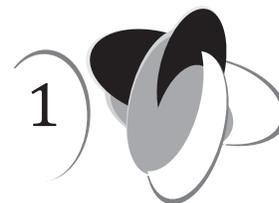




Nutrition in Plants



Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. I leaves of a green plant are coated with oil then leaves cannot photosynthesis and cannot make food.
 2. Yes, we think that saprophyte help us in keeping the environment clean.
 3. A plants sheds its leaves if kept inside a closed room for too long because the leaves require sun light to prepare food.

B. Multiple Choice Questions (MCQs) : Tick (✓) the correct answer :

- Ans.** 1. both of them 2. chlorophyll 3. roots 4. all of them

C. Fill in the blanks :

- Ans.**
1. glucose 2. iodine solution 3. plants and animals
 4. Cuscuta 5. chlorophyll 6. carbon dioxide, oxygen

D. Match the following :

- Ans.**
- | | | |
|-------------------------|-------|-------------------|
| 1. Fungi | ----- | (i) Leaf |
| 2. Pitcher plant | ----- | (ii) Parasite |
| 3. Plant's food factory | ----- | (iii) Insects |
| 4. Indian pipe | ----- | (iv) Heterotrophs |
| 5. Animals | ----- | (v) Saprophyte |

E. Tick the odd-one out giving reason :

- Ans.**
1. Root hair 2. Carnivores 3. Rhizobium
 4. Saprophyte 5. Saprophyte

Section II : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.**
1. **Autotrophic nutrition** – Autotrophic nutrition is shown by plants and involves a process by which living organisms make their own food.
 2. **Parasitic nutrition** – Such plants depend on green plants or on other living bodies. This mode of nutrition is called heterotrophic nutrition or parasitic nutrition.
 3. **Insectivorous plants** – A special category of plants are insectivorous plants. They are green plants (autotrophs). They make their own food by the same way as the other green plants do. But these plants trap small insects too. This is the reason these plants are called insectivorous (insect-eating) or carnivorous plants. They do so to obtain nitrogen from the insects after digesting them. Such plants have

specialised leaves to catch insects.

Some of the common ones are the pitcher plant, Drosera (Sundew), bladderwort, and the Venus fly trap.

4. **Photosynthesis** – Photosynthesis is the process by which a plants uses the energy from the light of the Sun to make its food.
5. **Symbiosis** – Plant which live in association with another living organisms for mutual benefit. this process is called symbiosis.

G. Give differences between the following :

Ans. 1. **Parasites** : Parasites are the organisms which obtain or absorb food from another organisms.

Saprophyte : Saprophytic plants are that plants which live on rotting material.

2. **Autotrophs** : Organisms that are able to synthesis food molecules using external sources such as carbon dioxide, water and sunlight.

Heterotrophs : Organisms that cannot manufacture their own food and have to dependon other plants or animals to obtain energy.

H. Answer the following questions in short :

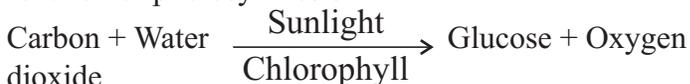
Ans. 1. All animals depend upon plants for food because plants are the primary source of food. They prepare their own food.

2. Lichens are an association between a fungus and a green algae. The fungus obtains nutrients from the algae, and the fungal tissue in turn provides shelter for the algae, allowing it to grow in harsh conditions such as rock surfaces where it would otherwise be destroyed.

3. Photosynthesis (see figure given below) is the process by which a plant uses the energy from the light of the Sun to make its food. The conditions required for photosynthesis are :

1. water from the soil
2. sunlight
3. carbon dioxide in the air
4. a green pigment called chlorophyll

Photosynthesis is a complex process. A series of chemical reactions change the raw materials like carbon dioxide and water to the food product glucose. The process can be shown simply by looking at the starting materials and the end products. Let us look at the following reaction of photosynthesis.



4. **Photosynthesis** : The process of using sunlight to convert water and carbon dioxide into carbohydrates (starch) and oxygen.
5. Sunlight is the major source of energy for photosynthesis. Leaves are the site where photosynthesis takes place. Leaves have some special organelles called chloroplast which contains the green pigment

chlorophyll. Some plants like cacti do not have any leaves. They perform photosynthesis using their green stem.

6. Photosynthesis involves the use of the energy in sunlight to convert water and carbon dioxide into carbohydrates (starch) and oxygen.
7. Saprophytic plants are plants that live off rotting material.
8. A special category of plants are insectivorous plants. They are green plants (autotrophs). They make their own food by the same way as the other green plants do. But these plants trap small insects too. This is the reason these plants are called insectivorous (insect-eating) or carnivorous plants. They do so to obtain nitrogen from the insects after digesting them. Such plants have specialised leaves to catch insects.

Some of the common ones are the pitcher plant, Drosera (Sundew), bladderwort, and the Venus fly trap.

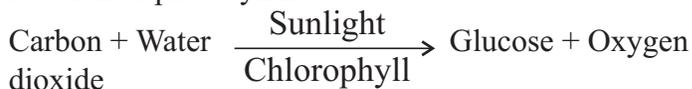
I. Answer the following questions in detail :

Ans. 1. Nutrient is a substance which the organisms obtain from the surroundings to derive energy for its maintenance and growth. Thus the term nutrition refers to the means by which an organism obtains its food and also the process by which nutrients in the food are broken down to simpler molecules for utilisation by the body. Various inorganic and organic raw materials are required for building the structure and maintaining the body functions of an organism. They are broken down by different modes of nutrition.

2. Photosynthesis (see figure given below) is the process by which a plant uses the energy from the light of the Sun to make its food. The conditions required for photosynthesis are :

1. water from the soil
2. sunlight
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3. The conditions required for photosynthesis are :

1. water from the soil
2. sunlight
3. carbon dioxide in the air
4. a green pigment called chlorophyll

- | | |
|--|--|
| <p>4. Autotrophic nutrition</p> <ol style="list-style-type: none"> 1. The type of nutrition that takes place in green plants is called autotrophic nutrition. 2. Food is synthesised from raw materials by photosynthesis. 3. Solar energy is required or used. 4. Digestive process is absent. 5. It is found in green plants, blue - green algae and autotrophic bacteria. | <p>Heterotrophic nutrition</p> <ol style="list-style-type: none"> 1. The type of nutrition that takes place in non-green plant and animals is called Heterotrophic nutrition. 2. Food is obtained from plant and animal sources. 3. Energy is produced in body. 4. Digestive process is present. 5. It is found in non-green plants (fungi), bacteria and all animals. |
|--|--|
5. Parasitic plants absorb food from another growing plant, called the host. Only the parasitic plant benefits from this relationship.

Can you guess which part they use to absorb food?

Usually, parasitic plants develop special roots called haustoria, which penetrate into the tissues of the host plant.

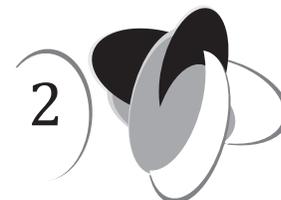
The prepared food is generally absorbed from the root or the stem of the host plant. Cuscuta (Dodder), mistletoe and Apodanthes are common examples of parasitic plants.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Nutrition in Animals



Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Oral questions :

- Ans.**
1. The tongue performs many functions like tarting of food, helping in its marination and swallowing.
 2. **Two suggestions to keep teeth and gums healthy -**
 - (i) Clean your teeth daily twice in a day.
 - (ii) Clean the mouth after eating anything.
 3. The caecum is located between the small and the large intestine.
 4. Cows need to chew the cud to swallow and make the cud digestive.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.**
- | | |
|--------------------|--------------------|
| 1. small intestine | 2. small intestine |
|--------------------|--------------------|

H. Answer the following questions in short :

- Ans.**
1. The process of nutrition consists of ingestion, digestion, absorption, assimilation and egestion.
 2. **Ingestion and egestion in Amoeba :** Amoeba captures food with the help of pseudopodia, any part of its body acts like mouth.
The indigested food is thrown outside at any point with the help of temporary a temporary vacuole.
 3. The human digestive system consists of mouth, oesophagus, stomach, small intestine and large intestine.
 4. **Digestion :** Making the food into simpler forms to make it usable for the body is called digestion.
 5. The last organ of the digestive system is the large intestine.
The large intestine absorbs water and also removes undigested solid wastes from the body in the form of faeces through the rectum (anus).
 6. Enzymes are biological catalysts which help in the digestion of food in animals.
 7. Gastric juice contain an enzyme pepsin which converts complex proteins into an acidic medium. In the stomach, food is thoroughly mixed with the gastric juice secreted by the gastric glands.
 8. Villi are finger-like projections in the intestine to increase its surface area for the absorption of food.

I. Answer the following questions in detail :

- Ans.**
1. Animals are heterotrophic in their mode of nutrition. They perform the following four types of heterotrophic nutrition.

Holozoic Nutrition

This type of nutrition is seen in humans and other commonly found animals. Organisms take whole solid food or liquid substances in this mode of nutrition. This food is used to release energy by a series of chemical reactions inside the body. Holozoic animals are herbivores (plant-eating), carnivores (animal-eating) or omnivores (eating both animals and plants).

Parasitic Nutrition

In this mode of nutrition animals derive nutrients from other animals or plants called host. This kind of relationship between the parasite and the host is called parasitism. Mosquito is an example of human parasite that feeds on human blood. Louse is another human parasite.

Saprophytic Nutrition

In this mode of nutrition, organisms derive nutrition from dead organic matter. Millipedes, woodlice and dung flies accomplish their nutrient requirements by this method. They are also called detritivores.

Mutualistic Nutrition

In this mode of nutrition, two animals live close to each other and they

interact in such a manner that either both are benefited or one of them is benefited. But none of them is harmed from this association. A very good example of mutualistic association is the association between remora and shark. The remora is a marine fish that is usually found in the warmer part of the oceans. They cling onto the body surface of sharks and get their nutrients from the places where the sharks move around.

2. Nutrition in amoeba

Amoeba is a microscopic, single-celled organism found in pond water. It is a simple organism having an irregular shape. Its body consists of a cell membrane, a founded nucleus and many bubble-like vacuoles (See figure below).

Amoeba is capable of constantly changing its shape and position. It gives out one or more finger-like projections called false feet or pseudopodia (singular pseudopodium). These help in movement and capturing food. Amoeba does not have a mouth or a digestive system.

Its food consists of microscopic organisms. On sensing food, Amoeba gives out pseudopodia which surround the food particle and ultimately take the food particle inside the body. The food particle inside the Amoeba forms a food vacuole.

Digestion of the food particle is a chemical process and is performed by digestive juices (called enzymes). The digestive juices are secreted into the food vacuole, and help in breaking down food into simpler substances. Then the digested food is absorbed. On assimilation, the Amoeba grows in size. The undigested food is thrown outside at any point with the help of a temporary vacuole.

3. Digestive System in Ruminants

Some higher mammals like goat, sheep, cow, buffalo etc. have a typical variation in their digestive system. These herbivorous mammals have complicated stomach which consists of four chambers, namely (i) rumen, (ii) reticulum, (iii) omasum and (iv) abomasum.

The food ingested by a ruminant first goes into the rumen where it is partially digested. From rumen, this partially digested food goes to reticulum. The reticulum returns this food to the mouth end for thorough chewing, called rumination. It is this particular activity which gives these animals the name—ruminants.

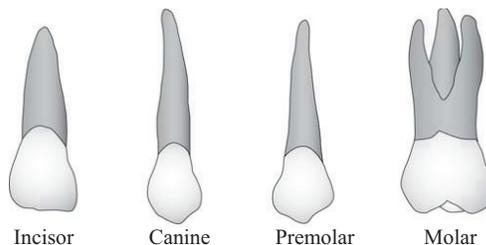
After thorough chewing, the food is swallowed second time and then it is digested in the other two chambers, namely omasum and abomasum. From these chambers, the food is sent to small intestine for absorption of nutrients.

The grass is rich in cellulose, a kind of carbohydrate. Many animals including humans cannot digest it. But the ruminants have a sac like structure between the small and the large intestine. It is in this chamber that cellulose gets digested by certain bacteria present.

4. There are four types of teeth. They are the incisors, canines, premolars and molars.

The front four teeth in each jaw are called incisors. They are flat in shape and help in biting the food. Next to the incisors are the canines. They are sharp and there are four canines in total, two in each jaw. They are meant for tearing food.

The pre-molars and molars are used for grinding and crushing the food. Pre-molars are next to the canines. They are eight in total, four in each jaw. And the next three teeth to the premolars are called molars. They are twelve in total, six in each jaw.



Various types of teeth

5. **Absorption of Digested Food in the Small Intestine**

The digested food is now ready to be absorbed by the walls of the intestine by blood vessels. The nutrients present in the digested food are absorbed by the finger-like projections on the inner wall of the small intestine. These finger-like projections on the inner wall of the small intestine are called villi (singular : villus). These villi increase the surface area for absorption. Villi contain blood vessels. The digested food passes through the thin walls of these blood vessels and enters the blood stream.

The absorbed nutrients are then taken to all the cells of the body by the blood. Energy from the food is produced in the cells.

The excess of nutrients are stored in the body until they are needed.

The incorporation of the absorbed nutrients into the cell components is called assimilation.

6. **The alimentation process**

Raw Food undergoes numerous changes in the alimentary canal.

In humans and other multicellular organisms, the various activities of nutrition are performed by special organs.

Ingestion takes place when food is taken in the mouth, chewed by the teeth, mixed with saliva and swallowed.

The saliva in our mouth is secreted by the salivary glands. Saliva contains ptyline (salivary amylase) which converts starch to a simpler compound called maltose.

Enzymes : They are biological catalysts which bring changes in food by breaking down food into simpler molecules.

The saliva also lubricates the food, making it easier to swallow. The tongue helps in swallowing the food. Now the food enters the oesophagus and moves towards the stomach by periodic relaxation and contraction of the muscles of the oesophagus.

This movement is also called peristalsis.

Gastric juice contains an enzyme pepsin which converts complex proteins into an acidic medium.

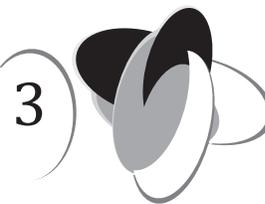
In the stomach, food is thoroughly mixed with the gastric juices secreted by the gastric glands. The food remains in the stomach for 1-4 hours. It then goes to the small intestine. It first passes through the duodenum (the upper part of the small intestine), where the food is mixed with the bile juice secreted by the liver and the pancreatic juice, secreted by the pancreas. Next, the food passes to the ileum (the lower part of the small intestine). The inner surface of the small intestine contains tiny projections called villi. This is the main region where the absorption of digested food takes place.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Fibre to Fabric : Animal Fibres



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. Scouring of the sheep's hair is done to remove greare dirt and durt.
 2. Lohi and Bakhawal are used for making swaters.
 3. The cocoons are pat in hot water, which kills the worms as well as loosens the filaments, leaving the cocoons to float freely.
 4. Sericulture is not very popular with people working for animal protection because in sericulture the cocoons are put in hot water, which kills the worms.

B. Multiple choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.**
- | | | |
|--------------------|------------------------------|----------|
| 1. all of them | 2. polyester | 3. nylon |
| 4. mulberry leaves | 5. both caterpillar and pupa | |

C. Fill in the blanks :

- Ans.**
- | | | |
|-----------|------------------|--------------------------------|
| 1. fibres | 2. breeds of | 3. eggs, larvae, pupa and moth |
| 4. lohi | 5. Wool and silk | 6. wool and silk |
| 7. hair | 8. hot water | 9. arthma bronchial |

D. Write True or False for the following statements :

- Ans.**
- | | | | | |
|----------|---------|----------|---------|----------|
| 1. False | 2. True | 3. False | 4. True | 5. False |
|----------|---------|----------|---------|----------|

E. Tick the odd-one out giving reason :

- Ans.**
- | | | | |
|------------|----------|-------------------|-------------------|
| 1. Deer | 2. Rayon | 3. Mulberry seeds | 4. Mulberry seeds |
| 5. Sorting | | | |

F. Match the following :

- Ans.**
- | | |
|-----------------------|-----------------------------------|
| 1. Food for silk moth | (i) Bombyx mori |
| 2. Patanwadi | (ii) Hair of sheep |
| 3. Silk moth | (iii) Silk fibre |
| 4. Shearing | (iv) Mulberry leaves |
| 5. Cocoon | (v) Removal of thick coat of hair |
| 6. Fleece | (vi) History |

Section II : Summative Assessment (CCE Pattern)

G. Define the following terms :

- Ans.**
- Wool-yielding animals :** The animals from which wool is obtained is called wool-yielding animals. Some wool-yielding animals are sheep, goat, yak, camel, rabbit, llama and alpaca.
 - Scouring :** Process of washing sheared wool with water to remove all unwanted and greasy material.
 - Rearing and breeding of sheep :** Sheep are herbivores and mainly feed on green grasses and green leaves. Sheep are also fed on corn, jowar and mixture of pulses and oil cakes (material left after taking out oil from seeds). In winter, sheep are fed on leaves, grains and dry fodder, and majorly kept indoor.
 - Sericulture :** Practice of rearing and producing silk.
 - Reeling :** Obtaining silk from cocoon.

H. Give below are some steps and their procedure related to the production of wool. Complete the matrix :

| | Step | Procedure |
|-------------|-------------|---|
| Ans. | 1. Shearing | The process of cutting wool off a sheep. |
| | 2. Scouring | The sheared skin with thick coat of hair is then washed thoroughly in tanks to remove grease, dirt and dust. |
| | 3. Carding | The dyed fibres are passed through metal teeth to straighten them. |
| | 4. Spinning | They are further combed and rolled into yarn. Threads of wool are formed by spinning two, three or four strands of wool together. |

I. Answer the following questions in short :

- Ans.**
- Wool-yielding animals :** The animals from which wool is obtained is called wool-yielding animals. Some wool-yielding animals are sheep, goat, yak, camel, rabbit, llama and alpaca.
 - Shearing :** The process of cutting wool off a sheep is called shearing.
 - The steps of extracting wool are - shearing, scouring, carding and spinning.
 - Silk is regarded as an expensive fibre because it is made from cocoon which is more costly.

5. Wool fibre keep our body warm because wool fibre is highly popus. the air in the pores acts as an insulator and does not allow the body heat to go out.
6. **Beeds of sheep Use of wool States where found**
- | | | |
|----------------|-------------------|------------------------------------|
| Bakharwal | For woollen shawl | Jammu and Kashmir |
| Lohi | superior wool | Rajasthan, Punjab |
| Nali | carpet wool | Rajasthan, Haryana Punjab |
| Rampur bushair | brown fleece | Uttar Pardesh, Himachal Pradesh |
| Patanwadi | For hosiery | Gujarat |
| Marwai | coarse wool | Gujarat |
7. The silkworm secretes a very fine filament from two glands on its head which solidifies upon coming in contact with air. Through figure-of-eight movements of the head, the silkworm deposits filaments in layers forming the cocoon.

J. Answer the following questions in short :

Ans. Production of Wool from Sheep

1. Getting wool fibre from sheep (or in general any wool-yielding animal) involves the steps given ahead.

The fine hair of sheep are used to make wool. Sheep are reared for this purpose.

Sheep are reared in different parts of our country. You might have noticed shepherds taking their herds of sheep for grazing on hilly areas such as Himachal Pradesh, Jammu and Kashmir, Uttarakhand, Sikkim and Arunachal Pradesh or on the plains of Rajasthan, Gujarat, Punjab and Haryana.

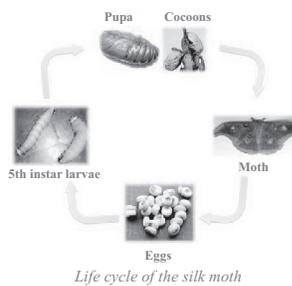
Shearing of sheep includes the following six steps :

- (i) Once the reared sheep have developed a thick coat of hair, their hair are removed for getting wool. The sheep are held on a wooden board and their fleece along with the thin uppermost layer of skin is shaved off. This process is called shearing. Shearing of sheep for wool is done mainly in early summer. This enables sheep to survive without protective coat of hair. The thin uppermost layer of skin that is shaved off is dead. The hair of sheep grow again just as your hair grow.
- (ii) The sheared skin with thick coat of hair is then washed thoroughly in tanks to remove grease, dirt and dust. This process is called scouring. Earlier scouring was done in tanks but nowadays, it is done by machines.
- (iii) After scouring, hair are graded and sorted. In factories, hair of different textures are separated.
- (iv) The small soft fluffy fibres called fuzz (burrs) are separated from the hair. The remaining fibres are again scoured and dried.

(v) The fleece of goat and sheep is white, brown or grey in colour. At this stage, it is dyed in desired colour.

(vi) The dyed fibres are then passed through metal teeth to straighten them. This process is called carding. They are further combed and rolled into yarn. Threads of wool are formed by spinning two, three or four strands of wool together, as per the requirement. The longer fibres of wool are used to make sweaters. The shorter fibres are used to spin and weave woollen clothes.

2. Inside the cocoon the silkworm transforms itself into a chrysalis (called the pupa stage in a moth's life cycle) and then into a moth. The moth eventually leaves the cocoon, which can then unraveled.



3. Silk production, formally called sericulture, is a very complex and lengthy process. It needs a lot of skill too, since it is a delicate fibre and needs careful handling.

The first step involves washing the silkworm eggs that had been stored over the winter. Under natural conditions, the eggs hatch only once a year in spring when the mulberry trees begin to leaf. After the eggs hatch, the larvae are spread out on trays to grow.

They are fed chopped mulberry leaves for 20-35 days. Towards the end of the period the worms may need to eat ten times a day, and the trays have to be cleaned regularly.

The one prepares the frames for the silkworm mats, where the worms will spin the cocoons. Spinning may take about a week, after which the cocoons have to be unraveled.

The cocoons are put in hot water, which kills the worms as well as loosens the filaments, leaving the cocoons to float freely.

The filaments from several cocoons are reeled off together to make a strong thread. To make stronger warp threads, several single threads are twisted together on a spooling frame. The threads are then dyed and wound onto smaller reels for weaving.

Uses of Silk

Silk fibre is used for weaving silk cloth. Silk cloth is a high-value dress material.

4. **Wool**

Wool is commonly obtained from the hair of sheep, goat, yak, rabbits and camels. These animals are therefore called wool-yielding animals. All these wool yielding animals bear hair on their body. Why?

Wool fibre is highly porous. The air in the pores acts as an insulator and does not allow the body heat to go out. Thus, hair on the body of these

animals keep them warm during colder conditions. Wool is used for making winter clothing.

Wool-Yielding Animals

Some wool-yielding animals are

| | | | |
|-----------------|-------|--------|-------|
| Sheep | Goat | Yak | Camel |
| Rabbit (angora) | Llama | Alpaca | |

The quality of wool depends on the breed of sheep. The quality of wool is judged on the basis of thickness, length, shine, strength and colour of the fibre. Pashmina is a fine, fluffy, light and warm wool from Kashmir and nearby Himalayan areas.

Pashmina is obtained from the under fur of Kashmiri goat.

There are six important wool-yielding breeds of Indian sheep.

| Breeds of sheep | Use of wool | States where found |
|------------------------|--------------------|------------------------------------|
| Bakharwal | For woollen shawl | Jammu and Kashmir |
| Lohi | superior wool | Rajasthan, Punjab |
| Nali | carpet wool | Rajasthan, Haryana Punjab |
| Rampur bushair | brown fleece | Uttar Pradesh, Himachal Pradesh |
| Patanwadi | For hosiery | Gujarat |
| Marwai | coarse wool | Gujarat |

5.
 1. Sorter's job in wool industry is risky as sometimes they get infected by a bacterium called anthrax, which causes a fatal blood disease called sorter's disease.
 2. The workers who dip the cocoons in boiling water to extract silk stand in water for long hours. As a result of this their skin becomes raw and blistered.
 3. The silk industry workers inhale vapours arising from cocoons in boiling water. Also during reeling lot of fibre and other things are inhaled by them. This results in health problems like asthma, bronchial allergies and ailments.
 4. The handling of dead silkworms with bare hands leads to various infections and illness.
 5. The workers in weaving industry are exposed to noise made by spinning and winding machines and looms. This results in hearing deficiencies.
 6. Working in poorly ventilated, damp rooms causes various respiratory problems.

Although research works are carried on all over the world to develop silk and wool industries, very little has been done to improve the working conditions of the labourers of these industries. The health professionals should find out the possible means in this regard.

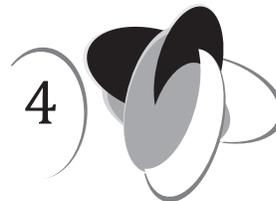
6. Do yourself

Section III : Activities Assessment (CCE Pattern)

Do yourself



Heat and Temperature



Exercises

A. Answer the following questions orally :

- Ans.** 1. Clinical thermometers have a kink in the capillary tube. The kink does not allow the mercury to fall as soon as the thermometer is taken out of the mouth.
2. Radiators in cars and air conditioners are painted black so as to have cooling effect by radiating most of heat.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. 37°C 2. conduction 3. vacuum
4. Absolute scale 5. none of these 6. -40°C

C. Fill in the blanks :

- Ans.** 1. hot to cold. 2. Radiation 3. conductors and plastics are insulators
4. night 5. convection

D. Write True or False for the following statements :

- Ans.** 1. True 2. False 3. False 4. False 5. False

E. Tick the odd-one out giving reason :

- Ans.** 1. Glass Capillary 2. Convection 3. Ventilation
4. Degree 5. Plastics

Section II : Summative Assessment (CCE Pattern)

F. Define the following :

- Ans.** 1. **Heat :** Heat is a form of energy.
2. **Conductor of Heat :** The transmission of heat through a substance from a region of higher temperature to a region of lower temperature.
3. **Infrared radiation :** The heat energy which is transferred from a hot body to a cold body without needing any medium to travel and without being absorbed by space between the hot and cold bodies is called infrared radiation.
4. **Land breeze :** Breeze which blows from the land towards sea at night-time in coastal regions.
5. **Convection current :** heat transfer in which heat is carried from the hotter part of a substance to it is called convection current.

G. Use the following terms against the sentences given.

- Ans. 1. Temperature 2. Kink 3. Celsius scale
4. Conduction 5. Radiation

H. Answer the following questions in short :

- Ans. 1. Mercury is used in thermometers because
(a) It is shiny and silvery white, so it can be seen easily from outside the glass.
(b) It does not stick to the glass.
(c) Mercury has a wide range of temperature with its freezing point 39°C and boiling point 357°C .
(d) Its expansion is fairly uniform over a wide range of temperature.
(e) It can be easily obtained in pure form.
2. **Clinical thermometer** : A thermometer used to measure the human body temperature :
3. Wearing more layers of clothing during winter keep us warmer than a single thick layer of warm cloth because more layers of clothing do not allow the air to go out.
4. Heat is transferred in the vessel by conduction in water the heat is transferred by convection and in air the heat is transferred by radiation and in air the heat is transferred by radiation.
5. Ventilators in our houses keep the air pass into the rooms.
6. We need to shake the clinical thermometer before use to bring down the mercury column.
7. (i) Cooking food in vessels (ii) Heating water
(iii) heaters and blowers heat the room by setting up convection currents.

I. Answer the following questions in detail :

Ans. **Clinical Thermometer**

1. The thermometer used to measure our body temperature is called clinical thermometer. You must have seen it at your home when someone has fever. It is generally a mercury thermometer. It has a fine thread of mercury running in the middle. It is seen when it shines.

Use of Clinical Thermometer

Using a thermometer : A thermometer has a bulb filled with mercury, and a glass stem with a thin, hollow tube running within it. The tube ends in the bulb at one end and is sealed at the other end. When the bulb is in contact with a hot object, the mercury gets heated and rises in the thin tube, called a capillary tube. The marking up to which the mercury rises tells you the temperature of the object.

Clinical thermometers have a kink in the capillary tube. The kink (bend) does not allow the mercury to fall as soon as the thermometer is taken out of the mouth. After you have checked the reading, you should give the

thermometer a couple of sharp jerks to bring down the mercury column.

Laboratory Thermometer

To measure the temperature of other objects, we use different thermometers. One commonly used thermometer is laboratory thermometer. The temperature of it ranges from -10°C to 110°C . Laboratory thermometer also consists of a long narrow uniform glass tube having bulb at one end filled with mercury. It does not have a kink.

Use of Laboratory Thermometer

While reading temperature of a hot or cold body, it should be kept upright. The bulb should be dipped properly in the body while reading the temperature. You must record the temperature immediately because as soon as the thermometer is pulled out the mercury level starts falling.

2. As you are aware, water being a bad conductor takes a longer time to heat up than land and also takes a longer time to cool down. During the day time, land heats up faster than water.

The air above the land gets heated and rises up. The cold air from the sea rushes to take place.

During the night time, land loses heat more rapidly than water. The air above water is warmer and rises and the cool air from the land moves towards the sea to fill the space.

3. **Radiation — Transfer of Heat Without A Medium**

For heat to flow by conduction or convection, matter must be present to carry the heat. When we stand in sunshine, we feel warm. Heat from the Sun has reached us. Heat is transferred through another process called radiation.

The heat energy which is transferred from a hot body to a cold body without needing any medium to travel and without being absorbed by space between the hot and cold bodies is called thermal radiation or radiation or radiant heat. The energy so radiated is called radiant energy.

Radiation is a kind of electromagnetic energy, similar to light energy. It travels with speed of light. When it is absorbed by some solid objects, the temperatures of the solid objects rise. Radiation is the fastest mode of heat transfer from hot to cold body.

4. **Scales of Temperature** : A thermometer has graduations (markings), or a scale, made on the basis of two standard temperatures agreed upon universally. These are called the lower and upper fixed points. Usually, the lower fixed point is taken as the temperature at which ice melts, while the upper fixed point is taken as the temperature at which water boils. You know already that solids melt at a particular temperature called their melting point and liquids boil at a particular temperature called their boiling point. Thus, ice always melts at the same temperature and water always boils at the same temperature.

The two commonly used scales for measuring temperature are the Celsius

scale and the Fahrenheit scale. On the Celsius scale, the melting point of ice is taken as 0° and the boiling point of water is taken as 100° . After these two points are marked on a Celsius thermometer, the distance between them is divided into 100 equal divisions. Thus, each division on the Celsius scale measures a temperature difference of 1°C . This is the scale used in laboratory thermometers.

5.

| Conduction | Convection | Radiation |
|---|--|--|
| 1. Heat is transmitted by molecules of the medium. Material medium is necessary. | heat is transmitted by molecule of the medium, Material medium is necessary. | Heat can pass through vacuum. |
| 2. Heat passes from molecule to molecule without any transfer of the molecules of the body. | Molecule carrying heat with them move from one part to other part. | Material medium is necessary. Radiations take place even in the absence of molecules/medium. |
| 3. It is a slow process. | It is a slow process. | It is a very quick process. |
| 4. Heat travels in any path. | Heat travels in any path. | Heat travels in straight lines. |
| 5. Solids are heated by conduction. | Liquids and gases are heated by convection. | Medium is not heated up by radiation. |

Section III : Activities Assessment (CCE Pattern)

Do yourself

Formative Assessment - I

A. Answer the following questions :

- Ans.**
1. Do yourself
 2. The tongue performs many functions like tarting of food, helping in its martication and swallowing.
 3. Yes, we think that saprophytes help us ion keeping the environment clean.
 4. The cocoons are pat in hot water, which kilsl the worms as well as loosens the filaments, leaving the cocoon to float freely.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans** 1. vacuum 2. neem 3. pseudopodia 4. nylon

C. Fill in the blanks :

- Ans.**
1. rumen reticulum omasum
 2. carbon dioxide oxygen
 3. arthma ailments bronchial allergies

4. conductors insulators

D. Write True or False for the following statements :

Ans. 1. True 2. True 3. False 4. False

E. Match the following :

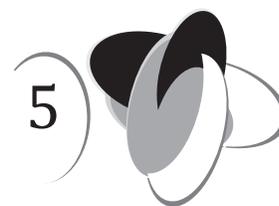
| | Column I | | Column II |
|-------------|-------------|-------|----------------------|
| Ans. | 1. Incisors | ----- | (i) Enzymes |
| | 2. Food | ----- | (ii) Bile juice |
| | 3. Cyclosis | ----- | (iii) Cow |
| | 4. Liver | ----- | (iv) Biting the food |
| | 5. cud | ----- | (v) Amoeba |

F. Tick the odd-one out giving reason :

Ans. 1. Water 2. Convection 3. Kidney 4. Deer



Different Kinds of Materials



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

Ans. 1. **Fruits** **Acid**
Lemon orange Citric acid
Orange Aecorbic acid

2. By adding water in concentrated acid we can prepare a dilute solution of an acid.

3. Magnesium hydroxide is used in making an antacid.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

Ans. 1. all of these 2. orange 3. neutral salt 4. red

C. Fill in the blanks :

Ans. 1. minerals 2. sour 3. natural 4. organic
5. phenol phthalein

D. Match the following :

| | | | | | |
|-------------|-----------------------------|-------|---------------------|-------|----------------|
| Ans. | 1. Dilute calcium hydroxide | ----- | (i) Phenolphthalein | ----- | (a) Red |
| | 2. Dilute hydrochloric | ----- | (ii) China rose | ----- | (b) Yellow |
| | 3. Soap | ----- | (iii) Red litmus | ----- | (c) Green |
| | 4. Vinegar | ----- | (iv) Blue litmus | ----- | (d) Blue |
| | 5. Curd | ----- | (v) Turmeric | ----- | (e) Colourless |

E. Write True or False for the following statements :

Ans. 1. False 2. False 3. True 4. True 5. False

Section II : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.** 1. **Natural Indicators** : The indicators which are found naturally are called natural indicators.
Synthetic Indicators : The indicators which are made by human are called synthetic indicators.
2. **Mineral Acids** : Some acids are prepared from the minerals present in the Earth's crust. Examples are hydrochloric acid and sulphuric acid.
3. **Anhydrous Salt** : A salt without the water of crystallization is called anhydrous salt.
4. **Acid bare indicators** : The indicators which indicate the substance is an acid.
5. **Neutralisation reactions** : An acid reacts vigorously with a base or an alkali to form salt and water. This reaction is called neutralization reaction because both salt and water formed after the reaction are neutral.

G. Differentiate between the following :

- Ans.** 1. **Strong acids** : The acids which are more acidic are called strong acids.
Weak acids : The acids which are dilute and are less acidic are called weak acids.
2. **Acidic substances** : The substances which are acidic in nature are called acidic substance.
Basic substances : The substances which are basic in nature are called basic substance.

H. Answer the following questions in short :

- Ans.** 1. Some of the characteristic properties of acids are :
- (i) **Acids have a sour taste, and are corrosive in nature**
Mineral acids such as nitric acid and sulphuric acid can destroy human tissues, clothes, paper, etc. They are usually strong acids. Thus, one should handle acids with care as they can cause burns upon contact with your skin.
Acids also have the ability to corrode metals such as iron and aluminium. For this reason, acids are stored in glassware. Moreover, the surfaces of the working shelves in laboratories are either covered with tiles or painted using acid-resistant paints.
- (ii) **Acids are soluble in water**
Most of the acids dissolve in water either at room temperature or on heating to form a clear solution. Vinegar is a 3–5% solution of acetic acid in water.
3. **Acids have combined hydrogen**
A large number of metals such as zinc, iron, etc. react with acids to evolve hydrogen gas from acids.

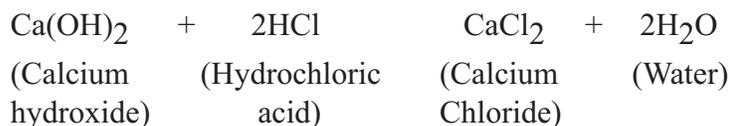
2. **The use of mineral acids in industries :**

(i) Hydrochloric acid is used in the textile industry as a bleaching agent.

(ii) Sulphuric acid is used in the manufacture of paints, drugs, dyes and artificial silk.

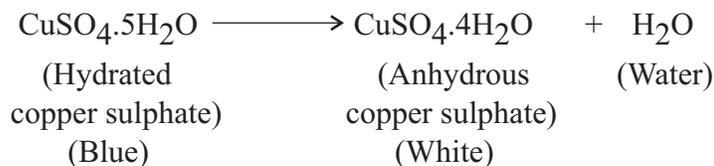
3. **Neutralization Reaction**

An acid reacts vigorously with a base or an alkali to form salt and water. This reaction is called neutralization reaction because both salt and water formed after the reaction are neutral, i.e. neither acidic nor basic. When lime water (calcium hydroxide) reacts with dilute acid, it forms calcium chlorides as salt and water.



In Activity 6.2, when the two solutions are mixed, vigorous reaction takes place resulting in formation of salt and water. Both are neutral because the blue litmus and red litmus papers did not show any change when dipped in the mixture after the reaction.

4. The salt formed during a chemical reaction is mostly a hydrated salt, i.e., a salt with the water. The water it carries is called the water of crystallization. A salt changes when it loses or gains water. A salt without the water of crystallization is called anhydrous salt.



5. **Uses of Salts**

The salts are used for the different purposes both domestically and industrially. The salts used by a person can be acidic, basic or neutral such as NaHCO_3 in baking powder is an acidic salt while in toothpastes basic salts are used widely. Table 5.4 lists some of the salts with their uses.

I. Answer the following questions in detail :

Ans. 1. Indicators

The presence of acid or base is tested using certain specific materials such as litmus paper. These materials are called indicators because they indicate whether the substance is an acid or a base. In laboratory, there are many indicators that are used to identify a substance as an acid or a base. These indicators include :

Litmus Paper

There are two types of litmus paper—the red and the blue. The blue

litmus paper is turned into red in presence of an acid and the red litmus paper turns blue in presence of a base.

Methyl orange

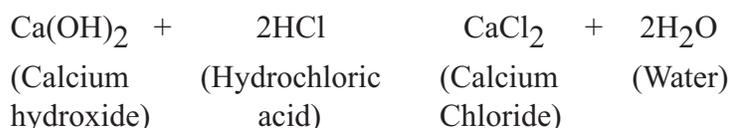
An acid-base indicator, when added to acidic solutions, turns red and yellow in the basic solutions.

Phenol Phthalein

Pink acid-base indicator, when added to acidic solutions, turn colourless but remains pink in basic solutions.

2. **Neutralization Reaction**

An acid reacts vigorously with a base or an alkali to form salt and water. This reaction is called neutralization reaction because both salt and water formed after the reaction are neutral, i.e. neither acidic nor basic. When lime water (calcium hydroxide) reacts with dilute acid, it forms calcium chlorides as salt and water.



In Activity 6.2, when the two solutions are mixed, vigorous reaction takes place resulting in formation of salt and water. Both are neutral because the blue litmus and red litmus papers did not show any change when dipped in the mixture after the reaction.

3. (a) Uses of Hydrochloric Acid are :

- Hydrochloric acid is also used for cleaning sinks and sanitaryware.
- It helps in purification of common salt.
- It is used in the textile industry as a bleaching agent.

(b) **Sodium hydroxide**

Sodium hydroxide is commonly known as caustic soda, which is an important base and widely used in industry and laboratories. Industrially, it is obtained from electrolysis of brine solution (salt water). It is mainly used :

in manufacturing soaps and detergents

in manufacturing paper, rayon, textiles, medicines, etc.

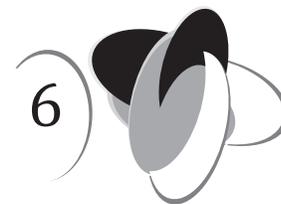
as a lab reagent

Section III : Activities Assessment (CCE Pattern)

Do yourself



Physical and Chemical Changes



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. The tearing of paper is a physical change because there is no substance is formed.
 2. A physical change is considered temporary because in physical change the substance gets back to the original form when conditions are reversed.
 3. During a chemical change a substance changes into a new substance.
 4. Tinned iron is used for the storage of food stuffs because it prevents the food from rotting.

B. Multiple Choice Questions (MCQs) :

- Ans.**
1. mixture
 2. drying of clothes
 3. pure solids only
 4. always irreversible
 5. digestion of food
 6. (i) and (iii) are correct

C. Fill in the blanks :

- Ans.**
1. chemical
 2. physical
 3. chemical
 4. galvanisation
 5. crystallisation

D. Write True or False for the following statements :

- Ans.**
1. False
 2. False
 3. True
 4. False
 5. True

E. Match the following :

- Ans.**
- | | | | |
|------------------------|-------|-----------------------------|-----------------------------|
| 1. Iron | (i) | Non new substance is formed | (a) Basic in nature |
| 2. Magnesium hydroxide | (ii) | Oxygen | (b) Endothermic reaction |
| 3. Physical changes | (iii) | Reacts with sulphate | (c) Rut |
| 4. Spoilage of food | (iv) | Reacts with zinc | (d) Zinc Sulphate is formed |
| 5. Copper sulphate | (iv) | Irreversible | (e) Chemical change |

F. Tick the odd-one out giving reason :

- Ans.**
1. Ammonium Chloride
 2. Stretching of rubber band
 3. Galvanisation
 4. Curdling of milk
 5. Magnesium ribbon

Section II : Summative Assessment (CCE Pattern)

G. Define the following terms :

- Ans.**
1. **Reversible change** : A change in which we get back the initial substance by reversing the action.
Irreversible change : A change in which we cannot get back the initial substance by reversing the action.

2. **Physical change** : Those changes in which the reacting substances can be re-obtained through physical methods.
3. **Chemical change** : a chemical change occurs when two chemical substances interact to produce a new substance with a different set of properties.
4. **Rusting** : The conversion of iron into iron oxide when exposed to moist air is called rusting.
5. **Crystallization** : The process by which an impure compound is converted into its crystal is known as crystallization.

H. Answer the following questions in short :

Ans. 1. Changes occurring in physical properties of a substance are called physical changes.

During a physical change no new substances is formed.

Generally physical changes are reversible in nature.

A chemical reaction is characterised by

- (a) formation of new substances
- (b) exchange of energy

2. **Chemical Change** : When two or more substances react in such a way that there is formation of one or more new substances, the change is called a chemical change.

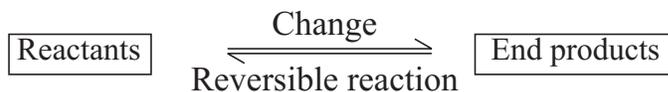
During a chemical change, reactants undergo changes to form products. Chemical changes, generally are irreversible change.

3. Setting of milk into curd is a chemical change because this reaction is irreversible. Milk is not obtained from the curd.

I. Answer the following questions in detail :

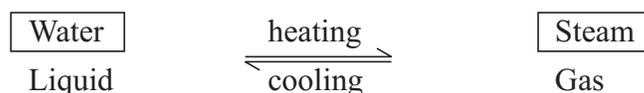
Ans. Properties of Physical Change

1. (i) No new substance is formed.
 (ii) Only shape, colour, size or state of the substance change.
 (iii) The substance gets back to the original form when conditions are reversed.
 (iv) Such changes do not involve gain or loss of energy.



Some examples are :

1. Tearing of paper into many pieces. The shape and size change but no new substance is formed.
2. When an iron nail is heated over flame it becomes red hot, but when flame is removed, red hot colour changes and it gives back the original colour.
3. Some substances change their state on heating but regain their original state on cooling.



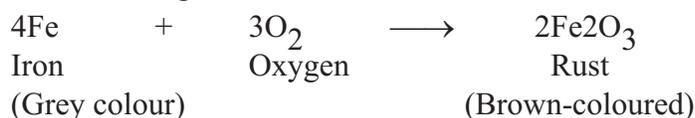
Chemical Change

When two or more substances react in such a way that there is formation of one or more new substances, the change is called a chemical change or a chemical reaction.

During a chemical change, reactants undergo changes to form products. Chemical changes, generally, are irreversible change.

Burning of paper, spoilage of food, cooking of food, digestion of food, photosynthesis, curdling of milk, ripening of fruits, rusting of iron, etc. are chemical changes.

2. The following reaction occurs :



The chemical name of rust is iron oxide which is formed from the reaction of air and water on iron. Oxygen and water are two essential conditions for rusting. This is a chemical change because rusting is permanent. You cannot get original iron from the rust.



Rusting increases if air has more humidity and is polluted with smoke, dust particles, acids/bases, etc.

Prevention of Rusting

- (i) By painting, greasing or oiling.
- (ii) By depositing a layer of zinc called galvanisation, as done on iron water pipes.
- (iii) By depositing a layer of chromium or tin called electroplating.

3. **Crystallisation**

After the salt residue is collected from the pits, it is dissolved again in water and filtered to remove insoluble impurities. The solution so obtained is heated to obtain a super saturated solution. A super saturated solution has very little water and excess of salt. On cooling it, we obtain pure crystals of common salt.

The method of separation of pure crystals of a substance from its hot and super saturated solution on cooling is called crystallisation.

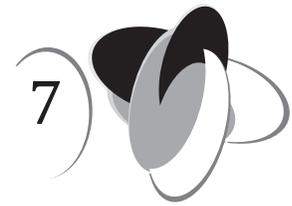
In crystals, the molecules of the substance get arranged to form a regular pattern. You can obtain crystals of substances such as alum, sugar, copper sulphate, urea etc. by the method of crystallisation.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Weather, Climate and Adaptations of Animals



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. Weathermen forecast the weather of a place on the basis of the temperature, humidity, rainfall, time of sunrise and sunset and time of moon rise and moon set of the particular place.
 2. The climate charts provide the information about the temperature, humidity and rainfall of a particular area.
 3. Weather of a place changes frequently.
 4. **Large animal** **Small animal (in tropical rainforest)**
Elephant Frog
Lion Chameleon

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.**
1. its feet are board with paddy soles
 2. a white fur over the body, a layer of fat below the skin, a keen sense of smell.
 3. provide food during unfavourable conditions
 4. the amount of humidity in the atmosphere

C. Fill in the blanks :

- Ans.**
1. climate 2. millimeters 3. temperature, humidity and rainfall
 4. holding 5. Indian rainforest

D. Write True or False for the following statements :

- Ans.**
1. True 2. False 3. True 4. True 5. False

E. Tick the odd-one out giving reason :

- Ans.**
1. Coastal area 2. Average monthly temperature
 3. temporary adaptation 4. Weather balloons
 5. Moderate climate

Section II : Summative Assessment (CCE Pattern)

F. Define the following terms :

Ans. Adaptation in Animals to polar Regions

1. As we know, the polar regions are covered with snow and are very cold throughout the year. During winter, the temperature can be as low as -40°C. That is why, animals living under such severe conditions have adapted themselves by developing certain specific features.

General features developed by animals living in polar regions are :

Animals living in polar regions are usually white or light coloured. It makes them not easily visible in the snowy background and protects them from their predators. It also helps them to catch their prey.

Most animals living in polar region hibernate during winter and utilise the energy from the food already stored in the body. Hibernation also minimises their metabolic activity.

The animals in these regions have thick wool and fleece on their bodies. This protects them from extreme cold.

The fat under the skin also gives them protection against cold.

2. Weather is defined as the day-to-day conditions of the atmosphere at a certain place with respect to temperature, wind speed, humidity, rainfall, sunshine or clouds, etc.

3. **Adaptations found in Elephant**

Elephant is commonly found in the Indian tropical rainforests. It has developed a number of adaptations to live in the rainforests.

1. **Large fan-like ears**

These help elephant to

- (i) hear even the very soft sound
- (ii) keep cool in the hot and humid climate. The thin skin over the ears can lose heat quickly.

2. **Large trunk**

- (i) Elephant has a strong sense of smell. It smells through its trunk.
- (ii) It uses its trunk for holding and picking up things including its food.

3. **Tusks**

The tusks of the elephant are its modified teeth. It uses its tusks for digging the roots of food plants or tearing the bark of trees to get the inside pulp.

Tusks enable elephants to compete for food rather well.

4. **Large pillar-like legs**

The four large pillar-like legs balance its bulky body by providing a broad base.

The cushion-like pads under its feet provide cushion during walking.

4. **Climate** : Climate is a long term prevalent weather condition of a particular place.

Climate chart : The climate chart provide the information about the temperature, humidity and rainfall fo a particular area.

5. The birds which migrate to warmer regions at the onset of winter (cold) season and come back after the winder is over are called migratory birds.

For example, Siberian crane comes from Siberia to warmer places in India like Bharatpur in Rajasthan and Sultanpur in Haryana.

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

Ans. **Climate** : Long term prevalent weather condition.

1. **Weather** : Conditions of air, water, heat, light on particular day.

2. (a) Maximum, Minimum, Thermometer (b) Hygrometer
(c) Rain Gauge
3. Factors on which the climate of a place depends are:
Distance from the equator Distance from the sea
Height above sea level Humidity and rainfall
Wind direction Temperature
4. To recall, only adaptations in camel are described here.
Camels store water in their blood for future use. The hump of a camel stores fat which is a source of food. A camel can go a week or more without even a drop of water. It can also survive for several months without food.
Sweat glands are less in a camel's body to prevent water loss.
Camels excrete concentrated urine to conserve body water.
Camels have wide feet with thick soles which help them to walk effectively on sand.
Eyelids of camels are transparent and cover the eyes to protect them from sand storm.
Unlike most mammals, a camel can withstand body temperature fluctuations throughout the day from 34°C to about 42°C.

5. Adaptations in Penguins :

- (i) White feathers on the belly
White feathers on the belly merge well with the snowy background. This protects penguins from their predators. Short but thick feathers make their body water-proof.
- (ii) Thick layer of fat under-the-skin
The under skin fat, thick skin and feathers on the body protect penguins from extreme cold conditions.
- (iii) Streamlined body, webbed feet and flattened flipper-like wings
These features help penguins in swimming.
- (iv) Penguins live in groups and remain huddled together
This feature helps them keep warm.

Adaptations in Polar Birds

Birds living in the polar region cannot survive in extreme cold winter. To survive, they migrate to warmer region as soon as winter sets in and return after the winter is over. This temporary change of living place (Habitat) is called migration.

H. Answer the following questions in detail :

Ans. 1. Climate : Climate is a long term prevalent weather condition of a particular area.

Factors affect climate :

- (i) Distance from the equator (ii) Distance from the sea
(iii) Height above sea level (iv) Humidity and rainfall

(v) Wind direction (vi) Temperature

2. (a) Maximum and minimum temperatures are recorded with the help of a maximum-minimum thermometer. It consists of a U-shaped tube with bulbs at the top of each arm. One arm records the maximum temperature and the other, the minimum temperature. Steel markers in the two arms are pushed by the mercury as it moves in the tube. When the mercury changes direction, it leaves the steel markers behind. This is how the temperatures can be recorded later.

If the maximum temperature shown in a newspaper for a particular day is 32°C (-2), it means that the maximum temperature for that day is 2°C lower than the average maximum temperature for that day. The average temperature is calculated over 30 or more years. The same goes for the minimum temperature. Usually, when the maximum or minimum temperature is much higher or lower than the average value, we say that a place is having an exceptionally hot summer or cold winter.

(b) Relative humidity is measured by a hygrometer. A simple hygrometer, also called psychrometer, has two thermometers. The bulb of one of them is wet and the other is dry. Evaporation from the wet bulb lowers the temperature relatively. As a result, the wet bulb thermometer shows a lower temperature than the dry bulb thermometer. The difference of the two readings is used to calculate relative humidity.

During conditions of high humidity, the evaporation of sweat decreases and it becomes difficult to maintain the body temperature. During a humid and hot day, the possibility of heat stroke increases.

(c) Rainfall is generally measured in millimeters with the help of a rain gauge. A simple rain gauge is a graduated cylinder with a collector fitted on top. A graduated cylinder is a jar with markings on its wall to measure the volume of a liquid.

3. The climate of a place is primarily determined by its latitude. There are mainly three temperature zones throughout the world based on the difference in their climates :

- (i) The hot or torrid zone is the region around the equator which is heated by the direct rays of the sun.
- (ii) The cold or frigid zone is the region around the north and the south poles which receives slanting rays of the sun.
- (iii) The temperate zone is the region between the torrid and the frigid zone.

The climate of India is warm and tropical by the large but the mountains have a much colder climate throughout the year. Generally the temperature falls by 1°C with every 300 feet rise (above the sea level) in the altitude.

Another factor that determines the climate of a place is its proximity to the sea. Places close to the sea have a moderate climate whereas those away from the sea face extreme climatic conditions. It is a feature of land to

absorb and radiate the heat of the sun much faster than the sea water, which accounts for the difference in the climate of these places.

The climate of a place is also influenced by the amount of rainfall it receives which in turn depends on factors like wind, proximity to the sea and presence of mountains. In general, winds blowing from the sea bring rainfall while the winds blowing from the land are dry.

4. **Adaptations of Animals Living in Tropical Rainforests**

The climatic conditions in rainforests are highly suitable for supporting a rich variety of plants and animals. The animals include apes, gorillas, lions, tigers, elephants, leopards, lizards, snakes, birds and insects.

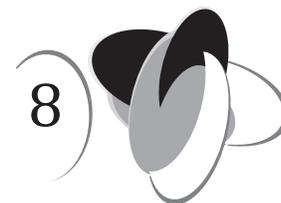
Since the number of animals living in rainforests is very large, there is intense competition between animals for food and shelter (living space).

Adaptations for food : As there is competition for food, some animals have developed adaptations to obtain food which is not easily available to all animals. For example, the bird toucan possesses a long, large beak. Long beaks help it to get food (fruits) from weak branches which may break away by its weight.

Adaptations for shelter : As the living area is quite less in comparison to the large number of animals, many animals are adapted to living on trees. For example, the red-eyed frog (see figure below) has developed sticky pads on its feet. These pads help to climb trees on which it lives. Monkeys have long tails for grasping branches.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. Freezing of water is responsible for the breaking of big rocks into smaller pieces.
 2. Parent rock (c-horizon contains the largest rock pieces.
 3. All soils are not of the same type because the texture of different soils are different.

B. Multiple Choice Questions :

Tick (✓) the correct answer :

- Ans.**
- | | |
|-----------------|------------------------|
| 1. all of these | 2. top soil |
| 3. loamy soil | 4. removal of top soil |

C. Fill in the blanks :

- Ans.** 1. humus 2. Top soil 3. wind rainfall
4. three 5. sand

D. Match the following :

- Ans.** 1. Loamy soil (i) Poor in humus (a) Cactus
2. Sandy soil (ii) Contains dead organic matter (b) Lentils
3. Red soil (iii) High humus content (c) Wheat
4. Clayey soil (iv) Lacks humus (d) Groundnut
5. Black soil (v) Contains some humus (e) Cotton

E. Tick the odd-one out giving reason :

- Ans.** 1. Glass cover 2. Rocks 3. Terrace farming 4. Part rock

Section II : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.** 1. **Loam** : A mixture of sand, silt, clay and humus. It is the best type of soil for cultivation.
2. **Weathering** : the breaking down of rocks due to the action of natural force such as wind, water, glaciers etc.
3. Soil erosion is a process of removal of fertile top soil by the agency of wind and rain.
We must conserve soil by adopting proper farming practices.
4. **Soil profile** : The sectional (side) view of soil is called soil profile. The sections shows three distinct horizons in the soil. There are topsoil, subsoil and parent rock.
5. **Precolation Rate of Water in Soil**
The term percolation describes the rate at which water (or any liquid) passes down through any material.
Percolation property of any material is linked to its porosity. Different soils have different porosity. Therefore, water percolates differently through different soils.

G. Answer the following questions in short :

- Ans.** 1. Loamy soil is considered to be the best for the plant growth.
2. **Causes of soil erosion** :
- (i) Large scale cutting of trees - deforestation.
 - (ii) Overgrazing in forests.
 - (iii) Cleaning the forests to make the land available for farming or for constructing buildings.
3. The process of formation of soil is called weathering (breaking of parent rocks).

Weathering takes place due to action of water, wind, climate and other factors. The parent rocks break up into still smaller pieces till very fine particles of soil are formed. It takes hundreds of years for soil formation, therefore, it is precious natural resource.

4. Sandy soil cannot retain water in it so it is not good for growing crops.
5. Xerophytic plants can grow in sandy soil. Jute is grown in clayey soil and food crops are grown in loamy soil.

H. Answer the following questions in detail :

Ans. Soil Profile

1. The sectional (side) view of soil is called soil profile.

The section shows three distinct horizons in the soil. These are :

(i) Topsoil (A-horizon) : It is the uppermost part of soil consisting of fine earth particles mixed with humus and decomposed matter. Plant's growth takes place in this part/layer. It also serves as water reservoir. This layer of the soil is fertile and is rich in nutrients required by plants.

2. Subsoil (B-horizon) : It is below the topsoil. It contains small stones and gravel mixed with small quantity of soil. It also serves as water reservoir.

3. Parent rock (C-horizon) : It consists of parent rock and is the lowermost layer. It is this layer which undergoes weathering and starts forming the soil. The properties of this rock greatly determine the composition of the soil and the topsoil, hence the soils formed are different in different regions.

2. 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.

The roles of water, air, plant roots and mechanical collisions in the formation of soil are described below :

Role of Water in Soil Formation

Water plays an important role in the breaking of rocks into smaller pieces. During rain, water enters the cracks and cavities of the rocks. During winter when the temperature falls, water freezes to ice and expands. This expansion exerts an outward force and the rock breaks into smaller pieces. These smaller rock pieces roll down with the flowing water or wind. While rolling down, they strike against each other and form very fine particles. These fine particles are carried by rain and river water and on the way get mixed up with organic matter to form soil.

Role of Plants Roots in Soil Formation

The roots of the plants enter the crevices of rock in search of water. These penetrating roots exert outward pressure on the rock and break it into smaller pieces. These smaller pieces due to weathering finally change into soil.

Role of Temperature

Variation in Soil Formation

Large variation in the day and night temperatures also leads to weathering of rocks. Rocks expand during the day and contract during night. This process of alternative expansion and contraction cause the breakdown of the rocks. The smaller rock pieces finally change into soil.

Role of Chemical

Weathering in Soil Formation

Rocks contain many minerals. In the presence of moisture and oxygen (in the air), these minerals get oxidised. This makes the rocks brittle which then crumble to form the soil.

3. **Soil conservation** : Preventing the fertile top soil from soil erosion is called soil conservation.

Steps for soil conservation :

- (i) Planting more trees and grass.
- (ii) Constructing dams, check-dams and river embankments.
- (iii) Preventing overgrazing.

4. **Soil Erosion**

Top soil is soft and light. It can be carried away easily by wind or washed away by the flowing water.

The process of carrying away the top soil by wind or by the flowing water is called soil erosion.

Soil erosion is a natural process. Erosion of bare soil (soil with no vegetation cover on it) is very severe. Erosion of soil by water is very severe on the steep slopes of hills and in the areas which have very heavy rainfall.

Erosion of soil by wind occurs mainly in the dry/desert area.

Causes of Soil Erosion

The main causes of soil erosion are :

- Large scale cutting of trees-deforestation.
- Overgrazing in forests.
- Clearing the forests to make the land available for farming or for constructing buildings.
- Leaving the land uncultivated after ploughing and tilling.
- Deep ploughing and forest fires also lead to soil erosion.

Prevention of Soil Erosion

- Soil erosion can be prevented by the following methods.
- By planting more trees and grass : Roots of trees bind the soil particles together and prevent soil erosion.

- Grass covers the bare soil and prevents soil erosion.
- Tall trees act as wind screens and prevent soil erosion by reducing the wind speed.

By step-farming : In hilly areas, the step-farming method prevents soil erosion by reducing the speed of flowing water.

By constructing dams, check-dams and river embankments : The embankments of rocks and stones along the river banks and check-dams prevent soil erosion.

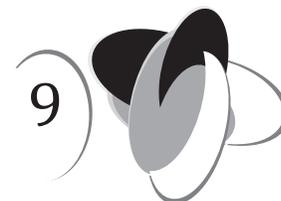
By preventing overgrazing : Overgrazing by animals results in the removal of the green cover on the land. Bare soil suffers erosion severely. So by preventing overgrazing, the green cover on the land is protected. As a result, soil is not eroded.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Respiration in Plants and Animals 9



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. A man after running fast will have higher breathing rate than a man at rest.
 2. Respiration is the process of taking in oxygen present in air, using it for releasing energy by oxidation of food and discarding waste products. Breathing in inhaling and exhaling of air.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.**
- | | | |
|------------------------------|----------|----------------|
| 1. move upwards | 2. 15-18 | 3. lactic acid |
| 4. carbon dioxide and energy | | |

C. Fill in the blanks :

- Ans.**
- | | | |
|-------------|--------------|------------|
| 1. speech | 2. breathing | 3. alveoli |
| 4. anerobic | 5. alcohol | |

D. Match the following :

- | | | | |
|-------------|-------------------|-------|---------------------|
| Ans. | 1. Yeast | ----- | (i) Red blood cells |
| | 2. Stomata | ----- | (ii) Chest cavity |
| | 3. Larynx | ----- | (iii) Man |
| | 4. Diaphragm | ----- | (iv) Voice box |
| | 5. Gills | ----- | (v) Plants |
| | 6. Oxyhaemoglobin | ----- | (vi) Fish |
| | 7. Lungs | ----- | (vii) Alcohol |

Atmospheric air will enter through A, mix with the limewater in the first glass and enter your mouth through B. On the other hand, the air you exhale will enter the second glass through C. Soon, the limewater in the second glass will turn milky, but that in the first glass will not. This is because the air you exhale contains carbon dioxide, which turns lime water milky. Atmospheric air also contains carbon dioxide, but not enough to turn limewater milky.

2. We take in air through the nostrils, which lead to the nasal cavity. As the air passes through this cavity, it becomes warm. It also gets moistened by the mucus secreted by the membrane lining the nasal cavity. Dust and other particles present in air get trapped by the mucus and hair present in the cavity.

From the nose, the comparatively clean, moist and warm air passes into a short tube, called the pharynx. From here, it goes into the trachea, or windpipe. The trachea branches into two thinner tubes called bronchi, which enter the lungs. Between the pharynx and the trachea lies the larynx, or voice box, which is responsible for speech. It is a small air passage, framed by cartilage. Two folds of tissue protruding into it vibrate to produce sound.

After entering the lungs, the bronchi divide into smaller and smaller tubes called bronchioles. Air passes through the bronchioles and finally, enters tiny sacs called alveoli (singular: alveolus) Each lung has millions of alveoli, which get filled with air when we inhale.

3. Our chest cavity is somewhat like the bottle. There is a sheet of muscle below the lungs, called the diaphragm. When we inhale, the chest muscles pulldown the diaphragm. At the same time the ribcage moves outwards. Both these movements increase the volume of the chest cavity, and makes air rush in to fill the alveoli. When we exhale, the diaphragm gets pushed up and the ribcage moves back in. These movements decrease the volume of the chest cavity, and air is pushed out of the alveoli and expelled through the windpipe.

How much the chest expands during inhalation is one way of judging good health. Of course, the normal or average chest expansion is different for children and adults. It is also different for men and women.

4. There is very fine mesh of blood vessels surrounding each alveolus. The oxygen of the air in the alveoli passes easily through the thin walls of these blood vessels. It combines with the haemoglobin in the blood to form oxyhaemoglobin, and is carried to all the cells of the body. Similarly, the carbon dioxide produced in the process of internal respiration is transported by the blood from all the tissues. It passes into the alveoli from the blood vessels and is expelled from our lungs.

How air enters the lungs : The following activity will show you how air enters the lungs when we inhale, and is pushed out when we exhale.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Formative Assessment-II

A. Answer the following questions orally :

- Ans.** 1. The tearing of paper is a physical change because there is no substance is formed.
2. Magnesium hydroxide is used in making an antacid.
3. Respiration is the process of taking in oxygen present in air using it for releasing energy by oxidation of food and discarding waste products by oxidation of food and discarding waste products. Breathing in inhaling and exhaling of air.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. camel 2. 15-18 3. mixture
4. pink 5. removal of top soil

C. Fill in the blanks :

- Ans.** 1. chemical 2. sand 3. phenolphthelin 4. root

D. Fill in the blanks :

- Ans.** 1. False 2. False 3. True 4. True 5. True

E. Write True or False for the following statements :

- Ans.** 1. Loamy soil (i) Poor in humus (a) Cactus
2. Sandy soil (ii) Contains dead organic matter (b) Lentils
3. Red soil (iii) High humus content (c) wheat
4. Clayey soil (iv) Lacks humus (d) Ground nut
5. Black soil (v) Contains some humus (e) Cotton

F. Tick the odd-one out giving reason :

- Ans.** 1. Humus 2. Lichens 3. Ammonium chloride
4. Moderate climate 5. Nighttime

Summative Assessment-I

A. Name the following :

- Ans.** 1. Chlorophyll 2. Digestion 3. Bare
4. Climate 5. Breathing

B. Define the following terms :

- Ans.** 1. **Wool-yielding animals :** The animals from which wool is obtained is called wool-yielding animals. Some wool-yielding animals are sheep, goat, yak, camel, rabbit, llama and alpaca.
2. **Climate :** Climate is a long term prevalent weather condition of a particular place.
Climate chart : The climate chart provide the information about the temperature, humidity and rainfall fo a particular area.
3. **Photosynthesis :** Photosynthesis is the process by which a plant uses the energy from the light of the Sun to make its food.

4. **Rumination** : The food ingested by a ruminant first goes into the rumen where it is partially digested. From rumen this partially digested food goes to reticulum. The reticulum returns this food to the mouth end for thorough chewing, called rumination.
5. **Peristaltic Movement** : The contraction and expansion in the alimentary canal for the passage of food is called peristaltic movement.

C. Differentiate between the following :

- Ans.**
1. **Alimentary Canal** : In humans the alimentary canal is a long tube about nine meters long.
Digestive system : The food that we consume is very complex and cannot be utilized by the body as such. To make it usable it has to be converted into simpler forms. This work is done by digestive system.
 2. Do yourself
 3. Do yourself
 4. **Wool-yielding animals** : The animals from which wool is obtained are called wool-yielding animals. Some wool-yielding animals are sheep, goat, yak, camel, rabbit, llama and alpaca.
 5. Do yourself

D. Give reasons for the following :

- Ans.**
1. Do yourself
 2. Do yourself
 3. Do yourself
 4. Do yourself

E. Answer the following questions in short :

- Ans.**
1. Sunlight is the major source of energy for photosynthesis. Leaves are the site where photosynthesis takes place. Leaves have some special organelles called chloroplast which contain the green pigment chlorophyll. Some plants like cacti do not have any leaves. They perform photosynthesis using their green stem.
 2. The human digestive system consists of mouth, oesophagus, stomach, small intestine and large intestine.
 3. Silk is regarded as an expensive fibre because it is made from cocoon which is more costly.
 4. Do yourself
 5. Humus makes the land fertile for the plants.
 6. Do yourself

F. Answer the following questions in detail :

- Ans.**
1. Nutrient is a substance which the organisms obtain from the surroundings to derive energy for its maintenance and growth. Thus the term nutrition refers to the means by which an organism obtains its food and also the process by which nutrients in the food are broken down to

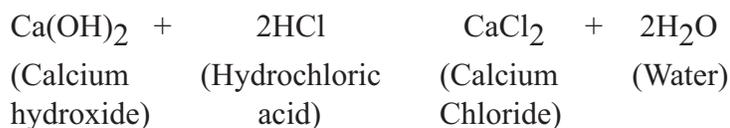
simpler molecules for utilisation by the body. Various inorganic and organic raw materials are required for building the structure and maintaining the body functions of an organism. They are broken down by different modes of nutrition.

2. Do yourself

| Conduction | Convection | Radiation |
|---|--|--|
| 1. Heat is transmitted by molecules of the medium. Material medium is necessary. | heat is transmitted by molecule of the medium, Material medium is necessary. | Heat can pass through vacuum. |
| 2. Heat passes from molecule to molecule without any transfer of the molecules of the body. | Molecule carrying heat with them move from one part to other part. | Material medium is necessary. Radiations take place even in the absence of molecules/medium. |
| 3. It is a slow process. | It is a slow process. | It is a very quick process. |
| 4. Heat travels in any path. | Heat travels in any path. | Heat travels in straight lines. |
| 5. Solids are heated by conduction. | Liquids and gases are heated by convection. | Medium is not heated up by radiation. |

4. **Neutralization Reaction**

An acid reacts vigorously with a base or an alkali to form salt and water. This reaction is called neutralization reaction because both salt and water formed after the reaction are neutral, i.e. neither acidic nor basic. When lime water (calcium hydroxide) reacts with dilute acid, it forms calcium chlorides as salt and water.



In Activity 6.2, when the two solutions are mixed, vigorous reaction takes place resulting in formation of salt and water. Both are neutral because the blue litmus and red litmus papers did not show any change when dipped in the mixture after the reaction.

5. (i) No new substance is formed.
 (ii) Only shape, colour, size or state of the substance change.
 (iii) The substance gets back to the original form when conditions are reversed.
 (iv) Such changes do not involve gain or loss of energy.
- Reactants End products

Some examples are :

1. Tearing of paper into many pieces. The shape and size change but no new substance is formed.
2. When an iron nail is heated over flame it becomes red hot, but when flame is removed, red hot colour changes and it gives back the original colour.
3. Some substances change their state on heating but regain their original state on cooling.

| | | |
|--------|---------|-------|
| Water | heating | Steam |
| Liquid | cooling | Gas |

Chemical Change

When two or more substances react in such a way that there is formation of one or more new substances, the change is called a chemical change or a chemical reaction.

During a chemical change, reactants undergo changes to form products. Chemical changes, generally, are irreversible change.

Burning of paper, spoilage of food, cooking of food, digestion of food, photosynthesis, curdling of milk, ripening of fruits, rusting of iron, etc. are chemical changes.

6. **Adaptations of Animals Living in Tropical Rainforests**

The climatic conditions in rainforests are highly suitable for supporting a rich variety of plants and animals. The animals include apes, gorillas, lions, tigers, elephants, leopards, lizards, snakes, birds and insects.

Since the number of animals living in rainforests is very large, there is intense competition between animals for food and shelter (living space).

Adaptations for food : As there is competition for food, some animals have developed adaptations to obtain food which is not easily available to all animals. For example, the bird toucan possesses a long, large beak. Long beaks help it to get food (fruits) from weak branches which may break away by its weight.

Adaptations for shelter : As the living area is quite less in comparison to the large number of animals, many animals are adapted to living on trees. For example, the red-eyed frog (see figure below) has developed sticky pads on its feet. These pads help to climb trees on which it lives. Monkeys have long tails for grasping branches.

7. **Soil Erosion**

Top soil is soft and light. It can be carried away easily by wind or washed away by the flowing water.

The process of carrying away the top soil by wind or by the flowing water is called soil erosion.

Soil erosion is a natural process. Erosion of bare soil (soil with no vegetation cover on it) is very severe. Erosion of soil by water is very

severe on the steep slopes of hills and in the areas which have very heavy rainfall.

Erosion of soil by wind occurs mainly in the dry/desert area.

Causes of Soil Erosion

The main causes of soil erosion are :

- Large scale cutting of trees-deforestation.
- Overgrazing in forests.
- Clearing the forests to make the land available for farming or for constructing buildings.
- Leaving the land uncultivated after ploughing and tilling.
- Deep ploughing and forest fires also lead to soil erosion.

Prevention of Soil Erosion

- Soil erosion can be prevented by the following methods.
- By planting more trees and grass : Roots of trees bind the soil particles together and prevent soil erosion.
- Grass covers the bare soil and prevents soil erosion.
- Tall trees act as wind screens and prevent soil erosion by reducing the wind speed.

By step-farming : In hilly areas, the step-farming method prevents soil erosion by reducing the speed of flowing water.

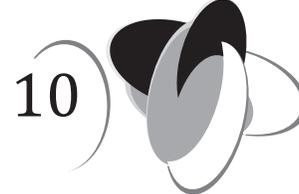
By constructing dams, check-dams and river embankments : The embankments of rocks and stones along the river banks and check-dams prevent soil erosion.

By preventing overgrazing : Overgrazing by animals results in the removal of the green cover on the land. Bare soil suffers erosion severely. So by preventing overgrazing, the green cover on the land is protected. As a result, soil is not eroded.

8. There is very fine mesh of blood vessels surrounding each alveolus. The oxygen of the air in the alveoli passes easily through the thin walls of these blood vessels. It combines with the haemoglobin in the blood to form oxyhaemoglobin, and is carried to all the cells of the body. Similarly, the carbon dioxide produced in the process of internal respiration is transported by the blood from all the tissues. It passes into the alveoli from the blood vessels and is expelled from our lungs.



Transportation in Plants and Animals



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.** 1. Red blood cells (RBCs), white blood cells (WBCs) and platelets are the components of the blood.
 2. The bicuspid valve is located in the heart.
 3. Stethoscope is an instrument or device used to hear heart beat.
 4. The urine contains the waste products.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. heart 2. glucose 3. water 4. water 5. haemoglobin

C. Fill in the blanks :

- Ans.** 1. transportation 2. haemoglobin 3. blood
 4. xylem phloem 5. vascular 6. special

D. Write True or False for the following statements :

- Ans.** 1. True 2. False 3. False 4. True 5. True 6. True

E. Match the following :

- | | | |
|--|-------|------------------------|
| Ans. 1. Pumping organ | ----- | (i) Plasma |
| 2. Carrier of oxygen | ----- | (ii) White blood cells |
| 3. Transport of food | ----- | (iii) Stomata |
| 4. Liquid part of blood | ----- | (iv) Heart |
| 5. Transport of water | ----- | (v) Waste products |
| 6. Transpiration | ----- | (vi) Phloem |
| 7. Blood cells which fight against infection | ----- | (vii) Haemoglobin |
| 8. Toxic to organisms | ----- | (viii) Xylem |

F. Tick the odd-one one giving reason :

- Ans.** 1. Oxygenated blood 2. Oxygen transport in the body
 3. Urethra 4. Oxygen-rich blood
 5. Gaseous waste

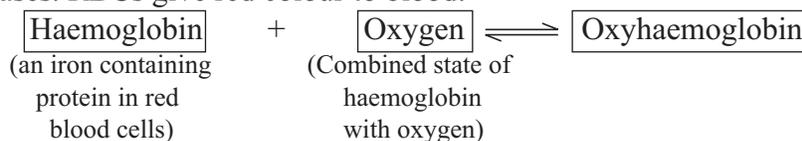
Section II : Summative Assessment (CCE Pattern)

G. Define the following terms :

Ans. 1. Heart : Organ in body which maintains the circulation of blood in the body by contraction and dilation.

2. Blood—Blood is a liquid connective tissue. The total amount of blood in an adult is around five litres. Blood consists of a liquid part called plasma and cells called blood cells which are suspended in it. There are three types of cells :

1. Red blood cells (RBCs) : These cells have a special protein called haemoglobin, which is red in colour because these cells carry respiratory gases. RBCs give red colour to blood.



Without this reaction in blood, oxygen is not supplied to the body cells.

2. White blood cells (WBCs) : These cells are useful for the protection of the body. They fight against infections and germs. Hence, these cells are called soldiers of blood.

3. Platelets : These cells help the blood to clot. Blood clots after an injury. The injury is plugged by a blood clot that dries and become dark red-black.

3. Transport of materials in the body of plant is done by conducting system consisting of xylem and phloem. This system is called vascular system.

4. Blood Vessels

Blood flows in our body through a network of tubes called blood vessels. In our body, there are three types of tubes — arteries, veins and capillaries. Let us study about them.

1. Arteries

Arteries are blood vessels that carry oxygen-rich blood (pure blood/oxygenated blood) from heart to all parts of the body.

2. Veins

Veins are blood vessels that carry carbon dioxide-rich blood (impure blood/deoxygenated blood) from different parts of the body to heart.

3. Capillaries

Capillaries are fine blood vessels that are very thin and just like hair in thickness. They reach up to the tissue cells.

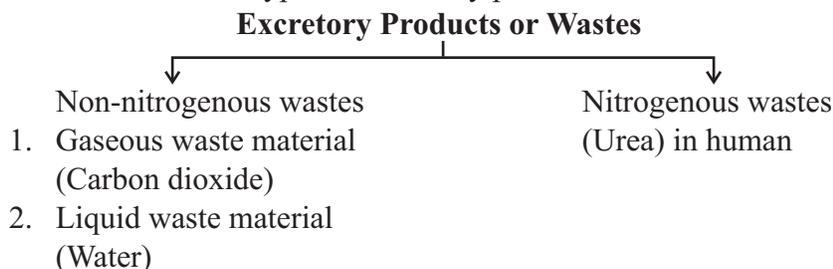
5. Heart beat : The heart pumps blood to all parts of the body. It is able to do so by the rhythmic contractions and relaxations of its muscles. There are known as the heart beats.

Pulse rate : As hearts beats and forces blood through the body, we feel a throbbing sensation at any point where an artery comes close to the surface of our skin, such as our wrist, neck, or upper arm. This throbbing sensation is called the pulse. The number of throbbing sensation in a certain time is called the pulse rate.

H. Answer the following questions in short :

Ans. 1. For the survival, living organisms need a constant supply of energy, i.e, food and energy to carry out their life processes. This process is called transportation.

2. There are different types of excretory products or waste materials.



3. Solid waste materials
(Unabsorbed food, fibres, salts, etc.)

3. Respiratory waste

The respiratory wastes carbon dioxide and water vapour are carried by the blood to the lungs. The alveoli in the lungs remove carbon dioxide from the blood and is exhaled through the nose.

Water, Salt, Urea etc.

The sweat glands under the skin remove water, salts, urea etc., from the blood flowing through blood capillaries in the skin by diffusion. These wastes are then thrown out of the body through tiny pores on the skin.

Liquid Waste

The liquid waste of the body is removed by the excretory (or urinary) system in the form of urine.

4. Kidneys are the most important organ of this system. Each kidney consists of millions of filters called nephrons.

Each nephron consists of a large number of coiled capillaries (called glomeruli).

These capillaries filter the blood through their walls by dialysis. The yellowish filtered solution contains glucose, salts and nitrogen-containing compounds, such as urea. The yellowish solution containing the waste products called urine passes through the ureters and gets collected into the urinary bladder. the urine is then disposed off through the urethra.

The concentration of various wastes in the urine depends upon the functioning of various organs or organ systems in the body. So the examination of urine of a person can give a good idea about his/her general health.

5. Dehydration takes place in a person when there is lack of water in the body.

I. Answer the following questions in short :

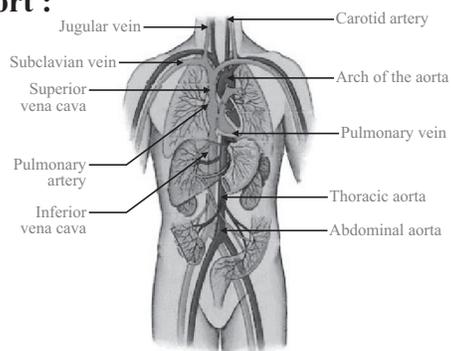
Ans. 1. The system which acts as transport of materials from one place to another in the body is called circulatory system.

Animals have two types of circulatory system :

(a) Open circulatory system : This type of circulatory system is found in cockroaches, prawns, insects etc.

(b) Closed circulatory system : This type of circulatory system is found in man, frog, dog, cat, rat, etc.

It is a system in which the blood remains within the blood vessels. Blood is always kept circulating throughout the body.



Circulatory system of man

Circulatory system also called blood vascular of man consists of :

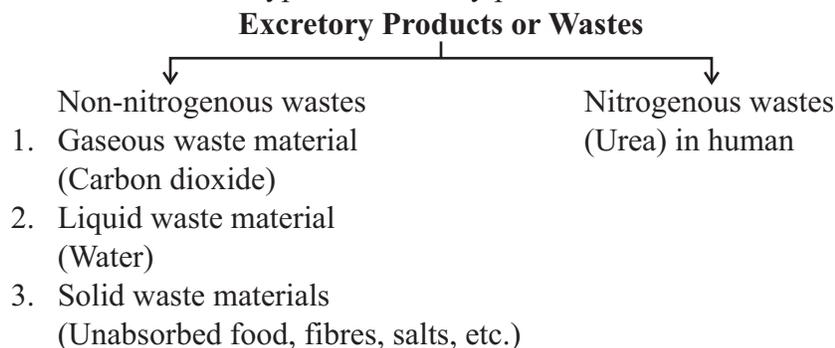
1. Circulating fluid–Blood
2. Pumping organ–Heart
3. Conducting (Blood) vessels–Arteries, veins and capillaries.

2. **Excretion**

All the living organisms need energy for their growth and development. Energy is also needed for various life processes. Food releases energy and many by-products. All these products are not useful to body. Some are harmful such as carbon dioxide, urea and uric acid. If these harmful wastes are accumulated in the body, whole system will be blocked and it may cause death. So, they must be removed in some way or the other. It is done by a specialised system called excretory system. Along with this system, some other body organs also help in removal of wastes.

The process of removal of nitrogenous wastes from the body is called excretion. The organs of excretion are called excretory organs.

There are different types of excretory products or waste materials.



Removal of Non-nitrogenous Wastes

1. **Removal of carbon dioxide :** Carbon dioxide is removed by the lungs. It is done during the process of expiration/exhalation.
2. **Removal of water :** Water is removed by lungs in little volume as vapour. Major part of it is removed by urine. Some part is removed as sweat and faeces.
3. **Removal of unabsorbed or undigested food materials :** Undigested or unabsorbed food materials are removed from the body through anus. They are called faeces.

3. **Differences between Arteries and Veins**

Arteries

1. They are thick-walled tubes.
2. They carry blood away from the heart.
3. They carry oxygenated blood, except the pulmonary artery.

Veins

1. They have thinner walls.
2. They carry blood to the heart.
3. They are superficially placed and blood does not move under pressure.

- | | |
|--|--|
| <p>4. They are deeply placed under the skin, and blood moves under high pressure.</p> <p>5. There are no valves inside arteries.</p> | <p>4. They are superficially placed and blood does not move under pressure.</p> <p>5. There are a series of valves present in the veins.</p> |
|--|--|

4. The Heart

The heart is a four-chambered muscular organ that pumps blood to all parts of the body (see figure on page 99). It is able to do so by the rhythmic contractions and relaxations of its muscles. These are known as the heart beats. A normal heart beats about 60 or 80 times a minute. We can hear our heart beat with the help of an instrument called a stethoscope.

5. Functions of Blood

1. It transports oxygen as oxyhaemoglobin to body cells and bring carbon dioxide back to lungs.
 2. It fights against infections and germs.
 3. It helps in clotting of blood.
 4. It transports digested food (glucose, amino acids, fatty acids, etc. from small intestine to body tissue cells.
 5. It transports wastes for its removal.
 6. It distributes heat evenly to the whole body.
- 6.** For the survival, living organisms need a constant supply of energy, i.e., food and energy to carry out their life processes. This is done by a system in the body of living beings. The system is called transport system in plants and animals. This system helps us to transport or carry substances or materials from where these are found. This is known as transport of materials or movement of substances.

For example, the food you eat gets digested. The digested materials are required to be distributed or transported from the place of absorption (intestine) to the place where they are used (in cells). It is equally necessary for the organism to get rid of waste materials such as carbon dioxide and water, etc., from body.

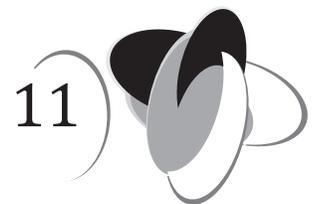
It is same as trucks and lorries, goods trains and other transports are used for the movement of substances from one place where they are produced to where they are consumed.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Reproduction in Plants



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. Some plant's parts swollen for vegetative propagation, such as corn./ Corn is a short, oval, thick stem and swollen with started food. It has several buds which give rise to plants, when separated and grown, e.g. gradiolus etc.
 2. Asexual reproduction is the formation of new individuals from the cell of a single present. This process of reproduction does not involve the fusion of male and female gemetes.
 3. **Dispersal of Seeds by Wind**
The seeds which are light, small or have tufts of silky hair on their body are carried away to distant places by the wind. Seeds of dandelion, drumstick, maple, madar and fruit of acer and sunflower are dispersed by wind.
 4. Dispersal of fruit and seed helps plants to grow in favourable condition. Common merchanisms of dispersal are wind, water, explosion and dispersal by animals.
 5. All seeds do not germinate because only few seeds get the essential favorable conditions for germination.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. bread mould 2. flower 3. fruit 4. fertilization
5. leaf

C. Fill in the blanks :

- Ans.** 1. ovule 2. propagation 3. fertilization 4. anther
5. spares 6. asexual yeast

D. Match the following :

- Ans.**
- | | |
|------------------|------------------|
| 1. Fertilization | (i) Yeast |
| 2. Spores | (ii) Rose |
| 3. Stem cutting | (iii) Zygote |
| 4. Hairy seeds | (iv) Potato |
| 5. Bud | (v) Madar |
| 6. Eyes | (vi) Bread would |

E. Write True or False for the following statements :

- Ans.** 1. True 2. True 3. True 4. True 5. True

Section II : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.** 1. In plants, flowers are the reproductive organs. Stamens are the male reproductive part producing male gamete. Carpel or pistil is the female reproductive part producing female gamete ova.

2. Reproduction is the process by which living beings produce new organisms of their own kind. It is necessary for a species to survive. There are two modes of reproduction: asexual and sexual.
3. **Dispersal of Seeds by Wind**
The seeds which are light, small or have tufts of silky hair on their body are carried away to distant places by the wind. Seeds of dandelion, drumstick, maple, madar and fruit of acer and sunflower are dispersed by wind.
4. Vegetative propagation is the process of producing new plantlets by the use of vegetative parts of a plant like roots, stem and leaves.
5. Fertilization is the fusion of male and female gamete to form a zygote. Fertilization in plants results in the formation of fruit and seed.

G. Answer the following questions in short :

- Ans.**
1. The production of new individuals from the parents is known as reproduction. Reproduction thus, ensures that organisms of a species continue to live, even after the death of the parent organisms.
 2. (a) Binary fission - bacteria (b) Fragmentation - Spirogyra
(c) Spore formation (d) Budding - yeast
 3. (a) Potato - stem (tubers) (b) Strawberry - subaerial stem (runners)
(c) Ginger - stem (rhizome) (d) Bryophyllum - leaf
 4. It is very common method of propagation in hard wood plants. In this process, the stem of a desired plant with good characters (such as flowers, leaves and fruits) is 'fixed' on the stem of other plant with good root system.
 5. **Grafting** : In this process, the stem of a desired plant with good characters is fixed on the stem of other plant with good root system.
Cutting : Plant a piece of a stem in moist soil and after some time it grows into a plant. This method is called stem cutting method. The stem used should have some buds.
 6. **Pollination** : Transfer of pollen grains from anther to the stigma of the same flower or different flower.
 7. The wind pollinated flowers are light, small or have tufts of silky hair on their body.
 8. Sexual reproduction is the most common method of reproduction in plants. In this process, two reproductive cells called gametes are produced from the reproductive organs. The two gametes fuse to form a third cell called the zygote.
The male gamete is a small cell with a nucleus and a little cytoplasm. The female gamete is larger, with a nucleus and more cytoplasm. The fusion of the two gametes is called fertilization. It results in the formation of zygote. The zygote then undergoes cell division and growth, and forms the new individual.

H. Answer the following questions in detail :

Ans.

1. Asexual reproduction is the formation of new individuals from the cell of a single parent. This process of reproduction does not involve the fusion of male and female gametes. It is common among plants, unicellular organisms like bacteria, and some algae and fungi. The new individuals produced by asexual reproduction are completely identical to their parents. Vegetative reproduction is a type of asexual reproduction in which new plants are produced from roots, stems, leaves and buds.



The common forms of asexual reproduction are :

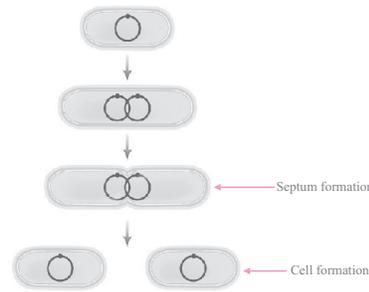
1. budding
2. fission—binary and multiple
3. fragmentation
4. spore formation

Budding

This kind of asexual re-production is observed in microscopic organisms, like yeast. In this process, a small projection arises from the parent's body. This projection is called bud. The bud gradually increases in size and develops all its body organelles. Finally it detaches from the parent and forms a completely grown yeast.

Binary fission

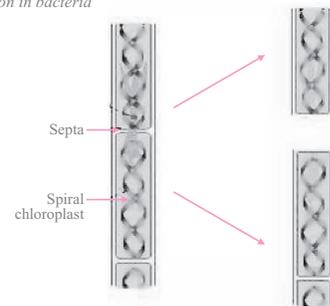
In some unicellular organisms, like bacteria, the parent cell divides into two daughter cells. These daughter cells divide again to produce more cells. This kind of division is called binary fission (see figure below).



Binary fission in bacteria

Fragmentation

Fragmentation is a very common form of asexual reproduction in lower plants. In this process, the parent body breaks into several pieces, each of which can produce an offspring. You might have seen slimy green patches in ponds or in other water bodies.



Fragmentation in Spirogyra

These green patches are called algae. When nutrients are available in water, algae multiply rapidly by fragmentation. An algae breaks up into two or more fragments. These fragments grow into new individuals. This process continues and soon the algae cover a large area of the water body in a short span of time.

Fragmentation is frequently observed in pond silk (Spirogyra) and is also common in mosses.

Spore Formation

Lower plants, like ferns or mosses, multiply asexually by forming spores. The spores are very small asexual reproductive bodies. Each of them is covered by a hard protective shell to survive in unfavourable conditions such as high temperature, scarcity of water and lack of food. A single parent cell can give rise to numerous spores. Under favourable conditions, the spores give rise to new individuals.

2. The transfer of pollen grains from another to the stigma of a flower with the help of various agents like birds, insects, wind, water, animals etc is termed as pollination. Pollination is of two types - self pollination and cross pollination.

Some flowers are brightly coloured and produce smell to attract insects for pollination.

3. Vegetative propagation which does not take place naturally but the multiplication of plant is done by man-made methods or artificially is called artificial propagation. Some of the methods of artificial propagation are :

(i) Vegetative propagation by grafting : It is very common method of propagation in hard wood plants. In this process, the stem of a desired plant with good characters (such as flowers, leaves and fruits) is 'fixed' on the stem of other plant with good root system. E.g. mango, rose etc.

(ii) Vegetative propagation from cutting of stem. Plant a piece of a stem (suitable length) in moist soil, and after sometime it grows into a plant. This method is called stem cutting method. The stem used should have some buds. The basal part of the stem in soil produces roots from the buds and the apical part of stem above soil produces leaves, e.g., sugarcane, rose, cactus, Bougainvillea, money plant, Portulaca, Champa, etc.

(iii) Vegetative propagation by layering method. In this method, a young branch is lowered down and bent towards the ground and covered by moist soil forming a layer. The growing tip remains above the soil. After sometime, roots grow from the stem part buried in the soil. If such a stem is detached from the mother plant, the stem grows into a new plant. It happens naturally also. Several plantlets can be produced by the plant, e.g., jasmine (Chameli), rose, Bougainvillea, etc.

(iv) Vegetative propagation by tissue culture. It is the method of propagation of plants by the use of a few cells from the mother plant and growing it into a tissue in nutritive medium. This is called tissue culture. The cells are placed in a jelly (a nutritive medium having nutrients and hormones—that make cells to divide into a small group of cells called callus). The callus grows into roots. The plantlet is formed. This tiny plantlet is then transferred to another jelly (having nutrients and different hormones for growth of shoot). Then, the plants are potted. All this is carried out in aseptic (free from infection) condition. Hundreds of plants can be grown by using this method from a single plant, e.g., orchids, chrysanthemum, asparagus, etc.

Advantages of Vegetative Propagation

1. Less Maturity time. Plants produced by the method of vegetative propagation mature earlier than those plants which are produced by seeds. So they bear flowers and fruits earlier such as in fruit bearing trees (mango).
2. Seedless plants (fruits). Vegetative propagation is used to propagate/grow plants that do not produce seeds in their fruits. Seedless fruits are liked by man such as banana, seedless grapes, oranges, sugar cane, jasmine, etc.
3. Identical daughter plants. The plants produced by vegetative propagation are identical (similar in all respect to their mother plant) if grown under same condition and method.
4. Less care. Plants grown by vegetative propagation methods need less attention/care in their early stages of growth than the plants grown from seeds.
5. Faster and large number of plants. Vegetative propagation methods are used to produce plants faster and in large number.

4. Dispersal of Seeds and Fruits by Water

Seeds and fruits having structure favourable for floating are dispersed by water.

For example, seeds/fruits of coconut, lily, lotus are dispersed by water. Coconut trees grow near the sea-shore. The fibrous fruit falls in water and is carried away by water currents.

Dispersal of Seeds and Fruits by Animals

Seeds and fruits which are dispersed by animals are either edible or have hooks, barbs, spines, bristles, and stiff hair on their surface.

Such seeds stick to the skin of animals or clothes of human beings and are carried to distant places.

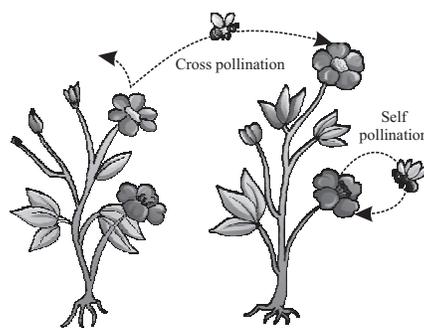
Human beings and birds eat the pulp (or edible) portion of fruit and throw the seeds. Such seeds germinate and develop into new plants.

5. **Sexual reproduction** : Reproduction that involves fusion of male and female gametes. Two parents are needed.

Asexual reproduction : Reproduction when a new individual is born from a single parent.

6. Pollination is of two types—self pollination and cross pollination.

When pollen grains are carried from anther to stigma of the same flower, it is known as self-pollination. However, when pollen are carried from anther of one flower to stigma of another flower, it is known as cross-pollination.



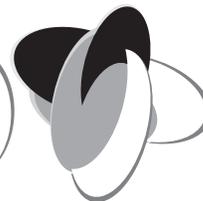
Self and cross pollination

Section III : Activities Assessment (CCE Pattern)

Do yourself



Moving Objects : Time and Motion 12



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.** 1. Stopwatch is used to measure time intervals during sports events.
2. Sundial led to the development of modern clocks and watches.
3. The speed of fast moving object is commonly km/hr.
4. Bar graph, pie chart or line graph.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. motion of a rocket 2. one month 3. second-metre
4. radio 5. insufficient data

C. Fill in the blanks :

- Ans.** 1. sun's position 2. stationary object
3. upper chamber lower chamber 4. stopwatch
5. 24 6. 100 7. oscillatory
8. amplitude 9. non-uniform motion.

D. Write True or False for the following statements :

- Ans.** 1. False 2. False 3. True 4. True 5. True 6. True
7. True 8. True 9. False

E. Match the following :

- Ans.** 1. Odometer (i) The time taken by a pendulum to complete one oscillation.
2. Time period (ii) A device used by Romans to measure time.
3. Sand clock (iii) A unit of time.
4. One second (iv) Representation of the speed of different moving bodies.
5. Distance-time graph (v) Gives the distance travelled by a moving vehicle.

F. Tick the odd-one out giving reason :

- Ans.** 1. Random motion 2. Table clock 3. Balance wheel
4. Metre per second

Section II : Summative Assessment (CCE Pattern)

G. Write short notes on the following :

- Ans.** 1. SI unit of time is second and the SI unit of distance is metre.

2. **Motion** : A change in the position of an object with time.
3. The physical quantity that informs us how fast or slow a body is moving is called speed. The speed of a body is the distance that the moving body covers in a unit time. The actual distance covered divided by the time taken gives us the speed of the body.

$$\text{Therefore, Speed} = \frac{\text{Distance}}{\text{Time}} \text{ or } s = \frac{d}{t}$$

The SI unit of speed is metre/second (or m/s).

4. Sundial and Sand clock.
5. The maximum displacement of the bob from its mean position is called amplitude of the pendulum.

H. Answer the following questions in short :

- Ans.**
1. The act or process of moving is called motion. In other words, we can say that motion is the movement of a body. There are three types of motion based on the way an object changes its position. These are translatory, rotatory and vibratory or oscillatory motion.
Every object takes a certain time to change its position. Thus, motion and time are related to each other.
 2. 10 times
 3. A simple pendulum consists of a small metallic ball (called bob) suspended by a light string (thread) from a frictionless, rigid support. A simple pendulum is shown alongside.
 4. The time taken by the bob of a pendulum to complete one oscillation is called the time period of the oscillation (or of pendulum). Time period is denoted by T.
 5. The physical quantity that informs us how fast or slow a body is moving is called speed. The speed of a body is the distance that the moving body covers in a unit time. The actual distance covered divided by the time taken gives us the speed of the body.

$$\text{Therefore, Speed} = \frac{\text{Distance}}{\text{Time}} \text{ or } s = \frac{d}{t}$$

The SI unit of speed is metre/second (or m/s). However, if distances is measured in kilometers and time in hours then the unit of speed will be kilometer/hour (or km/hr). The speed of fast moving vehicles is usually expressed in km/hr.

I. Answer the following questions in detail :

- Ans.**
1. Do yourself
 2. An object which remains fixed or stands still at a place is said to be at rest and is called a stationary object. However, the act or process or

moving is called motion. In other words, we can say that motion is the movement of a body. There are three types of motion based on the way an object changes its position. These are translatory, rotatory and vibratory or oscillatory motion.

Every object takes a certain time to change its position. Thus, motion and time are related to each other.

3. The easiest method of knowing the time was by observing the position of the Sun in the sky. The Sun appears at its highest position at noon. If you look at fixed pole, you will find that the length of the shadow of the pole is maximum in early morning. This shadow's length reduces to nothing (shortest) during noon. This decreasing and then increase in the length of shadow during the day was used in sundials to measure time.

A sundial is placed under open sky. It has a gnomon which points in north-south direction. The shadow of the gnomon on the circular scale shows the time at that moment. The only drawback of sundial is that it does not work after sunset or on a cloudy day.

4. Galileo in 1583 suggested that a pendulum can be used to regulate clocks. In 1658, Huygens actually used the pendulum to regulate the motion in clocks.



A simple pendulum consists of a small metallic ball (called bob) suspended by a light string (thread) from a frictionless, rigid support. A simple pendulum is shown alongside.

It shows the pendulum in the rest position. This rest position is also called the mean position.

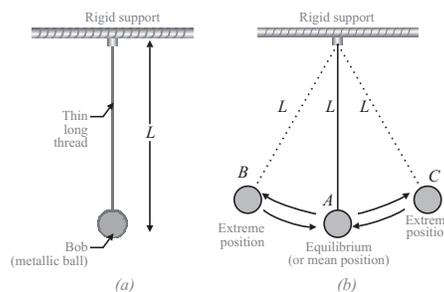
The positions where the bob is at the maximum distance from the mean position are called the extreme positions.

The motion from B and C and back to B is one complete oscillation.

The maximum displacement of the bob from its mean position is called amplitude of the pendulum. The displacement AB or AC is called amplitude of the pendulum.

The time taken by the bob of a pendulum to complete one oscillation is called the time period of the oscillation (or of pendulum). Time period is denoted by T.

The time taken by the bob of the pendulum to travel from B to C and back to B [Fig. (b)] is called the time period of the pendulum.



Basic design of a simple pendulum :
(a) in the rest position (b) showing its motion

5. The time taken by the bob of a pendulum to complete one oscillation is called the time period of the oscillation (or of pendulum). Time period is denoted by T.

The maximum displacement of the bob from its mean position is called amplitude of the pendulum.

6. The physical quantity that informs us how fast or slow a body is moving is called speed. The speed of a body is the distance that the moving body covers in a unit time. The actual distance covered divided by the time taken gives us the speed of the body.

$$\text{Therefore, Speed} = \frac{\text{Distance}}{\text{Time}} \text{ or } s = \frac{d}{t}$$

The SI unit of speed is metre/second (or m/s). However, if distances is measured in kilometers and time in hours then the unit of speed will be kilometer/hour (or km/hr). The speed of fast moving vehicles is usually expressed in km/hr.

7. A body that moves with a constant speed along a straight line throughout its journey is said to have uniform motion. A body with uniform motion covers equal distances in equal time intervals. For example, if a train covers a distance of 100 km every hour, its uniform speed is 100 km/hour. Thus, after 3 hours, the train will cover a 300 kilometres distance. Lifts in tall buildings and hotels have uniform motion. Escalators in metro stations and malls also have uniform motion.

A body that moves with changing speed along a straight line throughout its journey is said to have non-uniform motion. A body with non-uniform motion covers unequal distances in the same time intervals. For example, if a train covers 100 km in its first hour of its journey and 80 km in the second hour of the journey, it is said to be moving with non-uniform speeds. Speed of trains, buses, cars, aeroplanes keeps changing during their journey. All these bodies thus have non-uniform motion.

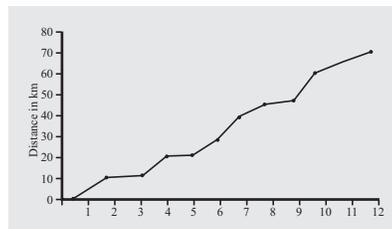
8. Vehicles are fitted with a speedometer which gives the speed of the vehicle in km/h at a particular point of time. Also there is another meter called odometer which measures the distance covered by the vehicle. If you note the distance covered by your car from the odometer after every five minutes as shown in Table 12.2, you can represent this data in the form of a distance-time graph.

Table 12.2 : Odometer readings at different times

| S.No. | Time (a.m.) | Odometer reading (km) | Distance from starting |
|-------|-------------|-----------------------|------------------------|
| 1. | 8:00 | 1221 | 0 km |

| | | | |
|----|------|------|------|
| 2. | 8:05 | 1223 | 2 km |
| 3. | 8:10 | 1225 | 4 km |
| 4. | 8:15 | 1227 | 6 km |
| 5. | 8:20 | 1229 | 8 km |

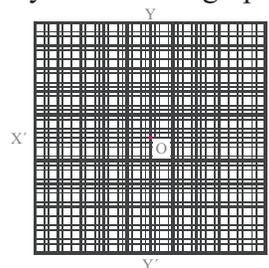
From the data given in Table 12.2, you can calculate the speed of the car at a certain time since you know the total distance covered by your car in a given time period. For example, your car has covered a distance of 8 km in 20 min., its average speed is $8 \text{ km}/20 \text{ m}$ or 0.4 km/m ; but you can not calculate the distance covered by your car from the starting point at 8:02 am or at 8:17 am. You cannot even calculate the speed of the car at these points of time. This problem can be solved by plotting a distance-time graph.



A line graph showing the movement of a train

The motion of a moving body is best represented by a line graph. For example, the figure given below shows various positions of a moving train at different points of time. It is also clear from the line graph that the motion of the train is non-uniform.

The distance-time graph is a line graph and can be easily drawn on a graph paper. A distance-time graph has two axes or lines drawn perpendicular to each other as shown in the figure below. Each axis represents one quantity. The horizontal line called X-axis represents time whereas the vertical Y-axis represents distance. The point of intersection of the two axes is called origin or O. The positive values on X-axis are drawn along OX and positive values on Y-axis are drawn along OY.



X-axis and Y-axis on a graph paper

J. Numericals for practice :

Ans. 1. Do yourself 2. Do yourself 3. Do yourself 4. Do yourself
5. Do yourself 6. Do yourself 7. Do yourself

K. Figure given below represent the distance-time graph for the motion of three moving bodies A, B and C. Which of them is the fastest moving body and which one is the slowest moving body?

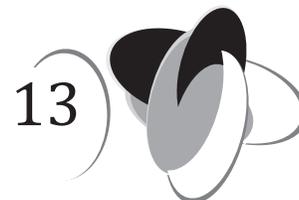
Ans. Do yourself

Section III : Activities Assessment (CCE Pattern)

Do yourself



Electric current and its Effects



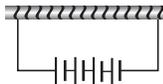
Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.** 1. The most common effects of electric current are
- Heating effect of electric current
 - Magnetic effect of electric current
 - Chemical effect of electric current
2. An electric fuse is a short piece of wire made of an alloy of tin and lead. It has very low melting point. It is generally connected with the mains. When current exceeds a particular value, the fuse wire melts and circuit is broken. So, fuse is a safety device which prevents the damage due to large flow of current.
3. The filament of a room heater made of nichrome wire.

B. Multiple Choice Types Questions (MCQs) :

- Ans.** 1. heating effect 2.  3. 
4. fuse 5. time only 6. doorbell

C. Fill in the blanks :

- Ans.** 1. Electricity 2. short vertical lines 3. Hans Christian Oersted
4. battery 5. Electromagnets 6. Fuse

D. Write True or False for the following statements :

- Ans.** 1. False 2. True 3. False 4. True 5. False 6. True
7. True 8. False 9. True 10. True

E. Match the following :

- | Ans. | Column A | Column B | Column C |
|------|------------|--|-----------------------------|
| 1. | Fuse | (i) Used in the element of heaters. | (a) Ampere |
| 2. | Greenwire | (ii) Flow of electric charge | (b) Insulating materials |
| 3. | Nichrome | (iii) Safety device | (c) Ohm |
| 4. | Bakelite | (iv) Hindrance to the flow of electric current | (d) Prevents Short circuits |
| 5. | Current | (v) Earth wire | (e) Earthing |
| 6. | Resistance | (vi) Used to make electric switches | (f) Offers large resistance |

F. Tick the odd one out giving reason :

- Ans.** 1. Circuit diagram 2. electromagnet 3. electric fuse

Section II : Summative Assessment (CCE Pattern)

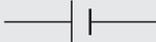
G. Define the following terms :

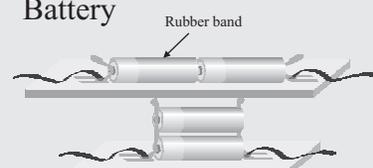
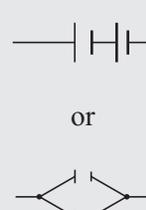
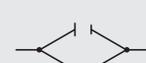
- Ans.** 1. Current passing through a wire produces heat in its surrounding region. It is called the heating effect of electric current.

2. **Battery** : A combination of two or more cells is called a battery.
3. An electric fuse is a safety device used in an electric circuit.
When current flowing through the fuse wire exceeds the marked current rating. The fuse wire melts and the fuse blows up.
4. Do yourself
5. Current passing through a wire produces a magnetic field in its surrounding region. It is called the magnetic effect of electric current.

H. Answer the following questions in short :

- Ans.**
1. If you want to turn off an electrical device, you have to 'open' (or 'break') the path of the current. For example, if you want to stop the current in a circuit consisting of a cell and a bulb, you can simply disconnect one of the wires. The circuit is now said to be open, and there is no current in it. By reconnecting the wire, you can 'close' the circuit and thus start the current. Usually we use a switch for opening and closing an electric circuit.
 2. When electric current flows through a resistor, such as, a heating coil of nichrome wire, it gets heated up.
The generation (production) of heat in a resistor (or conductor) when electricity passes through it is called heating effect of current.
The heat produced in a resistor when current is passed through it depends on the following factors.
 - Current passed through the resistor
 - Time (or duration) for which the current is passed
 - Nature of the material
 3. No substance is perfectly conducting or perfectly insulating. All materials conduct electricity to certain extent.
Copper conducts electricity many times better than glass. Silver is a better conductor than other metals but since it is very costly, so it is not used in electric wiring. While nichrome has a high resistance.
 4. Symbols of Some Electrical Components
The components such as cells, bulbs, wires, switches etc., are called elements of an electrical circuit. Each element of an electrical circuit can be described by its symbol.

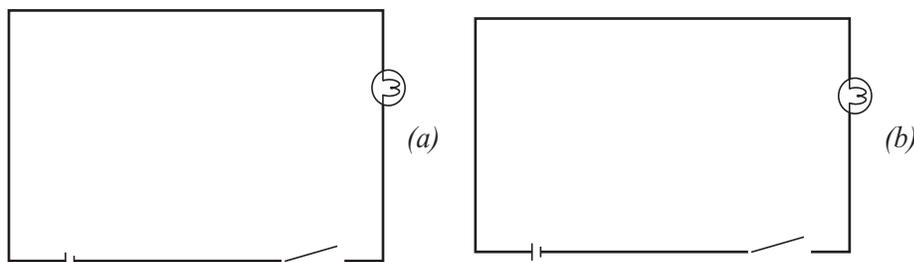
| Electrical Component | | | |
|----------------------|---|---|--|
| Name | Figure | Symbol | Description |
| 1. Electric cell |  |  | An electric cell is represented by a set of two short vertical lines. One of them is slightly shorter and thicker than the other. The longer |

| | | |
|---|---|---|
| <p>2. Battery</p>  |  <p>or</p>  | <p>line represents positive terminal and the shorter line represent the negative terminal of the cell.</p> <p>Battery is combination of two or more cells the cells can be connected in two ways shown alongside.</p> |
|---|---|---|

5. Electric Circuit

A path along which an electric current can flow is called an electric circuit. When you connect a bulb to a cell with wires, you create a closed path, or a circuit, through which current can flow. The cell, the bulb and the connecting wires are all part of the circuit. You can say that a circuit includes a source of electricity (e.g., a cell), conductors (e.g., wires) and a device that uses electricity (e.g., a bulb).

6. The figures given in the next column are showing both type of circuits—open and closed—using the symbols we have learnt earlier used for representing electrical components.



(a) An open circuit diagram

(b) A closed circuit diagram

7. Each electric cell has a specified wattage (Voltage : 1.5, Capacity : 1.1 mA.h). Therefore it can generate certain fixed current and volage. To obtain higher wattage two or more cells are joined as shown below. Such a combination of cells is called battery.

Arrangement-1

In one of such combinations, the cells are placed one after the other connecting negative terminals of one to the positive terminal of the other. This leaves one positive (+) and one negative (–) terminal free for connecting the battery to the other components in an electric circuit.

A battery of the two cells :

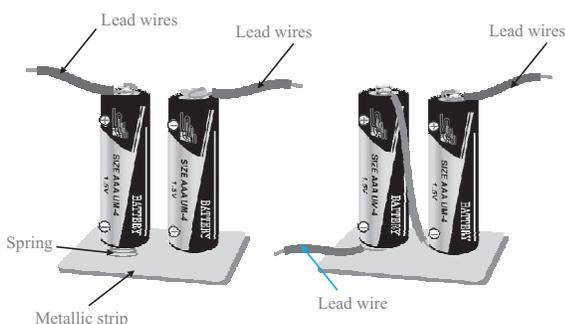


A batter of three cells :



Arrangement-2

In certain electrical appliances, the cells are placed side-by-side in a compartment and the cells are connected to each other with the help of a metal strip or thick wire.



A battery of two cells :

8. An electric fuse is a short piece of wire made of an alloy of tin and lead. It has very low melting point. It is generally connected with the mains. When current exceeds a particular value, the fuse wire melts and circuit is broken. So, fuse is a safety device which prevents the damage due to large flow of current.
9. Each type of fuse has a time-current characteristic. It shows the time required to melt the fuse due to overloading of current.
Fuses are characterised as "fast blow" or "slow blow", depending on the time, they take to respond to a given condition of heating due to overcurrent. Fast blow fuses open quickly. Slow blow fuses which are common in household circuit open only if the condition of overcurrent continues for sometime.
10. The electromagnet inside a doorbell magnetised and demagnetised to attract the iron strip for creating the sound.

I. Answer the following questions in detail :

- Ans.** 1. A fuse is an essential part of power distribution system to prevent fire or damage due to overload or short circuit.

Characteristics of Fuse

Each type of fuse has a time-current characteristic. It shows the time required to melt the fuse due to overloading of current.

Fuses are characterised as "fast blow" or "slow blow", depending on the time, they take to respond to a given condition of heating due to overcurrent. Fast blow fuses open quickly. Slow blow fuses which are common in household circuit open only if the condition of overcurrent continues for sometime.

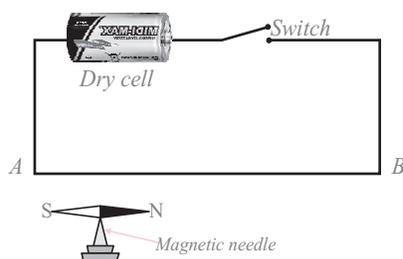
2. **Aim :** To show that when an electric current is passed through a wire, it behaves like a magnet.

Materials required : A piece of copper wire, Magnetic needle, Switch.

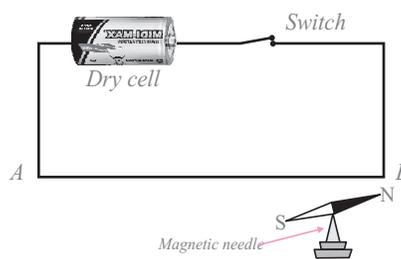
Procedure : Follow the steps given below :

- Bring a bar magnetic near the magnetic needle. Observe what happens.
- The magnetic needle gets deflected.

- Remove the magnet and observe. The magnetic needle returns back to NS position as before.
- Connect a thin copper wire to a battery through a key, so that the section AB of the wire is in the north-south direction.



When no current flows through the wire, the magnetic needle points in the north-south direction.



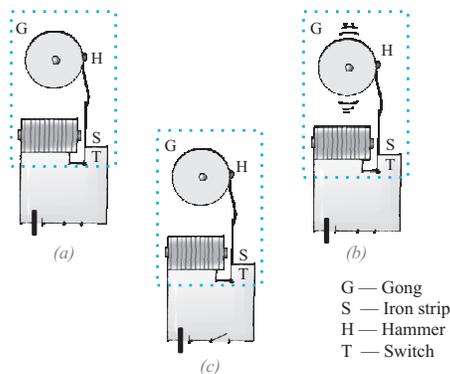
When current flows through the wire, the magnetic needle gets deflected from the north-south direction.

Showing the magnetic effect of current

- Place a magnetic needle near the wire AB and let it settle in the north-south direction.
- Turn the switch ON to pass current through the wire.
- What happens to the magnetic needle?
- The needle gets deflected from its original position.
- Now turn the switch OFF and see what happens.
- Magnetic needle returns to its original north-south position.
- Repeat the experiment by reversing the direction of current, and see what happens.

Conclusion : From this experiment, it is concluded that when electric current is passed through a wire, it acts like a magnet.

3. An electric bell is the most common application of electromagnets. It consists of an electromagnet, a springy iron strip, a hammer, a gong, two switches and connecting wires [Fig. (a)]. When you press the switch of the call bell at your door, the current passes through the circuit and the electromagnet pulls the springy iron strip 'S', which forms one terminal of the other switch 'T'. As the strip moves towards the electromagnet, its contact with terminal 'T' is lost. This breaks the circuit. As a result, the electromagnet stops attracting the iron strip. The strip goes back to its original position and its contact with terminal T is re-established [Fig. (c)]. This backward and forward movement of the iron strip takes place many a times in a second and produces



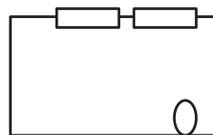
Working of an electric bell

Science-7

sound. The loudness of the sound may be enhanced with the help of a hammer attached to strip 'S' which in turn strikes the gong 'G'.

4. **Fault :** This is a open circuit.

Correct diagram :



5. Do yourself

Section III : Activities Assessment (CCE Pattern)

Do yourself

Formative Assessment-III

A. Answer the following question orally :

- Ans.**
1. Stopwatch is used to measure time intervals during sports events.
 2. Red blood cells (RBCs) white blood cells (WBCs) and platelets are the components of the blood.
 3. An electric fuse is a short piece of wire made of an alloy of tin and lead. It has very low melting point. It is generally connected with the mains. When current exceeds a particular value, the fuse wire melts and circuit is broken. So, fuse is a safety device which prevents the damage due to large flow of current.
 4. Asexual reproduction is the formation of new individuals from the cell of a single parent. This process of reproduction does not involve the fusion of male and female gametes.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.**
1. fertilization
 2. bread mould
 3. heart
 4. second/metre
 5. heating effect

C. Fill in the blanks :

- Ans.**
1. rotatory
 2. vascular
 3. ovule
 4. Voltmeter

D. Write true or false :

- Ans.**
1. False
 2. True
 3. False
 4. True

E. Match the following :

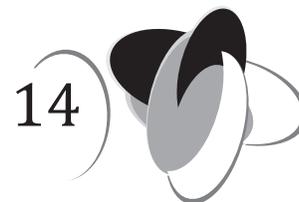
- Ans.**
- | | | | | |
|---------------|-------|---|-----|-------------------------|
| 1. Fuse | (i) | Used in the element of heaters | (a) | Ampere |
| 2. Green wire | (ii) | Flow of electric charge | (b) | Insulating Material |
| 3. Nichrome | (iii) | Safety device | (c) | Ohm |
| 4. Bakelite | (iv) | Hindrance to the flow of electric current | (d) | Prevents short circuits |
| 5. Current | (v) | Earth wire | (e) | Earthing |
| 6. Resistance | (vi) | Used to make electric switches | (f) | Offers large resistance |

F. Tick the odd-one out giving reason :

Ans. 1. Pollination 2. Electric fuse 3. Ureters 4. Table clock



Light



14

Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

Ans. 1. A ray of light is a very narrow emission. It is represented by a straight line with an arrow head.
2. Virtual image cannot be obtained on a screen.
3. The image formed by a plane mirror can not be contained on a screen.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

Ans. 1. the same angle 2. reflector 3. red 4. red and green
5. concave

C. Fill in the blanks :

Ans. 1. reflection 2. screen 3. rectilinear 4. convex
5. screen 6. plane 7. solar 8. lens
9. real image 10. light source

D. Write True or False for the following statements :

Ans. 1. True 2. True 3. False 4. False 5. True 6. True
7. True 8. False 9. False 10. True 11. False 12. True

E. Match the following :

| Ans. | Column A | | Column B | | Column C |
|-------------|-----------------|-------|---|-----|--------------------------|
| 1. | Concave lens | (i) | Splitting of white light | (a) | Headlights of automobile |
| 2. | Convex mirror | (ii) | The bouncing of light from a surface | (b) | To correct hypermetropia |
| 3. | Reflection | (iii) | A lens which always forms virtual image | (c) | To correct myopia |
| 4. | Dispersion | (iv) | A mirror which always forms diminished image | (d) | Solar cookers |
| 5. | Concave mirror | (v) | A polished curved surface which bends inward | (e) | Polished furniture |
| 6. | Convex lens | (vi) | The image is erect and of the same size as the object | (f) | Rainbow |

7. Plane mirror (vii) Coverages a parallel beam of light (g) Rear view mirrors in cars

F. Tick the odd-one out giving reason :

- Ans.** 1. Side-view mirror 2. Mirror Change in the direction
3. Glass slab 4. Parabolic mirror
5. Magnifying glass

Section II : Summative Assessment (CCE Pattern)

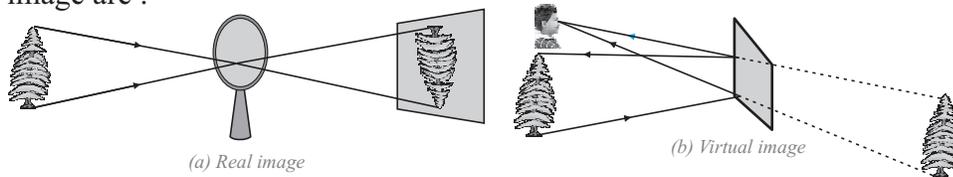
G. Define the following terms :

- Ans.** 1. Spherical mirror too shows reflection in accordance with laws of reflection. There are two kinds of spherical mirrors :
(a) Concave, where reflection takes place at inner surface.
(b) Convex, where reflection takes place at outer surface.
2. The beam of light which spreading away fo light rays is called divergent beam of light.
3. When a narrow beam of sunlight is allowed to pass through a prism, a rainbow is formed.
This band of seven colours is called spectrum and the phenomenon of splitting up of white light into different colours is called dispersion.
4. A real image is formed by actually meeting of rays after reflection while in case of a virtual image they appear to come from a point.
5. A convex lens always brings parallel rays of light together and is known as a converging lens. It bends parallel rays of light passing through it and converges them to a single point called the focus of the lens.
A concave lens, on the other hand, has the property of spreading the light rays. They diverge and appear to come from a point known as the focus of the lens. A concave lens is called a diverging lens.

H. Answer the following questions in short :

Ans. 1. Real Image

When the rays of light are reflected from a smooth surface in such a way that they actually meet at some other point on the screen, the image so formed is called real image [see fig. (a)]. The characteristics of a real image are :



- It can be taken on a screen.
- It is always inverted.
- Its size may be the same/smaller/bigger than the size of the object.

Virtual Image

When the rays of light are reflected from a smooth surface in such a way

that they appear to meet at a certain point but do not meet on a screen. The image so formed is called virtual image. The characteristic of a virtual image are :

- It cannot be taken on a screen.
- It is always erect.
- Its size may be the same/smaller/bigger than the size of the object.

2. **Concave mirror** : Inner surface acts as the reflecting surface.

Convex mirror : Outer surface acts as the reflecting surface.

3. Concave mirrors are used as :

Shaving mirror since it produces an enlarged and erect image when the object is placed close enough.

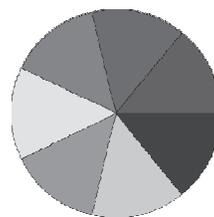
5. **Newton's Disc**

It is a colour disc prepared by painting seven colours of spectrum. When such a disc is rotated rapidly about its axis, it appears white.

You can make a disc like this yourself.

Aim : To make Newton's Disc.

Procedure : Take a circular piece of cardboard and paste a white paper on it. Paint the paper with seven different colours of the spectrum. Insert a pencil through the cardboard and rotate it rapidly. You will notice that different colours disappear and card appears greyish white.



6. **Laws of Reflection**

When a ray of light falls on a plane mirror, it gets deflected. The reflection of light from plane mirror takes place according to two laws which are known as laws of Reflection.

The laws are as follows :

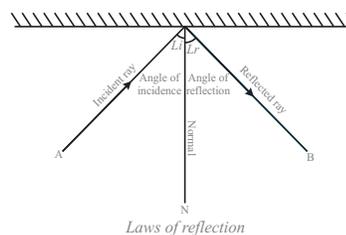
1st law of Reflection

The angle of incidence (i) is equal to the angle of reflection (r).

2nd law of reflection

The incident ray, the reflected ray and the normal, all lie on same plane at the point of reflection.

The laws of reflection are applicable to all polished and smooth surfaces whether plane or curved.



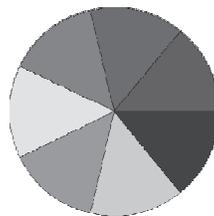
7. **Newton's Disc**

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You can make a disc like this yourself.

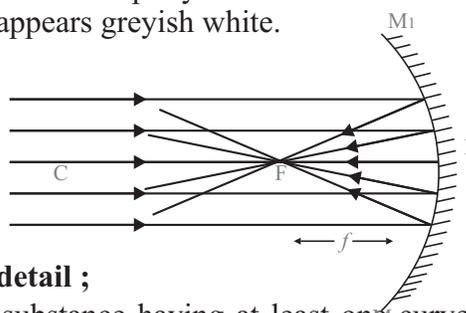
Aim : To make Newton's Disc.

Procedure : Take a circular piece of cardboard and paste a white paper on



it. Paint the paper with seven different colours of the spectrum. Insert a pencil through the cardboard and rotate it rapidly. You will notice that different colours disappear and card appears greyish white.

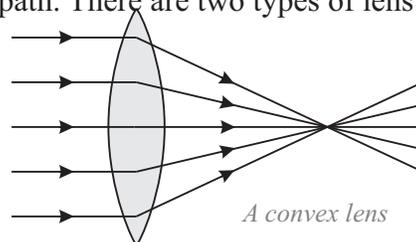
8. In case of a concave mirror, as shown by the figure given in the next column rays coming from infinity are reflected and meet actually at a point known as the 'focus' and form a real image.



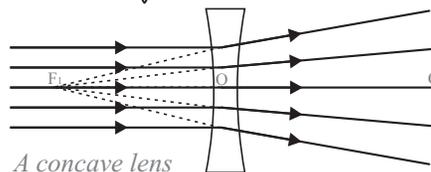
I. Answer the following questions in detail ;

Ans. 1. A lens is a piece of transparent substance having at least one curved surface. Unlike mirrors, light rays are not reflected from their surface. In lenses, rays are refracted which means that they pass through them, however, by bending from their original path. There are two types of lens :

(a) Convex lens : A lens having one or two spherical surfaces such that it is thicker at the centre than at the edges is known as a convex lens.



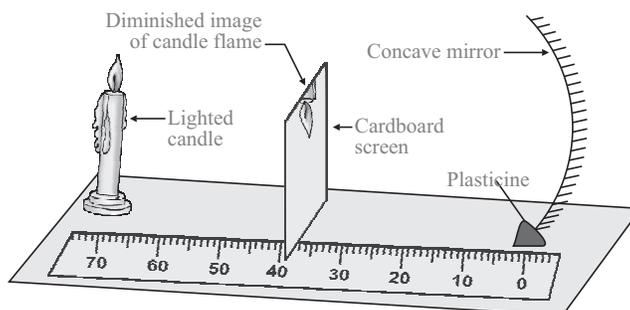
(b) Concave lens : A lens which is thinner at the centre than at the edges is called a concave lens.



- 2. Aim:** To study the formation of image by a concave mirror

Procedure: In a dark room, place a lighted candle at a distance of 5-6 ft. in front of a concave mirror as shown below. Move a small card back and forth between the candle and the mirror till you get an image of the candle.

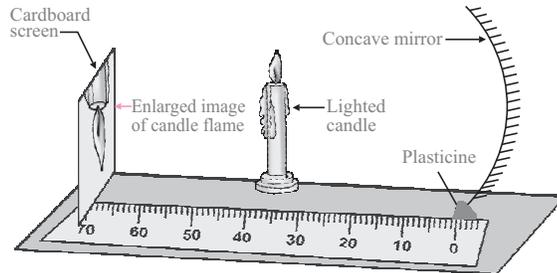
Observe and answer :



1. Is the image erect or inverted?
2. Is it smaller or larger than the object?

Now move the candle forward and place it closer to the concave mirror, at a distance of 3 feet. Take the card behind the candle and by moving it back and forth try to obtain the image of the candle. Your image will be enlarged, yet inverted, as shown below.

The activity shows that :
The size and position of the image changes with the change in position of the object from the concave mirror.

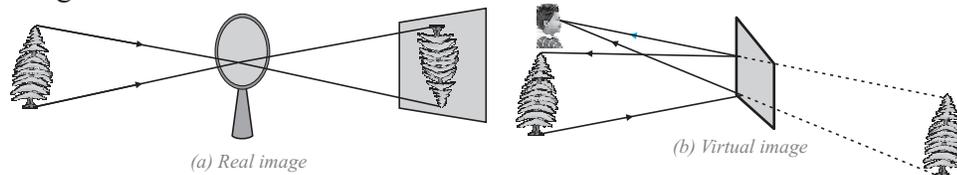


3. Real and Virtual Images

When a well-illuminated object is placed in front of a mirror or lens, its view through the mirror or lens is called its image. Thus, an image can be defined as the appearance or picture of a real object, formed by the light that passes through a lens or reflected from a mirror. The nature of image depends upon the nature of mirror/reflecting surface and also upon the distance of the object from the mirror. Images are of two kinds, real image and virtual image.

Real Image

When the rays of light are reflected from a smooth surface in such a way that they actually meet at some other point on the screen, the image so formed is called real image [see fig. (a)]. The characteristics of a real image are :



Types of images

- It can be taken on a screen.
- It is always inverted.
- Its size may be the same/smaller/bigger than the size of the object.

Virtual Image

When the rays of light are reflected from a smooth surface in such a way that they appear to meet at a certain point but do not meet on a screen. The image so formed is called virtual image. The characteristic of a virtual image are :

- It cannot be taken on a screen.
- It is always erect.
- Its size may be the same/smaller/bigger than the size of the object.

4. Rectilinear Propagation of Light

Light rays travels in straight line through a transparent homogeneous

medium. This property of light is called rectilinear propagation. Look at a light beam entering a dark room through a small opening of the window. You will see the straight line path that light takes.

Aim : To understand that light travels in a straight line.

Procedure : Take a flexible plastic pipe. Keep it straight and look at a glowing bulb through it.



A child looking at a glowing bulb through a pipe

Glowing bulb cannot be seen through a bent pipe

You can see the bulb because there is a straight path available through the pipe from the light source to your eyes.

Now bend the pipe from the middle. Can you still see the bulb through the bent pipe? No. Why? It is because now there is no straight path available from the light source to your eyes. This activity shows that light travels in straight line.

We can see a light source only if a straight line path is available from the source up to our eyes. If the path is bent anywhere we will not see the source of light. Let us do an activity to understand this property.

It is clear from the Activity 14.1 that if the straight path between a light source and an observer is blocked then one cannot see the light source. This happens because of rectilinear propagation of light.

5. Dispersion of Light

Sir Issac Newton found that when a beam of white light passes through prism, it disperses into seven different colours.

Light comes in various colours like blue light of gas flame, yellow of candle flame, red and green of traffic signals. Sunlight has no particular colour. It is known as white light. When a narrow beam of sunlight is allowed to pass through a prism, a rainbow is formed.

This band of seven colours is called spectrum and the phenomenon of splitting up of white light into different colours is called dispersion.



Colour bands

The colours in the spectrum are same as those in rainbow. A rainbow sometimes occurs when the Sun is shining after rain showers. The colours in the rainbow (violet, indigo, blue, green, yellow, orange and red) are due to dispersion of white light of the Sun by the droplets.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Winds, Storm and Cyclones



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.** 1. A violent storm with very strong winds which move in circle is called a Cyclone. A severe form of thunder- storm leads to a cyclone. It develops over the warm, moist waters of the Atlantic and Pacific Oceans near the equator. Several small thunderstorms merge to form one devastating storm or cyclone.
2. The pressure is higher at the equator.
3. As we go up in the atmosphere the air temperature is decrease.

B. Multiple Choice Questions MCQs :

Tick (✓) the correct answer :

- Ans.** 1. ocean towards land 2. all of these
3. A warm sea temperature 4. hurricanes

C. Fill in the blanks :

- Ans.** 1. Natural phenomena. 2. storm
3. anemometer 4. cup anemometer propeller anemometer
5. electrical stories

D. Write True or False for the following statements :

- Ans.** 1. False 2. False 3. False 4. True 5. True 6. True

E. Match the following :

- Ans.** 1. An instrument to find the direction of the wind (i) Typhoon
2. The name of a storm in western pacific (ii) Wind vane
3. Multipurpose satellite (iii) Anemometer
4. Low pressure region in the centre of the storm (iv) INSAT
5. An instrument to measure wind speed (v) Tornado

F. Tick the odd-oine out giving reason :

- Ans.** 1. Mountains 2. Ozone layer 3. Depressions
4. Sunny sky 5. Cyclone watch

Section II : Summative Assessment (CCE Pattern)

G. Define the following terms :

- Ans.** 1. A violent storm with very strong winds which move in circle is called a Cyclone.

2. The pressure which is exerted by the atmospheric air is called the atmospheric pressure.
3. **Tomado** : A violent spinning storm typically shaped like a funnel with the narrow end on the ground.
4. Thunderstorms are also known as electrical storms. They develop in tropical areas like India. It is a form of weather in which lightning and thunder are accompanied by heavy rains.

H. Answer the following questions in short :

Ans. 1. Thunderstorms

Thunderstorms are also known as electrical storms. They develop in tropical areas like India. It is a form of weather in which lightning and thunder are accompanied by heavy rains.

2. Tsunami waves are generated by earthquakes, volcanic eruptions or underwater landslides. Tsunami word is taken from Japanese term 'Tsu' meaning 'harbour' and 'nami' meaning 'waves'. These waves can get up to 15 m in height and can reach coast within minutes.
3. Every year, natural calamities cause a lot of damage across the world. Cyclones are the worst in this respect as they last longer and affect a wider area. A cyclone developed in the ocean pushes the water up and generates waves of height up to 2 to 3 metres. These high waves hit the coastal area and wash away everything in its way. Hundreds of people living in coastal areas are often killed and injured in a cyclone. The rains accompanying cyclones lead to floods and cause an enormous damage to people's belongings and farmlands. Towns and villages on coastal areas are flooded after a cyclone. Alkaline flood waters of the sea enters the farmlands and affects the fertility of the soil. Thus crop production of a region is severely reduced after a cyclone. During cyclone the wind speed reaches up to 300 km/hr and trees and lamp posts often get uprooted. The transport system is also badly affected as flood waters cover railway tracks and roads.
4. The Indian Meteorological Department constantly examines the coastline for likely occurrence of tropical storms with the help of multipurpose satellites (INSAT). There is a chain of cyclone detection radars that are installed along the coastline, which has proved to be an effective tool to cyclone warning work. These radars can locate and track approaching tropical cyclones within a range of 400 km.

The National Disaster Management Bill 2005 also emphasizes the setting up, maintaining and upgrading of early warning machines and broadcast information to the public every hour or half an hour when the cyclone is close to the shore. Cyclone alert is issued 48 hours prior to any approaching storm.

I. Answer the following questions in detail :

Ans. 1. We fill air into a bicycle tube, it keeps the tube tight. But if the tube is

filled with excess air, it may burst. It is easier to ride a bicycle, flying a kite, walking, sailing a boat, etc., in the direction in which wind is blowing but difficult against it.

Take a tin can. Fill it with water (up to half its level). Heat the can for sometime, then place the lid on the can tightly. Now, pour freshwater over the can. The can gets distorted. Some steam in can condenses into water. It decreases the pressure of air inside the can than outside. So, can gets deformed.

Atmospheric air exerts pressure from outside on the tin container. Due to this pressure, leaves or flags flutter when wind blows.

- Regions closer to the equator get more heat from the Sun. So, the air in these regions gets heated and rises up. The cooler air from 0-30 degree latitude belt on both sides of equator moves in. Similarly, at poles, air is colder than at 60 degree latitude. So, warm air from these latitudes rises up and cold air from polar regions pushes downward.

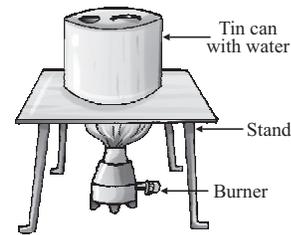
3. Thunderstorms

Thunderstorms are also known as electrical storms. They develop in tropical areas like India. It is a form of weather in which lightning and thunder are accompanied by heavy rains.

When temperature rises, it produces strong winds rising upward. These winds carry water droplets which freeze at some height and fall down again. This swift movement of air and water droplets creates lightning and thunder and is known as thunder storm. When water vapourises, it takes heat from atmosphere. When water vapour changes back to raindrop (liquid) it releases heat to the atmosphere and warms it. The air rises and causes drop in pressure. More air rushes to centre of storm.

Cyclones

A violent storm with very strong winds which move in circle is called a Cyclone. A severe form of thunder- storm leads to a cyclone. It

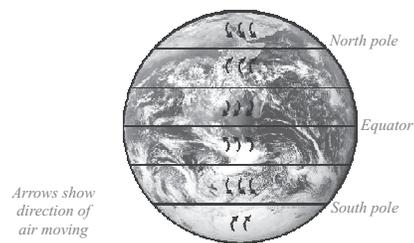


(a) Heating water in can



(b) Distorted can on pouring freshwater

Experiment showing air exerts pressure



Wind flow pattern



A Cyclon

develops over the warm, moist waters of the Atlantic and Pacific Oceans near the equator. Several small thunderstorms merge to form one devastating storm or cyclone.

If a storm stays over water it will continue to grow. Due to the rotation of the Earth, these winds start spinning (spiralling effect). Once the wind starts spinning, it is called a tropical depression. If the depression strengthens and wind speed climbs up, it is called a tropical storm. Some tropical storms grow and develop into full ledged cyclones, with a very high wind speed.

Tornado

Tornado is an extremely strong and dangerous wind that blows in a circle. It proceeds in a rotating column and extends from the surface of the Earth to a thundercloud. The rotating column is about 75 to 100 metres wide and travels with a high speed between 75 to 200 km/hour. When a rising column of hot air meets a horizontal current of cold air, a tornado is formed. Air gets sucked out of the centre of the column, and high-speed winds start spiralling around this low air pressure region. Its circulating air mass usually has a funnel shape small at the bottom and large at the top. People go underground to save themselves from a progressing tornado. A tornado lasts only up to a few kilometers. This devastating storm is very common in USA.

4. The Indian Meteorological Department constantly examines the coastline for likely occurrence of tropical storms with the help of multipurpose satellites (INSAT). There is a chain of cyclone detection radars that are installed along the coastline, which has proved to be an effective tool to cyclone warning work. These radars can locate and track approaching tropical cyclones within a range of 400 km.

The National Disaster Management Bill 2005 also emphasizes the setting up, maintaining and upgrading of early warning machines and broadcast information to the public every hour or half an hour when the cyclone is close to the shore. Cyclone alert is issued 48 hours prior to any approaching storm.

It is important that warnings and alerts should be rapidly communicated to the parts, fishermen, ships and to the general public.

Cyclone shelters should be constructed in cyclone prone areas and proper arrangements be made to shift people at the time of need.

Warnings issued by meteorological department through TV, radio or newspapers should not be ignored.

People living in cyclone prone areas should make arrangements to shift necessary household goods, domestic animals and vehicles to safer places.

Phone numbers of all emergency services like hospital, fire brigade and police should be kept handy all the times.

While staying in a cyclone hit area, people should take extra precautions to safeguard their interests like :

Drinking water should be purified before use as it may get contaminated.

Never touch wet electric switches or wet electric wires.

Avoid driving as the road may get damaged by the flood water.

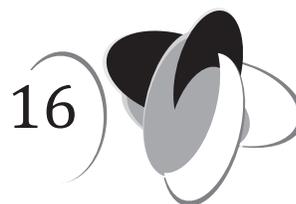
Cooperate and help your friends and neighbours.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Water : Scarcity and Conservation 16



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

Ans. 1. Water occurs in nature both in the free as well as in the combined forms.

Free water occurs as solid, liquid and gas. These are called states of water.

2. We observed the world water day to know the importance of water and attempt to conserve the water.

3. Following are the factors that affect the water table :

(i) Increasing population. (ii) Increasing industries

(iii) Increasing Agriculture activities (iv) uneven rainfalls

4. If usually water is not available on the Earth, there is not possibility of life on the Earth.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. 70% 2. humans beings use water for breathing
3. all of these 4. about three-fourths
5. scarcity of water 6. population growth

C. Fill in the blanks :

- Ans.** 1. tubewells handpumps 2. salty 3. Embankment
4. infiltration 5. water cycle 6. 1170 700

D. Write True or False for the following statements :

- Ans.** 1. False 2. True 3. False 4. True
5. False 6. True 7. True

E. Match the following :

- Ans.** 1. Infiltration ----- (i) Upper level of groundwater
2. Water table ----- (ii) Scarcity of water
3. Purest form of water ----- (iii) Seepage of water
4. Increasing population ----- (iv) Saline water
5. Ocean water ----- (v) Rainwater

F. Tick the odd-one out giving reason :

- Ans.** 1. Heavy rainfall 2. Sea water 3. increased infiltration
4. Rainwater 5. Drip irrigation

Section II : Summative Assessment (CCE Pattern)

G. Define the following terms :

- Ans.** 1. Free water occurs as solid, liquid and gas. These are called three states of water.
2. Scarcity of potable water is called water crisis. Some causes of scarcity of water are increasing population, increasing industries and agricultural activities, unmet increasing industries and agricultural activities, unmet, rainfall and water pollution.
3. Managing the activities to consume water for saving it for future use is called water management.
4. Nearly three-fourths of the Earth's surface is covered with water. Almost 97.5% of this available water is salty and is, therefore, unfit for human consumption. Of the remaining 2.5% fresh water, a major portion is frozen in glaciers and in the polar ice caps. Only 0.8% of this 2.5% fresh water is available as river water, lake water and groundwater, and is useful for human consumption.
5. Decreasing the level of groundwater is called the depletion of water table.

H. Answer the following questions in short :

- Ans.** 1. **Renewable natural resources :** The natural resources that never get exhausted or are replaced within a reasonable period of time.
Non-renewable natural resources : The natural resources that are exhaustible or can be used only once and cannot be replaced within a reasonable period of time.
2. Seas and oceans cover about 70% of the surface of the Earth. Water present in seas and oceans contains large amounts of dissolved salts. Rivers ultimately flow into sea and add dissolved salts into it. Due to the presence of salt, this water is salty and is called saline water. It is unfit for drinking, washing, irrigation and for industrial purposes.
3. Water being a renewable resource gets exhausted due to its over utilization and water pollution.
4. Rain, river, lakes, streams, seas, oceans, groundwater, etc. are the different sources of water.

5. Groundwater is pure as it gets filtered through many layers of sand, rock and soil. It contains dissolved salts and is free from suspended impurities.
6. The rainwater can be used to recharge the ground water. This process is called rainwater harvesting.
7. The melting point of ice is the point at which ice changes into liquid form (water) and the freezing point of water is the point at which water changes into solid form (ice).
8. Dams are constructed to prevent and store the water of rivers. This water is used for producing electricity and for irrigation.
9. These three states of water can be changed into each other by changing temperature.



Such change of any physical state of water into another and back by changing temperature is called interchangeability of three states of water.

10. Some part of rainwater goes into the soil into the non-porous rocks beneath and seeps under the ground. This is called groundwater or underground water. The level of groundwater is called the water table.

I. Answer the following questions in detail :

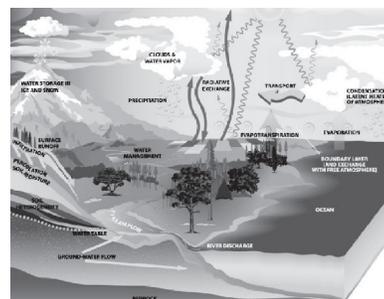
- Ans.** 1. In the solid form, water occurs on the Earth as Snow and Ice present as ice caps at the poles of the Earth, snow-covered mountains and glaciers.

In the liquid form water occurs as water present in oceans, lakes, rivers and underground.

In the gaseous form, water is present as vapour in the atmosphere.

These three forms of water undergo continuous cycling to keep the total amount of water on the Earth constant.

Such a continuous cycling of water in nature is called water cycle.



Water cycle in nature

2. Water is a precious natural resource. In order to make water easily available to us in future, we have to conserve it today. A few ways by which water can be conserved are as follows :

Do not leave taps running while brushing teeth, shaving or washing clothes.

Farmers should use better methods of irrigation like drip irrigation, in which water is supplied to plants drop by drop instead of filling the entire field with water.

Construct dams and reservoirs to control floods and collect water.

Recycle water in industries and use it as many times as possible, before disposing it.

Plant as many trees as possible. Vegetation slows down the flow of rainwater on land and increases the absorption of water by soil.

Treat sewage and factory wastes before disposing them into water bodies.

Use biodegradable fertilizers and pesticides.

Practise rainwater harvesting. It is done by allowing rainwater falling on roofs of buildings to flow into a deep trench in the ground.

Repair leaking taps and pipes at the earliest.

Recycle polluted water and use it for irrigation.

3. Do yourself
4. Nearly three-fourths of the Earth's surface is covered with water. Almost 97.5% of this available water is salty and is, therefore, unfit for human consumption. Of the remaining 2.5% fresh water, a major portion is frozen in glaciers and in the polar ice caps. Only 0.8% of this 2.5% fresh water is available as river water, lake water and groundwater, and is useful for human consumption.
5. Some causes of the scarcity of water are discussed here.

Increasing Population

Increase in population increases the demand for more water. Construction of houses, shops, offices, roads, etc., decreases open areas like parks, gardens and playgrounds. This, in turn, decreases the seepage of rainwater into the ground. Moreover, a huge amount of water is needed for construction of buildings. Often ground water is used for this purpose.

Increasing Industries

Water is required for all kinds of industries. The number of industries is increasing day by day. Therefore, there is an increasing need for water.

Increasing Agricultural Activities

Due to population pressure, agricultural activities are increased. So, for irrigating crops, farmers need more water.

Uneven Rainfalls

In India there are some places that have excessive rainfall every year and some areas have very low rainfall. This uneven rainfall causes floods in some areas and droughts in some other areas. Desert areas like some parts of Rajasthan, having a very low rainfall, face the acute problem of water scarcity.

Water Pollution

Water is polluted by domestic sewage and industrial wastes. Some factories and industries are located near rivers. They pour their harmful, industrial wastes into river water. This further reduces the availability of fresh water.

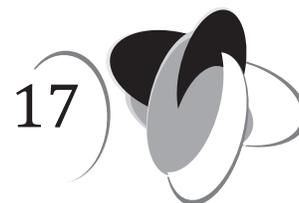
6. Some part of rainwater goes into the soil into the non-porous rocks beneath and seeps under the ground. This is called groundwater or underground water. The level of groundwater is called the water table. The level of water table is variable. It varies according to the place and season. The process of seeping of water deep below the ground is called infiltration. It is a continuous process and recharges the groundwater. Groundwater is pure as it gets filtered through many layers of sand, rock and soil. It contains dissolved salts and is free from suspended impurities.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Forest Products



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

Ans. 1. **Trees** **Animals**

(i) Neem (i) Elephant

(ii) Bangan (ii) Lion

(iii) Teak (iii) Fox

2. Roots help in recharging of the groundwater.
3. Due to the plants of huymisu the forest ground is dark in colour.
4. If forests disappear, the habitat of various animals will be ruined. It also disturb the ecology balance. It will cause less rainfall.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

Ans. 1. wood 2. all of these 3. food chain 4. all of these

C. Fill in the blanks :

Ans. 1. soil erosion floods 2. Wood 3. Quinine
4. food chain 5. herbivores 6. decomposes

D. Write True or False for the following questions :

Ans. 1. True 2. True 3. False 4. False

E. Tick the odd-one out giving reason :

Ans. 1. Bare soil 2. Aquatic 3. Volcanic activity 4. Annuals

Section II : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.**
1. **Forest** : The natural vegetation having big trees, plants and lots of vegetation in unplanned manner. The home of wild animals.
 2. **Food chain** : A feeding relationship in which a carnivore eats a herbivore which itself has eaten plant matter is called a food chain.
 3. In reality, most animals and plants of a forest are part of more than one food chain and eat more than one kind of food in order to meet their food and energy requirements. These interconnected food chains form a food web. A food web shows the movement of food through a habitat. It can also be used to help predict what might happen if one of the links in a food web is absent.
 4. Animals that eat only plants are called herbivores or primary consumers.
 5. Destruction of forests or felling of trees on a large scale is called deforestation.

G. Answer the following questions in short :

- Ans.**
1. Trees help to regulate the climate of a place. They absorb water from the ground through their roots, and then release some part of it as water vapour. Thus, they help in keeping the air cool and also help bring in the rain. Trees also help in checking global warming by taking in carbon dioxide, the main greenhouse gas, for photosynthesis.
 2. Forests provide 'home' to many animals and plants and many valuable products for human beings. All plants and animals in any forest depend on each other. Many tribal people living in forests also depend on plants, trees and animals living there.
 3. With the increase in human population, there have been ever-rising demands for converting forests into residential and agricultural areas, wood for fuel and construction, etc. As a result, lots of trees are being felled and forests cleared, thus destroying the habitat of several species of animals and plants.
 4. Forest ecosystems bring rain, maintain our climate, purify the air, and protect soils. They also provide habitat for wildlife, and preserve biodiversity and serve as sources of food, fuel, and medicine.
 5. A feeding relationship in which a carnivore eats a herbivore which itself has eaten plant matter is called a food chain.

Grass —> Rabbit —> Fox —> Lion

Food Chain

Most animals and plants of a forest are part of more than one food chain and eat more than one kind of food in order to meet their food and energy requirements. These interconnected food chains form a food web.

H. Answer these questions in detail :

Ans. 1. Keeping the correct balance between oxygen and carbon dioxide in the atmosphere is necessary if we want conditions on the Earth to remain stable. Burning of fossil fuels releases carbon dioxide and increases its concentration in the atmosphere. Carbon dioxide is a greenhouse gas. As it builds up, it prevents heat from leaving the Earth and contributes to global warming.

Actively growing plants in forest help to decrease the amount of carbon dioxide in the atmosphere by using it in photosynthesis and giving out oxygen. Cutting down large areas of forest decreases plants available for photosynthesis. The trees that are cut down are often burnt, contributing further to the build-up of carbon dioxide.

2. Do yourself

3. **Uses of Forests**

Our forest cover plays a major role in our life. The early men and women lived mainly in forests. They gathered food and were dependent on the forests for all their basic needs of food, clothing, and shelter. As time went by, they learnt techniques of growing food by cleaning small patches of land in the forests. But they still remained dependent on forests for several other things, and the need is still continuing.

We depend on forests for several things directly and indirectly.

Forests prevent soil erosion and floods. Trees help to control soil erosion by the action of strong winds and water currents. Roots of trees bind the soil particles together and prevent the soil from being washed or blown away. Trees also help in improving the quality of soil.

Trees help to regulate the climate of a place. They absorb water from the ground through their roots, and then release some part of it as water vapour. Thus, they help in keeping the air cool and also help bring in the rain. Trees also help in checking global warming by taking in carbon dioxide, the main greenhouse gas, for photosynthesis.

Some trees, such as coconuts and palms, help to break strong, winds in coastal areas. They act as shields or windbreakers. They can withstand strong winds. Trees grown for breaking winds are bushy and sturdy. They usually have leaves with serrated edges.

We get timber from more than a thousand species of trees, such as sal, mahogany, teak, and rosewood. Several timber-based industries such as those of plywood, sawmills, paper and pulp, and cardboards are all dependent on these trees.

We get fruits and most dry fruits from forests. Mango, coconut, orange, pear, jackfruit, lychee, apple, etc. grow wild in forests. We also get several nuts and spices from plants growing in forests.

We get firewood from trees. Wood is the most important fuel used for cooking in several rural areas even today. Usually, wood with low moisture content is chosen, so that it can dry faster. Wood charcoal is also a very common fuel used by people.

Our forests are home to several kinds of plants, which are used to make medicines. In ancient days, sages depended greatly on medicinal plants found in the forests for all types of treatments and cure. Even today, plants such as neem, eucalyptus, amla, and cassava are used for making several Ayurvedic medicines. Cinchona trees provide quinine, which is an important medicine for treating malaria.

Many varieties of grasses such as lemon grass, vanilla, kewra, and khus are the sources of several kinds of essential oils. Sandalwood and pine also give us oil, which can be extracted from the wood of these trees. We get oil from the leaves of certain plants such as eucalyptus, camphor, wintergreen, and pine. These oils are used in making soaps, cosmetics, incense, medicines, and as essence for flavour and smell in bakeries and confectioneries. The usefulness of aloe vera, a succulent plant that grows widely in forests, is being explored on a large scale all over the world for skin and other treatments.

Forests are a source of resins (used to make varnish and paint); latex (used to make rubber); bamboo (useful as fodder, and serves as an important raw material for the manufacture of paper and pulp, basket and other small-scale industries); and cane (used to make walking sticks, furniture, baskets, picture frames, screens, and mats).

We also get fibre from several plants growing in forests. Some of the common ones are cotton, jute, linen, hemp, flax, and ramie. These fibres are used for making clothes, mats, footmats, ropes, sacks, bags, etc. Coir, a form of fibre obtained from coconut, is used to make ropes and mattresses.

4. In every forest there are many food chains. A food chain describes the feeding relationships and energy flow within a forest. Every food chain has a particular structure. It begins with an energy source, which is usually the Sun.

A food chain shows how each living thing gets its food. Plants are called producers because they are able to use light energy from the Sun to produce their food (sugar) from carbon dioxide and water. Animals cannot make their own food so they must eat plants and/or other animals for food. They are called consumers. There are three groups of consumers.

- (i) Animals that eat only plants are called herbivores or primary consumers.
- (ii) Animals that eat other animals are called carnivores. There are three groups of carnivores :

- Carnivores that eat herbivores are called secondary consumers.
 - Carnivores that eat other carnivores are called tertiary consumers.
 - Carnivores that eat dead animal bodies are called scavengers.
- (iii) Bacteria and fungi that feed on dead plants and animals are called decomposers. The decomposers speed up the decaying process and make the nutrients for plants. When they have finished feeding, the bodies of plants and animals become reduced to the substances from which they were made.

In a tropical rainforest, there are many different kinds of plants that are producers. For example, a tree is a producer and the beetle that feeds on its leaves is a primary consumer. A tree frog feeds on the beetle and therefore it is a secondary consumer. A tree snake feeds on the frog and is a tertiary consumer.

We can say that food chains are simple representations of energy flow. When a herbivore eats, only a fraction of the energy (that it gets from the plant food) becomes a part of its body.

The rest of the energy is lost as waste or used up by the herbivore to carry out its life processes (e.g., movement, digestion, reproduction). Therefore, when the herbivore is eaten by a carnivore, it passes only a small amount of total energy (that it has received) to the carnivore. Because of the large amount of energy that is lost at each level in a food chain, the amount of energy that is transferred gets lesser and lesser.

5. We must undertake the following steps to conserve forests, in order to maintain the balance in nature :
 - (i) Spreading awareness about the usefulness of forests.
 - (ii) The forest resources should be carefully and judiciously used.
 - (iii) Alternate sources of energy have to be found instead to fire wood.
 - (iv) Permission for cutting trees should be granted with the condition that twice the number of trees to be cut will be planted.
 - (v) Overgrazing should not be allowed.
 - (vi) Continuous afforestation programmes should be undertaken.
 - (vii) Wildlife should be protected.
6. All living beings (both plants and animals) are directly or indirectly connected with each other in a forest. For example, a deer needs grass to live on, and a lion needs deer to live on. In this example, a deer is directly dependent on grass, and the lion's dependence on grass is indirect. Plants provide food, shelter, and nesting sites for the animals. On the other hand, plants are also dependent on animals for nutrients and pollination.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Exercises

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.** 1. The term WWTP means Waste Water Treatment Plant.
2. Solid wastes like tea leaves must be thrown in dustbin.
3. Jaundice, Chlera and dysentery are three water borne diseases.

B. Multiple Choice Question (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. oxygen 2. oil/ghee 3. biogas 4. dysentery

C. Fill in the blanks :

- Ans.** 1. Mosquitoes 2. Waste 3. Secorage 4. Covered
5. Open

D. Write True or False for the following sentences :

- Ans.** 1. False 2. True 3. True 4. True

E. Tick the odd-one out giving reason :

- Ans.** 1. Aeration 2. Organic pollutants 3. Potable water
4. Used tea leaves

Section II : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.** 1. Think of a water that is laden with so many impurities and is foul smelling and dark, coloured. It comes out from homes, industries, hospitals, hotels, office and other places. Such a wastewater is called sewage. It is a liquid waste.
2. Clean water is a basic need of all human beings, plants and animals. We use clean water for drinking, bathing, washing, cooking etc.
3. A large part of population in our country defecates in the open, dry riverbeds, fields, near railway tracks, etc.
Animal and human excreta are health hazards. They pollute both, soil and water.
When it rains, such exereta gets washed down to the rivers, ponds and pollutes the water therein. When polluted water seeps into the ground, it contaminates the groundwater.
We use groundwater in many forms such as well water, tubewell water, spring water, handpump water etc. Thus the polluted groundwater becomes a source of water-borne diseases.
4. Water after use becomes dirty and it is of no use.

Dirty water goes to drains and it is carried away from house. So waste after use is called waste water.

5. If better housekeeping practices are practised at home, hotels and other places, less wastewater is released. Some of the better house keeping practices are :
 - (a) Do not throw cooking oil and fats into drains. They must be thrown into dustbin. Throwing of cooking oil and fats in drain blocks the drain and it affects the filtration of waste.
 - (b) Chemicals (paints, insecticides, medicines, motor oil, etc.) must be thrown in dustbin. If thrown in drains, they kill the microbes (bacteria) that help in the purification of water.
 - (c) Solid wastes (cloth pieces, rags, tea leaves, cotton, paper, etc.) must be thrown in dustbin. Putting these materials in drain will choke it and affect the degradation process as free supply of oxygen will be blocked.

G. Answer the following questions in short :

- Ans.**
1. Homes hospitals, industries, hotels, offices etc are the different sources of waste water.
 2. The industrial waste water contains various chemical, physical and biological pollutants.
 3. The wastewater treatment involves the removal of physical, chemical and biological pollutants from wastewater. This is called recycling of water.
 4. Diarrhoea and cholera are two diseases caused by contaminated water.
 5. **Sludge :** Solid wastes (faeces) that settle at the bottom in a settling tank.

H. Answer the following question in detail :

- Ans.**
1. On a city level, the treatment of wastewater is done on a large scale. The entire set up for the purification of water is called Wastewater Treatment Plant (WWTP) or Sewage Treatment Plant. The wastewater treatment involves the removal of physical, chemical and biological pollutants from wastewater.

This is done in several steps :

Step 1 : The wastewater (or sewage) is passed through bar screens. Here, large objects such as, rags, cans, plastic bags, napkins and sticks are removed.

Step 2 : The water after step 1 is sent to the grit and sand removal tank. Here sand, grit and pebbles settle down and the water is sent to sedimentation tank.

Step 3 : The water from step 2, is allowed to settle down in a large circular tank.

Solids such as faeces settle down at its bottom and are removed with a scraper. This is called sludge. Lighter oily solids are removed with a skimmer.

The water so obtained is called clarified water.

The sludge is decomposed by the anaerobic bacteria in a separate tank. The biogas produced is used as a fuel or used for generating electricity.

Step 4 : The clarified water is aerated to help aerobic bacteria to grow. Aerobic bacteria decompose biodegradable contaminants such as human waste, food waste etc. in a few hours.

The suspended microbes settle down at the bottom of the tank as activated sludge. Dried sludge is used as a manure.

Step 5 : The upper layer of clean water is then either discharged into a water body such as sea, river or into the ground, or disinfected with chlorine or ozone and released into the distribution system.

2. If better housekeeping practices are practised at home, hotels and other places, less wastewater is released. Some of the better house keeping practices are :
 - (a) Do not throw cooking oil and fats into drains. They must be thrown into dustbin. Throwing of cooking oil and fats in drain blocks the drain and it affects the filtration of waste.
 - (b) Chemicals (paints, insecticides, medicines, motor oil, etc.) must be thrown in dustbin. If thrown in drains, they kill the microbes (bacteria) that help in the purification of water.
 - (c) Solid wastes (cloth pieces, rags, tea leaves, cotton, paper, etc.) must be thrown in dustbin. Putting these materials in drain will choke it and affect the degradation process as free supply of oxygen will be blocked.
3. Most diseases are caused by pollutants and disease-causing microorganisms in water.

Water gets polluted due to its mixing with

- (a) domestic sewage
- (b) excretion of infected persons/animals
- (c) industrial wastes
- (d) pesticides and insecticides

A large part of population in our country defecates in the open, dry riverbeds, fields, near railway tracks, etc.

Animal and human excreta are health hazards. They pollute both, soil and water.

When it rains, such excreta gets washed down to the rivers, ponds and pollutes the water therein. When polluted water seeps into the ground, it contaminates the groundwater.

We use groundwater in many forms such as well water, tubewell water, spring water, handpump water etc. Thus the polluted groundwater becomes a source of water-borne diseases. Typhoid, Jaundice, Cholera, Diarrhoea, Dysentery, Amoebiasis, Hepatitis and Polio are some waterborne diseases.

4. Dirty water, wastewater and toilet water all are carried away from your house through drains. These drains open into a network of pipes

outside the house called sewers. From here, they are connected to bigger drains that carry it out of the colony or city. This is sewer system or sewerage. It is covered drainage system. You can see manholes located at 50-60 m covered by iron lids in streets or roads. These are openings used by man to clean the sewer system.

Harmful effects of untreated or inadequately treated sewage :

Untreated sewage is a major source of ground water and surface water pollution.

Soap and detergents contain phosphates. When wastes containing soaps and detergents are released into rivers and ponds, they favour algae growth. Growing algae consume a lot of oxygen and thus oxygen level in water decreases. The algae compete with aquatic plants and animals for oxygen and affect the aquatic life.

5. Railway stations, Bus stands, Airports, Hospitals, Main bazars and Country fairs are generally very crowded places.

A large amount of garbage/waste is generated in such places. If this waste is not disposed off properly, it can give rise to an epidemic.

Although the government has laid down certain standards of sanitation at such places but generally these are not followed.

We, as active citizens, can help in maintaining sanitation at public places. We should

- Not spit or urinate at any public place.
- Use dustbin for throwing empty coffee cups, waste paper etc.
- Don't throw plastic packaging materials or shopping bags on the road.
- Educate your family, neighbours and friends about the need of sanitation at public places.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Formative Assessment-IV

A. Answer the following questions orally :

- Ans.** 1. The term WWTP means Waste Water Treatment Plant.
2. As we go up in the atmosphere the air temperature is decrease.
3. Virtual image cannot be obtained on a screen.
4. Following are the factors that affect the water table :
(i) Increasing population. (ii) Increasing industries
(iii) Increasing Agriculture activities (iv) uneven rainfalls
5. Due to the plants of humus the forests ground is dark in colour.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. hurricanes 2. biogas 3. 70% 4. concave 5. wood

C. Fill in the blanks :

- Ans.** 1. Quinine 2. smooth 3. Embankment
4. anemometer 5. covered

D. Write True or False :

- Ans.** 1. True 2. True 3. True 4. True 5. True

E. Match the following :

- Ans.** 1. Infiltration ----- (i) Upper level of groundwater
2. Water table ----- (ii) Scarcity of water
3. Purest form of water ----- (iii) Seepage of water
4. Increasing population ----- (iv) Saline water
5. Ocean water ----- (v) Rainwater

F. Tick the odd-one out giving reason :

- Ans.** 1. Magnifying glass 2. Drip irrigation 3. Clean water
4. Clean water 5. Hawks

Summative Assessment-II

A. Name the following :

- Ans.** 1. Transpiration 2. Speed 3. Electric cell 4. Virtual
5. Water pollution

B. Define the following terms :

- Ans.** 1. Do yourself 2. Do yourself 3. Do yourself 4. Do yourself
5. Do yourself 6. Do yourself 7. Do yourself 8. Do yourself

C. Differentiate between the following :

- Ans.** 1. Do yourself 2. Do yourself 3. Do yourself 4. Do yourself
5. Do yourself

D. Give reasons for the following :

- Ans.** 1. Do yourself 2. Do yourself 3. Do yourself 4. Do yourself
5. Do yourself

E. Answer the following questions in short :

- Ans.** 1. Transport of materials in the body of plant is done by conducting system consisting of xylem and phloem. This system is called vascular system.
2. The time taken by the bob of a pendulum to complete one oscillation is called the time period of the oscillation (or of pendulum). Time period is denoted by T.
3. **Tomado** : A violent spinning storm typically shaped like a funnel with the narrow end on the ground.
4. Rain, river, lakes, streams, seas, oceans, groundwater, etc. are the different sources of water.
5. **Sludge** : Solid wastes (faeces) that settle at the bottom in a settling tank.

F. Answer the following questions in detail :

Ans. 1. Functions of Blood

1. It transports oxygen as oxyhaemoglobin to body cells and bring carbon dioxide back to lungs.
2. It fights against infections and germs.
3. It helps in clotting of blood.
4. It transports digested food (glucose, amino acids, fatty acids, etc. from small intestine to body tissue cells.
5. It transports wastes for its removal.
6. It distributes heat evenly to the whole body.

2. Sexual reproduction : Reproduction that involves fusion of male and female gamete. Two parents are needed.

Asexual reproduction : Reproduction when a new individual is born from a single parent.

3. The easiest method of knowing the time was by observing the position of the Sun in the sky. The Sun appears at its highest position at noon. If you look at fixed pole, you will find that the length of the shadow of the pole is maximum in early morning. This shadow's length reduces to nothing (shortest) during noon. This decreasing and then increase in the length of shadow during the day was used in sundials to measure time.

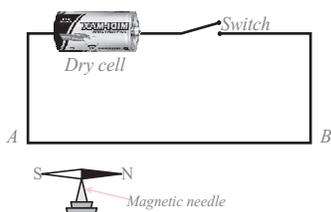
A sundial is placed under open sky. It has a gnomon which points in north-south direction. The shadow of the gnomon on the circular scale shows the time at that moment. The only drawback of sundial is that it does not work after sunset or on a cloudy day.

4. Aim : To show that when an electric current is passed through a wire, it behaves like a magnet.

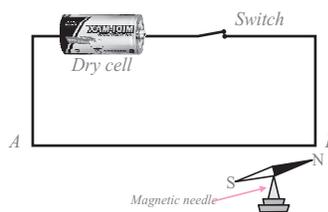
Materials required : A piece of copper wire, Magnetic needle, Switch.

Procedure : Follow the steps given below :

- Bring a bar magnetic near the magnetic needle. Observe what happens.
- The magnetic needle gets deflected.
- Remove the magnet and observe. The magnetic needle returns back to NS position as before.
- Connect a thin copper wire to a battery through a key, so that the section AB of the wire is in the north-south direction.



When no current flows through the wire, the magnetic needle points in the north-south direction.



When current flows through the wire, the magnetic needle gets deflected from the north-south direction.

Showing the magnetic effect of current

- Place a magnetic needle near the wire AB and let it settle in the north-south direction.
- Turn the switch ON to pass current through the wire.
- What happens to the magnetic needle?
- The needle gets deflected from its original position.
- Now turn the switch OFF and see what happens.
- Magnetic needle returns to its original north-south position.
- Repeat the experiment by reversing the direction of current, and see what happens.

Conclusion : From this experiment, it is concluded that when electric current is passed through a wire, it acts like a magnet.

5. Dispersion of Light

Sir Issac Newton found that when a beam of white light passes through prism, it disperses into seven different colours.

Light comes in various colours like blue light of gas flame, yellow of candle flame, red and green of traffic signals. Sunlight has no particular colour. It is known as white light. When a narrow beam of sunlight is allowed to pass through a prism, a rainbow is formed.

This band of seven colours is called spectrum and the phenomenon of splitting up of white light into different colours is called dispersion.



Colour bands

The colours in the spectrum are same as those in rainbow. A rainbow sometimes occurs when the Sun is shining after rain showers. The colours in the rainbow (violet, indigo, blue, green, yellow, orange and red) are due to dispersion of white light of the Sun by the droplets.

6. Regions closer to the equator get more heat from the Sun. So, the air in these regions gets heated and rises up. The cooler air from 0-30 degree latitude belt on both sides of equator moves in. Similarly, at poles, air is colder than at 60 degree latitude. So, warm air from these latitudes rises up and cold air from polar regions pushes downward.



Wind flow pattern

7. Some causes of the scarcity of water are discussed here.

Increasing Population

Increase in population increases the demand for more water. Construction of houses, shops, offices, roads, etc., decreases open areas like parks, gardens and playgrounds. This, in turn, decreases the seepage of rainwater into the ground. Moreover, a huge amount of water is needed for construction of buildings. Often ground water is used for this purpose.

Increasing Industries

Water is required for all kinds of industries. The number of industries is increasing day by day. Therefore, there is an increasing need for water.

Increasing Agricultural Activities

Due to population pressure, agricultural activities are increased. So, for irrigating crops, farmers need more water.

Uneven Rainfalls

In India there are some places that have excessive rainfall every year and some areas have very low rainfall. This uneven rainfall causes floods in some areas and droughts in some other areas. Desert areas like some parts of Rajasthan, having a very low rainfall, face the acute problem of water scarcity.

Water Pollution

Water is polluted by domestic sewage and industrial wastes. Some factories and industries are located near rivers. They pour their harmful, industrial wastes into river water. This further reduces the availability of fresh water.

8. In every forest there are many food chains. A food chain describes the feeding relationships and energy flow within a forest. Every food chain has a particular structure. It begins with an energy source, which is usually the Sun.

A food chain shows how each living thing gets its food. Plants are called producers because they are able to use light energy from the Sun to produce their food (sugar) from carbon dioxide and water. Animals cannot make their own food so they must eat plants and/or other animals for food. They are called consumers. There are three groups of consumers.

- (i) Animals that eat only plants are called herbivores or primary consumers.
- (ii) Animals that eat other animals are called carnivores. There are three groups of carnivores :
 - Carnivores that eat herbivores are called secondary consumers.
 - Carnivores that eat other carnivores are called tertiary consumers.
 - Carnivores that eat dead animal bodies are called scavengers.
- (iii) Bacteria and fungi that feed on dead plants and animals are called decomposers. The decomposers speed up the decaying process and make the nutrients for plants. When they have finished feeding, the bodies of plants and animals become reduced to the substances from which they were made.

In a tropical rainforest, there are many different kinds of plants that are producers. For example, a tree is a producer and the beetle that feeds on its leaves is a primary consumer. A tree frog feeds on the beetle and therefore it is a secondary consumer. A tree snake feeds on the frog and is a tertiary consumer.

We can say that food chains are simple representations of energy flow. When a herbivore eats, only a fraction of the energy (that it gets from the plant food) becomes a part of its body.

The rest of the energy is lost as waste or used up by the herbivore to carry out its life processes (e.g., movement, digestion, reproduction). Therefore, when the herbivore is eaten by a carnivore, it passes only a small amount of total energy (that it has received) to the carnivore. Because of the large amount of energy that is lost at each level in a food chain, the amount of energy that is transferred gets lesser and lesser.