There are four main kinds of teeth in humans incisors, canines, premolars and molars.
4. Majority of animals take food in the form of solids. This form of nutrition in which food is eaten in solid form is called holozoic nutrition.
5. Phagocytosis

**F. Answer the following questions in brief :**

**Ans.** 1. Bile is a digestive juice secreted by Liver. Bile juice is stored in a sac like strueture called the gall bladder. It helps in the digestion of fats.

2. The grass-eating animals chewed grass quickly and store it in a part of their stomach called rumen here the food gets partially digested. The partially digested food is called cud. When the animals are not eating, the curd returns to the mouth in small lumps and is chewed. This process is called rumination.

3. The main function of the large intestine is to absorb water and some salts from the undigested food.

4. 


**G. Answer the following questions in detail :**

**Ans.** 1. **There are two types of nutrition :**

**i. Autotrophic nutrition :** Autotrophic organisms make their own food by a process called photosynthesis. For example, Green plants, manufacture sugar and starch from carbon dioxide and water using the energy of sunlight to drive the neassary chemical reactions.

**Heterotrophic Nutrition :** Animals do not make their own food but depend on the food synthesised by plants, hence they are called heterotrophs and they show heterotrophic mode of nutrition. When the food is taken in the form of solid particles as a whole, the method of food intake is known as holozoic.

There are different types of heterotrophs whose mode of feeding varies with the kind of food they eat like snake swallows its prey, tiger chews its food, etc. based on the eating habits, the heterotrophs are classified as follows:

**Herbivorous Animals :** These are the animals that obtain their food only from plants, e.g., cow, sheep, goat, deer, elephant, kangaroo, giraffe, etc.

**Carnivorous Animals :** These are the animals that obtain their food by killing other animals. They never eat plants or plant products, e.g., tiger, lizard, lion, etc.

**Omnivorous Animals :** Such animals consume plants as well as other animals as their food, e.g., bear, dog, human beings, etc.

**Parasites :** Animal parasites are organisms that obtain their food from other animals either by living inside or outside their body, e.g., tapeworm and roundworm (inside body), tick and lice (outside body), etc.

**Scavengers :** Scavengers are those animals who feed on the remains of dead animals prayed on predators, e.g., vulture, crows, jackal, etc.

2. **a. Saliva :** In the mouth chewed food is mixed with saliva secreted by the salivary glands. Saliva mixed with food, so that it can easily digest.
   **b. Tongue :** Tongue, is a fleshy muscular organ. It is attached at the back and free at the front. It can be moved in all directions. It performs the following functions :
   - Helps in mixing the chewed food with saliva.
   - Helps in swallowing food.
   - Helps to detect different tastes of food, with the help of taste buds.

   **c. Pancreas :** Its enzymes complete the digestion of all the three components of food, i.e., carbohydrates, fats and proteins.
   **d. Liver :** It secretes bile juice which helps in the digestion of fats. Bile juice is stored in a sac called the gall bladder.
   **e. Pseudopodia :** Pseudopodia helps in the ingestion of food in case of Amoeba. On coming in contact with a food practicle, it forms a food vacuole. Digestion of food is chemical and it takes place inside the food vacuole.
3. a. Mouth b. Teeth
   c. Tongue, Food pipe d. Stomach
   e. Small Intestine f. Small Intestine
   g. Large Intestine h. Rectum

**H. HOTS**

**Ans.** 1. If we skip meals, then we do not get energy for performing any task. We need food to grow, to get energy & function properly of our body.
2. Small Intestine.

# 3 Cloth Materials— Fibre to Fabric

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. b. 3. c. 4. a. 5. b.

**B. Fill in the blanks :**

**Ans.** 1. Wool is also obtained from **sheep**.
2. The process of washing hairs is called **scouring**.
3. The small fluffy fibres are called **burrs**.
4. The **caterpillar** is called a voracious eater.
5. **Australia** is at the top in wool production.

**C. Encircle the odd-one out. Give reasons for your choice:**

**Ans. 1. Silk moth :** Because silk moth gives us silk and the others two give us wool.

**2. Reeling :** Because reeling is not used in case of fibre obtained from sheep. But shearing and scouring are used in the process of wool manufacture.

**3. Tassar :** Tassar is not a variety of wool.

**4. Cotton :** Cotton is obtained from plants but wool and silk is obtained from animals.

**D. Give one word for the following :**

**Ans.** 1. Sericulture 2. Shearing 3. Lohi
4. Caterpillar 5. Scouring

**E. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Yak | • **Tibet and Ladakh** |
| 2. Cocoon | • **Cover of pupa** |
| 3. Fleece | • **Hair of sheep** |
| 4. Mulberry leaves | • **Food of silkworm** |
| 5. Shearing | • **Shaving a sheep's body** |

**F. Write 'true' or 'false' for the following statements :**

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

**G. Answer the following questions in short :**

**Ans.** 1. The threads from which clothes are formed are known as fibres. They are of two types–natural & synthetic.

2. Cotton, wool, silk.

3. The process of shaving of sheep's body to obtain fleece is called shearing.

**H. Answer the following questions in brief :**

**Ans.** 1. People working in the sorting department are at risk because they may get infected by anthrax bacteria. The anthrax disease is a fatal blood disease and is called sorter's disease.

2. The rearing of silk moths for obtaining silk is called sericulture.

3. First of all fully grown cocoons are sorted out according to their colour, size, shape and texture. The sorted cocoons are immersed in boiled water or exposed to steam. This kills the pupae inside the cocoons.

The cocoons are then put through a series of hot and cold immersions. This makes the sericin (or silk gum) soft. The sericin is a gummy substance that hold the two strands of fibroin of a silk fibre together. The process is called softening of sericin.

The next step is the process of unwinding silk filaments from the cocoon. This is called reeling the filament. Three to ten filaments of cocoon are usually reeled together to produce the filament of raw silk of desired thickness.

Silk fibres are spun into silk threads which are used by the weavers to weave the silk cloth.

**I. Give reasons for the following.**

**Ans.**

1. We wear different types of clothes in different weathers because different clothes like cotton keep us cool in summers and woollen clothes keep us warm in winter have different qualities.
2. Wool-yielding animals have thick coat of hair on their body to keep them warm during cold winter season.
3. Merino wool is considered to be the best variety of wool because of its very fine fibre diameter and excellent durability.
4. Worsted woollen cloth is better than the ordinary woollen cloth because worsted woollen clothes is made from best quality of wool due to which they trap a lot of air and keep us warm better than ordinary woollen clothes.
5. The body of sheep is shaved only once in a year and mostly in spring or early ummer. By this they do not hurt of any type.

**J. Answer the following questions in detail :**

**Ans.**

1. Synthetic fibre are made by joining of monomers into polymers by the process of polymerisation.
   The chemicals used to form these chains are sodium hydroxide, carbon disulphide which are derived from coal, oil or natural gas.
2. Wool fibre is obtained from the hair on the body of wool-yielding animals. Sheep, yaks, angora goats, angora rabbits, cashmere goats are some wool-yielding animals.
   Types of wool are determined by the quality of sheep's fleece. The quality of wool depends on the age and physical condition of the sheep. The fleece of a healthy sheep is covered with an oily substance called yolk. It protects the sheep from rain and keeps the fleece from becoming matted. Young sheep produce the best wool. Lower quality wool comes from dead or diseased sheep.
3. **Occupational hazard :** An occupational hazard is a hazard experienced in the workplace. Occupational hazards can encompass many types of hazards, including chemical hazards, biological hazards, psychosocial hazards and physical hazards.
   **Occupational Hazards of Wool Industry :** People working in the sorting department are at risk because they may get infected by anthrax bacteria. The anthrax disease is a fatal blood disease and is called sorter's disease.
   **Occupational Hazards of Silk Industry :**

- Workers of sericulture industry get affected by respiratory diseases such as asthma and bronchitis because of inhalation of vapours arising from cocoons when being steamed, boiled and reeled.
- Workers develop infectious skin diseases due to dipping of hands in boiling water during killing of pupae.
- Severe headache, fever and pain in neck and low back are also observed in the workers of silk industry.
- Leg deformity and bow-leggerdness are also found in some workers.

4. **Life cycle of silk moth :**
   The life cycle of silk moth has four stages.

i. **Egg Clusters :**The female silk moth lays 300-400 eggs in clusters on mulberry leaves. These eggs are stored in cold for long term storage. The eggs are warmed to suitable temperature for the larvae to hatch from the eggs on mulberry leaves.

ii. **Silkworm :** The larva called the silkworm or caterpillar is a voracious eater, feeding day and night on mulberry leaves. When they are about 35 days old they are 10,000 times heavier than when they were hatched. The silkworm sheds its moult (skin) four times. When the worm stops eating it attaches itself to a piece of starw or branches placed in cultivation trays. They are now ready to spin a silk cocoon.

iii. **Pupa or Cocoon :** It first weaves a net to hold itself and then swings its head side to side in the form of figure 8. The spinning of cocoon is one continuous filament fibre. It consists of fibroin protein secreted from two openings in salivary glands in the head of these larva and a gum called sericin cementing the two filaments together. Silk solidifies when it comes in contact with air.

Once the cocoon is completed, the silkworm goes into a resting phase for two to three weeks.

iv. **Silk Moth :** The silkworm then metamorphosis into silk moth that emerges from the cocoon by breaking it; thereby destroying the continuity of the thread of cocoon case. The silk moth secretes a fluid to dissolves the silk and thus escapes from the cocoon with ease. Some of the healthy moth are trapped and kept for breeding.

**K. HOTS**

**Ans.** 1. Wool traps air and as air is a poor conductor of heat. So, the air trapped in the woollen clothes prevent us from cold.

2. The mulberry silkmoth's cocoon gives us standard fibre. Its size quality & tensel strength is good.

# 4 Physical and Chemical Changes

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. b. 3. b.

**B. Fill in the blanks :**

**Ans.** 1. **Change** is a universal phenemenon.

2. A change in which no new substance is formed is called **physical change**.

3. The process that leads to a chemical change is called a **chemical reaction**.

4. A **physical change** is usually accompanied by a change in shape, size or state.

5. **Rusting** is faster when moisture content in air is high.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Name the following :**

**Ans.** 1. A metal that burns with a dazzling white flame.**Magnesium**
2. It is chemically represented as CaO.**Calcium Oxide**
3. It is a substance formed by mixing metals.**Alloy**
4. It is a change in which a new substance is formed.**Chemical Change**
5. It is a yellow-coloured non-metal which is mixed with rubber to harden it. **Zinc Chloride**

**E. Answer the following questions in short :**

**Ans.** 1. A change in which only the physical properties of any substance are changed and no new substance is formed is called a physical change.
2. A change in which new substance is formed with change in chemical properties is know as chemical change.
3. Fe
4. A hot solution of a substance on cooling, deposits crystals of the pure substance is called crystallisation.
5. To prevent it from rust.

**F. Write whether the following processes are physical change or chemical change.**

| | | |
|---|---|---|
| 1. | Digestion of food | **Chemical change** |
| 2. | Formation of urine | **Chemical change** |
| 3. | Glowing of bulb | **Physical change** |
| 4. | Crystallization | **Physical change** |
| 5. | Photosynthesis | **Chemical change** |
| 6. | Burning of leaves | **Chemical change** |
| 7. | Melting of butter | **Physical change** |
| 8. | Explosion of fireworks | **Chemical change** |
| 9. | Melting of wax | **Physical change** |
| 10. | Respiration | **Chemical change** |
| 11. | Ripening of fruits | **Chemical change** |
| 12. | Evaporation of water | **Physical change** |

**G. Answer the following questions in brief :**

**Ans.** 1. It prevents the iron surface to come in contact with moisture and/or oxygen. So, no rusting occurs.
2. Oxygen and Moisture
3. The process of depositing a layer of zinc on iron surface is known as galvanization.
4. Rusting of iron is a slow oxidation process in which iron reacts with oxygen present in the air, in the presence of moisture to form a substance called iron oxide, which is commonly known as rust.
5. Yes, it is a chemical change. Actually, the magnesium enters in a chemical reaction and react with oxygen present in the air to form magnesium oxide.
Magnesium + Oxygen → Magnesium oxide

**H. Give reasons for the following :**

**Ans.** 1. To prevents the iron surface to come in contact with moisture and/or oxygen and to prevent from rust formation they often coated with paint.

2. As it reduces the amount of oxygen which is used to burn a fire.

**I. Answer the following questions in detail :**

**Ans.** 1. **Differences between physical and chemical changes**

**Physical change:**

i. A change in which no new substance is formed is called physical change.

ii. A physical change is usually accompanied by a change in shape, size or state.

iii. Examples are dissolving salt in water, food.

**Chemical change :**

i. A change in which a new substance is formed is called a chemical change.

ii. A chemical change is usually accompanied by a change in colour, release or absorption of heat or light, evolution of a gas, production of sound or change in smell.

iii. Examples are rusting of iron, spoiling of inflating a balloon.

2. This is the most effective way of preventing iron from rusting. It is also long lasting, e.g., stainless steel (alloy of iron, chromium, nickel and carbon) is used in making cutlery machine parts, surgical instruments. Nickel steel (iron and nickel) is used in making automobile parts.

3. **Galvanising :** Coating of iron by a layer of zinc is most popular way of preventing rusting of iron.

**Tinning :** Coating with molten tin to prevent rusting.

**Alloying :** Two or more metals, on a metal and a non-metal are mixed in definite proportion in their molten state to make a homogeneous mixture that behaves like a single metal.

4. Oxygen and moisture are two essential conditions for rusting.

**Method :** To understand that water and air are essential for rusting to occur.

For this we require three conical flasks labeled A, B and C nails, distilled water, tap water, anhydrous calcium chloride and heating arrangement.

**Procedure :** Take flask A. Pour distilled water in it (to prevent any electrolytic action) boil it for sometime to drive away dissolved air. Add few drops of ail to form an air sealing surface. Put few iron nails and then seal the flask and leave it for at least two days.

Take flask B. Pour tap water in it. Put few iron nails in it and observe the next day. It need not be sealed.

Take conical flask C. Put a desiccating agent like anhydrous calcium chloride after warming it for sometime. Then seal the flask after putting a few nails. Leave it for two days.

**Observation :** The nails in flask A do not rust because though there was adequate water but there was no oxygen in the water as it was boiled, water in flask was distilled so it did not act like an electrolyte.

The nails in the flask B showed rusting as both water and oxygen were available.

The nails in the flask C did not rust because though oxygen was available but water was not available.

**J. HOTS**

**Ans.** As, rusting requires water, oxygen (moisture) which is very much present in rainy season.

## 5 Acids, Bases and Salts

### Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. c. 3. c. 4. d. 5. c.
6. b. 7. a. 8. b.

**B. Fill in the blanks :**

**Ans.** 1. Baking soda is an example of a **basic substance**.
2. Acids are **sour** to taste.
3. The indicators used for identifying an acid or a base or also called **acid-base indicators**.
4. A reaction in which an acid combines with a base to form salt and water is called a **neutralisation reaction.**
5. The sting of an ant and a bee is acidic as it contains **formic acid**.

**C. Give one word for the following :**

**Ans.** 1. Indicators 2. Salt 3. NaCl

**D. Encircle the odd-one out. Give reasons for your choice:**

1. Tamarind, grapes, vinegar, (Sodium bicarbonate solution)
**Reason :** Because sodium bicarbonate solution is work as a base and all others are work as acids.
2. Milk of magnesia, sodium bicarbonate solution, soap solution, (sugar solution.)
**Reason :** Because sugar solution is work as a electrolyte.

**E. Write 'true' or 'false' for the following statements :**

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

**F. Match the following :**

**Ans.**

| | | |
|---|---|---|
| 1. Wasp sting | • | **Rubbing vinegar** |
| 2. Ant sting | • | **Rubbing sodium bicarbonate solution** |
| 3. Antacid | • | **Milk of magnesia** |
| 4. Sulphuric acid | • | **King of chemicals** |

**G. Group all the following into Acid, Base or Salt :**

**Ans.**

| | | | | | |
|---|---|---|---|---|---|
| 1. | Grapes | **Acid** | 2. | Sodium acetate | **Salt** |
| 3. | Ammonium hydroxide | **Base** | 4. | Ammonium chloride | **Salt** |
| 5. | Vinegar | **Acid** | 6. | Magnesium hydroxide | **Base** |
| 7. | Calamine | **Base** | 8. | Sodium hydroxide | **Base** |
| 9. | Milk | **Acid** | 10. | Sodium chloride | **Salt** |

**H. Name the acids present in :**

1. Tomato **Oxalic acid**
2. Orange **Cetric acid**

3. Ant bite **Formic acid**
4. Car batteries **Sulphuric acid**
5. Fertilizers **Nucleic acid**

**I. Answer the following questions in short :**

**Ans.** 1. Acid and bases, when mixed in right amounts, neutralise each other. This type of reaction is called neutralisation reaction.

2. NaOH, KOH, $Ba(OH)_2$

3. Turmeric

4. It is used to neturalise the acid made in stomach.

**J. Answer the following questions in brief :**

**Ans.** 1. **a.**

| **Acid** | **Base** |
|---|---|
| i. Acids are sour in taste. | i. Bases are bitter in taste. |
| ii. Acids change the colour of blue litmus to red. | ii. Bases change the colour of red litmus to blue. |

**b.** **Strong acids :** Most of the mineral acids like sulphuric acid, nitric acid, hydrochloric acid and phosphoric acid are strong in nature. Hence they are called strong acids.

**Weak acids :** On the other hand all the organic acids are weak acids by nature. For example, citric acid, tartaric acid, acetic acid and lactic acid are all weak acids.

2. Such substances, that are bitter in taste and produce a soapy feeling, are called bases. Baking soda is an example of a base.

3. **a** **An acid :**

i. orange ii. Vinegar

iii. Coca-cola

**b.** **base :**

i. soaps ii. toothpaste

iii. cleaning agents

4. **Acid Rain :** The large accumulation of pollutants like sulphur dioxide, carbon dioxide nitrogen dioxide in the atmosphere dissolve in the moisture of the cloud forming acids such as sulphuric and sulphurous acid, nitric and nitrous acid and carbonic acid. The first showers of rain in a highly polluted area thus has high acid concentration which harms plants, animals and buildings. This is known as **acid rain.**

**K. Answer the following questions in detail :**

**Ans.** **1.** To test if a given substance is acidic or basic, special kind of substances are used. Such substances are called **indicators.** The indicators used for identifying an acid or a base are also called **acid-base** indicators.

There are many indicators available but the naturally-occurring are .Turmeric .Litmus .China rose petals *(Gudhal)*

**Litmus :** Litmus is a natural dye. It is extracted from Lichens. In distilled water (neutral medium) its colour is purple (mauve). In acidic solution, its colour is red. In basic solution, its colour is blue.

**Turmeric :** *(Haldi powder)* can also be used as an indicator for identifying acids or bases. Turmeric is yellow in neutral solutions. Turmeric is yellow in acidic solutions. Turmeric is red in basic solutions.

**China Rose : China rose** *(Gudhal)* extract can also be used as an acid-base indicator for identifying acid and bases. China rose indicator in water (neutral) is pink. China rose indicator is magenta (dark pink) in acidic solutions. China rose indicator is green in basic solutions.

2. Acids may be weak or strong. All organic acids are **weak acids** by nature. For example, citric acid, tartaric acid, acetic acid and lactic acid are all weak acids. The organic acids are used as food ingredients.

   Organic acids contain carbon as a constituent and are found in living things plant and animal material e.g., citric acid, formic acid and acetic acid. These acids are naturally occurring. They are weak acids and that is why we use them as food supplements.

   So we can say that all acids are not corrosive and we can uses than in our food and food supplements.

3. We know that during a neutralization reaction, acids and bases react to form salt and water. The most common salt known to us is sodium chloride or common salt. Every salt has a metal part and a non-metal part, for example, in the salt, sodium chloride, sodium is the metal part and chloride is the non-metal part. The name of the salt is derived from the name of the metal contributed by the base. The non-metal part of the salt comes from the acid.

   In the above example of sodium chloride, sodium is derived from the base sodium hydroxide, and chloride is derived from the acid, hydrochloric acid.

   On the basis of reaction salts are of following types :

   **Neutral Salts**

   A Neutral salt does not contain any replaceable hydrogen atom in its molecule.

   **Acidic Salts**

   An acid salt still has replaceable hydrogen ions. Acid salts ionize in water to show properties of an acid.

   **Basic Salts**

   A basic salt is formed by incomplete neutralization of a base. A basic salt may further react with acid to form a normal salt.

4. Tooth decay is caused due to an acid that is produced by bacteria present in our mouth. If we do not clean our teeth properly, the bits of food remain between our teeth. certain bacteria live on these bits of

food and make acid. This acid is the cause of tooth decay. Toothpastes are basic in nature and neutralise this acid and thus help in preventing tooth decay.

**L. HOTS**

**Ans. 1.** (i) C (ii) D (iii) Three acids A, B and E
(iv) Yellow will change to red colour.
(v) (b) C and (B)

2. Because turmeric is works as a indicator when it reacts with the soap contains a base so it becomes red.

# 6 Heat Flow and Temperature

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. Sun is the primary source of **heat energy** on Earth.
2. **Radiation** is a process of heat transfer which does not require material medium.
3. The temperature of a healthy human being is **37°C**.
4. **Temperature** is the measure of the degree of hotness or coldness of a body.
5. **Mercury** is used in thermometer as it conducts heat.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.** 1. Temperature is the measure of the degree of hotness or coldness of a body. An object appears hot if its temperature is higher than our body, and cold if its temperature is lower than our body.
2. Cooling makes bond between two atoms to shrink. Due to this distance between two atoms decreases. This allow to pack them, so substance become shrinks on cooling.
3. Radiation is a process of heat tronsfer which does not require material medium.
4. Convection is the process by which heat gets transferred from a hotter region to a cooler region by the actual movement of particles.

**E. Answer the following questions in brief :**

**Ans.** 1. The silver coating on the inner bottle prevents heat transfer. The silver coating of the flask walls stops heat entering or leaving the flask by conduction.
2. White, Yellow, Pink and Blue because in summers we wear light color to keep us cool as heat transfer is less in light colour clothes from atmospheric to body surface.
3. There are three temperature scales. These are :
(a) Celsius scale
(b) Fahrenheit scale
(c) Kelvin (or Absolute) scale

4. Mercury used as a thermometric liquid as its use has the following advantages :
   (a) It shows a wide range of temperature from -39°C to 357°C.
   (b) Being a good conductor of heat, it heats up and thus attains temperature quickly.
   (c) It is easily visible.

**F. Answer the following questions in detail :**

**Ans.** 1. **Land Breeze :** During the night, the land cools down much faster than the sea, so the air above the land cools faster than the air above the sea. The warm air above the sea rises up and the cool air above the land rushes to takes its place. This cool air that moves from land towards the sea is called land breeze.

**Sea Breeze :** During the day, the land becomes hot faster than the sea, so the air above the land gets heated faster than the air above the sea. The air above the land rises and cooler air from the sea rushes over land to take its place. This cool air from the sea blowing over land is called sea breeze.

2. Temperature is the measure of the degree of hotness or coldness of a body. An object appears hot if its temperature is higher than our body, and cold if its temperature is lower than our body. To know the temperature of a body we use to measure the of that body is known as temperature scale.

**Celsicus Scale :** The celsius scale temperature was designed by Anders Celsius (1701-1744). On this scale temperature is described in degree Celsius (°C). It is a metric scale of temperature.

3. It is a special type of bottle or flask which does not allow heat loss or heat gain by the material/objects stored in it. A hot body loses heat to the surroundings by conduction, convection and radiation. Similarly, a cold body gains heat by any or all of the three methods of heat transfer. This loss or gain of heat is minimized in the structure of a thermos flask. Since the transfer of heat through the walls of the thermos flask is very small, the contents (hot tea or ice cubes) are kept at the same temperature for a long time.

**HOTS**

**Ans.** 1. No, because the conditions require for conduction are not present in vacuum i.e.
   a. The two bodies should be in contact with each other.
   b. The two bodies should have different temperatures.

2. When the surface of the water body is frozen then this frozen layer works as a barrier of heat transfer from water to the outer or surroundings and no more water freeze below this layer. So aquatic animals can survive below this layer.

# 7 Weather, Climatic Changes and Adaptations

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. c. 3. c. 4. b. 5. b.

**B. Fill in the blanks :**

**Ans.** 1. **Weather** is a complex phenomenon.
2. **Penguin** is a sea-bird which cannot fly.
3. **Weather** is the condition of the atmosphere at a particular time and place.
4. Camels are found in **desert** and penguins in **Antartica**.
5. Polar regions are situated near the poles **north pole** and **south pole**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Polar bear | • Thick white fur |
| 2. Monkey | • Long tails |
| 3. Icy area around the poles | • Polar region |
| 4. Humid and wet climate | • Tropical rainforests |

**E. Answer the following questions in short :**

**Ans.** 1. The short-time atmospheric conditions at a particular place and time with respect to temperature, relative humidity, rainfall, wind speed etc. is called the **weather** at that place.
2. Climate is the composite of average weather conditions over a period of many years.
3. Weather is changes from day to day
4. The maximum temperature of the day is usually recorded in the afternoon.
The minimum temperature of the day is usually recorded in the early morning.

**F. Answer the following questions in brief :**

**Ans.** 1. The temperature, humidity, rainfall, wind speed etc. are the elements of weather.
Climate of a place depends upon a number of factors :
a. Distance from the equator.
b. Height above the sea level.
c. Distance from the sea.
d. Direction of the winds.
e. Humidity and rainfall.
f. Temperature.
2. **Weather Forecasting**
Weather forecast is based on the data collected by weather balloons, satellites photographs of the cloud formation etc.
Weather forecast is helpful to people in the following ways.
It allows people to prepare for bad weather.It helps in the planning of daily activities.
3. **Adaptations in Animals of the polar region:**
a. They have a fat deposition below the skin which retain heat in the body and keeps warm.
b. They have flat and broad paws which help them to walk on ice.
c. They have long curved and sharp claws. This provides good grip and helps them to walk on ice.

d. They have small ears that help them to retain as much heat as possible.

4. a. Distance from the equator.
   b. Height above the sea level.
   c. Distance from the sea.
   d. Direction of the winds.

**G. Answer the following questions in detail :**

**Ans.** 1. **Weather :** Weather is a complex phenomenon. It can change suddenly over very short period. The weather may be sunny in the morning. It may get cloudy within an hour or two, and it may rain heavily very soon thereafter. That is why the weather is not always same.

**Climate :** Climate is the composite of average weather conditions over a period of many years. A minimum period of thirty five years is necessary to draw dependable averages. Our country generally experiences the tropical monsoon climate. The cooler months, are November to February, while April to June are hot months. During mid June to September, one experiences the monsoon.

**2. Adaptations of Polar Bear :**

a. The fur has two layers. The two thick layers of fur protect the polar bear from the extremely cold surroundings.
b. In addition to fur, a thick layer of fat is present under the skin. This layer of fat also helps to keep the body warm (insulates the body from cold).
c. It can close its nostrils. This feature helps the animal during swimming. By closing its nostrils, it can remain under water for long periods.
d. It has a strong sense of smell that helps in locating the prey from a distance.
e. Its paws are flat and broad which help it to walk on ice.
f. It has long curved and sharp claws. This provides good grip and helps it to walk on ice.
g. It has small ears that help it to retain as much heat as possible.

3. **Special features of Penguin :**

- Penguin is black and white in colour but still it merges well with the white background of ice and snow.
- Penguin has thick skin and a layer of fat below its skin which protect it from extreme cold.
- Penguins live together in large numbers. Penguins huddle together to keep themselves warm.
- Penguins has streamlined body, flipper-like wings, and webbed feet which make it a good swimmer. Being a good swimmer helps penguins in catching fish as prey.

4. The tropical rainforests are inhabited by a wide variety of animals. The animals are adapted to hot summers and plenty of rainfall. In these forests the temperature in the coldest months never comes down below 15°C and during summers it crosses 40°C.

The tropical rainforests are very thick. The climatic conditions are very supporting to animals, hence an enormous variety of animals live in these forests. Many animals live on trees. They are adapted to live on trees and move swiftly from one tree to another. Another important feature is the well developed sense of smell, enemies or prey. This helps the animals to protect themselves from large number of carnivorous animals and also to smell them.

**H. HOTS**

**Ans.** 1. Deforestation can lead the changes in temperature and rainfall and these factors effect the weather.

2. Many birds bones are hollow which makes their bodies lightweight. Birds have strong chest muscles that move the wings that help them fo fly.

## 8 Respiration Us

### Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. Fishes and other animals living in water are called **aquatic animals**.

2. **Stomata** are present on the surface of leaves.
3. The cells surrounding the guard cells are known as **subsidiary cells**.
4. Cellular respiration takes place inside the **cells**.
5. The process of inhalation and exhalation of air is called **external respiration**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Differentiate between each of the following pairs :**

**Ans.** 1. **Aerobic respiration**

Occur in the presence of oxygen.
Food is completely broken down into carbon dioxide and water.
More energy is produced.

$$\underset{\text{(Glucose)}}{\text{Food}} \xrightarrow{\text{(+) Oxygen}} \text{Carbon dioxide + Water + Energy}$$

**Anaerobic respiration**

Occur in the absence of oxygen.
Food is partially broken down into alcohol and carbon dioxide.
Much less energy is produced.

$$\underset{\text{(Glucose)}}{\text{Food}} \longrightarrow \text{Alcohol + Carbon dioxide + Energy}$$

2. **Cellular repiration :** Exchange of gases in the cells which utilise oxygen to produce energy by breaking down the food molecules into carbon dioxide and water is called internal respiration or cellular respiration.

**Breathing :** The process of inhalation and exhalation of air is called external respiration or breathing.

**E. Answer the following questions in short :**

**Ans.** 1. Insects have small openings in their body known as spiracles. It helps in the respiration.
2. Tiny openings present in the leaves known as stomata that helps the plant in respiration.
3. The process of inhalation and exhalation of air is called external respiration or breathing.
4. Microorganisms like yeast and bacteria can live without oxygen.

**F. Answer the following questions in brief :**

**Ans.** 1. **Respiration :** The process that includes breathing in of oxygen, using it for the release of energy by the oxidation of food in the living cells and breathing out of waste products like carbon dioxide and water is known as respiration.
2. In fishes respiratory organs are gills. They obtain oxygen dissolved in water when it passes over the gills.
These are formed of large number of gill filaments with a network of fine blood capillaries. The oxygen dissolved in water enters the blood capillaries. Carbon dioxide present in capillary blood is released into water. The oxygenated blood from capillaries is taken to heart and pumped to different parts of the body and blood from body tissues which has carbon dioxide is taken to gills for the exchange of respiratory gases.
3. Plants do not possess specific organs for breathing. The leaves of plants have small openings known as **stomata** that help in the exchange of gases by the process of diffusion. The oxygen is utilised to break down glucose into carbon dioxide and water.
Stomata are present on the surface of leaves. Each stomata is surrounded by two kidney-shaped cells called guard cells which can perform photosynthesis as they have chlorophyll in them. Plants growing underwater have stomata on the upper side of their leaves.
4. Insects have small openings in their body known as spiracles. There is a network of tubes called tracheae that help in the gaseous exchange. Air, that is rich in oxygen, enters the insect's body through the spiracles and is carried to all parts of the body through the tracheal tubes.

**G. Answer the following questions in detail :**

**Ans.** 1. There are two main processes of respiration-Aerobic and Anaerobic respiration.

**i. Aerobic Respiration**

Most organisms require oxygen for respiration. The breakdown of glucose to carbon dioxide and water in the presence of oxygen is known as aerobic respiration. The reaction involved is :

Nutrients from the food + Oxygen $\longrightarrow$ Carbon dioxide + Water + Energy

Or, $C_6H_{12}O_6 + O_{2\,(g)} \longrightarrow 6CO_{2\,(g)} + 6H_2O_{\,(g)} +$ Energy

**ii. Anaerobic Respiration**

Some organisms like yeast and some bacteria can survive in the absence of oxygen. In such organisms, food is broken down even in the absence of oxygen. The process of respiration, that takes place in the absence of oxygen, is known as **anaerobic respiration.** Carbon dioxide and ethyl alcohol are released as by-products during anaerobic respiration. The reaction involved is :

Glucose $\longrightarrow$ Alcohol + Carbon dioxide + Energy

Or, $C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_{2\,(g)}$ + Energy

2. **Aim :** To show that exhaled air contains more carbon dioxide than inhaled air.

   **Materials Required :** Glasses, lid with holes, straw and lime water.

   **Procedure :** Take two disposable glasses with covers and a hole at the top. Fill both these glasses with lime water. Put straw in both the glasses and let air enters glass A through the straw. In the other glass B, blow out some air through your mouth several times.**Observation :** You will see that the lime water in glass B turns milky, very soon. Lime water in glass A turns slightly milky after sometime.

   **Conclusions :** The exhaled air has carbon dioxide. The milkiness is due to the formation of calcium carbonate.

3. **Respiration :** The process of taking oxygen into the cells, using it for producing energy and removing the gaseous waste products (carbon dioxide and water) is termed as **respiration.** Respiration occurs in the living cells.

It is completed in two steps :

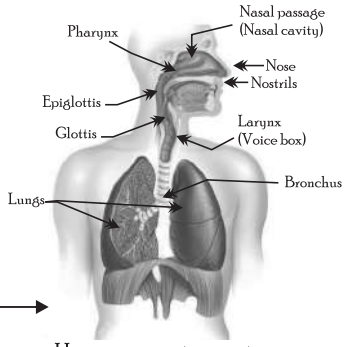
**i. External respiration or breathing :** The process of inhalation and exhalation of air is called **external respiration.** In this step, oxygen is absorbed and carbon dioxide is released from the body.

**ii. Internal respiration or cellular respiration :** Exchange of gases in the cells which utilise oxygen to produce energy by breaking down the food molecules into carbon dioxide and water is called **internal respiration** or **cellular respiration.** It involves many chemical reactions which are catalysed by various enzymes. The reaction involved is :

Sugar + Oxygen $\longrightarrow$ Carbon dioxide + Water + Energy

**Breathing :** Breathing is the physical act of taking in air rich in oxygen into our body and releasing carbon dioxide rich air out of the body through the nose. Breathing in, is called inhalation and breathing out is known as exhalation.

4. $\longrightarrow$



Human respiratory system

**H. HOTS**

**Ans.** 1. As height increases, the atmospheric pressure decreases. So, when we move top of the mountains the oxygen becomes less & so we feel difficulty in breathing. Hence, mountaineers carry oxygen with them.

2. When athlete runs, he/she needs more oxgyen because his/her rate of breathing increases so that more oxygen can be supplies to the body.

# 9 Transportation in Animals and Plants

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. b. 3. a. 4. c. 5. a.

**B. Fill in the blanks :**

**Ans.** 1. **Blood** is a fluid connective tissue.
2. The blood has two components **plasma** and **blood corpuscles**.
3. WBCs are called **White Blood Corpuscles**.
4. Blood flows through our body in a complex system of tubes called **Blood Vessels**.
5. **Heart** is a living pump.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Cells without nucleus | • **Red blood corpuscles** |
| 2. Tissue that translocates food | • **Phloem** |
| 3. Tissue that transports water and minerals | • **Xylem** |
| 4. Excretion | • **Kidney** |
| 5. Transpiration | • **Stomata** |

**E. Encircle the odd-one out. Give reasons for your choice:**

**Ans.** 1. Glucose : It is not excreted because it is not a excretory material.
2. Urine : Because urine is a excretory waste liquid.
3. Stomata : It is not a tissue it is a cell that help in transpiration of the plants.
4. Ventricles : Because it is a part of the heart and not act as a excretory organ but others are work as a excretory organs.
5. Ureters : It is an organ that helps in the excretion. But others all are part of the blood transport system.

**F. Give one word for the following :**

**Ans.** 1. Tricuspid & Bicuspid Valves 2. Cardiac Muscles
3. Left auricle 4. Pulmonary arteries
5. Urinary Bladder

**G. Answer the following questions in short :**

**Ans.** 1. Our heart is a four-chambered muscular organ. It has two auricles or atria and two ventricles.
2. Three types of blood vessels are arteries, capillaries, and veins.

3. Aorta
4. The discovery of blood circulation in the human body was discovered by William Harvey.

**H. Answer the following questions in brief :**

**Ans.** 1. i. White blood corpuscles (WBCs) defend the body against infection.
ii. They fight against germs and also provide immunity against infection.
2. The process of removing toxic waste from the body is called excretion and the organs that remove these toxic wastes are called excretory organs.
3. Process of artificial filtration of blood in case of kidney failures is known as dialysis.
4. Transpiration helps in the transport of water and minerals from the soil into the plant body. Without it no translocation of food and water occurs. So it is a necessary process of the plants.

**I. Differentiate between the following :**

**Ans.** 1. **Blood :** Blood is a fluid connective tissue. It is a red-coloured viscuos fluid that flows in the blood vessels. Blood has following functions :
- It supplies food and oxygen to every body cell.
- It removes wastes from the cells.
- It helps in regulating body temperature.

**Plasma :** Plasma is the non-living, liquid part of the blood. It is yellowish fluid that makes up more than half of blood volume. It removes carbon dioxide and wastes from the cells.

Plasma transports :
- Dissolved food to the cells,
- Oxygen to the cells,
- Enzymes, hormones and chemicals in the body.

2. **Circulatory System :** The system consisting of heart, blood and blood vessels that transports blood to various parts of the body.

**Vascular System :** Transportation of water, minerals and food in plants is done by special tissues present in the roots, stem and petioles (or the stalk) of the leaves. These special tissues are called the vascular tissues and transport of water and minerals with the help of vascular tissues is known as vascular system.

3. **Artery :**
a. They carry blood away from the heart.
b. They are thick-walled tubes.
c. They are deeply placed under the skin and blood, moves under high pressure.
d. There are no valves inside arteries.

**Vein :**
a. They carry blood to the heart.

b. They have thinner walls.
c. They are superficially placed and blood does not move under pressure.
d. There are a series of valves present in the Veins. These prevent the blood from flowing back to the organs.

4. **Xylem :** Water and dissolved minerals are absorbed by root hair of the plant from the soil. These are then transported upwards to different parts of the plant (stem, leaves and flowers) through xylem tissues.

   **Phloem :** Manufactured food in the leaves is transported to different parts of the plants through phloem tissues.

5. **Excretion :** Numerous biochemical reactions occur round the clock in all living cells. They produce a varitey of waste products like carbon dioxide, ammonia and other nitrogen compounds. If they accumulate in the body, they may prove to be toxic.

   The process of removing toxic waste from the body is called **excretion.**

   **Transpiration :** Plants do not use all the water taken up, some water evaporates from the stomata on the leaf surface. Constant diffusion of water along with the mineral from the root cells produces a pushing force. Simultaneously water constantly evaporates from the leaves of the plant to form water vapour. This process is called **transpiration.**

**J. Give reasons for the following :**

**Ans.** 1. Ventricles have thicker walls than auricles because ventricles are distributing chambers of the heart due to this they need more pressure to produce, to pump the blood to different parts of the body. So ventricles have thicker walls as comopare to auricles.

2. There are valves present between openings of auricles into ventricles. These valves open to let blood flow into the ventricles but shut as soon as the ventricles are filled with blood. This prevents a backward flow of blood from ventricles to auricles.

3. Arteries have thick walls because are deeply placed under the skin, and blood moves under high pressure.

4. WBC defend the body against infection. They fight against germs and also provide immunity against infection. Normally, there is only one WBC for every 600 RBCs. The white blood corpuscle count goes up when there is any infection in the body.

5. Water and minerals absorbed from the soil move up to the leaves from roots through xylem tissues. Plants do not use all the water taken up, some water evaporates from the stomata on the leaf surface. Constant diffusion of water along with the minerals from the root cells produces a pushing force. Simultaneously water constantly evaporates from the leaves of the plant to form water vapour. This process is called **transpiration.** This loss of water creates a pulling force, which causes more water to enter the roots and it is simply pulled up via the water carrying vascular tissue.

**K. Answer the following questions in detail :**

**Ans.** 1. When both atria and ventricles are relaxed, both the atria get filled with blood. The right atrium receives deoxygenated blood from various parts of the body and the left atrium receives oxygenated blood from lungs by pulmonary vein.

Now both atria contract simultaneously and their cuspid valves open up. Blood from left atrium comes in the left ventricle and from right atrium into right ventricle.

Both the atria relax and ventricles contract. The cusped valves are slam shut and semilunar valves open up.

2. Blood cells or corpuscles are the living part of the blood. There are three kinds of blood corpuscles.

**Red blood corpuscles (RBCs)** are cells without nucleus. Their cytoplasm has oxygen carrying pigment called haemoglobin. It gives red colour to these corpuscles (hence, red blood corpuscles). It combines with oxygen to form oxyhaemoglobin, which transports oxygen to all the body cells. RBCs live for 90 to 120 days (i.e., 3 to 4 months) only.

**White blood corpuscles (WBCs)** defend the body against infection. They fight against germs and also provide immunity against infection. Normally, there is only one WBC for every 600 RBCs. The white blood corpuscle count goes up when there is any infection in the body. WBCs are called soldiers of the body.

**Blood platelets are** very minute cells present in the blood. They help to stop bleeding by clotting the blood.

3. **Aim :** To demonstrate transpiration
   - Take a potted plant.
   - Cover it by polythene so that its roots along with soil get completely covered. This will prevent evaporation of water from the soil.
   - Put a bell jar over the potted plant. Apply Vaseline on the rim of the jar, this will prevent air from entering the jar from outside.
   - Keep this set-up in the sunlight for sometime. You will find drops of water on the inner side of the bell jar.
   - These drops are the water vapour due to the process of transpiration.

   This shows the up ward movement of the water in the plants.

4. Waste removal is important for all living organisms. Normal kidney function is essential for good health. A person cannot survive because of the accumulation of toxic wastes in the body regularly.

Kidneys clean all the blood in our body every 30 minutes and remove the waste materials.

About 200 litres of blood is filtered by kidneys each day.

About 1.5 to 2.0 litres of urine is excreted in 24 hours.

Urine contains 95% water, 2.5% urea and 2.5% of other waste products.

**L. HOTS**

**Ans.** 1. Left part of the heart has oxygenated blood and right part has deoxygenated blood.

2. There are valves present between openings of auricles into ventricles. These valves open to let blood flow into the ventricles but shut as soon as the ventricles are filled with blood. This prevents a backward flow of blood from ventricles to auricles.

3. Water constantly evaporates from the leaves of the plant to form water vapour. This process is called transpiration. This loss of water creates a puling force, which causes more water to enter the roots and it is simply pulled up via the water carrying vascular bundle tissue.

4. In summer, when we feel hot due to external heat, sweating and evaporation of sweat makes the body cool. Sweat evaporates from the body surface. Evaporation needs heat which is obtained from the body. This sweating causes cooling of the body surface. So we feel cool after sweating.

# 10 Reproduction in Plants

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. d. 3. b. 4. a. 5. d. 6. b.

**B. Fill in the blanks :**

**Ans.** 1. **Spores** are very small in size.

2. Budding is an **asexual** method of reproduction.

3. **Flowers** are the reproductive organs of a plant.

4. The fusion of male and female gametes is called **syngamy**.

5. The process of pollination is of two types **self-pollination** and **cross-pollination**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Fragmentation | • **Spirogyra** |
| 2. Bud | • **Rose** |
| 3. Sugarcane | • **Cutting** |
| 4. Eyes | • **Potato** |
| 5. Spores | • **Yeast** |

**E. Name the following :**

**Ans.** 1. fragmentation 2. Bisexual flower

3. fungi 4. bud

5. one 6. complete flower

7. Asexual reproduction 8. Zygote

9. Eyes 10. Spore formation

11. (a) Budding (b) Fragmentation
(c) Spore formation (d) Cutting

12. Self pollination and cross-pollination.

**F. Answer the following questions in short :**

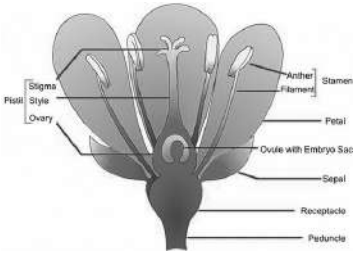
**Ans.**
1. Flowers are the reproductive organs of a plant.
2. The vegetative buds can also give rise to new plants.
3. The pollen grains of a particular flower may reach the stigma of the same flower, the process is then called self-pollination
4. Spores are very small in size. They have thick walls. The thick walls help the spores to survive adverse conditions in the environment, like high temperature, scarcity of water and lack of food.
5. Yeast

**G. Answer the following questions in brief :**

**Ans.**
1. Sexual reproduction takes place by the formation of seeds. It involves two parents and the fusion of male and female reproductive cells called gametes to form a single cell called the zygote.
2. The transfer of male gamete to female gamete of a flower is known as pollination. Depending on the flower which is pollinated, the process of pollination is of two types— self-pollination and cross-pollination. The pollen grains of a particular flower may reach the stigma of the same flower, the process is then called self-pollination (or self-fertilisation), or that of a different flower of the same kind, the process being termed cross-pollination (or cross-fertilisation).
3. When flowers have either male gametes or female gametes, they are called incomplete or unisexual flowers. Such type of flowers are found in corn and papaya plants.
4. After the pollen grains are transferred from anther to the stigma of the flower, then pollen tube is formed through which the male gametes enter into the ovary and fuse with the eggs in ovules. This process is referred to as fertilization. This fusion of male and female gametes is called syngamy.
5. Sexual reproduction takes place by the formation of seeds. it involves two parents and the fusion of male and female gametes to form a single call called the zygote. The zygote develops into an embryo and fertilized ovule into seed.

**H. Answer the following questions in detail :**

**Ans.** 1.




Male and female organs in a complete flower

2. **Self-pollination :** The pollen grains of a particular flower may reach the stigma of the same flower, the process is then called self-

pollination (or self-fertilisation). Self-pollination results in retaining the parental characters in the next generation.

Cross-pollination : When the pollen grains of a flower transferd to a same kind of another flower. Then this process being termed cross-pollimation or cross-fertilisation.

3. After the pollen grains are transferred from anther to the stigma of the flower, then pollen tube is formed through which the male gametes enter into the ovary and fuse with the eggs in ovules. This process is referred to as fertilization.

   Thus after fertilization has taken place, the fertilized ovule is known as zygote. The zygote develops into an embryo and fertilized ovule into seed.

4. The process by which the seeds or fruits are separated from the parent plant and scattered away is known as dispersal.

   Seeds are dispersed either by wind, water or animals. These dispersing forces are known as agents of dispersal. The various agents of seed dispersal are described below :

   For example, seeds of drumstick and maple are light and have wings which help them to get carried away by air.

   Human being also help in the dispersal of seeds as they eat the flesh of fruits and throw away the seeds. The seeds germinate into new plants under suitable conditions.

   For example, coconut has a large and fibrous fruit which floats in water. It is carried to far-off shores by the water currents.

   Fruits of some plants tend to burst. The seeds are thus blown away and scattered from the parent plant. Castor and balsam seeds are dispersed in this way.

**I. HOTS**

**Ans.** 1. Seeds of gokhru and xanthium have thorns which stick on to the hairs of animals. So they can dispersed by animals.

2. It represent that colony of algae which is green in coloar.

# 11 Motion and Speed

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. c. 3. c. 4. a. 5. a.

**B. Fill in the blanks :**

**Ans.** 1. The Romans used a sand clock for measuring **time**.

2. The SI unit of distance or length is **metre**.
3. A change in the position of a body with respect to time is called **motion**.
4. A simple pendulum consists of a small mass like a piece of stone or a metallic ball known as **Bob**.
5. The time between one sunrise and the next was known as a **day**.

**C. Name the types of motion in each case :**

**Ans.** 1. Non-Uniform Motion
2. Uniform Motion
3. Uniform Motion

**D. Write 'true' or 'false' for the following statements :**

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

**E. Answer the following questions in short :**

**Ans.** 1. Time is sometimes described as the continuous, forward flow of events.
2. A sand clock consists of two round glass bulbs. The two bulbs are separated by a narrow glass tube. The upper bulb is filled with a fixed amount of sand that passes through the tube into the lower bulb in a fixed interval of time.
3. Force of gravity
4. If an object travels unequal distances in equal intervals of time or vice-versa, it is said to be in a state of non-uniform motion.
5. The graph plotted between a distance travelled by a moving body and time taken by this body is known as distance-time graph.

**F. Answer the following questions in brief :**

**Ans.** 1. The need to measure time was felt by human beings a long, long time ago. In every civilization, and every culture, however ancient, there has been evidence of people keeping track of the passage of time. In very ancient times, people used to keep track of the passage of days. As the complexity of their lives increased, people felt the need to split the day into smaller periods. As civilizations grew, more ways of measuring time were devised.
2. A phenomenon, process or motion, which repeats itself after equal intervals of time, is called periodic. If a body moves to and fro repeatedly about a mean position it is called oscillatory motion.
3. The pendulum completes one oscillation when its bob moves from one extreme position A to other extreme position B and comes back to position A. The time taken by the pendulum to complete one oscillation is called the time period.
4. If an object covers equal distances in equal intervals of time, it is said to be in a state of uniform motion.
   If an object travels unequal distances in equal intervals of time or vice-versa, it is said to be in a state of non-uniform motion.

**G. Answer the following questions in detail :**

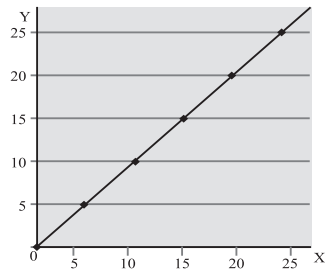
**Ans.** 1. **Structure of Simple Pendulum :**
A simple pendulum consists of a small mass like a piece of stone or a metallic ball known as **bob.** The bob is suspended by a string. At rest, the bob is at its mean position (i.e. at the centre).
When the bob of the pendulum is displaced slightly and released, it begins to move to and fro. One oscillation of a pendulum is completed when the bob moves from position O to A, then from A to B and then back from B to O. The pendulum also completes one oscillation when its bob moves from one extreme position A to the

other extreme position B and comes back to position A.

2. While travelling in a car, bus or a train, you must have experienced that the trees and buildings seem to be moving back. Each person in the moving vehicle is stationary with respect to other passengers but moving with respect to a reference point outside the vehicle. The position of a person or thing which does not change with time or with respect to a reference point is the position of rest. One more thing that you learn from this description is that motion and rest and relative terms are we cannot define one without mentioning the other.

3. According to question :
   Distance travelled by a train = 400 m
   Total time taken by train = 10 seconds
   Speed of the train = distance/time
   = 400/10 = 40 m/second
   = 40 × 3600/1000
   = 144 km/hour

4. i. Draw the X and Y axes on a sheet of graph paper and mark the point where they meet as O.
   ii. Represent the quantities on both the axes. Here, time is plotted on the x-axis and distance is plotted on the Y-axis.
   iii. Next, select a suitable scale to represent the time and distance on the graph. Scales are very important while plotting a graph.
   iv. Mark the values for the time on the x-axis and for the distance on the y-axis respectively.
   v. Then mark the points of time corresponding to the distance as given in the table. You will see that at 0 minutes the car is at rest, i.e., the distance travelled is 0. Therefore, the first point is on the origin itself. Similarly, after 5 minutes, the distance travelled is 5 km. Mark all the six points in the same way.




   vi. Join all the points on the graph as shown in the given figure alongside.

   The distance-time graph in this case is a straight line. This means that the car is moving at a constant or uniform speed.

5. The standard units of distance and time are metre and second respectively. Hence, unit of speed can be derived as follows :

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Unit of speed} = \frac{\text{Unit of distance}}{\text{Unit of time}}$$

$$= \text{metre/second or m/s}$$

   If distance is measured in kilometres and time in hours, the unit of speed becomes kilometre per hour.

The SI unit of speed is metre per second.

**H. HOTS**

**Ans.** 1. Uniform motion.

2. It is not effected because its time period does not depend on the material and shape of the bob.

## 12 Electric Current and Its Effect

### Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. c. 3. b. 4. d. 5. d.

**B. Fill in the blanks :**

**Ans.** 1. The flow of electricity through a conductor is called **electric current**.

2. An electric bulb contains a thin wire called **filament**.

3. An electric bell works on the principle of **electromagnetism**.

4. A **fuse** is a safety device in an electric circuit which prevents short circuits.

5. The path along which electric current can flow is called **electric circuit**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Nichrome | • **Used in the element of heaters** |
| 2. Fuse | • **Safety device** |
| 3. Current | • **Flow of electric charge** |
| 4. Green wire | • **Earth wire** |
| 5. Bakelite | • **Used to make electric switches** |

**E. Answer the following questions in short :**

**Ans.** 1. The flow of electricity through a conductor (such as a metal wire) is called electric current.

2. The path along which electric current can flow is called electric circuit.

3. Battery is combination of two or more cells. The cells can be connected in a series.

4. Heating & Magnetic effects of Electric Current.

5. A safety device in an electric circuit which prevents short circuits.

**F. Answer the following questions in brief :**

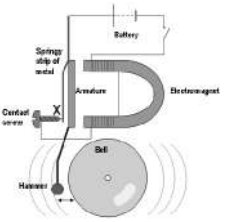
**Ans.** 1. Electromagnets are also used in medical science to cure certain ailments.

2. Electric heaters, irons, toasters, and so on also use the heating effect of electric current. They have a heating element made of a material called Nichrome. The element gets very hot when a current flows throuth it. Because Nichrone has high ressistant due to it produce lots of heat.

3. A fuse is a short piece of wire, made of an alloy of 40% lead and 60% tin, or a low melting alloy, that melts easily. Different fuse wires may have different thickness. More the thickness of the wire, more is the electric load it can withstand. We can also use bronze wire.

4. If we draw additional current which may heat the connecting copper wires to such an extent that the plastic insulation on them melt. As a result, the base wires will come in contact with each other and may cause sparking and an electric fire. The electric circuit in such a situation is called overloaded and the fire caused is called short circuit. Short circuit also occurs when a naked live wire and a neutral wire come in contact, bypassing the electric device in the circuit which in turn, occurs due to overload or the connection of the live wire with the earth wire.

**G. Answer the following questions in detail :**




**Ans.** 1. When a current flows through a circuit, heat is produced. This effect is known as the heating effect and some electrical appliances work based on this effect. For example, an electric iron becomes hot when switched ON. This is because the current flows through the wire and produces heating effect.

Electric bulb, electric immersion rod, electric oven, electric kettle, electric sandwich maker, electric hair dryer, electric power heater, etc. are some more examples of electric appliances that work on the heating effect of electric current.

2. **Electric Bell**

An electric bell works on the principle of electromagnetism. It consists of a gong, a horse-shoe electromagnet, an easy to magnetise soft iron bar with a hammer at one end and a contact screw arranged in a circuit as shown in the figure.

When the switch is closed, current flows through the winding of the electromagnet, causing the soft iron bar to get attracted to it. When the soft iron bar is pulled towards the electromagnet, the hammer attached to it hits the gong of the bell and produces a sound, thus causing it to ring. As the soft iron bar moves away from the contact screw, the circuit is broken. The electromagnet loses its magnetism and the soft iron is pulled back to the contact point by the spring action. This completes the circuit and the cycle is repeated. Thus the hammer will vibrate against the gong and produces a continuous ringing as long as the switch is closed.

3. Electrical resistance of a material is a measure of its hindrance to the flow of electric current. The unit of resistance is ohm (W). The higher the resistance of a material, the lower the current that can pass through it. An electric bulb contains a thin wire called *filament.* The filament is usually made of a material such as tungsten. Which shows high ressistance and produce more heat on flowing electric current through it. When the bulb is switched ON, the filament gets heated up and glows. When the filament breaks, the current will not flow and the bulb is said to be fused.
4. Some substances like metals conduct electricity well and are called good conductors or simply conductors. They offer very less resistance to the flow of electric current, but not all metals are good conductors.

This property of different resistance offered by different materials towards flow of electric current is used in various applications of electricity.

**H. HOTS**

**Ans.** 1. It radiates more heat and waste lots of electricity that harm the environment.

2. Because it has a high melting point. It will not melt easily when a high electric current passes through it & may damage the electrical appliances.

# 13 Wind, Storm and Cyclone

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. Air exerts **pressure**.

2. Air moves from a region of **high air pressure** to a region of **low air pressure**.

3. The Sun heats the surface of the Earth **unevenly**.

4. A storm that has both thunder and lightning is known as a **thunderstorm**.

5. A violent storm with very strong winds which move in a circle is called a **cyclone**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Very Short Answer Questions :**

**Ans.** 1. A column of rapidly spinning air around a low pressure area over the sea is known as cyclone.

2. Air expands on heating and occupies more space. Hence it becomes lighter, thus, warm air is lighter than cold air.

3. A severe atmospheric disturbance accompanied by very fast moving winds is known as storm.

4. Air pressure is the force exerted on you by the weight of tiny particles of air (air molecules).

**E. Short Answer Questions :**

**Ans.** 1. Before a cyclone, the warm and lighter air moves up and creates a low-pressure region. The cooler air from the surrounding regions moves towards the centre of the storm to occupy the empty space of this low-pressure region. The whole cycle is repeated several times. Due to the rotational movement of the Earth, air moving towards the centre of the storm starts circulating around it at a high speed. This forms a spinning cyclone. The strong wind current moves this spinning cyclone forward.

**Effect of cyclone :** They can damage houses, uproot trees, telephone and other communication systems leading to the loss of life and

property. A cyclone is accompanied by heavy rains. Heavy rains may bring floods.

2. On a hot summer day, severe heating of air creates very strong upward moving winds. As these winds move up, the water vapour winds. As these winds move up, the water vapour present in it changes into droplets and freezes. These frozen droplets then fall down with rain. During the downfall, their interaction with upward moving warm and humid air creates lightning and thundering sounds. This thunder and lighting causes a formation of thunderstorm.
3. Storms are severe atmospheric disturbances accompanied by very strong, high-speed winds.
   Storms are often set off when different types of air masses meet. This could be a dry air mass meeting a moist air mass, or a cold air mass meeting a warm air mass. Storms can range from moderate to very severe.
4. A violent storm with very strong winds which move in a circle is called a cyclone
   Tropical cyclones cause rains, flooding the coastal regions with huge sea waves.

**F. Long Answer Questions :**

**Ans.** 1. A severe form of thunderstorm leads to a cyclone. It develops over the warm, moist waters of the Atlantic and Pacific oceans near the equator. Several small thunderstorms merge to form one devastating storm or cyclone. Before a cyclone, the warm and lighter air moves up and creates a low-pressure region. The cooler air from the surrounding regions moves towards the centre of the storm to occupy the empty space of this low-pressure region. The whole cycle is repeated several times. Due to the rotational movement of the Earth, air moving towards the centre of the storm starts circulating around it at a high speed. This forms a spinning cyclone. The strong wind current moves this spinning cyclone forward.

   **Cyclone impacts on human lives :** The cyclone winds travel at a very high speed. They can be extremely destructive. They can damage houses, uproot trees, telephone and other communication systems leading to the loss of life and property. A cyclone is accompanied by heavy rains. Heavy rains may bring floods. The low pressure created in the central eye region of a cyclone lifts the water surface in the centre. The rising water appears like a wall of water. This water enters the low-lying coastal areas causing severe loss of life and property.

   Tropical cyclones cause rains, flooding the coastal regions with huge sea waves.

2. All the places on the Earth are not heated to the same extent. In other words, there is uneven heating on the Earth. This results in the generation of wind currents.
3. cyclones can be detected by satellites. The Indian Meteorological Department studies the development of cyclones with the help of INSAT satellites and cyclone detection radars. This governmental

organisation is responsible for meteorological observations, weather forecasts, and detection of earthquakes. The IMD is also responsible for forecasting tropical cyclones in the Arabian Sea and the Bay of Bengal. It is located in New Delhi.

4. Cyclones can be detected by satellites. People are informed about the possible occurrence of cyclones by the meteorological department. Fishermen are advised not to venture into the sea if there is a possibility of a cyclone.

**Some precautions need to be taken are as follows :**

- Government should forecast cyclones 24 hours in advance, with the help of satellites and radars.
- There should be shelters made for protecting people in the cyclone and tornado prone areas. They should have underground rooms which are away from shores.
- As a individual, when cyclone or a tornado strikes, one should take shelter under the tables, bow down and protect their heads and necks using their arms.
- In case of a cyclone warning, necessary food items and medicines should be stocked as much as possible.
- If possible, move to a safer place.

**G. HOTS**

**Ans.** 1. Becaue hot air always goes up so ventilators & exhaust fans are built near the ceiling.

2. The low airpressure draws up small objects which get trapped in bags.

# 14 Light

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. a. 3. d. 4. c.
5. c. 6. d. 7. c. 8. a.

**B. Fill in the blanks :**

**Ans.** 1. A convex lens used to magnify small objects is called **magnifying glass**.
2. The image in plane mirror is upright or **erect**.
3. The splitting of white light into its seven colours is called **dispersion**.
4. The band of seven colours obtained as a result of dispersion is known as a **spectrum**.
5. An image obtained due to actual meeting of reflected rays is called **real image**.

**C. Give one word for the following :**

**Ans.** 1. Focal length 2. Pole
3. Spectrum 4. Centre of Curvature
5. Dispersion

**D. Write 'true' or 'false' for the following statements :**

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

**E. Answer the following questions in short :**

**Ans.** 1. A very narrow path of light described by a straight line drawn in the direction of propagation of light is called a ray of light.

2. The mirror in which you look at yourself (in fact, your image) is called a plane mirror.

3. **Centre of curvature :** The centre of the hollow sphere, from which the mirror has been taken out, is called its centre of curvature. It is denoted by capital 'C'.

4. Convex Lenses

**F. Answer the following questions in brief :**

**Ans.** 1. A beam of light consisting of parallel rays diverging from a plant source is called divergent beam of light.
For example, beams of light coming from a light house, the headlight of a railway engine, car headlight, torch etc. are divergent beam of light.

2. The mid point of the pole and centre of curvature of the spherical mirror is called its focus. It lies on the principal axis and is denoted by capital 'F'.

3. A lens which has one or two spherical surfaces, such that it is thicker at the edges and tapering in the middle is called concave lens.

4. Bifocal spectacles are created with two different areas of visioin correction, divided by a line. The top portion of the lens is used for distance, while the bottom portion of the lens is used for closer vision.

**G. Differentiate between the following :**

**Ans.** 1. **Divergent Beam of Light**
A beam of light consisting of rays diverging from a plant source is called **divergent** beam of light.
*For example,* beams of light coming from a light house, the headlight of a railway engine, car headlight, torch etc. are divergent beam of light.
**Convergent Beam of Light**
A beam of light consisting of rays coming closer to each other, ultimately to meet a point, is called **convergent** beam of light.
The beam of light from a nearby large source is a convergent beam of light.

2. When the reflecting surface is bulging out it is called convex mirror and when the reflecting surface is curved in, it is called concave mirror.

3. A lens which has one or two spherical surfaces, such that it is thicker in the middle and tapering at the edges is called convex lens.
A lens which has one or two spherical surfaces, such that it is thicker at the edges and tapering in the middle is called concave lens.

**H. Answer the following questions in detail :**

**Ans.** 1. **Virtual image in plane mirror :**
The image formed by a plane mirror cannot be obtained on a screen. An image which cannot be obtained on a screen is called a virtual image. Thus, the image formed by a plane mirror is a virtual image.

**Virtual image in convex mirror :**
The size of the image is smaller than the size of the object. The position of the image is behind the mirror. The nature of the image is virtual and erect.

2. Convex mirror is used as rear view mirror as it gives a clear diminished and an erect image of the traffic that is behind you it. It covers a wide range of the traffic behind you and gives a very clear image.
3. In the plane mirror the left and the right sides of the image get interchanged, as compared to those of the object. This behaviour is known as lateral inversion. The image formed is called laterally inverted.
4. **Characteristics of the image formed by a plane mirror :**
   - The size of the image is equal to the size of the object.
   - The image is upright or erect.
   - The left and the right sides of the image get interchanged, as compared to those of the object. This behaviour is known as lateral inversion. The image formed is called laterally inverted.

**I. HOTS**

**Ans.** • It will trave to a very short distance.

# 15 Water

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. c. 3. b.
4. c. 5. c. 6. d.

**B. Fill in the blanks :**

**Ans.** 1. The Earth is also called **Blue** planet.
2. Water required for household use is called **domestic water**.
3. Continued absence of rains may result in **droughts**.
4. The process of seeping of water into the ground is called **infiltration**.
5. The uses of water can be broadly divided into **agricultural, domestic** and **industrial** uses.

**C. Write 'T' for true and 'F' for false statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Infiltration | • **Underground water** |
| 2. Aquifer | • **Seeping of water into the ground** |
| 3. Drip irrigation | • **Technique of watering plants** |
| 4. Bawris | • **Step wells** |
| 5. Rainwater harvesting | • **Using rain water for recharging** |

**E. Answer the following questions in short :**

**Ans.** 1. We use water for various purposes but two main uses of water are drinking and cooking.

2. Water evaporates from the oceans and other large water bodies and returns the Earth as rain, snow and other kinds of precipitation. This is called water cycle.

3. Water can exist in three forms, in the solid form as ice, in the liquid form as water and in the gaseous form as vapours.

4. Water required for household use is called domestic water.

**F. Answer the following questions in brief :**

**Ans.** 1. Our planet, The Earth, is often called the blue planet. When seen from space it appears blue. This is because 71% of its surface is covered with water. This water lies in the vast oceans, seas, rivers, lakes, ice-caps, underground water and in the atmosphere and it gives blue colour the Earth.

2. **Factors responsible for the depletion of water table:** Some of the factors are increase in population, industrial and agricultural activities. Scanty rainfall is another factor that may deplete the water table. Yet another factor affecting water table could be deforestation and decrease in the effective area for seepage of water.

   Increasing population has put a greater demand for construction of houses, shops, offices, roads and pavements. Construction of pavements, cementing of paths and grounds of different places does not allow seepage of water into the ground. As a result the water table does not get recharged easily.

   Water is used by all the industries. In almost all processes of industry we use water. The number of industries is increasing continuously. Water used by most of the industries is drawn from the ground. This lowers the water table further.

3. i. In cities, municipal water treatment plants supply homes with a domestic water quality that meets drinking water standards. In rural areas, however, over 80% of the domestic water comes from groundwater sources.

   In areas where water is scarce, where wells, ponds and rivers dry up in summers, people have to travel long distances to fetch water for their daily needs.

   ii. Scanty rainfall is another factor that causes scarcity of water.

4. The level of water table is not stable. It goes down when large quantity of ground water is taken out for various purposes. In certain areas of our country like Punjab, Haryana, etc. the level of water table has gone down to a large extent due to excessive use of ground water for irrigating crops like paddy.

5. Most of the rainwater just flows away. This is the wastage of a precious natural resource. We should know that rain water can be used to recharge the ground water. This process is called rainwater harvesting.

6. Water is wasted in almost all human activities whether it is domestic, agricultural or industrial. Overuse and misuse of available drinking water has led to its acute shortage all over the world. Pollution is another major factor that results in loss of clean water. In view of all this, there is urgent need to adopt water conservation.

**G. Answer the following questions in detail :**

**Ans.** 1. Water can exist in three forms, in the solid form as **ice,** in the liquid form as **water** and in the gaseous form as **vapours.**

All of these three states of water are interchangeable, *i.e.,* we can change one state into the another and vice-versa. This change in the three states of water is a physical change, i.e., the properties of water does not change and remains the same.

These three states of water and their interchangeable property play a key role in water cycle. This easy convertibility of water from one state to other makes it available in all the regions of the Earth all the time and throughout the year. It can therefore be concluded that "water evaporates from the oceans and other large water bodies and returns to the Earth as rain, snow and other kinds of precipitation. This is called water cycle.

2. A part of rainwater that seeps into porous soil and rocks and keeps filling the spaces till it reaches the layer of impermeable rock is called groundwater. The level of groundwater below the surface of the Earth at any given place is known as water table. It varies from place to place. Water, which is stored below the water table is the groundwater. Rainwater percolates into the ground through infiltration and the groundwater thus gets recharged. Groundwater is an important source of water for supply in towns, villages, for domestic and industrial purposes. It can be taken out by digging borewells, tube wells and handpumps.

3. In certain areas of our country like Punjab, Haryana, etc, the level of water table has gone down to a large extent due to excessive use of ground water for irrigating crops like paddy.

The water table does not get affected as long as we draw as much water as is replenished by natural processes. However, It goes down if the water is not sufficiently replenished. This has many causes. Some of these causes are increase in population, industrial and agricultural activities. Scanty rainfall is another factor that may deplete the water table. Yet another factor affecting water table could be deforestation and decrease in the effective area for seepage of water.

Increasing population has put a greater demand for construction of houses, shops, offices, roads and pavements. Construction of pavements, cementing of paths of grounds of different places does not allow seepage of water into the ground. As a result the water table does not get recharged easily.

Water is used by all the industries. In almost all processes of industry we use water. The number of industries is increasing continuously.

Water used by most of the industries is drawn from the ground. This lowers the water table further.

4. In most of our cities and towns water is provided by the civic authorities. They supply water through pipes. You might have seen some of these pipes in your locality leaking. This causes a lot of wastage of water. It is the responsibility of the civic authorities to prevent such wastage of precious water.
   Mismanagement or wastage may take place at the level of individuals also. All of us, knowingly or unknowingly, waste water while brushing teeth, shaving, bathing, washing and during may other activities. Leaking taps is another source of huge water wastage.
   A couple of techniques can be employed to save precious water.
   **Drip Irrigation :**
   A most important technique employed to save water is drip irrigation. Drip irrigation is a technique of watering plants by making use of narrow tubings which deliver water directly at the base of the plant. This saves a lot of water.

**H. HOTS**

**Ans.** 1. Dams are built to store water, we get water from rain and it stores in dams.
2. As, it water gets evaporated by the Sun.

# 16 Forest-The Elixir of Life

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. b. 2. a. 3. d. 4. d. 5. c.
6. d. 7. d. 8. d. 9. c.

**B. Fill in the blanks :**

**Ans.** 1. Growing more trees on barren lands is a method to check **soil errosion**.
2. **Quinine** is obtained from Cinchona tree.
3. In North-East India, **sal** is the most common tree.
4. The **forest floor** layer receives only 2 percent of sunlight.
5. A food chain involves the transfer of **energy**.
6. A forest provides **home** and **protection** to wildlife.
7. All green plants are called **producers**.
8. Forest attracts a lot of visitors for **recreation** and **spending holidays**.
9. Forests form a part of the **ecosystems**.

**C. Give two examples of the following :**

**Ans.**
1. Oil yielding trees — **1. Vanilla 2. Eucalyptus**
2. Timber yielding trees — **1. Sal 2. Teak**
3. Components of food chain — **1. living organisms 2. Non-living organisms**
4. Methods of forest conservation — **1. Afforestation 2. Stop Forest fire**

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

**Ans.** 1. forest 2. trees 3. consumers 4. decomposers
5. extension forestry 6. afforestation 7. food web

**E. Answer the following questions in short :**

**Ans.** 1. The Himalayan mountains have coniferous as well as trees with broad leaves.
2. Forests are natural ecosystems having a rich variety of flora and fauna. A forest contains a wide variety of different kinds of plants growing in abundance.
3. Many food chains are found in forests that are interlinked to form food web.
4. Due to deforestation soil fertility decreases and upper layer of the soil become barren.

**F. Answer the following questions in brief :**

**Ans.** 1. A forest is a biotic community spread over a large tract of uncultivated land and is predominantly composed of trees, shrubs, herbs and climbers. Forests are involuable wealth of a nation and a renewable natural resource. Forests have the ability to regenerate themselves. So they are also known as important natural renewable resources.
2. Forest regulate Earth's temperature and the water cycle. Trees in a forest absorb water from the ground and then release some part of it as water vapour. Water vapour leads to cloud formation and the rain. Therefore, forests help in bringing good rainfall. By the forests help in to increase the humidity in the atmosphere.
3. Deforestation has taken place due to the following reasons :
   (i) Due to the increasing demand of wood and timber.
   (ii) Due to the increasing demand of land for constructing factories, houses, roads and dams.
   (iii) Due to increasing mining activity.
4. Due to destruction of forests, oxygen level decrease and carbon dioxide increase in the atmosphere.
   An increase in the amount of carbon dioxide in the air can cause a worldwide increase in temperature, known as global warming. Global warming is believed to be causing uncharacteristically frequent and severe cyclones, floods, droughts and forest fires across the world. It is also affecting plants and animals in the polar region. According to one study, for example, the number of emperor penguins in the Antarctic has reduced alarmingly due to global warming.

**G. Answer the following questions in detail :**

**Ans.** 1. Man is indiscrminately cutting down trees due to increased demand for land and forest products. Large forest areas are cut every year for cultivation, irrigation, and for constructing houses, buildings, dams, roads, etc. People also cut trees for fuel wood, fodder, timber, etc.
   But, we forget that trees are the life support on Earth. The treeless land causes many imbalances in nature. The natural cycles such as water cycle, food chain, etc., are disrupted.

When it rains, most of rainwater is absorbed by trees and taken up to their leaves. It then evaporates during the process of transpiration. If there were no trees, the rain simply runs off the soil and into rivers. Much less goes back into the air as water vapour. The air becomes drier, and less rain falls.

Trees hold the soil firmly around their roots and help in preventing soil erosion. Loss of forests also means loss of a habitat for different kinds of animals. It may also result in extinction of some animals, birds and plants.

2. The dead decaying leaves, and other organic matter present on the wider side of the trees formed a manure which is black in colour and known as humus.

   The thick layer of humus on the forest floor absorbs and holds rainwater like a huge sponge. This ensures a perennial supply of water to streams, springs and wells. The absorbed water is available to plants, which prevent soil erosion.

3. The plants having medicinal value are found in forests. In ancient days, physicians used to collect medicinal plants for all kinds of treatment and curve. Even today, pharmaceutical industries use various plants like neem, amla, eucalyptus, *Aloe vera,* etc., to make various medicines. *Aloe vera* is used all over the world for skin treatment. The malaria-preventive medicine **quinine** is made from cinchona plants.

4. The dense forest consists of distinct horizontal layers. These are :

   **Canopy**

   The canopy is the uppermost levels of a forest formed by the crowns of trees and shrubs. The canopy layer is formed by the largest trees. This layer is very crowded and blocks out most of the sunlight. It also acts as wind breaker. The canopy is the densest layer and home to unique flora and fauna.

   **Understorey**

   The **understorey** layer lies between the canopy and the forest floor. This layer is home to a number of birds, snakes and lizards, as well as predators such as jaguars and leopards. The leaves are much larger at this level. A wide range of insects are also found. Only about 5% of the sunlight shining on the forest reaches the understorey. Forest understoreys also have higher humidity than the exposed areas.

   **Forest Floor**

   The forest floor layer receives only 2 per cent of sunlight. The forest floor has almost no vegetation because of the low sunlight penetration. Only plants adapted to low light can grow in this region. Many forms of fungi grow here which help in decaying of dead animals and plants thus converting them into dark coloured organic matter. This forms the humus.

5. • Trees purify the air by absorbing carbon dioxide releasing oxygen while making food. Therefore, a large patch of forest maintains the climatic balance of a large area.

- Forests also regulate Earth's temperature and the water cycle. Trees in a forest absorb water from the ground and then release some part of it as water vapour. Water vapour leads to cloud formation and the rain. Therefore, forests help in bringing good rainfall.
  A forest conserves and protects the biodiversity. It provides home and protection to wildlife.
- Forests prevent soil erosion and floods. Trees bind the soil particles by their strong network of root system and prevent them from being washed or blown away.
- Timber is obtained from more than a thousand species of trees such as Sal, Teak, Mahogany, etc. Some of the industries like those of plywood, sawmills, pulp, etc., are totally dependent on forests for raw materials.
- We get fruits from forests. Trees like apple, orange, mango, coconut, pear, etc., grow in forests and fruits are harvested from these trees.
- In several rural areas wood is still the most important fuel used for cooking.

**H. HOTS**

**Ans.** 1. Do it yourself.

2. In a forest there are no waste materials. Because every part of the forest has its quality and proper function and we can use all parts of the forest for our daily uses. So “A forest has no waste” is a true line.

# 1 Crop Production

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. Gram 2. d. harvesting 3 b. Soya bean
4. d. Moisture 5. d. Cotton 6. b. Plough
7. b. Pisculture

**B. Fill in the blanks :**

**Ans.** 1. **Kharif** crops are harvested in October.
2. Lever system of irrigating fields is also reoffered to as **rahat.**
3. In **sprinkler** type of irrigation, water is sprayed on the plants using rotating sprinklers.
4. Unwanted plants like weeds should be removed as they compete with the main crop for **nutrients, space, sunlight.**
5. Rearing of honeybees on a large scale is called **apiculture.**

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.** 1. Horticulture is the branch of agriculture that deals with the study of cultivation of vegetables, fruits and ornamental plants.
2. Pests are animals such as insects (termites, locusts, etc.) and rodents (rats) which damage or eat the crops.
3. Kharif crops are grown in June/July.
4. Tilling is the ploughing of the land during preparation for plantation
5. Broadcasting is the method of scattering seeds by hand.
6. Soil can be naturally replenished by the decaying of plants that will help in contributing the humans and other nutrient content of the soil.
7. Ploughing is the process of loosening and turning the soil.
8. Threshing is the separation of grains from the chaff.

**E. Answer the following questions in brief:**

**Ans.** 1. The various agriculture practices in the correct sequence are as follows :
- Preparation of soil
- Selection and sowing of seeds
- Addition of manure and fertiliser
- Irrigation
- Protection from weeds and pests
- Harvesting, Threshing and Winnowing
- Storage

2. **Kharif crops :** These crops are grown in June/July and harvested in September/October. They require more water for growth and hence, are grown during the monsoon season in India. Paddy, cotton, soya bean, maize and groundnut are examples of kharif crops

**Rabi crops :** These crops are grown between October and April. They

require less water and hence are grown during the winter season. Wheat, gram, barley, pea and linseed are examples of rabi crops.

3. Levelling is the process of making soil surface even and smooth. This is done with the help of wooden soil leveler. It ensures uniform irrigation and distribution of minerals in the field. Ploughing is the process loosening and over turning the soil. This is done with a plough. It is done to facilitate ventilation in soil and makes it suitable for the growth of plants.
4. We need to replenish the soil because all crops consume nutrients from the soil for their growth.
5. Manure is made of waste products of animals and plants such as cow dung, urine, plant wastes, night soil some organic wastes. Fertilizers are mixtures of chemical compounds rich in nitrogen, phosphorus and potassium. These are made in factories. They help the soil by replenishing all the essential nutrients required for crop production.
6. Weeds can also be removed by growing certain plants such as sunflower and soya bean among the crop plants. These plants release toxic substances into the soil, which do not allow the growth of weeds.
7. The most common food product that we get from animals is milk. From milk, we get other food products such as butter, ghee and cheese.
   Meat is obtained from goat, and from birds such as chicken, turkey and ducks. Seafood such as fish, prawns and oysters are also consumed.
   Honey obtained from honeybee is easily digestible and has medicinal properties.

**F. Answer the following questions in detail :**

1. Two of the agricultural practices are as follows :
   **Preparation of Soil :** Soil is the medium for plants to grow as they absorb both water and the essential nutrients for their growth from it. Soil also provides anchorage to the plant in which roots bind themselves to soil particles. It is the horizon A of the soil that is the most important for the plant's growth being rich in water and minerals. The humus formed on soild helps provide nutrients by decomposition of organic wastes by the soil bacteria and fungi. It is, therefore, important to prepare the soil before sowing or planting of the seedling.
   The preparation of soil caried out by ploughing is called tilling. The ploughing is done by using wooden or iron plough down by cattle or tractor in modern times.
   **Storage :** Once the crop is harvested, the grains have to be free from moisture and safe from any kind of insect or pet attack. Presence of moisture promotes microbial growth in the grains. So, grains are first dried in the sun and then packed in gunny bags or metallic bins to be stored in godowns. Large-scale storage of grains is done in granaries or silos to protect them from pests such as rodents, microbes and insects. Pesticides are often sprayed in godowns beforehand to avoid pest attack.
2. A good crop yield requires availability of the right amount of water. Plants can absorb minerals and fertilisers only in the presence of water.

Seeds do not germinate in the absence or scarcity of water. Hence, agricultural fields need to be watered regularly. The supply of water to agricultural fields at regular intervals is called irrigation. The source of water for irrigation could be rainfall, wells, tube wells, canals, ponds, lakes and rivers.

There are various tradition and modern methods of irrigation.

Examples of the traditional methods of irrigation are Dhekli, Chain pump, Moat and Rahat. Thee methods use cattle or humans to pull water from the well. Although these methods are cheaper, they are not very efficient. Pumps are also commonly used for irrigation and are run using diesel, biogas and electricity.

Examples of the modern methods of irrigation are Srinkler system and Drip system.

3. We can protect the crops from weeds by the method of weeding.
   Weeding can be done by any one of the following methodsmanually by hand; using a trowel (khurpa) or a harrow (a large comb-like tool); or by using certain chemicals called weedicides (also called herbicides). Weedicides are sprayed over the field and they selectively kill only the weeds. 2, 4-D (2, 4-dichlorophenoxy acetic acid), MCPAC2-Methyl-4-Chloro-L-phenoxyacetic acid) Butachlor are examples of weedicides. Weeds can also be removed by growing certain plants such as sunflower and soya bean among the crop plants. These plants release toxic substances into the soil, which do not allow the growth of weeds.
4. Crops have to be protected from a variety of animals, such as insects (termites, locusts, etc.) and rodents (rats), which may damage or eat the crops. They are known as pests.
   Crops can also be attacked by bacteria, viruses and fungi. These organisms can cause various crop diseases and thereby reduce the yield. For example :
   - **Bacterial disease :** Bacterial wilt of crops. Wilting blocks the tissue (xylem) in plants that a responsible for transportation of water. This consequently leads to plant death.
   - **Viral disease :** leaf curl in cotton
   - **Fungal diseases :** rust and smut of wheat, blight of potato

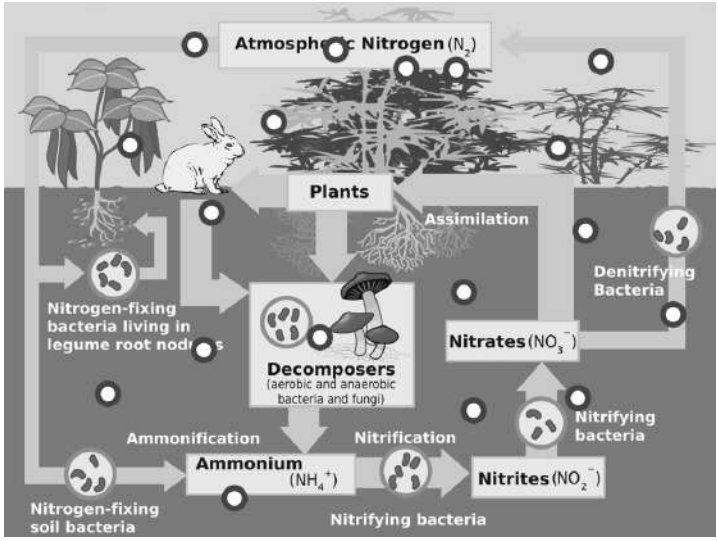
   A chemical substance used for controlling and destroying pests is known a pesticide. Pesticides can be of two types- insecticides and be of two types insecticides and rodenticides. Insecticides are used for killing insects. BHC (benzene hexachloride or gamaxene) and DDT (dichloro-diphenyl-trichloroethane) are examples of insecticides. Rodenticides are used for killing rodents. Warfin and zinc phosphate are examples of rodenticides.

   Fungicides are used for destroying fungi. Many copper salts and sulphur salts salt are examples of fungicides.
5. There has always been an increasing demand for food in India because of its ever-increasing population. To meet this ever-growing demand, we need to increase our crop production. Some of the common areas where we can improvise are the use of the right amount of fertilisers and

manure, providing better irrigation facilities for farmers, good variety of seeds for sowing and proper storage methods.

In order to improve crop variety, various procedures are followed. Plant breeding is often brought about to improve the genetic makeup of crops so that they are economically more useful. Breeding or crossing between two different varieties of a crop in order to incorporate the desired qualities of both parents in the offspring (referred to as the hybrid) is known as hybridisation. The hybrid so produced could be better yielding, disease-resistant, drought resistant, etc. However, the disadvantages can be that these crops may provide less fodder, require more amount of fertilisers, weedicides and pesticides.

6.




Nitrogen cycle

7. Nitrogen is one of the vital elements present in atmosphere, and is required for the normal growth and development of plants. Any deficiency of its compounds results in reduced growth and development; however, there are many commercial activities where nitrogen is used, such as :
   - In manufacture of chemical fertilizers such as urea, ammonium sulphate and ammonium nitrate. Of these fertilizers manufactured, urea is the best because it does not bring any change in the soil's pH.
   - In packaging of the food stuffs such as potato chips. This is because of the inert nature of nitrogen.
   - In the manufacture of explosives, such as nitroglycerine and trinitrotoluene (TNT).

## G. HOTS

Do it yourself

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. c. 3. d.
4. c. 5. a. 6. a.

**B. Fill in the blanks :**

**Ans.** 1. The bacteria which are rod shaped are known as **bacillus**.
2. Organisms that are visible only through a microscope are called **microorganisms**.
3. The linen threads are obtained from flax plant by a process called **retting**.
4. Protozoa are **unicellular & microscopic** organisms.
5. Disease causing microbes are called **pathogens**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.** 1. Microorganisms are the most abundant organisms on our planet. they are found almost everywhere– in ice-cold region, hot springs and deserts, and even inside the bodies of animals and human beings.
2. Yeast, Mushrooms.
3. Bacillus Typhoeus, Bacillus Agri.
4. Organisms that are visible only through a microscope are called microorganisms.
5. AIDS, Chickeupos, Polio.
6. In 1677, Anton van Leeuwenhoek observed bacteria for the first time. Smallest bacteria are coccus and largest bacteria are bacillus.

**E. Answer the following questions in brief :**

**Ans.** 1. The processing of food to prevent their spoilage and retain their nutritive value for long period is called Food Preservation.
2. Bacteria also help in production of some Vitamins and antibiotic which, helps in treating pneumonia., T.B., diphtheria, etc.
Blue-green algae like nostoc and anabaena fix nitrogen in the soil and improve its fertility.
3. (i) Agar obtained from a red alga and algin from a brown alga are used to prepare medicines, food and cosmetics.
(ii) Brown algae are a source of sodium, potassium and iodine.
(iii) Some marine algae like seaweeds are added to the soil by farmers as they are rich in minerals like nitrogen and potassium.
4. Protozoa are unicellular and microscopic organisms. Protozoa are notable for their ability to move independently, a characteristic found in the majority of species. Economic importance of the Protozoa :
**Soil Fertility :** Protozoa play important roles in the fertility of soil. by grazing on soil bacteria, they regulate bacterial populations and maintain them in a state of physiological youth, i.e., in the active growing phase.

Waste Treatment : Protozoa play important roles in waste water treatment processes. Protozoa feed on fungi and bacteria which decompose organic matter. Thus, protozoa constitute and important stip in waste degradation.

**F. Answer the following questions in detail :**

**Ans.** 1. **a. Coccus or round shaped :** The bacteria which have a spherical shape are called coccus forms (Singular coccus, plural cocci).
**Example :** Streptococcus which causes pneumonia.

**b. Bacillus or rod shaped :** The bacteria which are rod shaped are known as bacillus. These are with or without flagella. They cause certain dangerous diseases in the man like tuberculosis, diphtheria, tetanus, leprosy, etc.
**Examples :** Bacillus Typhoeus which causes typhoid.

**c. Spirillum or vibrio shaped :** These bacteria are cork-screw shaped or comma shaped. These may have one or more cilia or flagella on their body surface.
**Example :** Vibrio cholera which caused cholera.

2. Algae are useful or helpful to us in many ways.
   i. Chlorella, a green alga, yields an antibiotic called chlorellin.
   ii. Agar obtained from a red alga and algin from a brown alga are used to prepare medicines, food and cosmetics.
   iii. Brown algae are a source of sodium, potassium and iodine.
   iv. Blue-green algae like nostoc and anabaena fix nitrogen in the soil and improve its fertility.
   v. Some marine algae like seaweeds are added to the soil by farmers as they are rich in minerals like nitrogen and potassium.
   vi. Some algae are edible. For example, the red algae called Porphyra is eaten in China and Japan. Chondrus is used to make puddings and jellies in Ireland.
   vii. Some marine alga such as harminaria are used as fodder for sheep and cattle.
   viii. Diatoms, the golden brown algae such as Naviculr, Pinnularia and Cyclotelia after their death, provide sillier, which is used for making filters, special types of glasses and porcelain.

**Uses of Fungi as food:**

3. i. Mushrooms are eaten as food.
   ii. Cakes and breads are made by the help of yeast. The yeast reproduces very fast at suitable temperature and produces carbon dioxide by the fermentation of sugar. As more and more gas is produced the dough rises in volume which makes breads and cakes porous and spongy.
   iii. Certain species of fungi are used in the manufacture of alcohol, wines by a process called fermentation.

**G. HOTS**

**Ans.** 1. In summers the temperature is suitable for lactobacillus to multiply very fast & produces more lactic acid which coagulates milk proteins & thus convert milk protein into curd to make more sur.

2. As yeast cells grows, more and more gas is produced and the volume of dough rises.

# 3 Synthetic Fibres and Plastics

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.**
1. A **material** is a substance from which they are made.
2. Cloth made from **inorganic** minerals is called synthetic.
3. **Cellulose**, **silk** and **wool** are natural polymers.
4. **Bakelite** does not allow electricity to flow through it.
5. Plastic bags can be replaced by **cotton** or **jute** bags.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.**
1. Plastic
2. Plastics are polymers just like synthetic fibres but they can be moulded or shaped, usually by neat and pressure.
3. Man made or synthetic fibres are non-biodegradable.
4. The fibres which are which are made in laboratories/factories are known as man-dade or synthetic fobres. All symthetic fibres are obtained from small inorganic mollales or from their suitable compounts.

**E. Answer the following questions in brief :**

**Ans.**
1. **Advantages :** i. They do not shrink.

i. They are quick drying and need very little or no ironing. That is why, they are called wash-and-wear fabrics.

**Disadvantages :** i. Synthetic fibres do not absorb water or sweat in hot and humid weather, therefore the clothes made of synthetic fibre stick to the body and make the wearer uncomfortable.

ii. Synthetic fibres melt and burn easily. Synthetic fibres on burning shrink, forming beads which stick to the skin. Therefore it is not advisable to use clothes made from synthetic fibres while working near flame/fire, such as in kitchen.

2. A material is termed biodegradable, if it is decomposed over a period of time by the action of air, water and microorganisms e.g. paper, cotton, wood etc.
3. (i) Plastics can be moulded or shaped, usually by heat and pressure.
(ii) It is their malleability or plasticity that allows them t be cast, pressed, or extruded into a large variety of shapes such as films, fibres, plates, tubes, bottles, boxes and much more.

**F. Answer the following questions in detail :**

**Ans.**
1. **Thermosetting plastic**

i. Thermosetting plastics are the polymers in which chains get highly cross-linked on heating.

ii. Once moulded, thermosetting plastics cannot be reprocessed.
**Example :** Bakelite, Melamine- formaldehyde, resin

**Thermoplastic**

i. Thermoplastic are polymers with no cross-linking. Heating also does not produce any cross-linking between the chains.

ii. Thermoplastics can be processed repeatedly.
**Example :** Polythene, PVC,
Polystyrene, Nylon, Polyesters etc

2. Plastics are polymers just like synthetic fibres but they can be moulded or shaped, usually by heat and pressure. It is their malleability or plasticity that allows them to be cast, pressed, or extruded into a large variety of shapes such as films, fibres, plates, tubes, bottles, boxes, and much more.

**The plastics show the following general characteristics different from other compounds :**

- Toughness or tensile strength : plastics vary in their tensile strength from material to material. Plastics have much less toughness as compared to metals and alloys like steel.
- Light weight : Plastics are much lighter in weight as compared to wood, metals, etc.
- Chemical reactivity : Plastics are not affected by acids and alkalies. Natural polymers such as cotton, wool, etc. are damaged by acid and alkalies.
- Weather resistance : Plastics are not biodegradable that is why, they do not chanve with weather unlike natural fibres like cotton and wool.
- Thermal conductivity : Plastic are the bad conductors of heat. For this reason, the handles of the cooling utensils are made of plastic material.
- Electrical conductivity : Plastics do not conduct electricity. This property of plastic is used for making electrical applicances lile switches, irons, torches, bulb-hoders etc.
- Solubility in water : There is no effect of water on plastics. these are insoluble in water.

3. Plastics poses a serious environmental problem, as most of the methods used to dispose them harm the environment and result in some kind of pollution.

- Most of the plastic waste (after being picked up by rag-pickers) ends up floating in the nearby water body and becomes a home for many disease-causing germs.
- Burning plastic waste is also not a very good option as it does not get completely burnt. Moreover, during burning, it releases many toxic gases and pollutes the environment and causes health hazard.

If plastic waste is buried in the soil, it remains there for a long time and does not allow rainwater to seep through the ground. Plants growing in the area do not get sufficient supply of water and their growth is affected.

**G. HOTS**

**Ans.** 1. Melamine is used for making unbreakable plastic item. $C_3H_6H_6$ is the formula of Melamine.

2. A thermoplastic is a plastic that melts when exposed to heat and can be given any shape easily.

# 4 Metals and Non-metals

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. **Bromine** is the only non-metal that exists as a liquid at room temperature.

2. The property by virtue of which metals can be drawn into thin wires is called **ductility**.
3. Mercury is used in **thermometers** and **CFLs**.
4. **Non-Metals** do not react with dilute acids.
5. Metallic oxides are **basic** in nature.

**C. Answer the following questions in short :**

**Ans.** 1. **Metal :** Mercury
**Non- Metal :** Bromine

2. Potassium and sodium are soft metals and can be cut with a knife.
3. Sonority
4. Diamond
5. Graphite
6. It is a non-metal because meta oxides are basic in nature.

**D. Answer the following questions in brief :**

**Ans.** 1. Metals are good conductors of electricity and are, therefore, used for making electrical wires and cables.

2. Rusting of iron is an undesirable reaction because the layer of rust formed falls off, exposing the metal to further rusting.
3. Copper objects get coated with a green substance called basic copper carbonate with the passage of time. This green substance is formed due to the reaction of copper with carbon dioxide and moisture present in the atmosphere.
4. **Uses of Metals**

- Metals are used in the construction of houses, buildings, bridges, etc.
- They are used in making aeroplanes, trains, ships, automobiles, etc.
- Utensils used in our homes are made of metals.

**Uses of Non-Metals**

- Iodine has antiseptic properties. It is applied on wounds.
- Nitrogen is very essential for the growth of plants. It is used to manufacture fertilisers.
- Oxygen is a non-metal which is very essential for the life to exist. We breathe in oxygen all the time. No burning can occur without oxygen.

**E. Answer the following questions in detail :**

**Ans.** 1. **Ductility**

**Metals :** Most metals can easily be drawn into thin wires, which have a wide range of applications. The property by virtue of which metals can be drawn into thin wires is called ductility. Gold and silver are two of the most ductile metals known. Other metals that can be drawn into wires include copper, aluminium and tungsten.

**Non-metals :** Non-metals are non-ductile i.e., they cannot be drawn into wires. For example, when non-metals, such as sulphur and phosphorus, are stretched they break into pieces and do not form wires.

**Thermal Conductivity**

**Metals :** Metals are good conductors of heat and are, therefore, used for making cooking utensils. Silver is the best conductor of heat.

**Non-metals :** Non-metals are generally poor conductors of heat. Diamond, which is a good conductor of heat, is an exception.

**Electrical Conductivity**

**Metals :** Metals are good conductors of electricity and are, therefore, used for making electrical wires and cables.

**Non-metals :** Non-metals are generally poor conductors of electricity. Graphite, which is a good conductor of electricity, is an exception.

2. a. Zinc reacts with sulphuric acid to form zinc sulphate and hydrogen gas.

$$\underset{\text{Zinc}}{Zn} + \underset{\text{Sulphuric acid}}{H_2SO_4} \longrightarrow \underset{\text{Zinc sulphate}}{ZnSO_4} + \underset{\text{Hydrogen gas}}{H_2}$$

b. Magnesium reacts with sulphuric acid to form magnesium sulphate and hydrogen gas.

$$\underset{\text{Magnesium}}{Mg} + \underset{\text{Sulphuric acid}}{H_2SO_4} \longrightarrow \underset{\text{Magnesium sulphate}}{MgSO_4} + \underset{\text{Hydrogen gas}}{H_2}$$

c. Aluminum reacts with hydrochloric acid to form aluminum chloride and hydrogen gas.

$$\underset{\text{Aluminium}}{2Al} + \underset{\text{Hydrochloric acid}}{6HCl} \longrightarrow \underset{\text{Aluminium chloride}}{2AlCl_3} + \underset{\text{Hydrogen gas}}{3H_2}$$

3. In a displacement reaction, a metal reacts with a salt solution and 'displaces' (or replaces) the metal present in it. Displacement reaction are explained on the basis of the activity series of metals.
Iron, which is placed higher in the activity series than copper, reacts with copper sulphate solution. Copper, however, does not react with iron sulphate as it is less reactive than iron.

**HOTS**

**Ans.** 1. Because metals are good cenductors of heat but plastic and wood are bad comductors f heat. So plastic and wooden handles can not help in the conduction of heat and can safe the hand.

2. a. Zinc, Aluminium b. Hydrogen

3. It appears dull because of rust.

4. It is a metal. This is so because it is basic in nature.



## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. Species that are facing threat of extinction are called **Endangered species**.
2. All **animals** species found in a particular area are called fauna.
3. The plants found typically in particular area form the **flora** of that area.
4. Replanting trees in forests is called **afforestationl**.
5. **Wildlife** is a valuable resource.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Give one word for the following :**

**Ans.** 1. Hangement of Natural Resources
2. Biosphere Reserve
3. Core Zone
4. Endangered species

**E. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Endangered species | • **Asiatic lion** |
| 2. National parks/wildlife sanctuaries | • **Biosphere reserve** |
| 3. Urbanisation | • **Loss of biodiversity** |
| 4. Recycling | • **Paper** |
| 5. Deforestation | • **Floods and soil erosion** |

**F. Answer the following questions in short :**

**Ans.** 1. Migration is the regular, periodic, two way movements of birds and some animals from their place of residence to some other place along well defined routes.
2. The IUCN (International Union for the Conservation of Nature and Natural Resources).
3. Replanting trees in forests is called afforestation.
4. Some species of plants and animals are found exclusively in a particular area, and do not occur naturally anywhere else. Such species are called endemic species.

**G. Answer the following questions in brief :**

**Ans.** 1. Biodiversity is the variety of life on Earth. It includes the variability of species in different habitats, the diversity of microorganisms, plants and animals. It is an essential component of nature and it ensures the survival of human species by providing food, fuel, shelter, medicines and other resources to mankind.
2. **Affect of deforestaion on environment :**
- Destruction of forests has affected the food chain and destroyed the aabitats of many living organisms.
- Destruction causes global warming.

- Destruction leads to increase in temperature and pollation level on Earth. This disturbs the water cycle and reduces rainfall. The outcome is the drought.
- Destruction results in soil erasion.

3. A group is Extinct when there is no reasonable doubt that the last individual has died. Dinosaurs became extinct as they could no adapt to climatic changes.
4. Project Tiger is a conservation programme launched in 1973 CE to save tiger from poaching. Under this project, 48 tiger reserves have been established in India.

**H. Difference between the following :**

**Ans.** 1. **Endangered species :** A group is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
**Extinct species :** A group is Extinct when there is no reasonable doubt that the last individual has died. Dinosaurs became extinct as they could no adapt to climatic changes.

2. The plants found typically in particular area form the flora of that area. The term fauna represents the wild animals found in a particular o;ace or particular geographical region. For example, trees of jamunm mango, gauva, pine, chir, oak, deodar, bamboo frm the flora of Himachal Pradesh andtrees of dham, salai, jamum, arjan and ber form the flora of Rajasthan. Tiger, leopard, antelope, sambar, chinkara, nilgai, porcupine, hyena and wild bear represent the fauna of Rajasthan.
3. **Deforestation :** Deforestation is clearing of forests for using the land for other purpose.
**Afforestation :** Replanting trees in forests is called afforestation.
4. **Wildlife sanctuary :** A sanctuary is a protected land area reserved for the conservation of wild animals, birds and plants.
**Biosphere reserve :** A biosphere reserve is a specified land area in which multiple use of land is permitted for preserving biodiversity.
5. **Endemic species :** Some species of plants and animals are found exclusively in a particular area, and do not ocur naturally anywhere else. Such species are called endemic species to that state, country or geographical area. For example, Lion (babbar sher) is endemic to Gir forests in Gujurat.
**Exotic species :** The species introduced into a new locality from some other area is called an exotic species. It competes with the species already existing in that area and may cause extinction of some native species.

**I. Give reason for the following :**

**Ans.** 1. **Conservation of biodiversity is essential because :**
- Biodiversity maintains balance in nature or balance in the ecosystem.
- Wildlife animals and plants provide a variety of commodities.
- Wildlife is needed for breeding programmes in agriculture, horticulture, sericulture, apiculture

2. Mega biodiversity centres are very rich in plant and animal species. India, Brazil, Columbia, Mexico, Indonesia, Philippines, China and Australia are mega biodiversity centres of the world.
3. India has a rich and varied biodiversity because of a variety of habitats such as desert, grassland, tropical and temperate forests, coastal wetlands and alpine vegetation. More than 50% of total species of plants and animals found on the Earth are present in India. Therefore, India is one of the mega biodiversity nation.
4. **Habitat loss :** We already know that plants and animals depend on each other. A number of species of birds and other animals live in a forest. It is their habitat. They depend on each other for food and other things. Destruction of forests has affected the food chain and destroyed the habitats of many living organisms. Animals like lions and tigers have become much reduced in number because the forests in which they live have been destroyed.
5. Birds migrate better climatic conditions are which suitable for their body. They lay eggs and when the eggs hatch and the chicks are capable of flying, they move back to their natural habitats where climatic conditions have become suitable.

**J. Answer the following questions in detail :**

**Ans.** 1. A number of species of birds and other animals live in a forest. It is their habitat. They depend on each other for food and other things. Destruction of forests has affected the food chain and destroyed the habitats of many living organisms. Animals like lions and tigers have become much reduced in number because the forests in which they live have been destroyed.

2. A biosphere reserve is a specified land area in which multiple use of land is permitted for presering biodiversity. A biosphere reserve helps in maintaining the biodiversity as well as the culture of that area.
   A biosphere reserve may also contain other protected areas like national parks and wildlife sanctuaries. For example, Pachmarhi Biosphere Reserve includes Satpura National Park and two wildlife sanctuaries Bori and Pachmarhi.
3. A group is Endangered when it is not critically Edangered but is facing a very high risk of extioction in the wild in the near future. animals living in their natural habitats, like tigers and elephants in dense forests, crocodiles and alligators in natural water bodies. animals become Endangered are :

- **Habitat loss :** The destruction of natural habitats of animals by deforestation disturbs the life, growth and reproducing timing of wild animals.
- **Indiscriminate hunting :** Indiscriminate killing and poaching of wild animals for food, skin, fur, horn, tusk, etc.
- **Pollution :** Air, water and soil pollution is also responsible for death and elimination of sensitive wild species.

4. **Forest Conservation Act**
   This act empowers government and forest department

- to create and manage reserved forests, protected forests and village forests.
- to conserve forests as a natural heritage.
- to control movement of forest produce.
- to control and regulate cattle grazing in forests.

**Wildlife Protection Act**

- The objectives of this act are :
- Prohibition of hunting of listed threatened species.
- Setting up and management of national parks, sanctuaries and biosphere reserves.
- Control and management of captive breeding.
- Protection of specific plants and natural habitats of animals.

**K. HOTS**

**Ans.** 1. Cherrapunji in Meghalaya provides a good example of devastating effect of deforestation. This area was known to have the highest rainfall in the world. Lagge scale expoitation of forests left these hills barren : Now, this area has low and erratic rainfall, altered clmate pattern and fractured forest.

2. Overgrazing leads to desertification because of the less of grass cover on the ground.

# 6 The Cell

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c 2. d 3. b 4. c 5. a

**B. Name the following :**

**Ans.** 1. Cell Membrane 2. Microscope 3. Cell Membrane
4. Organelle 5. Chromosomes

**C. Fill in the blanks :**

**Ans.** 1. A **tissue** is a group of cells of the same size, shape and function.
2. An **organ** is a structure that contains more than one type of tissue.
3. A group of organs working together is called an **organ system**.
4. The different organ system working together form the **organism**.
5. The living parts of the cell that have a definite shape structure and function are called **organelles**.
6. The organisms with prokaryotic cells are called **prokaryotes**.

**D. Write 'true' or 'false' for the following statements :**

**Ans.** 1. true 2. false 3. true
4. false 5. false 6. false

**E. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Mitochondrion | • **Powerhouse of the cell** |
| 2. Organ | • **Contains more than one type of tissues** |
| 3. Chloroplasts | • **Green plastids** |
| 4. Amoeba | • **Unicellular organism** |
| 5. Protoplasm | • **Living substance of the cell** |

**F. Answer the following questions in short :**

**Ans.** 1. Microscope

2. As the blocks can be joined in many ways to make the building of different shapes and sizes. In the same way all living organisms are made differently of different shapes, sizes and by different number of cells.
3. Nucleus, Cell Membrane, Cytoplasm.
4. It is the living content of a cell that is surrounded by a plasma membrane. In also include nucleus and cytoplasm.
5. Plantcells are surrounded by cell wall.

**G. Answer the following questions in brief :**

**Ans.** 1. A tissue is a group of cells of the same size, shape and function. Examples of some tissues are muscle tissues and nerve tissues.

2. Do it yourself. Nerev cells are very long and branched shape with thin thread-like projections which help it to send messages over long distances in the body.
3. The cells are known as building blocks or basic structural unit of life,. As the blocks can be joined in many ways to make the building of different shapes and sizes. In the same way all living organisms are made differently of cells.
4. Unicellular organisms :

- They are made up of single cell.
- The single cell carries out all the processes of life.

Multicellular organisms :

- They are made up of many cell.
- They are of different shapes and size.

**H. Answer the following questions in detail :**

**Ans.** 1. **Number :**

Some living organisms are made up of single cell. These are called unicellular organisms. The single cell carries out all the processes of life. The organisms like Amoeba, paramecium and bacteria are the examples of unicellular organisms. Most of the organisms are made of many cells and are called multicellular organisms like mushrooms, man, cat, etc. There are millions of living organisms. They are of different shapes and sizes. Their organs also vary in shape, size and number of cells.

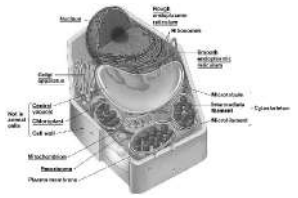
**Shape**

Cells may be of different shape and size. Some cells are round or oval, some are cuboidal, cylindrical spindle shaped while some are of irregular shape. The shape varies according to the type of function a cell performs. like nerve cells are long and muscles cells are needle like. In leaves, Guard cells are bean shaped and are opposite to each other. They are present in stomata. In unicellular organism, cell has irregular shape which keeps on changing with the activity of animals.

**Size**

The cell size varies form 1210th to 12100th millimetre. Most of the cells are microscopic. Amagnifying glass cannot enable us to see it.

The size of the cell has no relation with the size of body of the animals or plants.

2. 

3.

| | Organelles | Functions |
|---|---|---|
| (i) | **Mitochondrion** | Cell's powerhouse; provides energy to the cell |
| (ii) | **Endoplasmic reticulum** | Synthesis, storage and transport of materials |
| (iii) | **Golgi body** | Secretion of many materials |
| (iv) | **Lysosome (found in animal cells)** | Cell's suicide bag; helps in digesting excess or worn out organelles, engulfed bacteria, etc. |
| (v) | **Vacuole (non-living part** | Stores excess water, useful materials, pigments and waste products |
| (vi) | **Ribosome** | Synthesize proteins for the cell |
| (vii) | **Plastid (found only in plant cells)** | Chloroplasts (green plastids) contain chloro-phyll (green pigment) which is necessary for photosynthesis |

4. **a.** **Cytoplasm :** A jelly-like fluid which occupies the space between the cell membrane and the nucleus. Several organelles are embeded in the cytaplasm.
**Protoplasm :** It is the living content of a cell that is surrounded by a plasma membrane. It also inclyte nucleus and cytoplasn.

**b.** **Plant cell :** Vacocole & Chloroplasts is present. Nucleus lies in side. Cell wall is persent.
**Animal cell :** No, Chloroplasts and Vacocole is present. Nucleus lies in centre.

**c.** **Tissue :** A tissue is a group of cells of the same size, shape and function. Examples of some tissues are muscle tissues and nerve tissues.
**Organ :** An organ is a structure the contains more than one type of tissues. It is normally big enough to be seen with the naked eye. Examples of some organs are heart and brain in animals, and leaves, roots and stems in plants.

**d.** **Cell membrane :** It is the outer covering of a cell. It is a porous membrane through which selected substances can enter to leave the cell. The cell membrane is also called plasma membrane.

**e.** **Prokaryotes :** Prokarotic cells are more primitive than eukaryotic cells and have a simple structure. The nucleus of prkaryotic cells in not well organised. There is no nuclear

membrane around the nuclear material in te prokaryotic cells. The cells having nuclear material without a nuclear membrane around it, are called prokaryotic cells and the organisms which have these cells are known as and the organisms are called cukaryotes. The nuclear material in a prokaryotic cell is in direct contact with the cytoplasm.

Eukaryotes : The cells having nuclear material enclosed by a nuclear membrance are called eukaryotic cells. Eukarotic cells have a proper, well ortanised nucleus, The nuclear material in eukaryotic cells is not in direct contact with cytoplasm, it is separated from cytoplasm by the nuclear membrane. Enkaryotic cells are more advanced than prokaryotic cells.

**f.** **Cytoplasm :** A jelly-like fluid which occupies the space between the cell membrane and the nucleus. Several organelles are embeded in the cytaplasm.

**Cell membrane :** It is the outer covering of a cell. It is a porous membrane through which selected substances can enter to leave the cell. The cell membrane is also called plasma membrane.

**I. HOTS**

**Ans.** A. is Nucleus B. is Mitochondria
C. is Cell Membrane D. is Cytoplasm
E. is Chromosomes

# 7 Reaching the Age of Adolescence

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.**
1. **Adam's apple** is the protruding part of the throat.
2. The hormone whose deficiency may cause diabetes is called **Insulin**.
3. **Infancy** is the stage of growth from birth to about 2 years of age.
4. The age at which the reproductive system becomes functional is called **puberty**.
5. Thyroxine production requires the presence of **iodine** in water.

**C. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Thymus gland | • **Plays important role in body's immune system** |
| 2. Pituitary gland | • **Master gland** |
| 3. Pancreas | • **Deficiency causes diabetes** |
| 4. Thyroid gland | • **Deficiency cause cretinism and goitre** |
| 5. Adrenal gland | • **Stress hormone** |

**D. Write 'true' or 'false' for the following statements :**

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

**E. Encircle the odd one. Give reason for your choice :**

**Ans.** 1. **Insulin :** It is regulate the sugar level in our body but other three harrmones are sex hormones.

2. **Ecomomi Goitre :** Because it is depend upon the money other all are depent upon the our body growth.
3. **Goitre :** It is a deficiency disease but others are voice organs.
4. **Ovulation :** It is the release of the ovum but others are the part of the mhistruation cycly.

**F. Answer the following questions in short :**

**Ans.** 1. **Adolescence :** The period of life when the body undergoes changes, leading to reproductive maturity.
**Puberty :** The age at which the reproductive system becomes functional.
2. Conspicuous change during puberty is developmant of secondary sexual characters.
3. At puborty the voice box or the lorynx begins togrous. Boys develop larger voice boxes. The growing voice box in boys can be seen as a protruding part of the throat called Hormone Adam's apple.
4. These is a chemical substances which is secreted from endocrine glands.

**G. Answer the following questions in brief :**

**Ans.** 1. At the stage of puberty, secretions of cndocrine glands respondible for changes taking place in the body.
2. **Adolescence :** The stage between childhood and adulthood is called adolescence. During this peiod, the body attains reproductive maturity. thus, the period of life whin the body undergoes changes leading to the reproductive maturity is called adolescence.
Adolescence usually starts from the age of 11 years and lasts up to the age of about 18-19 years.
Puberty : During adolescence priod, the body grows rapidly and many changes in the body take place. These changes mark the onset of puberty.
At puberty, the boys and girls become capable of reproduction. Puberty ends when the adolescent reaches at the reproductive maturity.
3. The males (with XY type pari of sex chromosome) produce two types of sperms : i. having X chromosome ii. having Y chromosome.
The females on the other hand, produce only one type of eggs; eggs having only X chromosome.
Whether a baby s going to be a girl or a baby depends on sperms which fertilises on ovum as shown in the following table.
4. Changes during puberty :
Increase in height.
Increase activity of sweat and sebaceous glants.
Development of sex organs.
Development of secondary sexual characters.
5. At puberty, the voice box or the larynx begins to grow. Boys develop larger voice boxes. The growing voice box in boys can be seen as a protruding part of the throat called Adam's apple.

**H. Answer the following questions in detail :**

**Ans.** 1. Hormones are the chemical messengers which regulate most of the metabolic activities inside our body. Most of these hormones are secreted by special glands called endocrine glands.

Importation endocrine glants and their harmones :

i. Pineal gland : Melation hormone
ii. Pituitary gland : Growth hormone
iii. Thyroid gland : Thyroid hormone
vi. Parathyroid gland : Parat hormone
v. Thymus gland : Thymosin hormone
vi. Adrenal gland : Adrenal hormone
vii. Pancreas : insulin, Glucagon hormone

2. Sex hormone : The hormone, such as oestrogen or testosterone, offecting sexual development or reproduction are known as sex hormones.

They are called sex hormones because they are secreted by sex organs of the organisms and play important role in the maintaing xex chracters of that organisms.

The testes and ovaries secretes sex hormones. These hormones are respondible for the male and lemale secondary sexual charactirs.

The male hormone or testosterone begins to be released by the testes at the onset of puberty. This causes changes in boys about which you have just lwarnt, for example, the growth of facial hair. Once puberty is reached in girl, ovaries begin to produce the female hormone or estrogen which makes the breasts develop. Milk secreting glands or mammary glands develop inside the breasts. Its production is under the control of a hormone from another endocrin gland called pituitary gland.

The ovaries also releade one more hormone called progesterone which is responsible for the maintenance of the pregnancy.

3. **a. Exocrine glands :** Which have ducts that carry their secretions to specific places in the body. Sweat gland and sebaceous glands.

**b. Target side :** Endocrine glands releases hormone into the bloodstream to reach a particular body part called target site.

**c. Menarche :** The first menstrual flow begins at the onset of puberty and is called manarche. It occurs at the age of 11 or 12 years. It marks the beginning of reproductive phase in female.

**d. Menopause :** The permanent stoppage of menstruation is called menopause. It begins around 45 to 50 years of age and marks the end of reproductive phase in female.

4. The reproductive organs are testes and ovaries which produce the gametes, i.e., sperms in males and ova in females. In girls, breasts begin to develop at puberty and boys begin to grow facial hair, that is, moustaches and beard. As these features help in distinguishing the male from the female, they are called secondary sexual characters. Boys also develop hair on their chest. In both boys and girls, hair

grows under the arms and in the region above the thighs or the pubic region.

**I. HOTS**

**Ans.** 1. Thyroxine production requires iodine if iodine is not taken by a person thyroid gland stop working which may cause :
   i. It causes cretinism in childhood (stunted physical and mental growth).
   ii. It causes simple goitre in adults (enlargement of thyroid gland).
   iii. It causes swelling on face and hands, sluggishness, thick skin and coarse hair in adults (myxedema).
2. Many young people get acne and pimples on the face at incrcasef activity of sweat and sebaceow, glands.

## 8 Reproduction

### Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. **Asexual reproduction** does not involve fusion of egg and sperm.
2. The fertilisation which takes place inside the female body is called **internal fertilisation**.
3. The **zygote** is actually a fertilised egg.
4. The testes produce the male gametes called **sperms**.
5. The ovary produces female gametes called **ova** (eggs.).

**C. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Male gamete | • **Sperm** |
| 2. Internal fertilization | • **Mammals** |
| 3. Cloning | • **Dolly sheep** |
| 4. External fertilization | • **Fish** |
| 5. Female gamete | • **Ovum** |

**D. Write 'true' or 'false' for the following statements :**

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

**E. Answer the following questions in short :**

**Ans.** 1. In animals fertilisation are of two types :
   i. internal fertilisation, and
   ii. external fertilisation.
2. One
3. Reproduction means producing new living things of the same kinds.
4. Cloning is a technique of producing an exact copy of a cell, any other living part or a whole organism.

**F. Answer the following questions in brief :**

**Ans.** 1. **Zygote :** i. In human beings, the process of fertilisation is the meeting of a sperm cell from the father with an egg cell from the mother to form a fertilised egg cell called zygote.
   ii. All the multicellular animals start their life from a zygote.
   **Foetus :** i. The stage of the embryo in which all the body parts can be distinguished easily is called a foetus.

ii. When the development of the foetus is complete, the mother gives birth to this young one. The birth of the fully developed foetus is termed as parturition.

3. Internal Fertilisation : The fertilisation which takes place inside the female body is called internal fertilisation. In internal fertilisation, the female animal's eggs are fertilised by sperms inside her body. The fertilisation which takes place outside the female body is called external fertilisation. In external fertilisation, the female animal's eggs are fertilised by sperms outside her body. In frogs and most fishes, the fertilisation of eggs occurs outside the female animal's body. In external ertilisation, the male.
4. The technique of cloning enables us to produce exactly identical copies of domestic animals having favourable characteristics (without the risk of losing some of the beneficial genes or introducing unwanted genes through sexual reproduction methods). Cloning produces identical copies of the present domestic animals and helps in preserving desirable features (like high milk yield or good quality wool) of the parent animal for future generations.

**G. Answer the following questions in detail :**

**Ans.** 1. Fertilisation : The fusion of a operm with an egg (orovum) to form a zygote during sercuol reproduction, is called fertilisation. In human beings, the process of fertilisation is the meeting of a sperm cell from the father with an egg cell from the mother to form a fertilised egg cell called zygote. The head of a shows a sperm and an egg. Figure 'b' shows the head of a sperm entering the egg. note that though many sperms try to enter the egg, only one sperm is successful in entering the egg When the head of sperm enters the egg, then the nucleus of sperm cells fuses (or joins) with the nucleus of egg cell to form a new nucleus. The fusion of nucleus of sperm with the nucleus of egg to form a new cell called 'fertilised egg' or 'zygote' (The tail of successful sperm entering the egg remains outside).

2. **Asexual Reproduction :** The method of reproduction in which a single organism ids able to reproduce one or more of its own kind by its own kind by itself is called asexual reproduction. Asexual reproduction does not require gametes or sex cells (male and female). Only single parent is in this type of reproduction. The amoeba, yeast, hydra, etc. reproduce by method of asexual reproduction.

   Budding in Hydra and Yeast : In each hydra, there may be two or three bulges. These bulges. these bulges are the developing new individuas and they are called buds. Such presence of buds can also be seen in the yeast.

   The bud so formed slowly enlarges and detaches iself from the body and grows into a new young organism. Thus we find that in hydra and yeast both, the new individuals develop as outgrowths from a single parent. Indivduals develop from the buds in hydra, this type of asexual reproduction id called budding.

   **Binary fission in Amoeba :** Another method of asexual reproduction

is observed in Amoeba. Amoeba is single celled. It begins the process of reproduction by the division of its nucleus into two nuclei,. This is followed by division of its body into two with each part receiving a nucleus. Finally, two Amoebae (plura of Amoeba) are produced from one Amoeba. This type of asexual reproduction in which an animal reproduces by dividing into two individuals is called binary fission.

3. **(a) Ovaries :** Ovary produces female gametes called ova (eggs). In human beings, a single matured egg is released into the oviduct by one of the ovaries every month.
   **(b) Sperm :** It is a male gamete and help in the fertilisation. The fusion of a sperom with an egg formed a zygoti.
   The two sperm ducts open into the top of the urethra, just after it leaves the urinary bladder.
   **(c) Urethra :** The urethra, at different times, carries both urine and sperms. The urethra is a narrow tube and runs through the penis to the outside.
   **(d) Uterus :** The uterus communicates with the outside through a muscular passage, the vagina.
   **(e) Oviducts :** Eggs produced in the ovaries are received by the two expanded funnel-like openings of the oviducts, one on each side. The oviducts open into a wide walled muscular chamber called the uterus or womb.

**H. HOTS**

**Ans.** 1. 12 to 48 hours
2. During rainy season frogs move to the water in ponds and slow moving streams. When the male frog and female frog come together, the female frog lays hundreds of egg in water. The male frog releases millions of sperms from its body.

# 9 Force and Pressure

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. b. 2. c. 3. b. 4. c. 5. c.

**B. Fill in the blanks :**

**Ans.** 1. **Muscular Force** is the force exerted by the muscles of our body.
2. A push or pull on an object is called **force**.
3. The force exerted by a magnet is called **magnetic Force**.
4. The pressure exerted by **liquids** increases with depth.
5. The SI unit of **pressure** is newton per square metre (or N/m2).

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.** 1. A pull or push acting on a body which tends to change its state of rest or of motion.
2. The pressure exerted by the weight of the air on an object.
3. Our present day knowledge about the atmospheric pressure is based on the experiments conducted by E. Torricelli

Torricelli made a device to measure atmospheric pressure. This is called simple barometer (or mercury barometer).

4. Pascal

**E. Answer the following questions in brief :**

**Ans.** 1. There are two kinds of forces :
Contact force, and
Non-contact force or Action-at-a-distance force

2. Pascal's law : Pressure applied to a liquid is transmitted equally in all the dirctions.
Method : To show that liquids exerts the same pressure in all directions at a given depth.
- Take a plastic bottle.
- Punch three holes in the bottle at the same height.
- Now pour some water into it and let it flow through these holes.
- observe it.

You will observe that water comes from all the holes with the same force and falls at the same distance.
This shows that liquids exert the same pressure in all directions at a given depth.

3. We do activities like walking, stretching, eating, writing, playing, pulling, pushing, etc. The force needed by our body to perform these activities is provided by the action of our muscles. The force that comes from the action of muscles is called the muscular force.

4. Pressure is defined as the force acting on a unit area. In other words,
Pressure = Force (F) /Area (A)
For a fixed area of contact, the pressure exerted increases with an increase in force and vice-versa.

**F. Answer the following questions in detail :**

**Ans.** 1. **Force :** A push or pull on an object is called fore. The direction in which the obect is pushed or pulled is called the direction of force. Forces are used in everyday.
Thee are two kinds of forces :
- Contact force, and
- Non-contact force or Action-at-a-distance force

**Contact Forces :** A force that acts when two objects come in contact with each other is called a contact force. It is a force that acts only when objects tuch each other directly. Examples o contact forces as muscular forces (or mechanical forces) and friction forces.

**Non-contact Forces :** There are forces which act on a body from a distance, i.e. there is no physical contact between bodies. Such forces are known as action at a distance force or non-contact forces.

**Contact Forces :** A force that acts when two objects come in contact with each other is called a contact force. It is a force that acts only when objects tuch each other directly. Examples of contact forces as muscular forces (or mechanical forces) anc friction forces.

**Non-contact Forces :** There are forces which act on a body from a distance, i.e. there is no physical contact between bodies. Such forces

are known as action at a distance force or non-contact forces.

2. **Change the direction of a still or a moving object**
   - You apply a push to an almirah to make it face a different direction.
   - A football player kicks (pushes) a football to make it move in a different direction, over to another player of his team.

   **Make a moving object stop**
   - While catching a ball thrown by your friend, you apply a push and the moving ball comes to a stop.

   **Change the speed of a moving object**
   - You must have made someone push your swing to increase the speed while you sat on it.

     An elder child may stand opposite and apply a push to a tricycle being run by a younger child and slow it down.

   **Change the shape of an object**
   - Every day, your mother rolls down a ball of kneaded flour into chapatti (different shape) by applying a push. You might have played with moulding clay of different colours, making it into so many different shapes of fruits, animals, etc.
3. **Balanced forces :** When the resultant of all the forces acting on a body is zero, the forces are said to be balanced forces.

   The balanced forces :

   cannot set any stationary body into motion
   - cannot change the speed/velocity of a moving body.

   **Unbalanced force :** may change the shape and size of a soft object.

   When the resultant of all the forces acting on a body is not zero, the forces are unbalanced forces.

   The unbalanced forces can

   set a stationery object in motion

   set a moving object at rest

   change the direction of motion
4. **Depth :** Take a plastic bottle and punch three holes at different heights.

   Now pour some water into it and let the water flow through these holes.

   What do you observe?

   You will observe that water from that lowest hole comes out with the greatest force and falls at the maximum distance. You will observe that water from the topmost hole comes out with the least force and at the minimum distance.

   Repeat the experiment with different liquids.

   This proves that liquid pressure varies with depth.

   The pressure increases with depth of the liquid.

   **Amount :**

   Take a plastic bottle.

   Punch three holes in the bottle at the same height.

   Now pour some water into it and let it flow through these holes.

   Observe it.

You will observe that water comes from all the holes with the same force and falls at the same distance.

**Shope and size of the conteiner :**

Take two (or tree) cams of the same height but different widths. Drill equal-sized holes all around these cans at the same level. Fill these cans with water and observe the water streams flowing out of these holes. Water rushing out of the holes of all these cans fall at equal distanes frm the walls of the cans. This shows that the pressure of a liquid depends only on the depth and not on the shape or size of the container.

**G. HOTS**

**Ans.** • At the tall mountain air pressure is more due to this less air is available. The other reason that there is less oxygen in the atmosphere at top of a tall mountain. So, we need to breathe fast.

# 10 Sound

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. c. 2. d. 3. d. 4. b. 5. a.

**B. Fill in the blanks :**

**Ans.** 1. **Vibration** is a rapid back and forth movement of a body.
2. Frequency is measured in the unit **hertz (Hz)**.
3. The **eardrum** is stretched very tightly.
4. We should keep the volume of **radio** and **television** low.
5. Infrasonic sounds are very **low** frequency sounds.
6. Unpleasant sounds are called **noises**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Answer the following questions in short :**

**Ans.** 1. Sound is produced by the vibrations of a body.
2. The vibrations of air molewles produce a wave that brings the sound of a ringing telephone bell toour ears.
3. A vibration is a rapid back and forth movement of a body about a central position.
4. Amplitude

**E. Answer the following questions in brief :**

**Ans.** 1. Sound is produced by the vibratiens of a body. Vibration is a rapid back and forth movement of a body. Sound travels in the form of a wave. Waves are characteriqed by three quantities. They are frequacy, speed and amplitude.
2. Frequency & Pitch
3. The time taken to complete one oscillation is called the time period of the oscillation. It is measured in seconds.
4. The audible frequency range of sound is from 20Hz to 20,000 Hz. This type of vibrations are called sonic vibrations.

5. Musical instruments are classified into the following three categories.
   In stringed instruments like violin, guitar, and sitar, sound is produced by a vibrating string.
   In wind instruments like trumpet, flute, and harmonica, sound is produced by the vibrating air column inside the instrument.
   In percussion instruments like tabla, drums, and dholak sound is produced by a vibrating skin or membrane.

**F. Answer the following questions in detail :**

**Ans.** 1. **Sound Produced By Humans**
   In humans, the sound is produced by the voice box or the larynx. The voice box is at the upper end of the wind pipe. Two vocal cords are stretched across the voice box (or larynx) in such a way that it leaves a narrow slit between them. Air passes through this slit.
   When air from the lungs is forced out through the slit, The vocal cords vibrate to produce sound.
   The quality of sound is different when the vocal cords are stretched or relaxed.

2. When a loudspeaker is switched on, a membrane in the loudspeaker moves backward and forwards, i.e., it vibrates. This causes the air molecules surrounding the loudspeaker to vibrate. If we imagine the air molecules to be like small balls, a sound wave travelling through air alternatively pushes these balls close together and then pulls them away from each other. The areas where they lie together are called compressions, and the areas which they lie away from one another are called rarefactions.

3. The sounds that you hear are vibrations of the air around you. The outer part of the ear channels vibrations down to a thin membrane called the eardrum which is stretched very tightly. The ear drum then begins to vibrate and the vibrations are passed on to three tiny bones (the hammer, the anvil and the stirrup) in the middle ear. From here, the vibrations are passed on to the inner ear. The inner ear consists of a 34 mm long, coiled tube called the cochlea. The cochlea is filled with fluid and contains hair cells which are very sensitive to vibrations. The vibrations are then transmitted by the auditory nerve to the brain which registers the sound.

4. **(a) Amplitude :** The maximum displacement of the bob from the mean position during oscillation is called the amplitude of the oscillation.
   **(b) Frequency :** Frequency of a vibration is defined as the total number of complete vibrations by the vibrating object in one second. In other words, frequency is number of oscillations per second.
   **(c) Time period :** When the bob moves from one position and comes back to the same position (moving in the same direction), it is said to complete one oscillation. The time taken to complete one oscillation is called the time period of the oscillation. It is measured in seconds.

5. Unpleasant sounds are called noises. High-pitched noises are usually more annoying than low-pitched ones. Noise pollution can be defined

as the release of unwanted sound in the atmosphere. Noise can damage the ears, cause tiredness and loss of concentration and, if it is very loud, results in sickness and temporary deafness.

**Measures to Limit Noise Pollution**

- Ways of reducing unwanted noise include designing quieter engines. For example, rotating shafts in a machinery can be balanced better so that they do not cause vibration.
- Car engines are often mounted on metal brackets via rubber blocks which absorb vibrations and do not pass them on to the car body. Vehicle exhaust systems are fitted with 'silencers'.
- The use of sound-insulating material in homes, such as carpets and curtains, and double-glazed windows also helps.
- The further away the noise originates the weaker it is, so distance is a natural barrier. For this reason, there are trees between houses and a noisy road. Trees absorb sound.
- Factories should be located away from residential areas.
- Minimise the use of loud speaker.
- Keep the volume of radio and television low.

**G. HOTS**

**Ans.** 1. As, there is no medium in which sound can travel. So they are unable to talk.

2. Higher the frequency of the vibrating body, the higher will be its pitch. A high-pitched sound appears shrill, and a low-pitched sound appears deep or gruff to our ears.

# 11 Chemical Effects of Current

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. Negatively charged electrode in a voltameter is called **Cathode**.

2. **Poor conductor** materials do not allow electricity to pass through them.
3. The two thick copper wires dipped in the refined wheat paste are called the **electrodes**.
4. **Electroplating** is a common application of electrolysis.
5. The container carrying the electrolyte along with the electrodes is known as **Voltameter**.

**C. Write 'true' or 'false' for the following statements :**

**Ans.** 1. true 2. false 3. false
4. false 5. false 6. true

**D. Give one word for the following :**

**Ans.** 1. Voltameter 2. Anode
3. Salt 4. Electroplating

**E. Answer the following questions in short :**

**Ans.** 1. Liquids which conduct electritey Salt solution Liquits which to not contuct electricity Lemon juice, Sugar solution kerosene.

2. No
3. When our hand is wet, the current easily passes through it and gives an electric shock.
4. The materials which allow electric to pass through them easily are called good conductors of electricity.
   For example, the metals such as copper and aluminum allow electricity to pass through them easily.
5. LED

**F. Answer the following questions in brief :**

**Ans.**
1. Tap water has traces of salt and hence conducts electricity and makes the bulb glow faintly.
2. The solution or the paste which contains the electrodes and conducts the current through itself, is known as the electrolyte.
3. The electrode connected to the positive terminal of the battery is called the anode or the positive electrode.
4. Electroplating is a common application of electrolysis. The process of depositing a thin layer of a metal on any conducting substance by the process of electrolysis is known as electroplating.
5. **Application of Electolysis :** Refining impure metals into pure ones
   **Electroplating :** Extraction of metals from their ores.

**G. Answer the following questions in detail :**

**Ans.**
1. Make a circuit using a bulb, bulb holder, battery, battery holder and pieces of copper wire. Prepare solutions of salt and sugar, and take lemon juice, soda water, distilled water, tap water and kerosene in separate glass tumbeers. Test each solution by placing the conducting wire (preferably attached to a metallic conductor say a safety pin or a paper clip) into each solution. After testing one solution you need to wipe off the wire with a paper towel before testing another solution.
   Record your observations and compare and note which one will make a closed circuit. If the bulb glows you know that the solution is a conductor.
   The process of causing a chemical change in a solution by passing the electric current through it, is called electrolysis.
   During electrolysis, at least one of the following phenomena may occur in the electrolyte and the electrodes.
   Gas bubbles get deposited at the electrodes.
   Colour of the electrolyte solution change.
   A metal gets deposited at the negative electrode or cathode.
   These are called as the chemical effects of current. Electrolysis causes decomposition of the chemical compounds present in the electrolyte, which may result into the different behaviour as mentioned above.
3. In electroplating, the object to be electroplated is made the cathode (negative electrode) by connecting it to the negative terminal of the battery. The metal which has to be deposited is made the anode (positive electrode) by connecting it to the positive terminal of a battery. The electrolyte is usually a salt solution of the metal to be

coated. On passing electric current, the object gets coated with the desired metal.

4. **Applications of Electroplating :** Objects like bangles, chains etc. are gold plated by jewellers. On an ordinary metal a very thin covering of gold is provided to give them appearance of gold and are much less expensive.
   - Metal that rust are often coated with other metals to prevent rusting.
   - Chromium plating is found on bath taps, car bumpers, bicycle handlebars, etc. Chromium does not corrode. It can be polished to give a bright attractive appearance and it is a hard metal which resists scratches and wear. Chromium is expensive so it is used only for coating.
   - Silver plating is also common for the same reasons. Silver plated items many have EPNS stamped on them; this stands for "electroplated nickel silver". Cutlery and jewellery items are often silver plated. They have the appearance of silver but are much less expensive.
5. The amount of metal depo-sited on the cathode during electroplating depends upon (i) the time for which the current is passed through the electrolyte and (ii) the amount of current which passes through the electrolyte.

**H. HOTS**

**Ans.** 1. Because LED can glow even of the current is too small.
2. The liquids which have ions can conduct electricity while which don't have ions therefore do not conduct electricity.

## 12 Some Natural Phenomena

### Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. The phenomenon of electric repulsion was first observed by **Otto Von Guericke** in **1672**.
2. **Like** charges repel each other whereas **unlike** charges attract each other.
3. **Thunder** is the loud sound we hear during lighting.
4. **Earthquake** are the most frightening and destructive phenomena of nature.
5. The intensity of an earthquake is expressed by the modified **Richter sclae**.

**C. Encircle the odd one out. Give reason for your choice :**

**Ans.** 1. Insulator : Its do not carry electricity and do not have free electrons to move.
2. Focal depth : It is different from Earthquake. It is a condition ofter earthquake in the delp sea.

3. Cotton cloth : Cotton clothes do not show friction but all others show friction on rubbing.
4. Volcanic eruption : All others are relater to the earthquake. but volcamic eruption is different from others.

**D. Match the following :**

**Ans.**

| | | |
|---|---|---|
| 1. | Tectonic plates | • **Lithosphere** |
| 2. | Earthing | • **Lightning** |
| 3. | Faults | • **Earth's crust** |
| 4. | Earthquake | • **Richter scale** |

**E. Answer the following questions in short :**

**Ans.**
1. An earthquake is a sudden movement or a fracture in the crust and the upper layer of the mantle.
2. The rapid flow of charge through the air between the two oppositely charged clouds is called electric discharge or lightning.
3. Most destructive earthquakes are caused by dislocation of the crust called faults.
4. An object or body having no electric charge or which does not acquire am electric charge is called an uncharged object or body.

**F. Answer the following questions in brief :**

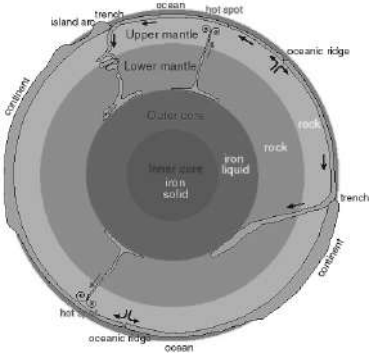
**Ans.**
1. The process of transfer of charges from a charged object to the Earth is called Earthing or grounding.
2. When a charged cloud passes over a tall building or a tree, it induces an opposite charge on them. If the charge built up is large, it leads to an electrical discharge in the form of a lightning strike. When lightning strikes a building or a tree, it can shatter and set it on fire. Lightning can severely burn and cause death of living beings if they happen to be in that area.
3. **Structure of the Earth :**
   The inside of Earth is made up of three main layers : Core, mantle and Crust.
   i. **Core :** The innermost part of the Earth is called core.
   ii. **Mantle :** The centrol region of Earth (between the core and crust) is called mantle.
   iii. **Crust :** The outermost layer of Earth is called crust.
4. The earthquakes can be caused due to the following reasons :
   i. Volcanic eruptions
   ii. Man-made explosions
   iii. Dislocations (or faults) of the crust
   iv. Movements of the tectonic plates

**G. Answer the following questions in detail :**

**Ans.**
1. **The Lighting conductor :** High-rise buildings can be protected from lightning by providing a lightning conductor at its highest point.
   A lightning conductor consists of a long, thick metal rod/strip having sharp spikes at its upper end. The spikes pointing towards the sky are fixed at the highest point of the building. The lower end of the metal rod/strip is connected to a large copper (or aluminium) plate which is buried deep inside the Earth. This is called earthing.

When a highly charged cloud passes over a tall building, it induces an opposite charge on the spikes. This charge quickly flows to the earth through the copper rod/strip. Thus, the lightning discharge is prevented and the building is saved from damage.

2. • Do not use electrical appliances when lightning strikes.
   • Stay away from water. Do not take a shower because water is a good conductor of electric current.
   • Do not go on the terrace or on the roof of any tall building.

3. 

The structure of earth.

4. • Since most damage to human life is caused by falling of buildings, we should work towards making them earthquake resistant. The first factor to be considered is the type of soil on which a building is being constructed. Landfills and reclaimed areas are more dangerous as they may not have enough strength to support a building during an earthquake. Quality of the materials used for construction and the structure and design of the building are also important.
   • Buildings in earthquake-prone areas should use lightweight materials so as to reduce the loss of life in case these structures collapse in the event of an earthquake.
   • Ceiling fans, air conditioners, air coolers, etc., should be secured firmly. These objects can cause a lot of harm in case they fall down during an earthquake.

**H. HOTS**

**Ans.** 1. A plastic comb, a plastic pen or an inflated balloon get electrically charged when rubbed against dry hair. The objects such as a balloon filled with air, plastic scale, plastic open or plastic comb on rubbing against hair acquire an electric charge. They are called charged objects or charged bodies. An object or body having electric charge on it is called a charged object or body.

Rub a strip of iron, copper or aluminium on your dry hair. they do not attract small pieces of paper. These are known as uncharged bodies. An object or body having no electric hcarge or which does not require an electric charge is called an uncharged object or body.

uncharged bodies aan be uncharged, though it is not true in case of all uncharged bodies. Uncharged bodies like a plastic comb, a plastic scale or an inflated balloon can be charged but uncharged bodies like a strip of iron cannot be charged.

2. The activity of comb shows the charges will stay for some time. In further, you can store them in capacitor.

# 13 Light

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. The ray of light that gets reflected from the mirror is called **Reflected ray**.

2. The angle between the reflected ray and the normal is called the **Angle of Reflection**.
3. The **retina** is a screen on which the image if formed in the eye.
4. **Iris** is the coloured part of the eye.
5. The least distance at which a normal eye can see an object clearly is called **near point** of the eye.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Cataract | • **Eye lens become cloudy or opaque** |
| 2. Optic nerve | • **Carries visual messages to the brain** |
| 3. Auditory aids | • **Tape recorders, compact discs (CDs)** |
| 4. VIBGYOR | • **Produced when white light splits** |

**E. Answer the following questions in short :**

**Ans.** 1. The ray of light coming from an object that falls on the surface of the mirror.

2. The angle formed between the reflected ray and the normal is called angle of reflection.
3. Some people can see objects that are far away clearly but nearby objects appear blur to them. This defect generally occurs in old age when the ciliary muscles become weak and are unable to thicken the eye lens. This defect is also called hypermetropia.
4. Visually challenged people are those whose vision is extremely poor or they are blind. The are unable to see because either their cornea, eyelens, retina or optic nerve fails to perform its function properly. These people make use of other senses like sense of touch and hearing or man-made aids to identify things.

**F. Answer the following questions in brief :**

**Ans.** 1. When light suffers reflection from a smooth polished surface, it obeys following two laws, known as the laws of reflection.

**Ist law :** The incident ray, the reflected ray and normal to the reflecting surface at the point of incidence all lie in the same plane.

**IInd law :** The angle of incidence is equal to the angle of reflection, i.e., $< i = > r$

The laws of reflection apply to all reflecting surfaces, whether plane or curved.

2. The white light splits into various colours. This phenomenon of splitting of white light into its component colours is called dispersion of light.
3. • Wash your eyes with clean water at least twice a day.
   • Don't rub your eye if something falls in it. Immediately wash it with water and consult a doctor, if the problem persists.
   • Avoid reading in dim or very bright light and in moving vehicles.
4. When we look at an object close to us, the ciliary muscles contract making the lens thicker, thereby reducing its focal length. This increases the converging power of the lens and we can see the object clearly. The ability of the eye to alter the focal length of its lens, so that it can clearly see all objects within a certain range, is called accommodation.

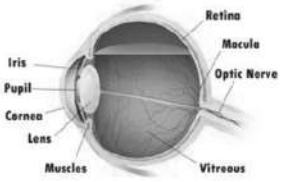
**G. Answer the following questions in detail :**

**Ans.** 1. i. The image is formed behind the mirror.
   ii. It is a virtual image which cannot be taken on the screen.
   iii. The size of the image and the object is the same.
   iv. The image formed by the plane mirror is erect and not inverted.
   v. The image will be formed as far behind the mirror as the object is in front of it. That is why you find that when you move closer to the mirror your image also seems to move closer. Similarly, when you move away from the mirror, your image also seems to move away.

2. Eyes are very important part of our body. We must take good care of them.
   • Wash your eyes with clean water at least twice a day.
   • Don't rub your eye if something falls in it. Immediately wash it with water and consult a doctor, if the problem persists.
   • Avoid reading in dim or very bright light and in moving vehicles.
   • Consult a doctor in case of an injury.
   • Blink your eyes from time to time while doing a work that needs concentration like reading, working on the computer or watching television.
   • Do not look at very bright light or the Sun directly.
   • Consult a doctor if you are unable to read clearly what is written on the blackboard. There may be defect in the eye that needs treatment.
   • It is important to eat a balanced diet with sufficient quantity of vitamin A to keep our eyes healthy. Raw carrot, Broccoli, green vegetables, cod liver oil, eggs, milk and milk products, fruits like

papaya and mango are rich source of vitamin A. Vitamin C and E are also good for eyes

3. 



Structure of the human eye.

4. Louis Braille (1820) developed this method so that visually impaired people could read using the sense of touch. This method called Braille, involves the use of special symbols representing the alphabets and their combinations.
In this method, the text is printed on a thick sheet of paper using special symbols. These symbols consist of up to six dots, two vertical rows of three dots each, in a rectangular array. The dots are embossed, that is, raised slightly above the surface of the paper.
Such a rectangular array of rised dots is called a Braille cell.
A visually challenged person recognises each letter by the position of dots in each cell.

**H. HOTS**

**Ans.** 1. Retina is a screen on which the image is formed if it gets damaged then we will be unable to see anything.
2. A light when pass from one medium to another at an angle & speed changes. It bent reversed at the second so all light displaced in same direction as the incoming ray. So ray of light does not disperse.

# 14 Combustion and Flame

## Exercise

**A. Tick (✓) the correct answer :**

**Ans.** 1. a. 2. d. 3. a.

**B. Fill in the blanks :**

**Ans.** 1. A device which is used to stop fire is called **Fire extinguisher**.
2. A chemical process in which a substance reacts with oxygen to give off heat is called **combustion**.
3. Ignition temperature is also called **kindling temperature**.
4. **Fire** is the heat and light that come from burning materials.
5. The substance used for producing heat energy is called **fuel**.

**C. Write 'true' or 'false' for the following statements :**

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

**D. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Acid Rain | • **Global warming** |
| 2. Supporter of Combustion | • **$O_2$** |
| 3. $CO_2$ | • **Used in fire extinguishers** |
| 4. Inflammable substance | • **Petrol** |

**E. Answer the following questions in short :**

**Ans.** 1. A flame consists of three zones (or three parts). These are : innermost zone, middle zone and outer zone.

2. As dry paper has low ignition temperature due to which it can catch fire rapidly.

3. Because in hearth regular supply of air occurs. In hearth heat also remains inside and not transfer to the surrounding due to which temperatare incrcas after burning of charcoal.

4. Carbon Monoxide, sulphur dioxide.

**F. Answer the following questions in brief :**

**Ans.** 1. As dry paper has low ignition due to which they temperature can catch fire rapidly.

2. Goldsmith uses the outer most zone as it is the hottest zone & non-luminous in naturae.

3. i. LPG has a much higher calorific value than wood, so it produces much more heat on burning than an equal mass of wood.
   ii. LPG burns without producing any smoke but burning of wood products a lot of smoke.
   iii. LPG burns completely without leaving behind any solid residue but wood leaves behind a lot of ash on burning.

4. Some substances combine with oxygen very slowly. During this process, no light and very little heat is produced. Rusting of an iron is an example of slow oxidation or combustion.

**G. Answer the following questions in detail :**

**Ans.** 1. A chemical process in which a substance reacts with oxygen to give off heat is called combustion. The substance is called a fuel. Sometimes, light is also given off during combustion, either as a flame or a glow. The fuel may be a solid, liquid or gas. When a substance burns, it produces heat and light which is also known as fire. Combustion is another name for burning. Magnesium and charcoal are said to be combustible substance.

Each combustible substance must be heated to certain temperature before it could catch fire. The lowest temperature up to which a substance must heated before it catches fire is called its ignition temperature. Ignition temperature is also called kindling temperature.

2. For oxtingeush a fire, the supply of supporter of combustion that is air (oxygen) should be cut off. This can be done by increasing the concentration of non-supporters of fire, like carbon dioxide. Carbon dioxide forms a protective blanket around the fire as it is heavier than the oxygen. For this purpose fire extinguishers are used which release carbon dioxide. These extinguishers are easily available in all sizes. This method is especially used for petrol/diesel and electrical fire.

3. The process of burning of fuels to produce heat and light is known as combustion. The materials which burn, are called combustible materials like paper, wood, petrol etc. Substance that do not burn easily are called non-combustible materials like iron, glas, etc. The air

or oxygen which helps in burning is called supports of combustion and chemical reaction which takes place with the release of energy is called combustion.

Combustion can also take place in absence of oxygen. For example, sodium can burn in the atmosphere of chlorine. So, it is called non-combustible substance. Wood, paper, coal, hydrogen, LPG, CNG, Petrol, kerosene, etc., are the combustible substances.

b. **Luminous :** It is light giving zone of the flame. It is the glow of hot carbon particles which makes the middle zone of a flame luminous (or light-giving). The middle zone (or luminous zone) of a flame produces a moderate temperature. This zone is the major part of a candle flame.

**Non-luminous flame :** Non-luminous flame does not produce much light. The outermost zone (or non-luminous zone) has the highest temperature in the flame. In other words, the outermost zone (or non-luminous zone) is the hottest part of the flame. The outermost zone of a flame is quite thin as compared to the middle zone.

**H. HOTS**

**Ans.** 1. Because most of the energy comes from fossil fuels which are non-renewable.

2. Carbon dioxide forms a protective blanket around the fire as it is heavier than the oxygen. For this purpose fire extinguishers are used which release carbon dioxide.

3. Global warming is a cause of concern for environment lists because it is causing increase in the temperature of the Earth. As a result of this the Earth is becoming hotter and it is creating imbalance in the climate of the world.

4. Among the above fuels Z is the best fuel. The reason for this is the amount of calorific value produced by it.

# 15 Coal and Petroleum

## Exercise

**A. Tick (✓) the correct answer :**

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

**B. Fill in the blanks :**

**Ans.** 1. The materials obtained from nature are classified as **Natural resources**.

2. The natural resources which can be exhausted as a result of human consumption are called **exhaustible** notural resources.

3. **Coke** is a black, porous and tough substance.

4. A gaseous mixture covering the crude oil is known as **natural gas**.

5. **Natural Gas** is a very important fuel.

**C. Match the following :**

**Ans.**

| | |
|---|---|
| 1. Anthracite | • **Hardest coal** |
| 2. Rock oil | • **Petroleum** |
| 3. Oil well | • **Bombay High** |
| 4. Black gold | • **Coal** |
| 5. Bitumen | • **Paints** |

**D. Answer the following questions in short :**

**Ans.**

1. Compressed Natural Gas
2. **Exhaustible Resources :** The resources which can be exhausted as a result of human consumption are called exhaustible. For example, coal.
3. **Inexhaustible Resources :** The resources which are not likely to be exhausted due to human activities in unlimited quantities are called inexhaustible resources. For example, air and sunlight.
4. The materials obtained from nature are classified as natural resources. For example, air, water, soil, wildlife, forest, coal, petroleum, etc.
5. Coal, petroleum and forests.
6. The natural fuels formed from the remain of living organisms buried under the earth long ago, are colled fossil fuels.

**E. Answer the following questions in brief :**

**Ans.**

1. The process of separating petroleum into usable fractions by fractional distillation is called refining of petroleum. It is also called fractional distillation of petroleum. It is carried out in a petroleum refinery.
2. Due to natural calamities like earthquakes and volcanic eruptions, a large number of plants and animals get buried under the surface of the Earth millions of years ago. Also as the trees and plants lost their leaves and died, their leaves and the dead material got buried into layers of rotting vegetation. Pressure from the overhead layers pushed these layers together to form a layer of soft material called peat. Sometimes mud and sand were washed over the layers of the peat pressing them even further and tighter together to form a layer of aoft material called peat. Sometimes mud and sand were washed over the layers of the peat pressing them even further and tighter together. This made a soft brown coal or lignite, which had high moisture content and carbon content of 25%-35%. It is the softest type of coal.
3. Coke is the solid residue left behind during the dostructive distillation of coal. The process of breaking of coal into simpler substances upon heataing in the absence of air is caller destructive distillation. Coke is a black, porous and tough substance. It burns easily and does not produce smoke like coal. It is used in the manufacture of steel and extraction of metals.
4. The more volatile components of petroleum form a gaseous cover over petroleum. Such a gaseous mixture covering the crude oil is known as natural gas.
   Natural gas is a clean fuel it causes no pollution and has high calorific value. It generates a large amount heat by burning a unit quantity.

**F. Answer the following questions in detail :**

**Ans.** 1. Petroleum gas (or LPG), Petrol (gasoline), Diesel :

i. **Petroleum Gas :** Petroleum gas is used as a fuel in homes and industry. Petroleum gas is used as a fuel as such or in the form of Liquefied Petroleum Gas (LPG).

ii. **Diesel :** Diesel is used as a fuel in heavy mothor vehicles (such as buses, truck, tractors, and diesel train engines). Diesel is also used to run pump sets for irrigation in agriculture and in electric generators (to produce electricity on a small scale).

2. • Drive at moderate speed.
   • Ensure correct tyre pressure.
   • Switch off the engine at traffic lights.
   • Get the vehicle serviced regularly.
   • Use public transport and bicycles for short distances.
   • Use car pools to go for work or to school.
   • Use lessor amount of cool to remain the cnvironment clean.
3. The natural resources which can be exhausted as a result of human consumption are called exhaustible natural resources. For example, coal, petroleum, water, forests, minerals, natural gas, etc.

**G. HOTS**

**Ans.** 1. Fossil fuels such as coal and petroleum are major sources of energy till date. Due to depletion of cool and petroleum energy crisis will occur and all activities of our life will be affected.

2. To present depletion of coal and petroleum we should conserve them, use them judiciously and replace them with non-conventional sources if energy such as solar energy, wind energy, etc.
3. Using of natural rosources are better than fossil fuels because they do not causes pollution.