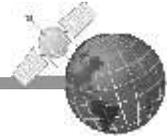




## 1 How Do Plants Live



### Exercises

#### Section I

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

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

##### B. Fill in the blanks :

- Ans. 1. All green plants convert **solar** energy into **chemical** energy.  
 2. **Autotrophs** are also known as producers.  
 3. Photosynthesis always occurs in the presence of **sunlight**.  
 4. A common plant parasite is **cuscuta** or **dodder** plant.  
 5. **Insectivorous** plants have developed special structures to catch insects.

##### C. Write true or false :

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

#### Section II

##### A. Very short answer questions :

- Ans. 1. Photosynthesis is the process by which green plants prepare their food.  
 2. Algae are green because they contain a green coloured pigment called chlorophyll.  
 3. Symbiotic relationship.  
 4. Insectivorous plants catch insects to fulfil their requirement of nitrogen. This is so because they grow in nitrogen deficient soil.  
 5. Symbiosis is a kind of association of two organisms in which both are benefited.

##### B. Short answer questions :

- Ans. 1. Green plants make food by the process of photosynthesis. During this process, the green plants convert simple inorganic substances like  $\text{CO}_2$  and  $\text{H}_2\text{O}$  into glucose, in the presence of sunlight. Light energy from sunlight is captured by the chlorophyll molecules (green pigments) present in green plants and transformed into chemical energy in their form of food (starch).  
 2. Organisms which make or synthesise their own food from simple raw materials are called autotrophs. As they can prepare their food from raw inorganic materials (carbon dioxide and water), they are also known as producers.  
 Organisms that are not capable of synthesizing their food, and are dependent on other organisms for their food requirement are called heterotrophs. As these organisms depend on others for food (plants and animals) they are also called consumers.

3. Only leaves can synthesise food because they contain a green coloured pigment called chlorophyll. Chlorophyll can convert solar energy into chemical energy in the form of starch (food).
4. Organisms need to take food to provide nutrients to their body cells so that they can carry out activities to keep themselves active. Autotrophic nutrition and heterotrophic nutrition are two main modes of nutrition in organisms.
5. Plant parasites are those plants which live on other living organisms and obtain their food from them. *Cuscuta* or dodder plant is a common plant parasite.

### C. Long answer questions :

**Ans.** 1. The process of intake of food and its proper utilisation in the body is termed as nutrition. Living organisms broadly exhibit two modes of nutrition autotrophic (self nutrition) and heterotrophic (another nutrition).

Nutrients are the components of food such as carbohydrates, fats, proteins, vitamins and minerals.

2. We can test a leaf for starch by the following activity.

**Aim :** To show that starch is produced during photosynthesis.

**Materials required :** Iodine, solution, ethyl alcohol, a green leaf, beakers, water.

#### **Procedure :**

- Pluck a green leaf from a plant.
- Take some water in a beaker and boil the leaf in it for about 5 minutes.
- Now put the leaf in ethyl-alcohol for a minute. Chlorophyll being soluble in alcohol comes out of the leaf. The leaf becomes colourless.
- Wash the leaf thoroughly with water and dip the leaf in iodine solution.

**Observation :** The leaf turns blue-black.

**Inference :** The leaf contains starch which turns blue-black on reaction with iodine.



Starch is produced during photosynthesis

3. **Symbiotic Plants :** Plants which live in association with other plants and share shelter and nutrients are called symbiotic plants. This association between two different plants is called symbiotic association or relationship. Both the plants benefit from a symbiotic association.

#### **Examples :**

- Certain fungi live in the roots of trees. The tree provides nutrients to

the fungus. In return, the fungus provides certain nutrients from the soil to the tree.

- In lichens also, symbiotic relationship is seen. There is an association between a green alga and a non-green fungus. The fungus provides shelter, water and minerals to the alga. The alga, in return, provides food to the fungus. The alga, being green, prepares food by photosynthesis.



Lichens

4. This can be shown by the following activity :

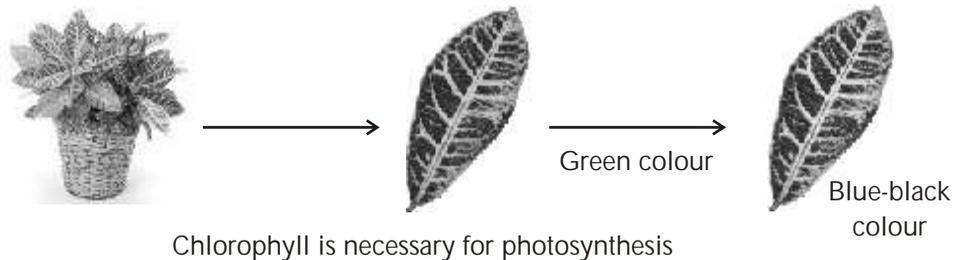
**Aim :** To show that chlorophyll is necessary for photosynthesis.

**Materials required :** A healthy croton plant (with variegated leaf), iodine solution, ethyl alcohol.

**Information :** Variegated leaves are partly green and partly non-green. Chlorophyll is present only in their green portions.

**Procedure :**

- Take a variegated leaf from the croton plant that has been exposed to sunlight for a few hours.
- Wash the leaf with water and test it for starch.



**Observation :** The leaf turns blue-black in colour only in the region where chlorophyll is present. The other region does not change its colour.

**Inference :** Starch is produced only in the green part of the leaf, where chlorophyll is present.

Thus, chlorophyll is necessary for photosynthesis.

5. In a pitcher plant, the pitcher-like structure is the modified part of the leaf. The leaf tip is modified to form a lid which can open or close the mouth of the pitcher. Inside the pitcher, downward-pointing hair are present. Once an insect enters the pitcher, the lid closes and the insect gets trapped in the hair. Digestive juices secreted in the pitcher now digest the insect.

#### D. Higher Order Thinking Skills (HOTS) :

- Ans. 1. a. (i) Carbon dioxide (ii) Water  
 b. (i) Glucose (ii) Starch  
 c. Photosynthesis  
 d. Food E  
 e. Chlorophyll
2. a. (i) Alga (ii) Fungus (iii) Lichen



vessels and enters the blood stream.

5. There are many other organisms in the water, which are smaller than Amoeba. Amoeba feeds on these animals. When a small organism comes close to an Amoeba, it puts out pseudopodia around the organism and joins up the cavity. The prey becomes trapped in the cavity called food vacuole.

The undigested food is egested out of the body from any part of the surface of its body.

### C. Long answer questions :

**Ans.** 1. The main steps of holozoic nutrition are discussed below :

**(i) Ingestion :** This is the process of taking in of food. It includes two steps : capturing of food and eating it.

**(ii) Digestion :** The ingested food is required to be broken down into small units to obtain energy for maintaining life processes. This process of the breaking down of the bigger constituents of food into simpler and smaller units, is known as digestion. In most of the animals, the process of digestion includes both physical and chemical digestion. In physical digestion, the big-sized food particles are broken down into smaller units. In chemical digestion, the complex substances are converted into simple and absorbable substances.

**(iii) Absorption :** The simple substances resulting from the process of digestion are absorbed by the cells of the body. This process is done into small intestine.

**(iv) Assimilation :** The cells of the body make use of absorbed substances in the formation of some constituents and in obtaining energy for them. This process is known as assimilation.

**(v) Egestion :** In this process, the undigested food is removed or eliminated from the body. This process is done in the last part of large intestine.

2. There are four types of teeth in our mouth— incisors, canine, premolar and molar.

**Incisors :** There are two pairs of incisors in each jaw. They have chisel-like ends and are meant for cutting and biting.

**Canines :** There is a pair of canines in each jaw. They have pointed ends and are meant for tearing the food. Canine teeth are well-developed in carnivores.

**Premolars :** There are two pairs of premolars in each jaw. They are bigger than incisors and canines and are flattened on top. There are four premolars each on upper and lower jaws, two on either side, the surface of a premolar has small humps which facilitate grinding and mastication of food.

**Molars :** There are three pairs of molars in each jaw. We, the human beings have 12 molars. They are used to chew food. Molars are also

flattened on top.

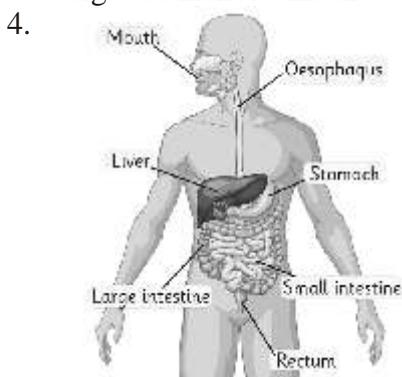
3. The process of digestion, in humans, starts from the mouth when saliva in the mouth mixes with the food. Saliva contains an enzyme known as the amylase that breaks down carbohydrates to simple sugar molecules. It also makes the food slimy so that it can be easily swallowed.

The food passes from the mouth into a long tube called oesophagus (food pipe). The windpipe and food pipe lie close to each other where the pharynx is the common passage for both food and air.

Further digestion of the food takes place in stomach. The stomach is a J shaped pouch located on the left side of the abdomen and serves as food storage. Our stomach is about 12 inches long and 6 inches wide at its widest point. An average adult can hold about 2 litres of food.

The stomach produces digestive juices like pepsin that breakdown the proteins to their simple form of amino acids. Stomach also secretes hydrochloric acid that kills bacteria in the swallowed food. Thus, the food is processed in the stomach to a thick liquid known as the chyme and moves down towards the small intestine.

The digestion continues in the small intestine. The main job of the small intestine is to absorb the nutrients obtained during digestion. Small intestine is the longest portion of the digestive tract. It is about 6 meters long. The small intestine is divided into three parts namely duodenum, jejunum and ileum. The small intestine receives various enzymes like pancreatic amylase, lipase and trypsin from pancreas, and bile from liver. Enzyme lipase converts fats to fatty acids and glycerine (glycerol); starch is converted to sugars by amylase. Trypsin acts on proteins that are not digested in the stomach.



Alimentary canal of humans

5. The process of digestion in ruminants can be described as follows :
  - a. Plant material is chewed a little before being swallowed by ruminants. This material is then directed into the first compartment of the stomach, called the rumen. Here, the food is broken down and partly digested before it passes to the next chamber, reticulum.

- In reticulum, the food is formed into balls (cud), which are regurgitated to the mouth for further chewing. This process is called rumination and these animals are hence called ruminants. Ruminants can digest grass rich in cellulose, which is a type of carbohydrate that many animals and humans cannot digest. The cud is swallowed and passed to the next chamber, called omasum.
- In the omasum, most water from the cud is absorbed; the remainder is dried up and passed to abomasum (or the rennet bag).
- The secretions of abomasum act upon the cud and digest all the proteins found in it.
- The semi-fluid mass (chyme) into which the food has now been converted, passes to the duodenum (a tube connecting the abomasum and small intestine) and the small intestine where digestion is completed and the products of digestion are absorbed.

**D. Higher Order Thinking Skills (HOTS) :**

Ans. 1. Beans

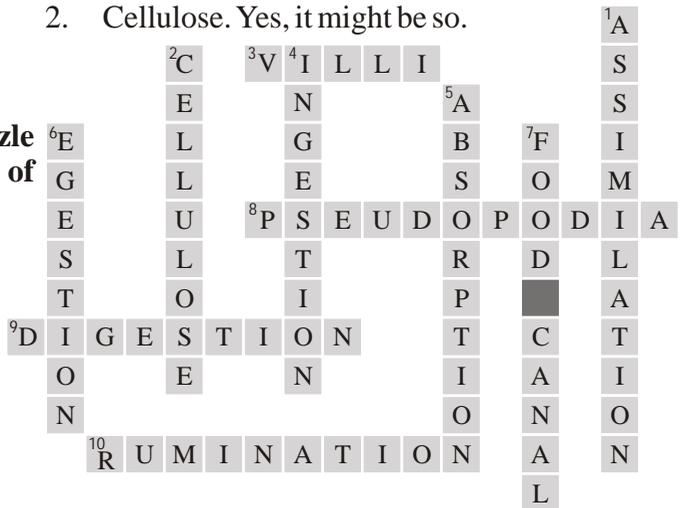
2. Cellulose. Yes, it might be so.

Tasks For You

Think and Tell

Solve the crossword puzzle given below with the help of the clues given below :

Ans.



# 3 Fibre to Fabric



## Exercises

### Section I

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

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

**B. Fill in the blanks :**

- Ans. 1. Fibres are thin threads, either **natural** or **synthetic**.  
 2. **Woollen** fabrics are good insulators of heat.  
 3. Silk is an **animal** fibre.

4. The caterpillars are fed on **mulberry** leaves.
5. **Sericulture** is the rearing of silkworms for silk production.

**C. Write true or false :**

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

**Section II**

**A. Very short answer questions :**

- Ans.**
1. Wool and silk.
  2. Those fibres that are obtained from natural means are called natural fibres.
  3. Wool has a high tensile strength and elasticity.
  4. Different process involved in wool production are :
    - a. Rearing and breeding of sheep
    - b. Shearing
    - c. Washing or scouring
    - d. Sorting
    - e. Carding
    - f. Dyeing
  5. There are four stages in the life-cycle of a silk Moth—egg, caterpillar (larva), pupa and adult.

**B. Short answer questions :**

- Ans.**
1. A fibre can be defined as a long, fine, continuous thread or filament obtained from plants and animals. In animals, fibres are mostly hair growing on the body. Plant fibres like hemp, jute, cotton are based on cellulose that is used to give structure to the fibre.  
Yarn is a long, continuous, thread-like structure obtained by joining fibres and twisting them.
  2. Wool comes from sheep, llama, alpaca, guanaco and vicuna. Cashmere from Kashmiri goats is another well-known clothing fibre.
  3. The fleece along with a thin layer of skin is shaved off. This process is called shearing. Shearing is done annually in the spring or summer months. Shearing is done with a manual razor or blade, just as those used by a barber to shave off hair. Shearing is done in the hot weather so that the animals can survive without their protective coat.
  4. Following types of health hazards are associated with wool industry.  
In earlier days, the workers who sorted wool were often infected by bacteria that cause a fatal disease called anthrax, also known as sorter's disease. The bacteria are found in the wool of contaminated sheep and can enter the human's body through inhaled air. Nowadays, this disease occurs rarely because of the use of vaccines for prevention.
  5. The properties of silk are as follows :  
**Properties of Silk**
    - (i) It s versatile and very comfortable.
    - (ii) It absorbs moisture.
    - (iii) It can be easily dyed
    - (iv) It retains its shape and is relatively smooth.
    - (v) It is the strongest natural fibre and is also lustrous.

- (vi) It has a poor resistance to sunlight exposure.
- (vii) It burns with the smell of burning hair and unlike wool stops burning when removed from the flame.

6. **Some uses of silk are :**

- (i) Silk is used to make sarees, blouses, scarves, pants and ties.
- (ii) It can also be made into curtains, draperies cushion covers and sofa covers.
- (iii) It is also used in the medical field for sutures and prosthetic arteries.

**C. Long answer questions :**

**Ans.** 1. Wool is generally creamy white in colour. Some breeds of sheep produce natural colours, such as black, brown (commonly called moorit) and grey. Most of the fibre from domestic has two qualities, which distinguish it from the hair or fur. The wool fibre has scales which overlap like shingles on the roof. Furthermore, it is crimped and in some cases have more than 8 bends per centimetre.

The number of crimps per centimetre determines the fineness of wool fibre. A fine wool like merino may have upto 40 crimps per centimetre, whereas a coarse wool like karakul may have 1 or less crimps per centimetre.

To sum up, wool on account of the crimps is considerably resilient. It has a high tensile strength and elasticity. It can be easily dyed. Furthermore, it is light weight and has properties such as heat insulation and water absorption.

2. The production of wool involves the following steps :

**Shearing :** The fleece of the sheep is removed from its body. This process is called shearing. The fleece is removed by using special clippers called blade shears. In most parts of the world sheep are sheared once a year,, in early spring or early summer.

**Grading (sorting) :** The fleece from the same sheep may be different from different parts of the body. So it is sort out into separate piles of similar nature. This process is called grading or sorting.

**Washing (scouring) :** The sheared skin is washed thoroughly with soap or detergents to remove dirt, dust and grease. This process of cleaning wool is called scouring.

**Carding :** The dried wool is disentangled. These disentangled fibres are then passed through the rollers which are covered with fine sheet of thin wire teeth. This process arranges the wool into a flat sheet called a web.

**Spinning :** The web is drawn into narrow strands and then passed through spinning machines. The spinning machines twisted the strands into yarn. The yarn is wound to form balls of wool. This year is either weaved into fabric or retained for knit.

3. **a. Woollen System :** In this system, the woollen fibres of mixed lengths are carded and then spun to form woollen yarn. The fabrics made from

such a yarn do not have smooth finished surface.

**b. Worsted System :** In this system initially the woollen fibres are combed, which separates the long fibres from short fibres. The long fibres are then formed into smooth compact strands, which are then spun to form woollen yarn. The fabrics made from such a yarn have smooth finished surface. The fabrics made from such called carding wool and is employed in spinning woollen yarn, for soft woven fabrics.

4. The first step involves washing the silkworm eggs that had been stored; the eggs hatch only once a year in spring.

After the eggs hatch, the larvae are spread out on trays to grow. They are fed chopped mulberry leaves for 20-35 days. Racks or twigs are placed on the trays where the worms spin the cocoons. Spinning may take about 3-7 days, after which the cocoons are put in hot water, this kills the worms and loosen the filaments. The filaments are taken out from the cocoons by a process called reeling or filature. Filaments from several cocoons are twisted together to make a strong thread, which is wound on a reel. The threads are dyed and woven into silk fabric.

**D. Higher Order Thinking Skills (HOTS) :**

Ans. a. silkmoth

b. (i) Larva                      (ii) Caterpillar                      (iii) Pupa                      (iv) Silkworm

c. Silk

d. Mulberry tree



## 4 Heat



### Exercises

#### Section I

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

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

**B. Fill in the blanks :**

- Ans. 1. **Sun** is the primary source of heat energy on Earth.  
2. The measure of heat energy level in a body is called **temperature**.  
3. The thermometer should always be held **vertical**.  
4. **Silver** and **copper** are the best conductors of heat.  
5. The heat which comes out of the hot object is called **radiant heat**.

**C. Match the following :**

- |                         |                                |
|-------------------------|--------------------------------|
| Ans. 1. Heat            | c. A form of energy            |
| 2. Clinical thermometer | e. The celcius scale           |
| 3. Convection           | b. Transfer of heat in liquids |
| 4. Conduction           | a. Transfer of heat in solids  |
| 5. Radiation            | d. Transfer of heat in gases   |

## Section II

### A. Very short answer questions :

- Ans.**
1. We wear woollen clothes in winter because they keep us warm.
  2. Our normal body temperature is  $37^{\circ}\text{C}$ .
  3. Conduction is the movement of heat through a solid object from hot to the cold region.
  4. Land breeze is a breeze that blow towards the sea from land at night.

### B. Short answer questions :

- Ans.**
1. Heat is a form of energy which produces the sensation of hotness. It makes a body hotter than it was. This measure of heat energy level in a body is called temperature. The hotter the substance is, the higher is its temperature.
  2. Digital thermometers are preferred to mercury thermometer because they do not use mercury. Mercury is a toxic metal and there is a problem of disposal in case the thermometer breaks.
  3. Precautions to be taken while using a laboratory thermometer are as follows : While using a laboratory thermometer, the following precautions need to be followed :
    - The thermometer should be held vertical.
    - The bulb of the thermometer should be completely surrounded from all sides by the substance whose temperature is to be measured.
    - The bulb should not touch the bottom or the sides of the beaker.
    - The reading should be taken without removing the thermometer from the substance.
    - The eye should be kept at the level of mercury thread.
  4. Solids conduct heat better than liquids and liquids conduct heat better than gases. This is so because the molecules of solids are in closer contact with each other as compared to liquids. The molecules of liquids similarly are closer to each other as compared to gases.
  5. Convection currents in the atmosphere bring about weather changes. The hot air over the land rises. This is replaced by cooler and denser air above water in the sea. This results in sea breeze.  
At night the reverse process occurs. Land cools faster than sea. Warmer air above sea rises faster than the air above land. Cooler air from the shore replaces this. This results in the land breeze.

### C. Long answer questions :

- Ans.**
1. **Conduction** : It is the spontaneous transfer of heat energy from a region of higher temperature to a region of lower temperature. Therefore, conduction acts to equalise temperature differences. It is also described as heat energy transfer from one material to another by direct contact.  
**Convection** : Liquids and gases are together called fluids, since both can flow. In the case of fluids, the molecules themselves carry energy from a hotter region to a colder region. This process of heat transfer is called convection.

**Radiation** : Radiation refers to the transmission of energy as electromagnetic radiation from a heated surface to another colder surface. This process requires no medium to convey the energy.

2. We use a clinical thermometer to measure the temperature of our body. It can measure only a short range of temperature from 35°C to 42°C. It is because the temperatures of the human body do not vary beyond these limits. The average temperature of the human body is 37°C or 98.4°F or 36.9°C or 98.6°F. There is a constriction in the glass tube of the clinical thermometer. The constriction does not let the mercury drop back into the bulb. So, we can read the temperature without it showing any change.

To study a clinical thermometer, hold it firmly in your right hand and give it a few jerks. The jerks will bring the level of mercury below 35°C. Then put the bulb of the thermometer under your tongue. After time minute, remove the thermometer out from the mouth. Observe the upper end of the mercury level and read the temperature trains it on the scale. This is your body temperature.

3. For this we can do the following activity.

Aim : To know about conductors and insulators :

1. Take three rods of glass, iron and copper of exactly the same sizes.
2. Using melted wax, fix a small nail at one end of each rod.
3. Rest them on a tripod stand such that the other ends are very close to each other.
4. Using a burner, heat the other ends so that they are heated equally. Which rod gets heated first?

How can you say so?

You would observe that the nails fall first copper and then from iron rod but not from the glass rod. It proves two things :

- a. Copper and iron are conductors of heat while glass is an insulator.
  - b. It shows that copper is a better conductor of heat as compared to iron.
4. Importance of convection currents is as follows :
- Ventilators and exhaust fans are usually near the ceiling of a room because the air we breathe out is warmer and lighter than ordinary air. It rises and escapes through the ventilator or exhaust fan, and cold, fresh air enters through the windows.
  - Hot smoke and gases from industrial furnaces rise and escape through chimneys, much as the smoke escaped through the chimney in the shoe box.
  - Heaters, blowers and heat convectors heat a room by setting up convection currents.
  - The sea and land breezes which blow in coastal areas are actually convection currents. The sea takes longer to get heated than does the land. So the land is hotter than the sea during the day. The air in contact with the land becomes hot and rises, and the cooler air above the sea rushes in towards the land to take its place. This sets up a

convection current, which we call a sea breeze. After sunset, the land cools much faster. The air above the sea is warmer than that above the land. It rises, and the cooler air above the land moves out towards the sea. We call this a land breeze.

- Birds use convection currents of air to rise high and glide effortlessly without flapping their wings.
5. Applications of heat radiation are as follows :
- White and light-coloured clothes are more comfortable in summer because they reflect most of the sun's heat that falls on them.
  - Black and dark-coloured clothes are more suitable in winter because they absorb most of the sun's radiant heat.
  - The base of the cooking vessel is painted black so as to absorb most of the heat energy provided and cook the food in less time.
  - Electric room heaters have a polished metallic surface behind the heating coil. This surface reflects most of the radiant heat falls on it and gives effective heating to the room.

**D. Higher Order Thinking Skills (HOTS) :**

- Ans.** 1. On doing this the temperature of the thermometer will rise dramatically.  
2. It is so because plastic is an insulator and it will prevent the transfer of heat from pan to the hand of a person.



## 5

## Acids, Bases and Salts



### Exercises

#### Section I

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

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

**B. Fill in the blanks :**

- Ans.** 1. **Elements** are considered to be pure substances.  
2. The acids are classified as **organic** and **mineral** acids on the basis of source.  
3. **Strong bases** are the bases which are soluble in water.  
4. **Phenolphthalein** and **methyl orange** are the two most common synthetic indicators.  
5. Salts have high **melting** and **boiling** points.

**C. Write true or false :**

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

#### Section II

**A. Very short answer questions :**

- Ans.** 1. Lactic acid and oxalic acid.  
2. Aluminium hydroxide  
3. China rose  
4. When an ant or a bee stings, formic acid (or methanoic acid) gets injected into the skin. This acid causes irritation and swelling.  
5. Sulphuric acid ( $\text{H}_2\text{SO}_4$ )

## B. Short answer questions :

- Ans. 1. Two characteristics of bases are as follows :
- Bases have a bitter taste.
  - They have a soapy touch.
2. Phenolphthalein and methyl orange.
3. Neutralisation reaction is a reaction between an acid and a base to form salt and water. For example, hydrochloric acid and sodium hydroxide react to form sodium chloride salt and water.
4. Antacids are tablets or gel that we take to have relief from acidity. They contain aluminium hydroxide or magnesium hydroxide. For example, milk of magnesia and baking soda.
5. Basic soil can be treated by using organic matter/manure.

## C. Long answer questions :

- Ans. 1. Acids present in different food materials are as follows :

Food material	Acid present
Curd 	Lactic acid
Lemon juice 	Citric acid
Raw mango juice 	Citric acid
Tomato juice 	Oxalic acid
Vinegar 	Acetic acid
Grapes 	Tartaric acid
Tamarind 	Tartaric acid
Apples 	Malic acid

2. On the basis of source, acids are classified as following :
- Organic acids :** The acids which are derived from plant or animal products, are called organic acids. For example, citric acid, tartaric acid, oxalic acid, lactic acid, acetic acid and malic acid.
  - Mineral acids :** The acids which are derived from minerals, are called mineral acids. For example, nitric acid, sulphuric acid, hydrochloric acid and phosphoric acid.
3. Properties of acids are as following :
- Most acids are sour in taste. The sour taste of many unripe fruits, lemons and sour milk, is caused by the acids in them.
  - They are generally good conductors of electricity.

- c. Most of the mineral acids, such as sulphuric acid and nitric acid, have a corrosive action on skin, cloth, paper or wood, metals such as iron and zinc. So acids are stored in glass containers instead of metal containers.
  - d. Except carbonic acid all mineral acids cause burn on the skin.
  - e. Most of the acids are soluble in water.
4. Applications of two important bases can be given as under :
- a. **Sodium hydroxide (NaOH) : It is used :**
    - to manufacture washing soap and detergents.
    - in textile industry.
    - in the manufacture of rayon, medicines and paper.
    - in refining edible oils.
  - b. **Calcium hydroxide [Ca(OH)<sub>2</sub>] : It is used :**
    - in the manufacture of bleaching powder.
    - for whitewashing.
    - as a dressing material for acid burns.
    - as antidote for acid poisoning.
    - in the preparation of mortar and plasters.
    - to detect the presence of carbon dioxide gas.
5. Neutralisation reactions are quite common in everyday life.
- a. **Insect stings :** When an ant or bee stings us, it is painful and very irritable. This is because of the secretion of formic acid from the insect's mouth. For relief, we can immediately apply baking soda (a base) on the affected area. Baking soda neutralises the acid and gives instant relief. Wasp sting on the other hand is basic. So, vinegar (acetic acid) is used for relief from wasp stings.
  - b. **Acidity :** Excess hydrochloric acid in our stomach can cause indigestion and is painful. To treat such indigestion caused by acidity, antacid tablets such as milk of magnesia (magnesium hydroxide) are used to neutralise the excess acid.
  - c. **Treating wastes from factories :** When acidic wastes from factories are disposed off in rivers, they are first treated with bases to neutralise them. This prevents the river water from getting acidic, as acidic substances may harm aquatic life.
  - d. **Preventing tooth decay :** When you brush your teeth using a toothpaste, which contains bases, any kind of acid present in the mouth or teeth cavities is neutralised. This helps in preventing tooth decay.
  - e. **Treating soil :** Most of the plants grow best in neutral soil, but excessive use of fertilisers makes the soil either acidic or basic. This affects the growth of plants, thereby affecting the productivity adversely. In such a situation, neutralisation reactions help in the following ways :

- Acidic soil is treated with bases like slaked lime (calcium hydroxide) to nullify the effect of the acid.
- Basic soils are neutralised by adding large quantities of acidic substances like composted manure.

**D. Higher Order Thinking Skills (HOTS) :**

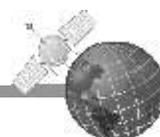
**Ans.** 1. (i) A-Weakly acidic; B-Strongly acidic; C-Basic; D-Neutral  
(ii) B and C

2. This is so because soaps are basic in nature. And turmeric turns red in basic solutions.



**6**

## Changes in Matter



### Exercises

#### Section I

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

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

**B. Fill in the blanks :**

- Ans.** 1. Matter is made up of **atoms** and **molecules**.  
 2. **Physical** change is generally reversible.  
 3. **Exothermic** reactions take place with evolution of heat energy.  
 4. The chemical reaction in which an element replaces another element in a compound is called **displacement reaction**.  
 5. During **melting**, a solid is dissolved in water.

**C. Write true or false :**

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

#### Section II

**A. Very short answer questions :**

- Ans.** 1. Solid, liquid and gas are the three states of matter.  
 2. Iron is covered with zinc to prevent rusting. This is so because zinc is a non-corrosion metal.  
 3. When an iron object is left outside in the rain, a reddish brown layer is deposited on its surface. This is due to the presence of rust which forms naturally due to a chemical reaction. The process of formation of rust is called rusting.  
 4. The purpose of galvanising is to prevent rusting.  
 5. A change in which one or more new substances are formed is called a chemical change.

**B. Short answer questions :**

- Ans.** 1. Matter is anything that occupies space and has weight (as against energy like light or electricity which does not occupy space).  
 2. a. **Sublimation** : Process in which substances can be converted from solid state to gaseous or vapour state without going into the liquid state. These substances again condense to become solid on cooling. Naphthalene is an example.

- b. **Melting** : When a substance changes its state from solid to liquid it is said to melt. Melting point is a particular temperature when this happens, the solid and the liquid states of the substance are at an equilibrium, at this temperature.
- c. **Freezing** : When a substance changes its state from liquid to solid state. Freezing point is a particular temperature and may or may not be the same as melting point.
- d. **Boiling** : It is the state for a liquid when the maximum vapour pressure of the liquid is equal to external pressure that the liquid is under. For a substance it is a constant temperature.
3. Characteristics of physical change are as follows :  
 ? Only physical properties of a substance undergo change.  
 ? Physical changes are generally reversible.  
 ? No new substance is formed.  
 ? A very small amount of energy is either absorbed or evolved during a physical change.
4. **Exothermic reactions** : Some reactions takes place with evolution of heat energy. Such reactions are known as exothermic reactions.  
 Example : Burning of coal.  
**Endothermic reactions** : Some reactions take place with absorption of heat energy. Such reactions are known as endothermic reactions.  
 Example : Photosynthesis in plants (Heat energy is used)
5. (i) Decomposition reaction (ii) Displacement reaction  
 (iii) Combination reaction (iv) Precipitation reaction  
 (v) Displacement reaction
6. Galvanisation is a process in which we deposit a layer of metal like chromium or zinc on iron surface. Both chromium and zinc are corrosion free metals. In this way rusting is prevented.

### C. Long answer questions :

- Ans.** 1. During the conversion of milk into curd many reactions involving proteins, organic acids, and fat take place. The taste and other properties of curd are different from those of the milk. It is not possible to obtain milk from the curd. Thus, we can say that, curding of milk is a chemical change.
2. Different types f chemical reactions are as follows :  
**Combination Reaction** : The chemical reaction in which two or more simple substances (reactants) combine to form a complex compound is called combination reaction.  
 Look at the following examples of combination reaction.  
 (i) Burning of magnesium ribbons in presence of oxygen (of air) is an example of combination reaction. Magnesium oxide is the product of this reaction.



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**D. Higher Order Thinking Skills (HOTS) :**

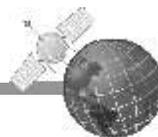
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- b. (i) Chemical change (ii) Physical change  
 2. a. (i) Baking soda (ii) Vinegar  
 b. Acetic acid c. Chemical change d. Carbon dioxide



7

## Weather and Climate



### Exercises

#### Section I

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

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

##### B. Fill in the blanks :

- Ans. 1. **Weather** gives us information about the atmosphere at a given place and time.  
 2. Afternoon is the **hottest** and early morning is the **coldest** time of a day.  
 3. The **climate** varies from region to region.  
 4. The Siberian crane migrates from **Russia** to **India** in winters.  
 5. **Monkeys** have a long and coiled prehensile tail.

##### C. Write true or false :

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

#### Section II

##### A. Very short answer questions :

- Ans. 1. The day-to-day condition of the atmosphere at a place with respect to physical conditions like humidity, temperature, rainfall and speed of wind is known as weather.  
 2. The climate refers to the average weather pattern taken over a long period (about 25 years) for a particular place.  
 3. Temperature, humidity, cloudiness, rainfall and wind speed are known as elements of weather.  
 4. Weather forecasting is to predict weather conditions beforehand.  
 5. Canada, Greenland, Ice land, Norway, Sweden, Finland, Alaska in U.S.A. and Siberian region of Russia are some of the well-known countries of the polar region.

##### B. Short answer questions :

- Ans. 1. Whether is a complex phenomenon that includes variations in factors such as temperature, rainfall and humidity over a short period of time. It is basically a daily phenomenon and is the nature of the atmosphere at any given point of time.  
 Climate tells us about the average weather pattern of a place over a period of time. It is a long term phenomenon which tells about the average temperatures, rainfall or humidity levels over a along period of time.  
 2. **Humidity** : The amount of water vapour present in the atmosphere is

called humidity. The capacity of air to hold water vapour increases with the rise of temperature.

- Humidity is expressed in terms of relative humidity. It is calculated as

$$= \frac{\text{Amount of water vapour in air at a particular temperature}}{\text{Maximum amount of water vapour the air can hold at that temperature}}$$

- Relative humidity is always expressed in percentage, i.e., if relative humidity is 100%, it means, the air is saturated with water vapour.
  - Relative humidity is measured by a device called hygrometer.
  - Relative humidity varies with the temperature. It keeps changing throughout the day and is represented as maximum and minimum relative humidity. It also changes with the season.
3. Weather report in the newspaper provides us information on temperature, precipitation, wind, pressure and humidity.
  4. Three adaptations as found in an animal living in polar regions are as follows :
    - (i) Animals living in polar regions are usually white or light coloured. It makes them hard to recognise.
    - (ii) Most animals living in polar region hibernate during winter and utilise the energy from the food already stored in them.
    - (iii) The fat under the skin gives them protection from cold.

### C. Long answer questions :

**Ans.** 1. Elements of weather are as follows :

**Temperature :** Temperature is the measurement of heat at a particular time. It is a key factor governing the air density and generating wind. Temperature is high during the day than at night. It is maximum in the afternoon and minimum early in the morning.

**Humidity :** The amount of water vapour present in the atmosphere is called humidity. The capacity of air to hold water vapour increases with the rise of temperature.

- Humidity is expressed in terms of relative humidity. It is calculated as

$$= \frac{\text{Amount of water vapour in air at a particular temperature}}{\text{Maximum amount of water vapour the air can hold at that temperature}}$$

- Relative humidity is always expressed in percentage, i.e., if relative humidity is 100%, it means, the air is saturated with water vapour.
- Relative humidity is measured by a device called hygrometer.
- Relative humidity varies with the temperature. It keeps changing throughout the day and is represented as maximum and minimum relative humidity. It also changes with the season.

**Rainfall :** When air with 100% humidity cools down, its water vapour condenses, i.e., changes into water droplets. The mass of water droplets

forms clouds. Further cooling causes these droplets to pour down as rain. At high altitudes where temperature is very low, water droplets freeze and come down as snowfall.

2. By looking at the changes in the atmosphere, and comparing them to the weather patterns of the past, forecasters can make a guess about the weather of subsequent days. However, sometimes they may prove wrong!

### **Benefits of Weather Forecasting**

- It allows people to prepare for bad weather.
  - It is helpful to protect life and property.
  - It is helpful to plan activities and events.
  - It helps farmers to plan various agricultural activities.
3. The following adaptations help the polar bear to live successfully in extremely cold conditions.
    - The body of the polar bear is covered over by a thick coat of white fur. It helps the animal to hide itself from the enemies because its colour merges with the background i.e., white snow. This adaptation also helps the polar bear to hunt its prey easily.
    - It has two thick layers of fur. Beneath the fur is a thick coat of fat. The fat insulates the body from cold and keeps it warm.
    - Polar bear is a good swimmer. It has wide and large paws that help it to swim. These also help it to walk easily on the snow.
    - The body of polar bears, is so insulated that they have to move slowly and rest often to avoid getting overwarm.
    - On warm days, on account of physical activities, they require cooling. They go into the water for swimming and can remain under water for long durations.
    - Polar bear has a strong sense of smell so that it can locate its prey easily.
  4. Animals living in rainforests show following adaptation in feeding habits. Although animals in tropical rainforests have a wide variety of food available, but there is lot of competitions for food. As a result, many animals have adapted to a particular food which is not eaten by other animals. These animals have developed several methods for obtaining food.
    - Most tropical rainforest animals are herbivores due to plenty of vegetation around them.
    - The bird toucan has a long and large beak. This helps it to reach fruits on the branches of a tree on which it cannot sit.
  5. By the following we can say that a chameleon is adapted to live in its habitat :
    - Chameleon is an arboreal lizard.
    - Its tail is long and prehensile.

- It has a great gripping power due to its fused fingers in groups of three and two.
- The eyes are very large, and they move in all directions, better adapted for binocular vision. The chameleon sees front with its right eye, and behind with its left eye.
- Its tongue is large, sticky and rolled up as a tape inside the mouth.
- It has the capacity to change its skin colour similar to that of the background to hide itself.
- On finding a suitable prey the chameleon at once shoots its tongue out to catch the prey. The tongue is then rolled up back into the mouth.

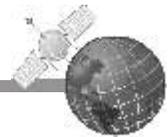
**D. Higher Order Thinking Skills (HOTS) :**

- Ans.** a. (i) Polar bear (ii) Penguin  
 b. Surroundings covered with ice and snow.  
 c. The thick layer of fat insulates the body of these animals against heat loss and keeps them warm in extremely cold climate.  
 d. Animal Q (It is a penguin)



**8**

**Winds, Storms and Cyclones**



**Exercises**

**Section I**

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

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

**B. Fill in the blanks :**

- Ans.** a. The effects of **wind** on objects can be observed.  
 b. The greater the pressure difference, the **faster** the air moves.  
 c. The **warm** air rises in the equatorial regions of Earth.  
 d. During winter, wind blows from the **land** towards the **sea**.  
 e. **Hurricanes** are violent and cause severe damage to life and property.

**C. Write true or false :**

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

**Section II**

**A. Very short answer questions :**

- Ans.** 1. Thunderstorm, hurricanes and tornadoes.  
 2. Wind is air that moves.  
 3. The temperature of land is higher than that of water in oceans because land heats up quickly than water.  
 4. A thunderstorm is a storm accompanied with lightning and thunder. It is produced by a cumulonimbus cloud, usually producing gusty winds, heavy rain and sometimes hail.  
 5. Cyclones of the temperate latitudes, especially in Europe are often called depressions (since they are systems with low pressure centres).

## B. Short answer questions :

- Ans.** 1. Air exerts pressure because the force of the Earth's gravity pulls the molecules of the air towards the ground.
2. The uneven heating on the Earth (which produces winds) can take place under two situations:
- Uneven heating between the Equator and poles of the Earth, and
  - Uneven heating of land and water of oceans.
3. Cyclone is a storm which develops on the sea and has high speed winds swirling around a low pressure centre called the eye of the storm. The high speed winds revolve in anti-clockwise direction in Northern hemisphere and in clockwise direction in Southern Hemisphere. The moist air over the seas and oceans gets heated up by sunrays. The warm air carrying moisture rises up. This creates a low pressure area. The warm air condenses as it rises up to form clouds. The heat released due to condensation of water vapour warms the air around. The air tends to rise and causes a drop in pressure. More air rushes to the centre of the storm. This cycle is repeated, resulting in a system of low pressure region with high-speed winds revolving around it. This weather condition is referred to as cyclone.
4. Tropical cyclones in the Gulf of Mexico, the Caribbean Sea and western Pacific Ocean are known as Hurricanes. These winds are violent and cause severe damage to life and property.

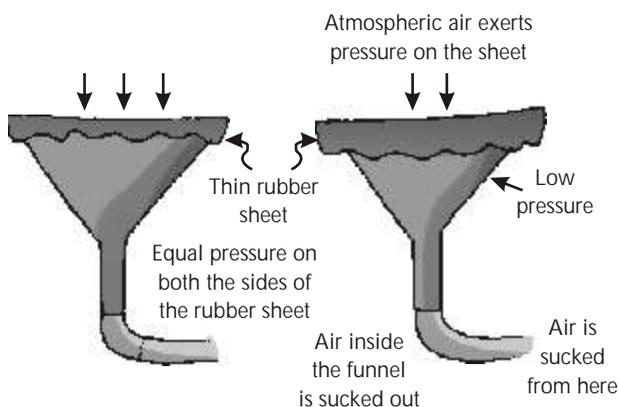
## C. Long answer questions :

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

**Aim :** To show that air exerts pressure.

**Materials required :** Funnel, rubber sheet (thin), a piece of rubber tube.

**Procedure :** Take a funnel and tie a piece of thin rubber sheet over its mouth. Connect the stem of the funnel to a rubber tube. When the open end of the rubber tube is open to the atmosphere, the rubber sheet is flat. Now suck the air out from the funnel. What do you see? The rubber sheet



Demonstrating the effect of pressure due to air

over the funnel gets depressed. This is because when air from the funnel is sucked out, there is very little air inside. The atmospheric air exerts pressure on the rubber sheet and it gets depressed.

2. In summer, land near the Equator of Earth heats up faster than the water in

oceans, so most of the time, the temperature of land is higher than that of water in oceans. The air over the land gets heated and rises creating a low pressure area. The cooler air from over the oceans (being at higher pressure), rushes towards the land. This causes the wind to blow from the oceans towards the land. The winds blowing from the oceans towards the land in summer are called monsoon winds. The monsoon winds carry a lot of water from the oceans (in the form of water vapour) and bring large amount of rains on land. The process in which the winds coming from the oceans carry a lot of water vapour and bring rains is a part of the 'water cycle' in nature.

In winter, the direction of wind flow gets reversed. During winter, wind blows from the land towards the ocean. This happens as follows : During winter, land cools down faster than the water in oceans. So, the temperature of water in oceans is higher than that of land. The warm air over the oceans rises up creating a region of low pressure and cooler air from the land rushes towards the ocean. This causes wind to blow from land towards the oceans. The winds coming from colder land regions (or colder winds) carry only a little of water vapour and hence bring only a small amount of rain in winter season.

3. Precautions to be observed during a thunderstorm are as under :
  - The best place is to stay indoors with all the doors and windows shut.
  - If in a forest, do not lie down. Take shelter under a small tree.
  - If you are in a pool, get out and take shelter in a building.
  - If in a car or bus, close the windows and stay inside.
  - Do not use an umbrella having a metallic handle.
  - Do not take shelter under an isolated tree.
  - Do not sit near a window.
4. Some damaging effects of cyclones and destruction caused by them are given below :
  - Cyclones push water and produce water waves causing floods.
  - The low pressure in the eye of the cyclone lifts water to a height of up to 12 m. It appears like a wall of water. This water wall enters low-lying coastal areas and causes severe loss of life and property.
  - It causes loss of fertility of the soil.
  - High speed winds of a cyclone can damage buildings, telephone and electricity systems, uproot trees and other destruction.

#### **D. Higher Order Thinking Skills (HOTS) :**

- Ans.**
1. Winds blow towards the equator in the two latitude belts of  $0^{\circ}$ - $30^{\circ}$ N and  $0^{\circ}$ - $30^{\circ}$ S. This is so because of the rotation of the Earth on its axis.
  2. If the Earth rotate from east to west the entire pattern of wind would get reversed.



# 9 Soil



## Exercises

### Section I

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

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

#### B. Fill in the blanks :

- Ans. 1. Soil supports different varieties of **plants** in different areas.  
2. **Top soil, sub-soil** and **parent rock** are the three main layers of soil.  
3. Sandy soil is highly **porous** because the particle size is large.  
4. The amount of water a particular soil can absorb is called its **water absorption capacity**.  
5. **Clayey soil** and **loamy soil** have a greater water retention capacity.

#### C. Match the following :

- |                                |                                            |
|--------------------------------|--------------------------------------------|
| 1. Sandy soil                  | <b>b. Large particles</b>                  |
| 2. A home for living organisms | <b>d. All kinds of soil</b>                |
| 3. Clayey soil                 | <b>e. Small particles and packed tight</b> |
| 4. Upper layer of the soil     | <b>a. Dark in colour</b>                   |
| 5. Middle layer of the soil    | <b>c. Lesser amount of humus</b>           |

### Section II

#### A. Very short answer questions :

- Ans. 1. Soil is the uppermost layer of the Earth's crust and is usually composed of a thin layer of mineral particles, and a layer of dead and decayed plant and animal remains called humus.  
2. A vertical section of soil showing its different layers or horizons is called soil profile. Each layer differs in feel (texture), colour, depth and chemical composition.  
3. Sandy soil contains a large amount of sand particles and very small amount of silt and clay particles.  
4. We grow crops to provide food for people.  
5. The wearing away of the topsoil by agents like wind, water or ice is known as soil erosion.

#### B. Short answer questions :

- Ans. 1. Soil is very important because it provides us many things. We grow crops in soil. We get all types of minerals from it. A large number of organisms live in soil.  
2. Soil is formed from rocks by the process of weathering. In weathering, rocks are broken down very slowly by the action of sun's heat, wind, rain, flowing river water, etc., to form tiny rock particles. These tiny rock particles then mix up with humus to form fertile soil. The nature of any soil depends on the rocks from which it has been formed and the type of vegetation that grows in it.  
3. Soil is very important for plants as all types of plants grow in the soil.

4. Water, time and temperature are three factors responsible for soil erosion.
5. Sandy soil is not good for crops as it is dry, well aerated and light.

### C. Long answer questions :

**Ans.** 1. Millions of years ago, the surface of the Earth was very hard and rocky. Volcanic eruptions brought molten rocks from inside the Earth to the surface. The hot lava flowed and cooled to form igneous rocks. As the time passed, these rocks were broken into smaller pieces by violent earthquakes.

Over thousands of years, these smaller pieces of rocks changed into soil under the combined effect of water, wind, roots of plants and mechanical collisions etc.

2. **Sandy Soil :** This soil contains a large amount of sand particles and very small amount of silt and clay particles. This soil is highly porous because the particle size is large. There is lot of space between the particles which is filled with air. This type of soil is thus a well aerated soil. The water retention of this type of soil is poor, as it drains off quickly through the spaces. Thus, the sandy soil is dry, well aerated and light. It is not suitable for growth of plants.

**Clayey Soil :** The percentage of clay particles is the maximum in this type of soil. This soil is extremely sticky and hence cultivation is difficult. It has excellent water retention capacity but poor air circulation. It is good for the growth of plants because of rich minerals present in it.

**Loamy Soil :** This type of soil consists of a good mixture of sand, clay and humus. It has good water retention capacity and air circulation is also sufficient. It has got sufficient minerals for plants. Hence, loamy soil is the best soil for the cultivation of plants.

3. Soil is essential for agriculture. A variety of crops is raised on soil. Different types of soil are found in different parts of India. The crops growing in a region are influenced by the climatic factors and the constituents of soil of that place. You have read earlier in this chapter that clayey and loamy soils have a greater water retention capacity. They are suitable for growing crops like wheat and gram. Pulses and cotton grow well in loamy soil. Soils rich in organic matter and having good water holding capacity are suitable for growing paddy.

4. **Soil Erosion :** The wearing away of the topsoil by agents like wind, water or ice is known as soil erosion. You may have seen rain carrying the soil down the hill slopes. This happens if the soil is not held by the roots of plants and trees. Soil which is not covered by vegetation can be carried away even by wind.

Deforestation (cutting down and removal of all or most of the trees in a forested area) is a major cause of soil erosion. Apart from this, excessive farming and over-grazing by cattle also result in soil erosion. If a piece of land is left uncultivated for a very long time, it may turn into a barren land

as the top soil is left uncovered and hence prone to getting carried away by strong winds and flowing water.

Therefore, cutting of trees and deforestation should be prevented.

**D. Higher Order Thinking Skills (HOTS) :**

- Ans.** 1. Clayey soil is used for making pots.  
2. In that case there would be no life as plants (the producers) cannot grow in the absence of soil.



# 10

## Respiration



### Exercises

#### Section I

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

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

**B. Fill in the blanks :**

- Ans.** 1. **Respiration** involves the taking in of oxygen.  
2. Aerobic respiration occurs in the presence of **oxygen**.  
3. Breathing involves the movement of the **diaphragm** and the **rib cage**.  
4. **Earthworms** breathe through their skin.  
5. Stomata with nearby cell is known as **Stomata apparatus**.

**C. Write true or false :**

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

#### Section II

**A. Very short answer questions :**

- Ans.** 1. The process of breaking down of the food materials inside the body with the release of energy is known as respiration.  
2. Aerobic respiration and anaerobic respiration are the two types of respiration.  
3. Exhalation is the process of expelling out of carbon dioxide.  
4. In humans, lungs are present in the thorax (chest) and are protected by the ribcage.

**B. Short answer questions :**

- Ans.** 1. The basic difference between aerobic respiration and anaerobic respiration is that aerobic respiration occurs in the presence of oxygen, where food (glucose) is broken down into carbon dioxide and water. As oppose to this, anaerobic respiration takes place in the absence of oxygen.  
2. Carbon dioxide, water and energy are the end products of respiration.  
3. The breathing rate increases after physical activity to take in more oxygen as the requirement of it is more.  
4. Lungs are the organs of respiration in human beings. They are present in the thorax (chest) and are protected by the rib cage. A dome-shaped muscle is present beneath the lungs.

**C. Long answer questions :**

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Inhalation

relaxes, becomes convex and the abdominal organs take their original position. The capacity of the chest decreases, the lungs become compressed and the pressure in them rises. The air from the lungs rushes out through the air passages.

Breathing rate is the rate at which breathing takes place. In an average human it is 72 per minute.

5. In humans, several organs take part in the process of respiration.

**Organs of the Respiratory System**

- Nostrils
- Windpipe (trachea)
- Lungs
- Nasal cavity or passage
- Bronchi (singular bronchus)

Air enters our body through the nostrils.

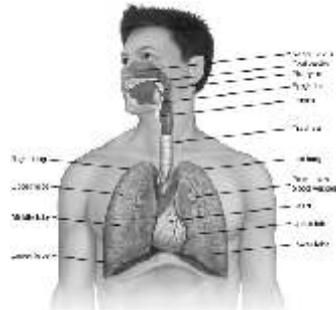
From the nostrils, the air containing oxygen is taken into the nasal cavity. From here it goes down the windpipe or trachea; from trachea it goes to two smaller tubes called bronchi (singular bronchus). One bronchus enters each lung. Inside the lungs, each bronchus divides repeatedly into a large number of small branches called the bronchioles. Each bronchiole ends in a number of air sacs known as alveoli (singular alveolus). The walls of the alveoli have a large number of very thin blood capillaries.

Lungs are present in the chest cavity. This cavity is surrounded by ribs on the sides. Ribs form a cage-like structure, called the rib cage. A large muscular sheet called diaphragm forms the floor of the chest cavity.

This completes the process of respiration.



Exhalation



**D. Higher Order Thinking Skills (HOTS) :**

- Ans.** 1. This is so because it may harm their growth.  
 2. This is so because at night a tree takes in oxygen and releases carbon dioxide.



11

**Transportation in Animals and Plants**



**Exercises**

**Section I**

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

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

**B. Fill in the blanks :**

- Ans.** 1. The organs that transport substances together form the **circulatory system**.  
 2. **Aorta** carry blood from the heart to all parts of the body.  
 3. The blood is pumped through the **pulmonary artery** to the lungs for reoxygenation.

4. **Kidneys** are the most important organ of the excretory system in humans.
5. The upward movement of water and minerals in plants is called **ascent of sap**.

**C. Write true or false :**

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

**Section II**

**A. Very short answer questions :**

- Ans.**
1. Circulatory system is very important as it moves substances throughout our body with the help of blood.
  2. Heart, blood vessels and blood are the parts of the circulatory system.
  3. Plasma is a straw-coloured liquid consisting of 90% water and nutrient contents like glucose, oxygen, carbon dioxide, urea, various types of proteins, hormones, etc. dissolved in it.
  4. Stethoscope is used for listening to the heart beat.

**B. Short answer questions :**

- Ans.**
1. Blood consists of a liquid part called plasma in which three types of cells float— red blood corpuscles (RBCs), white blood corpuscles (WBCs) and the blood platelets.
  2. Pulse is the rhythmical movement of the arteries as blood is pumped through them by the beating of the heart. Pulse rate is number of pulse beats per minute. The pulse rate is the same as the rate of heart beat, i.e., 70-72 per minute.
  3. Heartbeat is the regular contraction and relaxation. In an adult human being, the heart pumps out blood to the arteries about 70 times per minute.
  4. Not all the water absorbed by the plant is used up. The excess water is given out by the plants in the form of water vapour through the stomata present in the leaves. The process is called transpiration.

**C. Long answer questions :**

- Ans.** 1. Circulatory system is a transport system moving substances throughout our body with the help of blood. This system consists of the heart, blood vessels and blood. Blood is the main medium for transport of materials in animals.

In humans, a liquid always circulates within narrow tubes or channels throughout the body. This liquid is called blood and the tubes or channels are called blood vessels. The blood circulatory system is the major means of transport in a human body.

Blood carries or transports the following substances :

- Digested food from the small intestine to other parts of the body.
- Oxygen from the lungs to the cells of the body.
- Waste products produced in the body for removal from the body.

The circulatory system in humans consists of :

- (i) heart
- (ii) blood vessels (arteries, veins and capillaries), and
- (iii) blood.

The heart acts as the pump and brings about circulation of blood within the blood vessels.

2. Various life processes taking place inside an organism produce some water products. These waste products are usually toxic and if allowed to remain inside the body, they may prove to be fatal. The removal of these waste materials in the form of solids, liquids or gases from the cells of living organisms is called excretion.

The major waste products formed in the human body are carbon dioxide, water, urea, sweat and faeces. Excretion is essential in order to maintain proper and healthy growth and sustenance of an individual.

3. At times the kidneys of a person get damaged due to infection. The toxic materials start accumulating in the blood. Dialysis is a method of removing these toxic materials from blood through an artificial kidney. This is done periodically.
4. Water is absorbed from soil by root hair. They are in close contact with water between the soil particles. Water and dissolved minerals move from root hair to the cells of root cortex and then to the xylem vessels by the process of diffusion.

These vessels form a continuous network of channels from roots, through the stem and branches up to the tips of the leaves. These vessels transport water and minerals to all the parts of a plant.

#### D. Higher Order Thinking Skills (HOTS) :

- Ans. 1. Plant absorbs more water than they require to keep themselves cool.  
2. Veins have valves to prevent back flow of blood. They carry impure blood to heart.



## 12 Reproduction in Plants



### Exercises

#### Section I

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

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

##### B. Fill in the blanks :

- Ans. 1. **Reproduction** is the most important characteristic of living organisms.  
2. Yeast can also be seen under a **microscope**.  
3. Ginger is a modified swollen underground stem called **rhizome**.  
4. In **bryophyllum** buds are present in the margins of leaves.  
5. The male reproductive part of the flower is the **stamen**.

##### C. Write true or false :

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

#### Section II

##### A. Very short answer questions :

- Ans. 1. Asexual and sexual are the two modes of reproduction.

2. Common forms of asexual reproduction are Budding, Fission, Fragmentation and Spore formation.
3. A colony is a chain of yeast cells formed in a very short time.
4. Asexual reproduction in plants involves simple division of the plant body into two or more plants or the formation of spores under unfavourable conditions, i.e., harsh environmental conditions which are not suitable for a plant to survive.
5. If the pollen lands on the stigma of the same flower, it is called self pollination. When the pollen of a flower lands on the stigma of another flower of the same plant, or that of a different plant of the same kind it is called cross pollination.

**B. Short answer questions :**

**Ans.** 1. The transfer of pollen grains from the anther of the stamen to the stigma of the pistil by air, water, insects, etc. is called pollination. Insects visit the flower and carry away pollens on their bodies.

Self pollination and cross pollination are the two types of pollination.

2. Buds are formed in yeast is formed by the division of the nucleus of the parent body.
3. If a piece of bread is kept in a warm and moist place, mass of fine thread-like structures which are the hyphen grow from the spores after they have settled on it. At the tips of the hyphen, spores are formed.
4. Vegetative propagation by stems takes place in a number of plants like potato, ginger, turmeric, sugarcane, onion, mint, strawberry, grasses, banana and gladiolus.

Let us study the stem of a potato.

Potato which you eat, is an underground swollen stem (tuber) in which stored food material is present if you observe. a potato, you will find scars called 'eyes' on its surface. Vegetative buds are present in these eyes.

The 'eyes' on germination (sprouting) give rise to new plants.

Similarly, you can grow ginger. Ginger is also a modified swollen underground stem called rhizome containing stored food material.

5. Once a pollen grain has landed on the stigma of the same species it germinates. A sugary solution is secreted by the stigma that stimulates the germination of the pollen tube from weak spots, on the pollen grain. The pollen tube carries the male gamete. After reaching the ovule, the tip of the tube bursts, releasing the male gamete. The male gamete fuses with the female gamete to form zygote. This process is called fertilization.

**C. Long answer questions :**

**Ans.** 1. The vegetative propagation method has the following advantages :

- The new plants (daughter plants) obtained by vegetative propagation under the same conditions are genetically identical to the parent plant.

- Fruit trees or flower plants grown by this method start giving fruits and flowers in lesser time those grown from seeds.
  - Plants which do not produce seeds can be easily grown by this method.
  - This method is more economical and less time consuming.
2. A plant produces a large number of seeds that grow into new plants. If the seeds get scattered only around the plant, they will not be able to grow since each one of them will compete for space, sunlight and minerals. Due to lack of these requirements in a limited space, they may die. Therefore, it is necessary to disperse the seeds over a large area.

Following are the ways of dispersal :

**(i) Dispersal by Wind :** Wind dispersed seeds are light and dry. They may have one or more appendages in the form of thin, flat membranous wings, as in drumstick and maple. In sunflower, the fruit is hairy and opens out in an umbrella-like fashion that helps it to float in the air. The seeds of madar and cotton are also hairy.

**(ii) Dispersal by Water :** The seeds and fruits to be dispersed by water usually develop floating devices in the form of spongy or fibrous outer coats. The fibrous fruit of coconut is capable of floating long distances in the sea without suffering any injury. In lotus, the spongy receptacle, bearing the fruits on its top, floats about in water and drifts according to the currents of water.

**(iii) Dispersal by animals :** It is common in such fruits and seeds which have spiny structures with hooks. The hooks stick to the bodies of passing animals and are carried away several kilometers before they are rubbed off and fall to the ground. Examples are gokhru and Xanthium.

**(iv) Dispersal by Explosive mechanism :** Many fruits burst with a sudden jerk. This results into seeds being scattered far away from the parent plant. Common examples of explosive fruits are balsam, pea and castor.

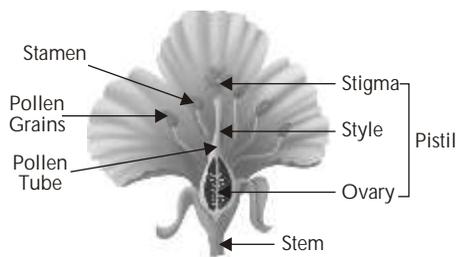
3. A flower is basically made up of four concentric rings of structures called whorls. There is an outer ring of modified leaves called sepals. Sepals are usually green in colour. They provide protection to the flower before it opens. This outer ring (first whorl) is known as the calyx.

Inside the sepals is another ring (second whorl) of modified leaves called petals which are often brightly coloured. The petals in most plants are very colourful nectaries. The nectaries are meant to attract insects for pollination. The petals are collectively called corolla.

The third whorl of the flower is androecium. It consists of stamens which represent the male reproductive organ of the flower. The number of stamens varies in different varieties of flowers, but all are composed of two main parts the filament and the anther. The anther part of the stamen

possesses numerous pollen grains which produce male gametes.

The fourth whorl of the flower is gynoecium. It consists of carpels or pistils which represent the female reproductive organ of the flower. Each carpel consists of a basal swollen portion called ovary, a narrow stalk-like portion called style, and a single or many lobed structure at the top of style, the stigma. The ovary contains many ovules. The female gamete is present inside the ovule. The ovule develops into a seed.



Structure of flower

A flower that has all the four whorls is a complete flower. A flower in which one of the whorls is absent is an incomplete flower.

4. It is essential that the male and female gametes must come in contact with each other and then fuse to form the zygote. Therefore, the first step is the transfer of pollen grains from anther to stigma of the pistil. The transfer of pollen grains from anther to stigma is called pollination. Pollination can be self or cross pollination.

**Self-pollination :** When there is the transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower on the same plant itself, it is called self-pollination. Self-pollination has the following features :

- Self-pollination preserves parental characters.
- It ensures seed production.
- There is little wastage of pollen grains.
- The flowers need not be large, showy, scented or full of nectar.

It also has some disadvantages, which are as :

- No useful character can be introduced in the future generation.
- Weaker or defective characteristics cannot be eliminated.
- Immunity towards diseases falls after some time.
- Yield decreases after a few generations.

**Cross-pollination :** It is the transfer of pollen grains from the anther of a flower to the stigma of another flower on a different plant of the same species. Cross-pollination requires help of some external agents for the transfer of pollen grains from one flower to another. There are two groups of pollinating agents abiotic and biotic. The abiotic agents include water and wind. The biotic agents include insects, birds and animals.

**D. Higher Order Thinking Skills (HOTS) :**

- Ans.**
1. She is not telling the truth. Every flower has a pistil.
  2. It will grow into a new plant.



# 13 Motion and Time



## Exercises

### Section I

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

Ans. 1. d.                      2. b.                      3. b.

#### B. Fill in the blanks :

- Ans. 1. The terms **motion** and **rest** are relative terms.  
 2. **Christian Huygens** made the first pendulum clock in **1656**.  
 3. **Winding clock** and **wrist watches** are refinements of the pendulum clocks.  
 4. Speedometer records the speed of the vehicle in **km/h**.  
 5. The **gradient** of the graph gives the speed of the object.

#### C. Write true or false :

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

### Section II

#### A. Very short answer questions :

- Ans. 1. A player playing a football.  
 2. Time is a passage of a period.  
 3. Sundial, water clock and sand clock were the instruments used to measure time during ancient times.  
 4. Origin is a point of intersection in a graph where OX and OY intersect. It is represented by O.  
 5. The distance time graph will be in the form of a curved or a zigzag line.

#### B. Short answer questions :

- Ans. 1. Average speed is the speed that we get after dividing the 'Distance travelled' by 'Time taken'. It gives us an idea how a vehicle run during a journey.  
 2. Periodic motion is a motion which repeats itself after a fixed interval of time.  
 3. A simple pendulum consists of a small metallic ball(or a stone) called a bob suspended from a rigid stand by a thread.

#### C. Long answer questions :

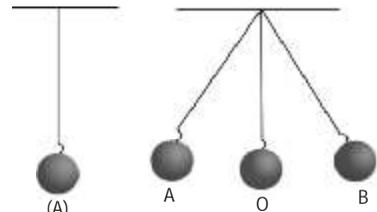
- Ans. 1. When a body is in motion there is often a need to measure the quality of this motion with respect to time. A body moves faster than another body if travels larger distance with the elapse of same time interval. In the same way there is a need to measure the elapse of time between two events.  
 Many of you board the school bus early in the morning at the bus stops in your colony. While the bus is driving past, the position of bus changes with respect to other objects like trees, houses and lamp posts by the roadside. Thus the bus is said to be in motion, as it changes its position relative to the surrounding and with the elapse of time. Children sitting in

the bus are in motion relative to houses, trees and other objects on the roadside, but they are stationary relative to each other.

The terms motion and rest are thus relative terms and are dependent on who and where the observer is.

2. A simple pendulum consists of a small metallic ball (or a stone) called a bob suspended from a rigid stand by a thread.

Figure (A) shows the pendulum in the rest position. This position is also called its mean position. When the bob of the pendulum is pulled to a side and released, it begins to move, to and fro, at fixed intervals. This back and forth motion of a simple pendulum is an example of periodic or oscillatory motion.



A simple pendulum

When the bob moves from one position and returns to the same position, it is said to complete one oscillation. The path of oscillation could be (i) between two extreme positions i.e. from A to B and back to A or (ii) Start from the mean position O, moves to A, to B, and back to O.

The time taken by the pendulum to complete one oscillation is called its time period.

3. **Hourglass :** The hourglass uses the flow of sand to measure time. It consists of two rounded glass bulbs connected by a narrow neck of glass. The upper bulb contains some sand that streams down into the bottom bulb giving the fixed interval of time. It works on a principle that a definite amount of sand takes constant time to fall from the upper chamber to the lower chamber.



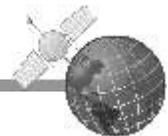
Hourglass

**D. Higher Order Thinking Skills (HOTS) :**

- Ans.** 1. Second is the standard unit of time.  
2. Speed is the ratio of distance travelled to the time taken.



# 14 Electric Current and Its Effects



## Exercises

### Section I

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

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

**B. Fill in the blanks :**

- Ans.** 1. We cannot imagine life without **electricity**.  
2. We use some standard **symbols** to show the circuit diagrams.  
3. **Electricity** cannot flow in an open circuit.  
4. The **heating** effect of current has many practical applications.

5. The movement of the iron causes the hammer to hit the **gong**.

**C. Write true or false :**

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

**Section II**

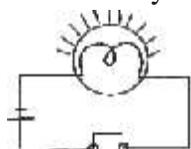
**A. Very short answer questions :**

- Ans.** 1. Electricity is stream of moving electrons in a conductor.  
2. The continuous path of an electric current is called an electric circuit.  
3. We use fuse in electrical circuits to safeguard the circuit from being damaged when excess flow of current passes through it.  
4. A battery is a combination of cells arranged in a definite pattern.  
5. Tungsten  
6. Electromagnet is a temporary strong magnet. It consists of a piece of soft iron with an insulated copper wire around it.

**B. Short answer questions :**

- Ans.** 1. Electric current can't flow in an open circuit. Whereas in a closed circuit it can flow very easily.

2.



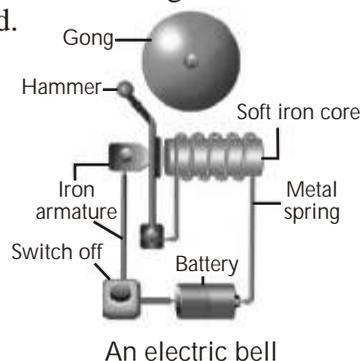
Closed Circuit

3. A fuse works on the heating effect of current. The electric fuses are inserted in the main electrical circuits. There is maximum limit of the current that can safely flow through a circuit. When the current flowing exceeds this safe limit, the fuse melts quickly and break the circuit. Thus, an electric fuse is a device that limits the current in an electric circuit. It prevents damages to electrical circuits and possible fires.
4. The strength of the electromagnet depends upon :
- The amount of electric current passing
  - The number of turns of a coil.
5. Miniature circuit breakers give better protection than fuses because they break the circuit automatically when the current flowing in the circuit exceeds its limit for which MCB is connected.

**C. Long answer questions :**

- Ans.** 1. One of the applications of electromagnet is the door bell or an electric bell. Its components are : an electromagnet, an armature (a soft iron bar mounted on a spring), a contact screw, a gong and a hammer.

The diagram alongside shows the different parts and the electric circuit due to which the



An electric bell

bell rings.

- When the bell is pressed the contact screw touches the iron strip and the circuit is completed.
  - The current starts flowing through the coil.
  - The electromagnet becomes magnetised and the soft iron armature is attracted towards the electromagnet. The movement of the iron causes the hammer to hit the gong.
  - This movement breaks the circuit at point P, so that the current stops flowing and switches off the electromagnet.
  - The spring pulls the armature back to its original position, the circuit is remade and the process starts over again. This is how the bell rings.
2. **Electric Bulb** : An electric bulb has a thin coiled wire made up of tungsten known as a filament. The bulb is filled with an inert gas at low pressure to prolong the life of the filament. Tungsten has high resistance to current. When a current is passed through the filament, it gets heated to such a high temperature that it starts glowing. Since tungsten has very high melting point, it does not melt even when white hot.
- Electric Iron** : It is an appliance used for ironing clothes. It has an upper part which is grooved. The groove contains a coil made up of high resistant wire. The coil of wire is known as element. When a current is allowed to pass through the iron, its element becomes red hot and release heat. The metal plate and the element are separated by an insulator made of mica. Since mica is a bad conductor of electricity but good conductor of heat, it prevents the flow of current from the element to the metal plate. But it allows the heat to flow through it to the metal part. Finally the metal part becomes hot.
3. Some of the very prominent uses of electromagnets are as following :
- Electromagnets are used on cranes in steel-works and scrap yards.
  - They are also used by doctors to remove 'foreign bodies' like iron filing from a patient's body, particularly from the eye.
  - Some modern trams and trains use electromagnets. The Maglev train at Birmingham airport rides just above the surface of the track. It is held there by electromagnets. The ride, therefore, is very smooth and quiet because the train stays 15 mm away from the track and does not touch it. A part from being quiet, this saves wear and tear on the wheels and the track.
  - Electromagnets are also used in electric bells, loudspeakers, television, telegraphs, telephones, audio and video tape recorders and players, etc.

**D. Higher Order Thinking Skills (HOTS) :**

- Ans.** • A fuse made of a long wire have a low melting point because the resistance power decreased with increase in length.



# 15 Light



## Exercises

### Section I

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

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

#### B. Fill in the blanks :

- Ans. 1. We get diffused reflection from a **rough** surface.  
 2. A smooth polished surface that can return the rays of light incident on it to form a clear image is called a **mirror**.  
 3. Convex and concave mirrors can both form **diminished** images.  
 4. A lens is made of a **transparent** material.  
 5. **Sun** light consists of many colours.

#### C. Write true or false :

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

### Section II

#### A. Very short answer questions :

- Ans. 1. A light ray is a line that is drawn to represent the straight line path of light.  
 2. An image is formed when a beam of light falls on an opaque object.  
 3. A real image is an image that can be obtained on screen.  
 4. Concave and convex are the two spherical mirrors.  
 5. Violet, Indigo, blue, green, yellow, orange and red.

#### B. Short answer questions :

- Ans. 1. An image formed by a plane mirror is:
- Erect
  - Virtual, i.e., it cannot be obtained on a screen.
  - Of the same size as that of the object.
  - At the same distance from the mirror as the object is in front of it.
  - The image appears to be formed behind the mirror.
2. This interchange of sides from left to right and vice versa between the object and its image is called lateral inversion.
3. A real image can be obtained on a screen but a virtual image cannot be obtained on a screen.
4. **Uses of Concave Mirror**
- Used in head lights of cars/torches/scooters/search lights.
  - Used by doctors for examining eyes, ears, nose and throat.

#### Uses of Convex Mirrors

- These mirrors are used to see rear view or side view in cars and scooters. They view a large area much wider than that of a plane mirror.

- These mirrors help the driver to see the traffic coming from behind.
- Used in shops/malls for surveillance.

### C. Long answer questions :

**Ans. 1.** A perfectly flat, polished surface capable of reflecting light regularly is known as a plane mirror. The image size on plane mirror does not change. An ordinary mirror we use to look in is a plane mirror. If we look into a plane mirror, we can see ourselves in the mirror, which is our own image. In this case, our body is the object. This image is obtained after reflection from the mirror. This image is of the same size as our body and is upright or erect. We cannot obtain this image on a screen as it seems to be formed behind the mirror. So this is a virtual image.

Thus, a plane mirror produces an upright and virtual image, which is of the same size as that of the object. It is formed behind the mirror. The distance of the image formed on the mirror is equal to the distance of the object in front of the mirror. Another characteristic of the image is lateral inversion, i.e., right side appears left and the left side appears right.

A concave mirror is a small part of a hollow sphere of glass. The hollow inner surface functions as a reflecting surface. The reflecting surface is made shining by painting the outer surface first with mercury and then with lead oxide (red lead). Thus, the inner surface becomes the reflecting surface.

The mirror in which the outer bulging surface functions as a reflecting surface is called a convex mirror. The hollow bulging surface functions as the reflecting surface. For this, the inner hollow surface is painted first with mercury and then with lead oxide. Thus, the outer bulging surface becomes the reflecting surface.

2. (i)
  - Concave mirrors are used in torches and car headlights to reflect the light of bulb to create a powerful beam of light.
  - Concave mirrors are used as shaving mirrors as these magnify the image and image is upright, when the mirror is held close.
- (iii) • Convex mirrors are used as rear view mirrors in automobiles as the images are erect and field of view is wide. However the distance of the objects in the mirror appear farther than they are.
- (iv) • Convex mirrors are used in street lights to spread the light over a large.

3. **Aim :** To demonstrate image formation by a concave mirror.

**Materials required :** Concave mirror, candle, cardboard sheet, white chart paper and a wooden stand.

**Procedure :** Fix the concave mirror on the wooden stand as shown in the figure. Arrange a table for carrying out this experiment. Place the mirror (with its support) on the table. Paste the white chart paper on the sheet of cardboard. This will act like a screen. Now light the candle and keep it on the table at a distance of about 50 cm from the mirror. You will see a

blurred image of the candle flame on the screen.

Adjust the screen till you get a sharp image of the flame on the screen.



Shift the candle a little towards the mirror. Observe the image when the distance of the object changes. Now place the candle at different distances and note the changes in the image on the screen. Bring the candle very close to the mirror as well and note your observation.

**Inference :** A concave mirror forms a real and inverted image. When the object is brought very close to the mirror, the image formed is virtual and erect.

**D. Higher Order Thinking Skills (HOTS) :**

**Ans.** • Concave and convex mirrors are called spherical mirrors because they are a part of a sphere. To understand this better, take a coconut which has been cut into a half. The inner surface of the cut coconut is called concave and the outer surface is called convex.



# 16 Water



## Exercises

### Section I

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

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

**B. Fill in the blanks :**

**Ans.** 1. **Sea** and **ocean** water is highly salty.  
2. All the three states of water are **reversible** or **interchangeable**.  
3. The level of **ground water** is called the water table.  
4. Excess of **rainfall** in an area causes floods.  
5. **Rainwater harvesting** is an effective tool of water management.

**C. Write true or false :**

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

### Section II

**A. Very short answer questions :**

**Ans.** 1. Canal and tube well.  
2. Aquifer are water-bearing rocks readily transmitting water to wells and springs.

3. Dam is a wall type structure built to hold water back.
4. In order to conserve water run off from roads I would built drains to let water reach a pond.

**B. Short answer questions :**

- Ans.**
1. The level of ground water is called the water table. The level of water table varies from place to place. It also varies from season-to-season. It falls down during summers and rises during rainy seasons.
  2. Flood is a situation that take place due to the excess of rainfall. Drought is a situation that take place due to the absence of rain for a long time.
  3. Sea water is not fit for human consumption as it is saline in nature.
  4. Depletion of water table means going down of water in the aquifers.
  5. This is an innovative technique of watering directly the individual plant, instead of the entire area under cultivation, as with flood irrigation. Thus, water is used economically, saving upto 1/3rd of the water. Drip irrigation decreases water requirement and labour and also minimizes the water loss due to evaporation.

**C. Long answer questions :**

- Ans.**
1. Water exists in three states, i.e., solid, liquid, and gas. All the three states are reversible or interchangeable.

All the three states of water are also present in our natural environment at any given time.

**Solid :** Glaciers, icebergs, snow, hail, frost, and ice crystals in the clouds are solid forms of water.

**Liquid :** Rain, dew, and clouds are water droplets or liquid forms of water. Liquid water also covers three-quarters of the surface of the Earth in the form of lakes, rivers, and oceans.

**Gaseous :** Water vapour, fog, steam, and clouds are gaseous forms of water. Water exists in all the three states because water can change its state very easily in a range of temperatures, i.e., between 0°C (ice) and 100°C (vapour). This change also takes place on its own in our environment forming a cycle which we know as the water cycle.

2. The causes of depletion of water table are as follows :

**Increasing Population :** The need of drinking water and its use for various domestic purposes has increased with increase in population. There is more demand for construction of houses, roads and buildings. This has led to decrease in open areas leading to reduced seepage of water in the ground. Lots of water is required for construction work. At times ground level water is used for this purpose. This has led to depletion of ground water and fall in water table because not only has the usage of this water gone up but at the same time seepage of water has also reduced.

**Increasing Industries :** Water is used by all the industries. With increase in the number of industries, the demand of water has also increased. Industries are the greatest consumers of water, as almost everything that

we use needs water in its production process. Be it processing, cleaning, transportation etc. Water used by most of the industries is ground water. This has put a heavy load on the underground water resulting in water table level falling down every year.

**Agricultural Activities :** India is basically an agricultural country. Most of the farmers of our country depend upon rain for irrigation of their crops. Due to erratic rains, farmers are forced to use ground water for irrigating the crops. Population pressure on agriculture has increased the use of ground water day by day. This leads to decline in the level of water table.

3. The process of seeping of rain water and water from other sources such as rivers, ponds and lakes into the soil, filling up empty spaces and cracks deep below the ground is called infiltration. It is a continuous process and the groundwater gets recharged. Ground water is pure as it gets filtered through many layers of sand, rock and soil.
4. **Deforestation :** In the name of urbanization, more and more forests are being cleared for construction of houses, offices, shopping malls, etc. This has led to slowdown of the natural process of ground water replenishment. Trees and plants increase the absorption of water by soil by slowing down the flow of water.
5. Rainwater harvesting is the process of capturing and storing rainfall to prevent its run off, evaporation and seepage its efficient utilization and conservation. Rainwater harvesting is an effective tool for utilizing the huge amount of high quality water, which otherwise goes as waste to the sea or in case of urban areas-down the drain. In designing a rainwater harvesting system, the key concept is capturing rainfall run offs from the roof of buildings and roads and creating artificial connectivity to sub surface water in hygienic condition.

**Components of Rainwater Harvesting :**

- |                         |                     |
|-------------------------|---------------------|
| (i) Catchments Area     | (ii) Conduit        |
| (iii) Filtration System | (iv) Strange System |
| (v) Reuse System        |                     |

**D. Higher Order Thinking Skills (HOTS) :**

**Ans.** • In that case the water table will deplete at a faster rate.



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## Forests and Waste management



### Exercises

Section I

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

**Ans.** 1. b.                      2. a.

**B. Fill in the blanks :**

**Ans.** 1. **Forests** are storehouse of biodiversity.

2. **Food chain** involves transfer of energy.
3. The materials that can be recycled collected in **blue bins**.
4. Plastic and iron scrap are the examples of **non-biodegradable** wastes.

## Section II

### A. Very short answer questions :

- Ans.** 1. A food web is a system of interdependent food chains used to represent the various relationships of organisms.
2. Three reasons for deforestation are :
- a. Growing population
  - b. Industridisation
  - c. Converting forest into residential locations.

### B. Short answer questions :

- Ans.** 1. Recycling involves collecting waste materials and processing them to make new products.
2. Plastic, paper, metals, glass and water.
3. Forests are useful to us in the following ways:
- a. Forests maintain temperature, humidity and regulate rainfall.
  - b. Forests are a rich source of wood for fuel and timber nuts, fruits, seeds and medicinal plants.
  - c. Forests decrease the run off rate of rainwater and thus prevent soil erosion.
  - d. Forests recycle water into the atmosphere which fall as rain to replenish the ground water.
  - e. Forests put a check on strong winds and reduce the occurrence of dust storms.

### C. Long answer questions :

- Ans.** 1. Since forests are helpful in various ways to the living beings on the Earth, they should be conserved. Below are given some measures to conserve forests.
- Deforestation should be prohibited.
  - Wastage of timber and fuel wood should be avoided.
  - Alternative sources of energy, such as biogas should be used to supplement fuel wood.
  - Forest fires should be prevented.
  - Pests and diseases of the forest trees should be controlled chemically and biologically.
  - Reforestation of the deforested areas should be practiced.
  - Large afforestation should be done in areas that are unfit for agriculture.
2. Forests form a part of the ecosystem. These are self sustaining and self regulatory units of nature. The interactions among organisms in the forest ecosystem is depicted in the form of food chain. Food chain involves transfer of energy through the process of eating and being eaten. The

green plants trap solar energy and convert it into chemical energy which is stored as carbohydrate. The plants further transfer their energy to animals after being eaten. The animals may in turn be eaten by other animals and in this way energy is transferred at all levels. The transfer of energy through a series of organisms each feeding on the preceding organisms is called food chain.

3. **Recycling Biodegradable Waste :** Biodegradable waste can be recycled by the method of composting. This is one of the oldest forms of disposal. It is a natural process that recycles the nutrients in the waste to yield manure or compost. It ensures that the waste is not carelessly thrown left to decay. The manure obtained is very rich in nutrients and is an excellent medium for growing plants. Apart from being clean, cheap and safe, it also reduces the amount of disposable waste.

**Reusing and Recycling Non-biodegradable Waste :** Over the last few year, we have started buying a number of products packaged in cans, aluminium foils, plastics and other such non-biodegradable items. We then throw away the packaging. This has led to an immense increase in the amount of non-biodegradable waste. That is why reuse and recycling of these wastes has become very essential. Recycling non-biodegradable waste involves the collection of used and discarded materials, and processing them to make new products. Plastics are also recycled to make various plastic products.

**D. Higher Order Thinking Skills (HOTS) :**

- Ans.** 1. I would dispose off day leaves by composting. It will recycle them into useful manure.
2. Yes. This is so because he help us in protecting our all important limited resources.