

How Do Plants Live

Formative Assessment

A. Tick (✓) correct answer :

Ans. 1. (d) 2. (c) 3. (b) 4. (d) 5. (c) 6. (b)

B. Fill in the blanks :

- Ans. 1. **Glucose, Cellulose** are chemical substances present in food.
 2. Starch gives a blue-black colour with a solution of **Iodine**.
 3. **leaf** is the site of photosynthesis in plants.
 4. Autotrophs are all **green** plants.
 5. **Cuscuta** is a plant parasite.
 6. Plant food is stored in the form of **starch**.
 7. **Lichen** is an example of symbiotic association.
 8. **Saprotrophs** depend on dead and decaying organic matter for food.

C. Write 'T' or 'F' for the statements :

Ans. 1.F 2.T 3.F 4.T 5.T 6.T

Summative Assessment

A. Very Short Answer Questions :

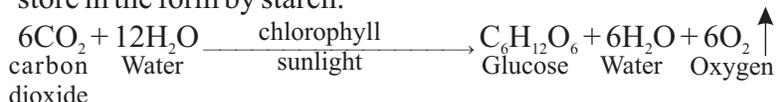
- Ans. 1. Glucose, Cellulose.
 2. Nutrition is the act of providing nutrients to the body cells of living organisms so that they can carry out activities to keep themselves alive.
 3. H₂O, sunlight, CO₂
 4. Photo energy change into chemical energy is called photosynthesis.
 5. **Chlorophyll**: (i) Chlorophyll is a green pigment.
 (ii) Chlorophyll absorbs the solar energy and can convert it into chemical energy.

Chloroplast: Food is made by the process of photosynthesis in chloroplast.

6. Water reach the leaves for synthesizing food by the Xylem.

B. Short Answer Questions :

- Ans. 1. Plants make their own food by the process of photosynthesis by take the CO₂ from environment, H₂O (water) in the presence of sun light and chlorophyll. Food that make by the green plants in called Glucose. That is store in the form by starch.



2. Green leaves are the kitchen of the plant, as in the cells of these leaves, there are tiny structures, the chloroplasts (chloros = green) where food is made by the process of photosynthesis.



Water and minerals are absorbed from the soil by the roots.

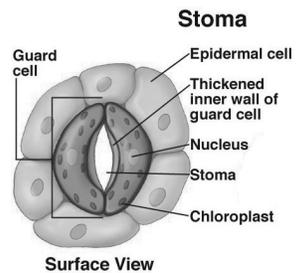
3. Insectivorous plants. These plants are also called carnivorous plants as they capture animals of different kinds, particularly insects. These are usually green and can make their own food. In this way, they supplement their normal autotrophic nutrition with a form of heterotrophic nutrition.
4. Vascular tissues are the conducting tissue in plant they are placed as double pipe line throughout the plant body, these are of two types Xylem for carrying water and minerals from roots to leaves and phloem, For carrying dissolved food from leaves to store organ of plants.
5. Nitrogen is important for all living being because it is a basic Ingrain in Camino acids that make up all proteins.
6. Stomata allow carbon dioxide to pass in and oxygen to be released out into the atmosphere and help in the process of evaporation.
7. **Saprotrophs** : Organisms feeding on dead and decaying organic matter.

C. Long Answer Questions :

Ans. 1. **Nutrient** : Components of food that are chemical substances and provide nourishment to the body. Nutrients provide us energy promote growth; repair womb out tissues and protector body from various diseases.

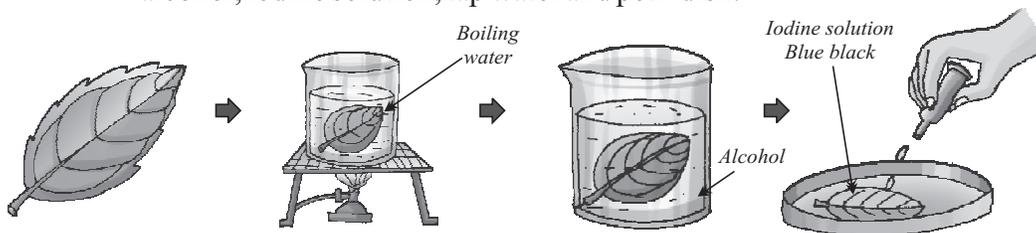
Nutrition : Nutrition is the act of providing nutrients to the body cells of living organism so that they can carry out activities to keep them selves alive.

2. Stomata is a Opening of uaves. Which help in evaporation. In stomata outer think layer is called epidermal cell that dived in many pices in epidermal cell a structure is called chloroplast that is green in colour dived in two parts. Where the epidermal cell and chloroplast join that structure is called Guard cell in one stomata chloroplast have 2 nucelus that present in middle of chloroplast. One hole between two chloroplast structure. This opening is open when evaporation process is start.



3. **Aim** : To test for the presence of starch in leaf.

Materials Required : Green leaf, beaker, tripod stand, burner, test tube, alcohol, iodine solution, tap water and petri dish.



Starch test on a green leaf

Procedure : Pluck a healthy green leaf of a plant which was kept in sunlight. Boil it in water contained in a beaker for about two minutes.



This will make the leaf soft and stop any further chemical changes in it. Place the leaf in beaker having alcohol. The alcohol will bleach the leaf and make it free from chlorophyll. Wash the leaf in water. Place it in a petri dish and add a few drops of iodine solution.

Observation : The leaf turns blue-black.

Conclusion : The leaf changes into blue-black colour due to presence of starch in it.

4. (i) **Saprotrophic Nutrition :** Organisms which feed on dead and decaying organic matter are called saprotrophs. Other terms used for saprotrophs with the same meaning are saprophytes and saprobionts. Saprotrophs secrete digestive juices on the dead and organic matter. It is then digested and converted into simple soluble forms.
- (ii) **Parasitic Nutrition :** Parasitic organisms live on or inside other living organisms called hosts and derive their food from them. The mode of nutrition in which organisms take in food from other living organisms is called parasitic nutrition.
- (iii) **Symbiotic Nutrition :** Two organisms living in close association with each other, being of mutual benefit are called symbionts (syn = together; bios = life) and the condition of living together is called symbiosis. The mode of nutrition in which a close relationship between two organisms of different species is established and they live together for their mutual benefit is called symbiotic nutrition.
5. The hollow leaves of Pitcher plant are filled with a fluid. Insects come to drink it, but the lid closes, the insects are drowned and eaten by the pitcher plant.
6. There are some other organisms which live together and share shelter and nutrients. This is called symbiotic relationship. It can be seen in certain types of fungi which live in the roots of trees. In this association, the tree provides nutrients to the fungus and, in return, receives help from it to take up water and nutrients from the soil. This association is very important for the tree.



Pitcher plant



Lichens

SYMBIOTIC NUTRITION

In Lichen, a chlorophyll containing partner, which is an alga and fungus live together (see fig). The fungus provides shelter, water and minerals to the alga and in return, the alga provides organic food to the fungus which it prepares by photosynthesis. Thus, both of them are mutually benefited from each other. This is called symbiosis.

7. **Nutrition in Plants :** The process by which an organism takes in food and utilizes it to carry out the different life processes is called nutrition. There are broadly two modes of nutrition in plants : autotrophic (auto, self;



tropho, nourishment) and heterotropic (hetero, other; tropho, nourishment).

Autotrophic Nutrition : The mode of nutrition where an organism prepares its own food by taking in simple substances present in its surroundings is called autotrophic nutrition. Organisms that show this type of nutrition are called autotrophs.

Heterotrophic Nutrition in Plants : The mode of nutrition in which organisms cannot prepare their food and depend on other plants and animals is called heterotrophic nutrition. Such organisms are called heterotrophs.

Replenishment of Nutrients in the Soil : Plants require nutrients such as carbon, hydrogen, oxygen, and so on. They get carbon and oxygen from the air and hydrogen from water. All other nutrients are absorbed from the soil. One of the most essential nutrients absorbed from the soil is nitrogen. Due to this the amount of nitrogen in the soil gets depleted. Thus, nitrogen needs to be added from time to time to replenish the soil.

Depleted Use up or become empty

This can be done by :

- (i) Planting plants like peas and beans alternately with other crops. Rhizobium present in such plants converts atmospheric nitrogen into water-soluble forms that is absorbed by the plant along with water.
- (ii) Adding fertilizers containing nitrogen to the soil.

D. Higher Order Thinking Skills (HOTS) :

- Ans.** 1. Photosynthesis process can't be done. 2. Yes
3. Plant shed its leaves if kept inside a closed room for too long. Because there is shortage of sunlight, CO₂, water.



How Do Animals Take Food

2

Formative Assessment

A. Multiple Choice Questions :

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

B. Find the odd one out and give reasons for the same :

- Ans.** 1. Herbivore, Carnivore, **Producer**, Omnivore.
2. Wisdom teeth, Permanent teeth, **Adult**, Milk teeth.
3. Digestion, Ingestion, **Circulation**, Assimilation.
4. Reticulum, Abdomen, Omasum, Rumen.

C. Fill in the blanks :

- Ans.** 1. After mixing with saliva, the bread tastes **sweet** due to conversion of **Starch** into **maltose**.
2. The secretions in stomach is collectively known as **gastric** juice.
3. Fats are broken down into **fatty acid** and **glycerol**.
4. Digestion of proteins begins in **stomach**.
5. Villi are found in **small intestine**.
6. Undigested semi-solid food remaining in large intestine is called **faeces**.



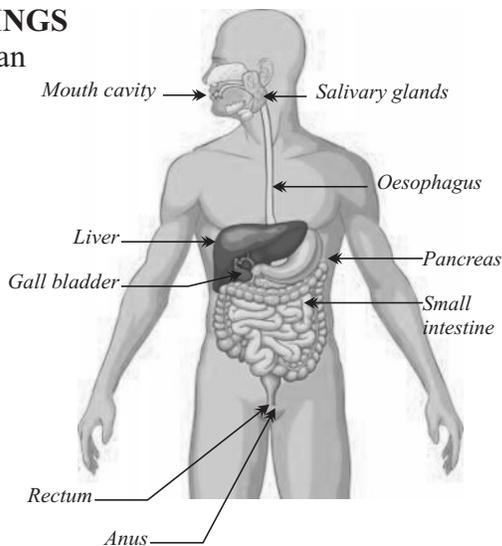
1. Ingestion Process of taking in food into the body of animal from external environment.	2. Digestion Breakdown of complex organic food into simple soluble forms so that it can be absorbed by the body cells. Certain chemical substances, enzymes, help in the breakdown of these complex food.	3. Absorption Taking in of soluble nutrients by the body cells.	4. Assimilation Utilisation of absorbed nutrients by body cells.	5. Egestion Removal of undigested waste products from the body.
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2. DIGESTION IN HUMAN BEINGS

The digestive system of human beings consists of the following :

Alimentary canal : A long, continuous and muscular tube consisting of organs of varying diameter and shape. In an adult, it is about nine metres long. It has opening at both ends and consists of following parts :

- Mouth
- Oesophagus/Food pipe
- Stomach
- Small intestine
- Large intestine
- Rectum



Digestive glands : Organs associated with the alimentary canal which secrete digestive juices into it. The different glands are :

- Salivary gland
- Liver
- Pancreas

- Grass is rich in cellulose and difficult to digest. Many animals, including humans cannot digest the cellulose. Then how do ruminants digest their food?
 - Firstly, it requires more chewing that is why ruminants have big chewing teeth with powerful jaw muscles.
 - Ruminants have a unique stomach divided into four compartments rumen, reticulum, omasum and abomasum.
 - The half chewed grass is swallowed and it first goes from mouth to rumen, the largest of the four compartments.
 - Bacteria and protozoa, present in the rumen breakdown the cellulose found in grass.
 - This half digested food then goes into the second muscular chamber, the reticulum from where it is sent back to the mouth as cud to be chewed again. This action is known as ruminating.
 - The richweed matter is swallowed for the second time.
 - By-passing the first two chambers, it enters the third chamber, the omasum, where food is broken down into still smaller piece. Excess water is absorbed.



- Finally it enters the fourth chamber, the abomasum which is the true stomach. Enzymes act upon the food and digestion progresses.

4. **Ingestion** : Amoeba sends out pseudopodia to engulf the prey. The pseudopodia surrounds the food without touching it. Later, pseudopodia fuse at their tips to form food vacuole.



Digestion : Inside the food vacuole, food gets digested and is broken down into simpler substances by the action of digestive enzymes.

Absorption and Assimilation : Digested food diffuses into the cytoplasm, where it is assimilated into the protoplasm.



Egestion : The undigested food is expelled from the hinder part of the body.

Food goes into the body of animal from the external environment, so that it can be absorbed by the body cells. Certain chemical substances, enzymes, help in the breakdown of these complex food.

5. In adults each jaw has four incisors (flat teeth for biting into food); two canines (pointed teeth for tearing tougher food such as meat); four premolars (for grinding food) and six molars (larger than premolars, also for grinding). Wisdom teeth are the last molars to come through, at the back of the mouth.

D. Higher Order Thinking Skills (HOTS) Questions :

- Ans.**
1. Sweet
 2. By this we understand that these animals have well-developed molars. They take food in large amount and then bring it back into their mouth for the purpose of chewing it properly.



Materials of Daily Use

3

Formative Assessment

A. Tick (✓) the correct option :

- Ans.** 1. (iii) 2. (ii) 3. (i)

B. Fill in the blanks :

- Ans.**
1. The whole process of obtaining silk starting from the silk moth is called **sericulture**.
 2. The sleeping period of a silkworm is **twenty-four** hours.
 3. The quality and quantity of wool depend upon the **breed** of the sheep.
 4. The thinner the fibre, the **better** is the wool.
 5. Wool has a **very high** tensile strength.
 6. Wool dissolves in **acids** and **alkalis**.

C. Match the columns A and B :

Ans. Columns A

Columns B

- | | |
|--------------|--|
| 1. Mulberry | (iii) The best feed for silkworms |
| 2. Organzine | (iv) The lengthwise thread in silk weaving |



- | | |
|--------------|--|
| 3. Tram | (v) The crosswise thread in silk weaving |
| 4. Combing | (i) To remove burrs from fleece |
| 5. Weighting | (ii) To soak silk in solutions of salts |

Summative Assessment

A. Very Short Answer Questions :

- Ans.**
1. Wool and silk are two animal fibres which are suitable for making fabrics.
 2. The new born of silk moth which emerge from eggs, called larva or silkworms. Silkworm (produce silk) is an example from the sources of animal fibres.
 3. The raw silk obtained is twisted to make what is known as thrown silk. The process is called throwing and the employees who throw the silk are called throwsters.
 4. The silk filament which is made by a cocoon is too fine and delicate to handle. So, many of them are reeled together to make a stronger thread, called raw silk. Broken cocoons are used to make low quality silk, called spun silk.
 5. Different kinds of silk are produced by different kinds of moths. The most common types are eri, moonga, tassar and mulberry.

B. Short Answer Questions :

- Ans.**
1. A cocoon is a soft covering that the worm spins with silky threads to protect itself. The thread is formed by the hardening of a liquid secreted by the worm. When the silkworm is fully grown, it is placed on some straw or small bushes on which it makes its cocoon.
 2. The raw silk obtained is twisted to make what is known as thrown silk. The process is called throwing and the employees who throw the silk are called throwsters.
 3. In India, sheep are shorn twice a year. In hot regions, this can be done thrice also. The best seasons for the purpose are spring and autumn. The sheep feels comfortable if shorn in these seasons.
A few days before shearing, the animal is washed thoroughly with water in order to remove dirt from the wool. The wool obtained from such an animal is called washed wool.
Shearing is done using a pair of scissors or electrically-driven shears. Bad shearing lowers the price of the wool, so shearing is done by experienced persons only. They shear the fleece as far as possible at one go and not in clumps. Any accidental cuts are treated with an antiseptic like iodine solution. The fleece are tied into bundles.
 4. The quantity and quality of wool largely depend upon the breed of the sheep. A sheep may not be of a breed yielding good wool. So they are crossed with better breeds which yield quality wool. The process is called crossbreeding. In our country, crossbreeding with some better breeds like Merino, Rambouillet, Somalia, Corriedale, Dorset and Soviet Merino has given better results.



Only healthy males are selected for breeding. The springs season is the suitable time for mating. The ewe gives birth to its lamb after a pregnancy of five months, at the end of the rainy season.

5. The worm completes its cocoon, of about 4 cm length, in about five days by producing 600-1200 metres of what is called silk filament.

C. Long Answer Questions :

- Ans.** 1. The process of shaving the hair of sheep is called shearing. In India, sheep are shorn twice a year. In hot regions, this can be done thrice also. The best seasons for the purpose are spring and autumn. The sheep feels comfortable if shorn in these seasons.

A few days before shearing, the animals is washed thoroughly with water in order to remove dirt from the wool. The wool obtained from such an animal is called washed wool. Shearing is done using a pair of scissors or electrically-driven shears. Bad shearing lowers the price of the wool, so shearing is done by experienced persons only. They shear the fleece as far as possible at one go and not in clumps. Any accidental cuts are treated with an antiseptic like iodine solution. The fleece are tied into bundles. The wool obtained from live sheep is called clipped wool and that from dead sheep, pulled wool.

2. During the feeding period, a silkworm sleeps four times (twenty-four hours each time) at intervals of about six days. While sleeping, its skin breaks and on awaking, the worm sloughs off, i.e., leaves the old skin and comes out in a new one. This process is called moulting.
3. The silk filament which is made by a cocoon is too fine and delicate to handle. So, many of them are reeled together to make a stronger thread, called raw silk. Broken cocoons are used to make low quality silk, called spun silk.

D. Higher Order Thinking Skills (HOTS) Questions :

- Ans.** 1. Sericulture is not very popular with people working for animal protection because it kills a number of silkworms during the production of silk. Silk is obtained from the cocoon of silkworm and it is the cruelty against the silkworm.
2. Wild life conservationists object to using 'shahtooh' shawls because these shawls made from the silk. Silk is an animal obtaining fibre and it is produced by the silkworm at the cost of its life. So, to protect the silk worm we should avoid the garments which are made from the silk.



Physical and Chemical Changes

4

Formative Assessment

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. (c) 2. (a) 3. (d)

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

Summative Assessment

A. 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.



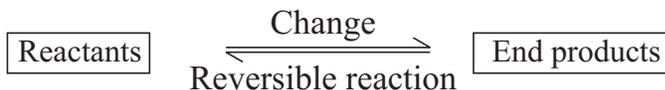
B. Answer the following questions in short :

- 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
In a chemical change the properties of products also undergone a change.
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.

C. Answer the following questions in detail :

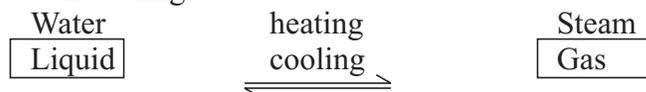
Ans. Properties of Physical Change

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.

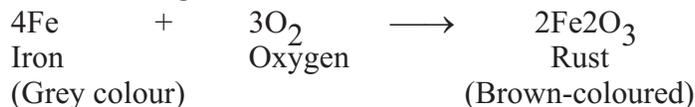
Burning of paper, spoilage of food, cooking of food, digestion of food,



photosynthesis, curdling of milk, ripening of fruits, rusting of iron, etc. are chemical changes.

2. **Rusting of Iron :**

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.



Acids, Bases and Salts

5

Formative Assessment

A. Tick (✓) the correct option :

Ans. 1. (iii) 2. (i) 3. (i)

B. Fill in the blanks :

- Ans.**
1. The acid found in tamarind is **tartaric acid**.
 2. Bases soluble in water are called **Alkali**.
 3. Bases turn red litmus solution **blue**.
 4. **Sodium chloride** is called table salt.
 5. Bases are **soapy** to touch.



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

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Tamarind, lemon, unripe mango, grapes, amla, tomato, vinegar, apple etc. are the some natural sources of acids.
2. Soap, shampoo, detergent baking soda etc. are the some sources of bases.
3. Litmus paper and turmeric (haldi) are the name of two natural indicators.
4. When red litmus paper is treated with base, it changes into blue colour. When blue litmus paper is treated with acid, it turns pink/red.

B. Short Answer Questions :

Ans. 1. China rose indicator gives dark-pink colour in acid and green colour in base. Turmeric remains colourless in acidic medium but turns red in basic medium.
2. When an acid is added to a base, a salt and water are formed.
Neutralisation Reaction The reaction between an acid and a base is called a neutralisation reaction. Salt and water are formed in this process with the evolution of heat energy.
3. The term 'acid' has been obtained from the Latin name Acidus which means sour. Acids are substances which are sour in taste. The sour taste of lemon juice is due to the presence of citric acid and sour taste of grapes or tamarind is due to tartaric acid and that of vinegar is due to acetic acid. Vitamin C present in citrus fruit is ascorbic acid. Formic acid is present in the sting of brown ants. The sharp pain caused by the sting of brown ants, nettles, and bees is due to formic acid.
4. (a) Tomato **acid**
(b) Eno **base**
(c) Lemon **acid**
(d) Grapes **acid**
(e) Milk **base**
(f) Apple **acid**
(g) Soap **base**

C. Long Answer Questions :

Ans. 1. Indicators are the substances that are used to test the acidic or basic nature of a substance. These are special chemical substances which change in colour when brought in contact with acids and bases. These indicators can be **natural, artificial or olfactory**.
Some examples of artificial indicators are phenolphthalein and methyl orange.
Vanilla essence and clove oil are called olfactory indicators as they give different odours in acidic/basic mediums.

Natural Indicators

(i) **Litmus** : Litmus is a most commonly used natural indicator made



from the extract of lichens. There are two types of litmus:

(a) **Red litmus paper:** When red litmus paper is treated with base, it changes into blue colour.

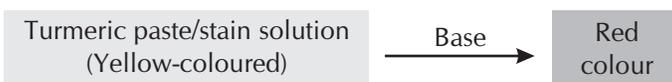
(b) **Blue litmus paper :** When blue litmus paper is treated with acid, it turns pink/red.

(ii) **Turmeric :** Turmeric (haldi), which is used in the kitchen as food ingredient, is a natural indicator. Turmeric acts as a very good indicator for acids and bases.

Steps to make Turmeric paper

1. Add small amount of turmeric in a little water to make a paste.
2. Now, put this paste on a blotting/filter paper and allow it to dry. Cut thin strips of this yellow paper.
3. Now, use this to differentiate between acids and bases.

When some one washes utensils in kitchen having turmeric on them, the colour immediately changes to red when soap/detergent is applied. This is because bases give a red colour with thrmeric as indicator.



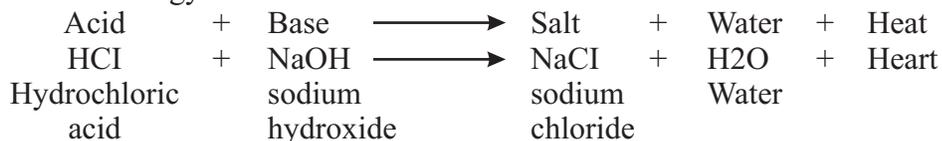
China Rose Indicator.

Steps to prepare this indicator.

- a. Take some China rose petals and put them in a bowl.
- b. Pour some warm water to it and keep it for sometime.
- c. On cooling, crush the petals with hand and then filter the mixture. You will get pick-coloured clear solution which can be used as an indicator. Use this indicator and observe the colour change in acidic, basic and neutral solutions.

2. Neutralisation Reaction

The reaction between and acid and a base is called a **neutralisation reaction**. Salt and water are formed in this process with the evolution of heart energy.



Importance of Neutralisation Reaction

- a. **Indigestion :** When our stomach secretes a lot of hydrochloric acid it causes acidity in our stomach. To relieve indigestion in our stomach, one must take some antacid such as milk of magnesia, which contains magnesium hydroxide. It will neutralise the effect of excessive acid.
- b. **Ant-sting :** The sting of an ant contains formic acid which it releases when it bites us. Its effect can be neutralised by rubbing a moist base-like baking soda or calamine lotion or solution of zinc carbonate.



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

Summative Assessment

A. 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 its colder part by actual movement of hot particles in it is called convection current.

B. Use the following terms against the sentences given.

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

C. Short Answer Questions :

- 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.
Laboratory thermometer : A thermometer used to measure the temperature of other objects.
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.



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) Cooknig food in vassals (ii) Heating water
(iii) heaters and blowers heat the room by setting up convection currents.

D. Long Answer Questions :

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 aso soon as the thermometer is pulled out the mercury level starts falling.

2. **Sea Breeze and Land Breeze :** In coastal areas, the breeze generally blows from sea breeze. At night, the breeze blows from land to sea and is called land breeze. Sea breeze and land breeze are actually convection currents.

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.

Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself



Weather, Climate and Adaptations of Animals

7

Formative Assessment

A. Tick (✓) the correct option :

Ans. 1. (iv) 2. (iii) 3. (iii)

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

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

C. Fill in the blanks :

- Ans. 1. The average weather pattern taken over a long period of time is called **climate** of that place.
 2. **Sun** cause all the changes in the weather.
 3. Rainfall is measured by **rain gauge** in **millimeters**.
 4. The air can hold different amount of **humidity** at different temperatures.
 5. The two regions of the earth with extreme climatic conditions are **polar regions** and **tropical regions**.

D. Match the following :

Ans.	Column A	Column B	Column C
1.	Camel	(i) Polar region	(a) Feet with sticky pads
2.	Monkey	(ii) Desert	(b) Flat and broad paw
3.	Polar bear	(iii) Tropical forests	(c) Well-padded wide feet
4.	Penguin		(d) Thin with long tail
5.	Red-eyed frog		(e) Webbed feet

Summative Assessment

A. Very Short Answer Questions :

- Ans. 1. Rainfall is measured by an instrument called rain gauge as shown in the given figure. A rain gauge is a graduated cylinder with a funnel at the top. Rainfall is generally measured in millimeters.
 2. Rajasthan is the state in India which has a typical desert climate.
 3. Polar bear and Penguin are the two animals which live in the polar regions of the earth.



4. Migration is a means to escape the extreme climatic conditions at home environment.

B. Short Answer Questions :

- Ans.**
1. The day-to-day conditions of the atmosphere at a particular place with respect to temperature, wind speed, humidity, rainfall, sunshine or clouds, etc., is called the weather at that place. The temperature, wind speed, humidity, rainfall, etc., are termed as elements of weather.
 2. The climate of region is actually the average weather pattern of that region. The meteorological department maintains the record of day-to-day weather conditions. The average of these weather patterns taken over 25-30 years is termed as climate of that region. If the temperature of a particular region is high whole of the year and it receives good rainfall, the climate of such as place is termed as hot and wet.
 3. Polar regions are situated near the poles—north pole and south pole. These regions remain covered with snow and the climate is too cold for most part of the year. The temperature in winter may be as low as -37°C . The sun does not set for six months in a year and for the other six months, it does not rise.
 4. The ability to adjust to one's surroundings is termed as adaptation.

C. Long Answer Questions :

- Ans.**
1. The climate of a region is mainly determined by its latitude. There are mainly three temperature zones of the world based on the difference in their climates:

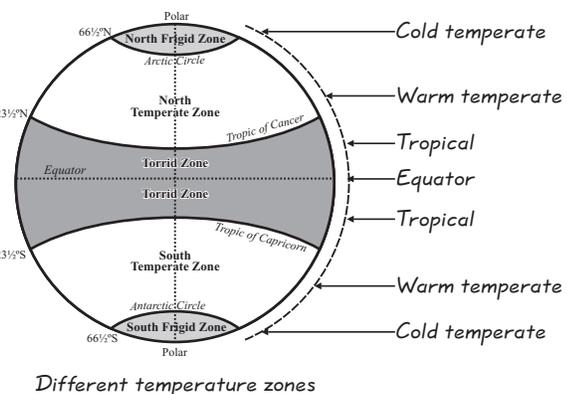
(i) The hot or **torrid** zone is the area around the equator which is heated by the direct rays of the sun.

(ii) The cold or **frigid** zone is the area around the north and the south poles which receives slanting rays of the sun.

(iii) The **temperate** zone is the area between the torrid and the frigid zone.

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

Another important factor that determines the climate of a region is its **proximity to the sea**. Regions close to the sea have a moderate climate whereas those away from the sea face extreme climatic conditions. It is a characteristic 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 regions.

The climate of a region is also influenced by **rainfall** it receives which in turn depends on factors such as, wind, proximity to the sea and presence of mountains. Mostly winds coming from the sea bring rainfall while the winds coming from the land are dry. The winds coming from the Indian Ocean or Bay of Bengal in monsoon season bring rainfall, while the winter winds coming from the northern mountains are cold and dry.

2. (a) Polar Bear

Adaptations in a Polar Bear

The body has a white fur. This blends with the white background of snow. This adaptation protects the polar bear from predators. It also helps in catching the prey.

- The fur has two layers. These two thick layers of fur protect the polar bear from the extremely cold surroundings.
- Other than fur, a thick layer of fat is present under the skin. This layer of fat also helps to keep the body warm.
- It has a strong sense of smell which helps in searching the prey from a distance.
- It can close its nostrils. This special feature helps the animal during swimming. By closing its nostrils, it can remain under water for long period.
- It has small ears that help it to retain as much heat as possible.
- Its paws are flat and broad which help it to walk on ice easily.
- It has long curved and sharp claws. This provides good grip and helps it to walk on ice.

(b) Penguin

Adaptation in a Penguin

- Penguin is white coloured from the underside and blends well with the white background of snow.
- The body is streamlined and the feet have webs. Both these features help in swimming. Penguins are extremely good swimmers.
- Like polar bears, penguins also have very small ears which help the animal to retain as much heat as possible.
- It has thick skin and a thick layer of fat under the skin. These features protect it from extreme cold.

(c) Birds in cold climate

Adaptations in Birds

The bodies of birds are covered with feathers to protect from the cold. For survival, birds must remain warm. They fly to warmer regions when winter sets in. They come back after the winter is over.

(d) Camel

The adaptation in camel are described here.



- It has a brown-coloured skin which blends well with the surroundings.
 - The hump of a camel stores fats and supports the animal to survive without food for some months.
 - It has long eyelashes which covers the eyes during sand storms.
 - It can close its nostrils to block sand from entering the nasal cavity.
 - The animals can drink over 40 litres of water at a time and this water is stored for future use.
 - It has well-padded wide feet which enable it to walk on hot sand.
 - It has thick lips which help it to eat prickly desert plants such as, cacti without hurting itself.
3. The climatic conditions in tropical rainforests are suitable for supporting a variety of plants and animals. The animals include lions, gorillas, monkeys, apes, tigers, elephants, leopards, birds, snakes, lizards, and insects. Since the number of animals living in rainforests is very large, there is intense competition between animals for food and shelter.

Adaptations for food: As there is intense competition for food, some animals have developed special adaptations to get food which is not easily available to all animals. For example, the bird **toucan** possesses a long, large beak. This type of beak helps the bird to reach the fruits on branches which are too weak to support the weight of the bird.

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

Other Types of Adaptations

Other adaptations may include sensitive hearing, sharp eyesight, thick skin and a skin colour that blends with the backgrounds (**camouflage**). Camouflaging provides mainly protection from predators. For example, lions and tigers have sensitive hearing and thick skins. The **beard ape** found in the rainforests of Western Ghats in India lives on trees. It has a silvery-white mane which covers the head from the cheeks down to its chin. As it lives on trees, it is good climber. It feeds on seeds, fruits, young leaves, stems and flowers. It also looks for insects under the bark of trees. Since it is able to get sufficient food on the trees, it rarely comes down to the ground.

Elephant is found in the Indian tropical rainforests. It has many types of adaptations to live in the rainforests.

4. Mountains get rainfall from moisture laden winds. When these winds hit the mountains, they move up. They rise up and the water vapour condenses to form water droplets. These droplets fall down in the form of rainfall or snowfall. The side of the mountain which receives rainfall is



called **windward side**. These winds then rise further and reach the other side of the mountains. Since there is not much moisture left, so they do not bring enough rainfall here. This side of the mountain is called the **leeward side**. For example, Mumbai present at the windward side of the Western Ghats gets enough rainfall, while Pune, on the leeward side does not get much rain.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Delhi would have moderate climate if it was near the sea.



Soil

8

Formative Assessment

A. Answer the following questions orally :

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

B. 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 | |

Summative Assessment

A. Define the following terms :

- Ans.**
- Loamy soil :** A mixture of sand, silt, clay and humus. It is the best type of soil for cultivation.
 - Weathering :** the breaking down of rocks due to the action of natural force such as wind, water, glaciers etc.
 - 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.
 - 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.
 - 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) Clearing 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. Long Answer Questions :

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.
 - (ii) **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.
 - (iii) **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.

D. Higher order thinking Skills (Hots) Questions :

- Ans.** 1. Farmers sometimes plough the soil deeply to make it more fertile. By ploughing deeply he make sure that their is enough air in the soil. Also the humas gets mixed with the soil making it more fertile.



Respiration, Circulation and Excretion 9

Formative Assessment

A. Tick (✓) the correct option :

- Ans.** 1. (i) 2. (i) 3. (iii)

B. Write the correct organs for the following organ systems :

- Ans.** 1. Human respiratory system **lungs**.
2. Plant respiratory system: **stomata**.
3. Human circulatory system: **Heart**.
4. Plant circulatory system: **xylem and phloem**.

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

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

Summative Assessment

A. Very Short Answer Questions :

- Ans.** 1. The process of inhalation and exhalation is known as breathing.
2. The walls of the capillaries are so thin that diffusion of gases and chemical substances takes very easily.
3. Blood consists of many types of cells suspended in liquid called plasma.



these include Red blood cells, white blood cells and blood platelets.

4. Sap is a white liquid that acts as a medium for transporting materials inside a plant body.

B. Short Answer Questions :

Ans. 1. **Aerobic** : Process of respiration that takes place in the presence of oxygen

Anaerobic : Process of respiration that takes place in the absence of oxygen

2. The series of chemical reactions that result in the release of energy by the oxidation of food particles is known as respiration or cellular respiration.
3. Respiration in cells is a physiological process. It is the characteristic features of living beings. In this process no external source of energy is required and there is no need of oxygen. But without oxygen burning or combustion can not be possible. External source of energy is required for burning or combustion.
4. Most plants have a white liquid called sap, which acts as the medium for transporting substances inside a plant body. A connective tissue of plant called xylem takes water and up the stem to the leaves. Absorption of water and nutrients is a continuous process. This is because water is being continuously lost from the leaves by the process of transpiration. As a result a low pressure is created and a pulling force results which pulls up the water and nutrients. This process of pulling up water and nutrients is also known as the ascent of sap.
Food is made by the leaves. Once the food is prepared it needs to be sent to all parts of the plant body. The method by which it takes place is called translocation. Special types of tissues of plants called phloem act as pipelines, and carry the prepared food to all parts of the body.
5. These are thin-walled tubes and form a network of extremely small blood vessels between arteries and veins. The walls of the capillaries are so thin that diffusion of gases and chemical substances takes very easily.

C. Long Answer Questions :

Ans. 1. Blood is a connective tissue that flows through the entire body. It forms a medium through which nutrients, important gases, water and body waste products are transported inside the body. The blood flows in blood tubes, namely, arteries, veins and capillaries. Blood constitutes about 8% of the body weight. An average male body has about 5 to 6 litres of blood. Blood consists of many types of cells suspended in liquid called plasma, which is a straw-coloured liquid.

2. **The Heart :-** The heart is a four-chambered muscular organ that pumps blood to all parts of the body. It is able to do so by the rhythmic contractions and relaxations of its muscles. These are termed as the heart beats. Generally a normal heart beats about 60 to 80 times a minute. We can hear our heart beat with the help of a stethoscope.



As your heart beats and forces blood through your body, you would feel a throbbing sensation at any place where an artery comes close to the surface of your skin, such as your neck, wrist, or upper arm. This throbbing sensation is called the pulse.

The four chambers of the heart are:

- (i) The right auricle
- (ii) The left auricle
- (iii) The right ventricle
- (iv) The left ventricle

The right auricle opens into the right ventricle and the left auricle into the left ventricle. The walls of the ventricles are thicker, since they have to push blood to reach the farthest parts of the body. The walls of the auricles are thinner than those of the ventricles, because the auricles have to pump blood into the ventricles, which is very near. The blood in the right side of the heart remains completely separated from the left side with the help of valves. Valves separate the two chambers which allow blood to flow only in one direction. Thus, there is no mixing of oxygenated (oxygen-rich) and deoxygenated (carbon dioxide-rich) blood.

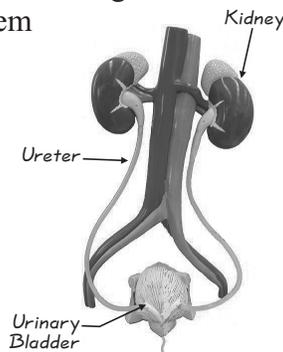
The veins bring deoxygenated blood to the right auricle from all parts of the body. This blood is pumped into the right ventricle, which in turn pumps it into the pulmonary artery that sends it to the lungs for oxygenation.

The left ventricle then sends the oxygenated blood to all parts of the body.

3. Blood groups play an important part in blood transfusions. Blood transfusion involves a donor, whose blood is given to another person, the recipient.

There are four types of blood groups in human beings: A, B, AB, and O. Group O is called a universal donor, which means a person with blood group O can donate blood to any of the blood groups, i.e., A, B, AB or O. Group AB is called a universal recipient, which means that a person with the blood group AB can receive blood from any of the four groups. It is very important to match the blood groups correctly before transfusion. A mismatch can lead to clotting of the blood and the death of the recipient.

4. The excretory system



The excretory system



- | | |
|----------------|-------------|
| 4. Hairy seeds | (v) Madar |
| 5. Bud | (i) Yeast |
| 6. Eyes | (iv) Potato |

E. Write 'T' or 'F' for the following statements :

Ans. 1.T 2.T 3.F 4.T 5.T

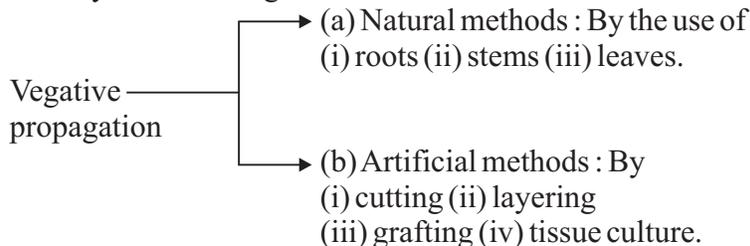
Summative Formative

A. Define the following terms :

- Ans.** 1. Root, stem, bud, flower, leaf, seed.
 2. The production of new individuals from the parents is known as reproduction.

MODES OF REPRODUCTION : Plants reproduce by various methods. These methods can be divided into two types : (i) asexual reproduction, and (ii) sexual reproduction.

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, stems and leaves. It can be done by the following methods :



5. **Fertilization :** After pollination, the fusion of male gamete with the female gamete takes place. The process of fusion of male and female gametes is called fertilization.

Fertilization leads to the formation of zygote which develops into an embryo.

During fertilization, the following events occur :

- After landing on the stigma, the pollen grains germinate and produce their tubes. The tubes are called pollen tubes. They carry the male gamete.
- Only one pollen tube reaches the ovule. Female gamete is present inside the ovule.
- Finally, the male gamete fuses with the female gamete; thus fertilization occurs.

B. Short Answer Questions :

- 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.

There are different methods by which new individuals are produced by their parents. In this chapter, we shall learn about these methods.

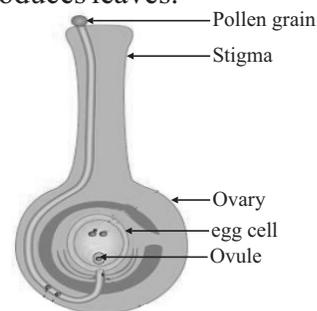
2. (a) Bacteria (b) spirogyra (c) mosses (d) Yeast
3. (a) eyes (b)? (c) Eyes, Buds (d) Leaves
4. **Vegetative propagation by grafting** : it is very common method of propagation in hard wood plants. In this process, the stem of a desired plant with good characters (such as flowers, leaves and fruits) is 'fixed' on the stem of other plant with good root system.
5. **Grafting** : This is very common method in hard woody plants. In this method the stem of a desired plant with good characters (such as flowers, leaves and fruits) is joined on the stem of other plant with good root system.

Cutting : Plant a part of a stem in moist soil. After sometime it grows into a plant. This method is called stem cutting method. The stem used must have some buds. The basal side of the stem in soil produces roots from the buds and the apical side of stem above soil produces leaves.

6. **Pollination** : The transfer of pollen grains from anther to the stigma of a flower with the help of various agents like birds, insects, wind, water, animals etc. is termed as pollination. All these are called agents of pollination.

Types of Pollination : Pollination is of two types— self pollination and cross pollination.

7. **Characteristics of wind pollinated flower** : Wind pollinated flower has small petals which are often brown and dull green. neither have scent nor nectar. The pollen is produced in great quantities and is very light and smooth so that it can be blown in the wind and stays clumping together.
8. **SEXUAL REPRODUCTION** : 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.



Insect pollination by a bee

C. Long Answer Questions :

- 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 :

- a. budding
- b. fission binary and multiple
- c. fragmentation
- d. 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 given).

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. These green patches are called algae.

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. **Pollination :** Various agents like birds insects wind water animals etc. is transfer the pollengrains from anther to the stigma of a flower this process is called pollination

Types of Pollination : There are following two types of pollination :

- a. Self pollination
- b. Cross pollination
- b. **Self pollination :** When pollen grains are carried from anther to stigma of the same flower, it is known as self pollination.
- b. **Cross pollination :** When pollen are carried from another of one flower to stigma of another flower, it is known a cross pollination.

Features of wind pollinated flower are as follow.

- a. These flowers have small petals which are offen brown and dull green.
- b. There flower neither have scent nor nector.



- c. The pollen is produced in great quantities and is very light and smooth so that it can be blown in the wind and stops its clumping to gather.

Features of insect-pollinated flowers are as follows.

These flowers have large brightly coloured petals to attract insects.

They are often sweetly scented and usually contain nectar. Also these flowers have moderate quantity of pollen.

3. **Vegetative propagation by artificial methods (Artificial propagation) :**

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 a 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 another plant with good root system. The grafted plant has :

(a) Stump/scion : The stem part with desired characters fixed on another stem. A scion has :

–good vegetative growth or cambium activity.

–good leaves, flowers and fruits production.

(b) Stock : The stem part fixed to soil with extensive or good root system. A stock has:

–good cambium activity.

–good root system and absorbing capacity but poor leaves, flowers and fruits.

- (ii) **Vegetative propagation from cutting of stem.** Plant a piece of a stem (suitable length) in moist soil, and after some time it grows into a plant. This method is called stem cutting method. It 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 some time.
- (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.

Advantages of Vegetative Propagation

- (i) Identical daughter plants. The plants produced by vegetative propagation are identical (similar in all respects to their mother plant) if grown under same condition and method.
- (ii) Less care. Plants grown by vegetative propagation methods need less attention/care in their early stages of growth than the plants grown from seeds.



- (iii) Faster and large number of plants. Vegetative propagation methods are used to produce plants faster and in large number.
4. Each plant produces a large number of seeds. A part of these seeds can be collected and used for producing seedlings. Some fruits have structure favourable for dispersal by water. Some of these seeds and fruits are carried away by various agents to distant places.

The three main agents which help in the dispersal of seeds and fruits are

- Wind
- Water
- Animals

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. Eg-Drum, stricks.

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. Eg- Xanthium, Tribulus.

5. (1) There are many methods by which parents produce their young ones :
- Asexual Reproduction :** The process of reproduction in which only one parent is involved and no sex cells are involved is known as asexual reproduction. Different types of asexual reproductions are
- (i) Budding : Yeast, Hydra etc.
 - (ii) Fragmentation : Spirogyra etc.
 - (iii) Spore formation Bacteria, ferns, algal etc.
 - (iv) Vegetative propagation : It can be done by the following methods.

(A) Natural Methods :

- a. By roots : Guava, mint, dohlia etc.
- b. By stem : Potato, garlic, onion etc.
- c. By leaves : Bryophyllum etc.

(B) Artificial Methods

- a. Grafting : Mango, guava etc.
- b. Cutting : Sugarcane, rose, cactus etc.
- c. Layering : grapes, jasmine, bougainvillea etc.
- d. Tissue culture : Orchids, asparagus etc.

Sexual Reproduction : The process of reproduction in which both parents and sex cells are involved is known as sexual reproduction. In



this process, new plants are produced from seeds. It is the most common method of reproduction in plants.

- (2) Vegetative propagation is the process of producing new individual plants by the use of vegetative parts of a plant such as, root, stem, leaves etc.

Advantages of Vegetative Propagation

- (i) Plants grown by vegetative propagation methods need less attention in their early stages of growth than the plants grown from seeds.
 - (ii) Plants produced by the methods 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.
 - (iii) Vegetative propagation methods are used to produce plants faster and in large number.
 - (iv) The plants produced by vegetative propagation are identical if grown under same condition and method.
 - (v) Vegetative propagation is used to grow plants that do not produce seeds in their fruits. Seedless fruits are liked by man such as banana, pineapple, seedless grapes, jasmine, oranges, sugar cane, etc.
- (3) **Fertilisation** is the process of fusion of male nucleus with female nucleus.

The stages of fertilisation in a flower are following :

- (i) **Growth of pollen tube** : After reaching the stigma of a flower, the pollen grains absorb the nutrients secreted by the stigma. The pollen tube grows through germ pore of pollen grain.
 - (ii) **Male gametes** : The pollen tube has two male gametes.
 - (iii) **Entry of pollen tube into ovule** : The pollen tube with two male gametes enters the ovule through a small opening called micropyle. Finally, it goes near the egg cell.
 - (iv) **Release and fusion of gametes** : The male gametes are released inside the ovule and they fuse with female gamete and a nucleus. Thus, fertilisation has taken place. The fertilised ovule is called zygote.
6. 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.

Advantages of cross pollination :

- (i) Cross pollination helpful for develop new varieties (spp.)
- (ii) It is helpful to decrease the diseases in plant.
- (iii) It is helpful to transfer new Qualities in plants.

D. Higher Order Thinking Skill (HOTS) Questions :

Ans. Do yourself





Formative Assessment

A. Tick (✓) the correct option :

- Ans. 1. (iii) 2. (ii) 3. (i) 4. (ii)
5. (iv) 6. (iii) 7. (i) 8. (iv)

B. Fill in the blanks :

- Ans. 1. When an object covers equal distances in unequal intervals of time, its speed is **uniform**.
2. One thousand year is equal to one **millennium**.
3. **Motion** and **rest** are relative terms.
4. One solar year is equal to **365** days.
5. A clock which use pendulum as timing device is a **modern** clock.
6. One leap year is equal to **366** days.
7. A **simple** pendulum has a period of 2 seconds.
8. Displacement can be **positive or negative** whereas distance travelled can never be **negative**.
9. SI unit of speed is **meter/second**.

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

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

Summative Assessment

A. Very Short Answer Questions :

- Ans. 1. **Time** : Time is the interval between two events.
2. The only drawback of sundial is that it does not work on a cloudy day or after sunset.
3. Simple pendulum is an instrument having a metallic heavy point called bob suspended by a thread.
4. **Ancient clocks are** : Sundial, sand clock, candle clock and water clock.
5. **Distance** : Distance is the actual distance travelled by an object.
6. **Uniform motion** : When a moving object covers equal distances in equal intervals of time, it is said to be having uniform motion.
7. Under uniform motion, distance and displacement are equal.
8. Distance travelled by a moving object in unit time is called speed.
SI unit of speed is metre per second or ms^{-1} and kilometer per hour or kmh^{-1} .

B. Short Answer Questions :

- Ans. 1. **Non-uniform Motion** : When an object covers unequal distances in equal intervals of time, the object is said to be having a non-uniform motion.
A cycle moving on a busy road describes non-uniform motion. It moves



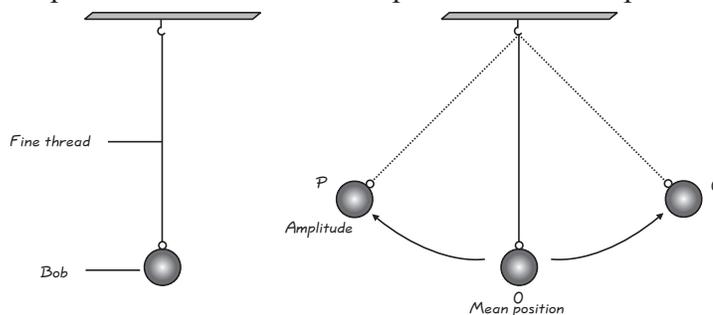
slow or fast, so it do not cover equal distances in equal intervals of time. All moving objects generally perform non-uniform motion.

- We have realised the importance of time. For special things, we need to measure the time accurately. For scientific calculation and rocket launcher, another type of clocks named atomic clocks are used. Atomic clocks are very accurate. They have an error of one second in million years.
- Simple Pendulum.** It is an instrument having a metallic heavy point called bob suspended by a thread.

If we take the bob at one end say P as shown in [Fig (b)] given on the next page, and release it, it begins to move to and fro. It is a type of motion which repeats after regular intervals. This kind of a motion is an example of periodic motion which is also known as oscillatory motion.

The pendulum completes one oscillation when bob starts from one extreme position, goes to other end and then comes back again at that point.

The period of oscillation: Time taken to complete one oscillation is called the period of oscillation. Time period does not depend on mass of bob.



(a) A simple pendulum

(b) Different positions of the bob of an oscillating simple pendulum

C. Long Answer Questions :

- Ans.** 1. A continuous change in the position of an object relative to other object is called mechanical motion. A man sitting in a train is moving relative to railway tracks, farms, mountains, railways, etc., but he is at rest with respect to other persons sitting in the same coach.

For a man moving in a bus, trees, buildings, etc., appear to be moving in backward direction. For those people who are standing on the road, the bus is moving in forward direction. And at the same time, people sitting in the bus are not changing their position with respect to each other, so they appear at rest. So, rest and motion are relative terms. A body that does not change its position with respect to others is said to be at rest, i.e., it is stationary.

- 1. Uniform Motion**

When a moving object covers equal distances in equal intervals of time, it is said to be having uniform motion.

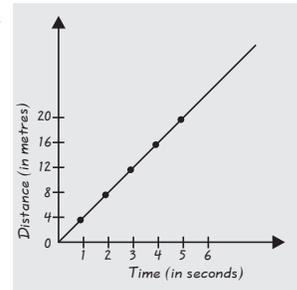
Let us make an observation table showing the distances covered by an object in equal intervals of time.

Time (in seconds)	0	1	2	3	4	5
Distance covered (in metres)	0	4	8	12	16	20

The distance covered in first second is 4 m. The distance covered in 2nd second is 4 m, i.e., is $(8-4) = 4$ m and so on. So, we can say that object covers equal distances in equal intervals of time.

Let us perform a simple activity to know the position of an object graphically not moving in straight line.

The graph given here shows the distance covered by an object in equal time intervals. The graph is a straight line. Such a graph represents **uniform motion**.



Distance-time graph showing uniform motion

2. Non-uniform Motion

When an object covers unequal distances in equal intervals of time, the object is said to be having a **non-uniform motion**.

A cycle moving on a busy road describes non-uniform motion. It moves slow or fast, so it do not cover equal distances in equal intervals of time. All moving objects generally perform non-uniform motion.

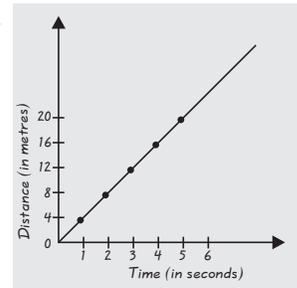
3.

Time (in seconds)	0	1	2	3	4	5
Distance covered (in metres)	0	4	8	12	16	20

The distance covered in first second is 4 m. The distance covered in 2nd second is 4 m, i.e., is $(8-4) = 4$ m and so on. So, we can say that object covers equal distances in equal intervals of time.

Let us perform a simple activity to know the position of an object graphically not moving in straight line.

The graph given here shows the distance covered by an object in equal time intervals. The graph is a straight line. Such a graph represents uniform motion.



Distance-time graph showing uniform motion

D. Higher Order Thinking Skills (HOTS) Questions :

- Ans.**
- $108 \times \frac{5}{18} = 30$ m/s
 - Speed of athlete = 10m/s
Speed of cyclist = $24 \times \frac{5}{18} = 6.6$ m/s
So, Athlete is faster
 - $40 \times \frac{18}{5} = 144$ km/h
 - Average speed = $\frac{\text{Total distance}}{\text{Total hours}}$



F. Tick the odd one out giving reason :

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

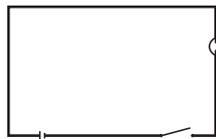
Summative Assessment

A. 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.

B. Short Answer Questions :

- 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. The copper wires used for making connections in the circuit do not get hot when current flows through the circuit. This is because copper is a good conductor and offers very little resistance to the flowing current. While nichrome has a high resistance.
4. **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).
The figures given in



(a)



(b)

the next column are (a) An open circuit diagram (b) A closed circuit diagram



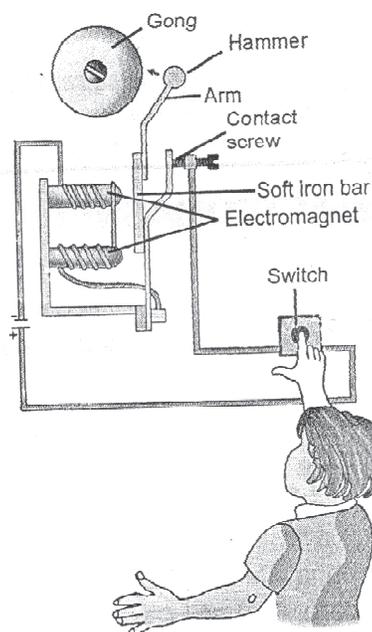
showing both type of circuits—open and closed—using the symbols we have learnt earlier used for representing electrical components.

- 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.

7. Electric Bell

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

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



C. Long Answer Questions :

- 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 over current. Fast blow fuses open quickly. Slow blow fuses which are common in household circuit open only if the condition of over current continues for sometime.

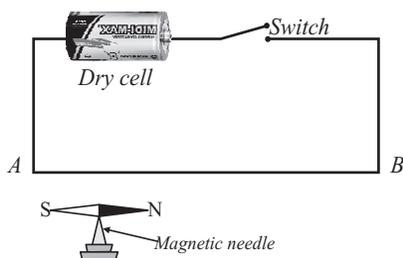
- Aim :** To show that when an electric current is passed through a wire, it behaves like a magnet.



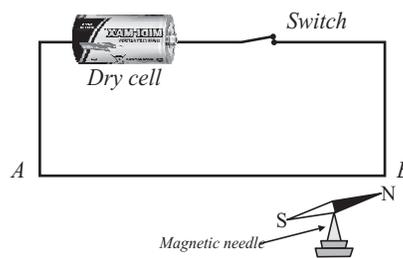
Materials required : A piece of copper wire, Magnetic needle, Switch.

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.



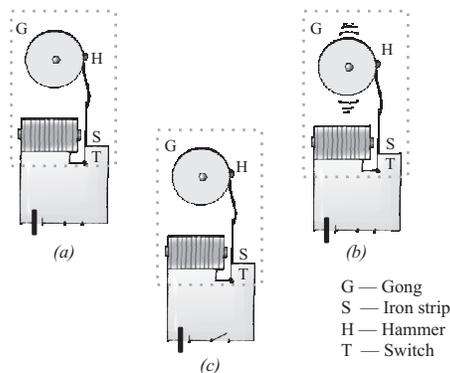
When current flows through the wire, the magnetic needle gets deflected from the north-south direction.

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



Working of an electric bell



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 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. **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). 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.
5. An electric bulb is represented by a circle with a curved (M-shaped) wire inside it. The curved wire represents the filament of the bulb. The filament glows when an electric current passes through closed circuit. When the switch is off bulb can't emitting when the switch is on bulb starts emitting light.

D. Higher Order Thinking Skills (HOTS) Questions :

- Ans.** 1. Do yourself 2. Do yourself 3. No

Fun Time

Do yourself



Winds, Storms and Cyclones

13

Formative Assessment

A. Tick (✓) the correct option :

- Ans.** 1. (i) 2. (i) 3. (ii) 4. (i)

B. Write 'T' or 'F' for the following statements :

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

C. Fill in the blanks :

- Ans.** 1. Moving air is called **wind**.
 2. Air pressure **decreases** when wind speed increases.
 3. Air moves from the region of **high** air pressure to the region of **low** air pressure.



4. Wind is generated due to **uneven** heating of land and water.
5. Warm air is **lighter** than cold air and **goes up**.
6. Thunderstorm is accompanied by high speed wind, **lightning** and **heavy rainfall**.

D. Match the following :

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

Summative Assessment

A. Very Short Answer Questions :

- Ans.** 1. Anemometer 2. Wind vane 3. Warm air
4. The east coast 5. Cyclones

B. Short Answer Questions :

- Ans.** 1. When air moves it is called wind or in other words moving air is called wind. Air moves from the region of high air pressure to the region of low air pressure. The greater the difference in the pressure, greater is the speed of the wind.
2. The regions around the equator are heated by the direct rays of the sun. The air in these regions gets heated and rises and the cooler air from the surrounding regions moves in. These winds blow from north and south towards the equator.
The regions around the north and south poles are colder as the sun rays are slant the most in these regions. As a result, cold wind moves northwards from the south pole and southwards from the north pole to fill the gap generated by the rising warm air at latitudes of about 60°. The flow of winds is not exactly vertically north to south or from south to north. A change in the direction of wind is seen due to rotation of the earth.
3. To demonstrate that air exerts pressure.
- Take a tin can with a lid and fill in two-thirds with water.
 - Boil the water on a burner.
 - Now put off the burner, cover the mouth of the can with its lid tightly and pour cold water on the hot can.
 - You will see that the tin loses its shape.
 - When the water in the can is heated, it changes into vapour form. When cold water runs over the tin can containing hot water, some of the steam in the can turns back to liquid state, reducing the quantity of air inside. This reduces the air pressure inside the can compared to the air pressure outside. So, the can gets compressed.
4. The upward movement of warm air and downward movement of cold air leads to stormy winds along with rainfall, lightning and thunder. These



events together are called thunderstorm. A thunderstorm fades away when the rising column of hot air cuts off due to decreased precipitation.

5. **Thunderstorm** : The upward movement of warm air and downward movement of cold air leads to stormy winds along with rainfall, lighting and thunder. These events together are called thunderstorm.

Tornadoes : A tornado is another type of storm and has a dark funnel shaped cloud that reaches to the ground from the sky. It is formed when a rising column of hot air meets a horizontal current of cold air.

C. Long Answer Questions :

- Ans.** 1. Cyclones generally develop over tropical seas. The air, after becoming hot by sun rays, rises creating a region of low pressure. Cold air from surroundings comes in and rises up as a result of the heat of the sun. This process continues developing a current of air. The rotation of earth takes this air current around the region of low pressure. The centre of cyclone which is also called the 'eye' is a calm area with a diameter of about 10 to 30 km. It is a region of low intensity winds and is free from clouds.

The space around the eye is the region of thick clouds with heavy rains and high speed winds of 150-250 km/h. This cloudy space is about 150 km in size. Cyclones are common phenomenon and are given different names in different places. Cyclones developing over the western pacific region are called **typhoons** whereas those developing over Indian Ocean or Bay of Bengal are called **cyclones**. The whole coastline of India is vulnerable to cyclones, particularly the east coast. The frequency and intensity of cyclones along the west coast is much less as compared to the east coast. Cyclones produce giant waves in the sea along with torrential rains.

IMPACT OF CYCLONES : We know the fact that natural disasters kill more and more people year after year. Cyclones are very destructive as they travel over seas at 15-30 km/h and the violent winds push water towards the shore even when the storm is hundreds of kilometers away. This is actually the first indication of a coming cyclone. The central low pressure area lifts the water surface in the centre to a height of 312 metres and it appears like a water wall going towards the shore. As a result seawater enters and floods the low lying coastal regions causing loss of life and property. This reduces the fertility of the soil also. Since cyclones are accompanied by heavy rainfall, it further worsens the flood situation. In addition, the communication system, bridges, livestock, buildings, trees and many other man-made structures are also destroyed by high speed winds and rainfall.

2. Because soil does not hold the roots straggly.
3. The precautions to be followed by the people living in cyclone prone regions are:
- People living in cyclone prone regions should make arrangements to



shift necessary household goods, domestic animals and vehicles to safer places.

- Warnings issued by meteorological department through TV, radio or newspapers should not be ignored.
 - 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 more precautions to safeguard their interests like:
 - Never touch wet electric switches or wet electric wires.
 - Drinking water should be purified before use as it may get contaminated.
 - Cooperate and help your friends and neighbours.
 - Avoid driving as the road may get damaged by the flood water.
4. Thunderstorms occur in hot humid, tropical areas. The air over the land gets heated, becomes light and rises. The upward movement of warm air and downward movement of cold air leads to stormy winds along with rainfall, lightning and thunder. These events together are called thunderstorm.

Cyclone is a type of storm which develops on the sea and has high speed winds swirling around a low pressure centre called the eye of the storm. Cyclones generally develop over tropical seas. The air, after becoming hot by sun rays, rises creating a region of low pressure. Cold air from surroundings comes in and rises up as a result of the heat of the sun. This process continues developing a current of air.

5. **Thunderstorm** : Thunderstorms occur in hot humid, tropical areas such as India most frequently. The air over the land gets heated, becomes light and rises. In doing so, the water vapour condenses fast to form tiny droplets of water which freeze forming ice particles. During the condensation of water vapour and freezing of droplets, a large amount of heat is given out which further pushes the air up at a higher speed. The water droplets and ice particles rub against each other in fastly rising air. This develops an electric charge which is released by a stroke of lightning. The lightning heats up the surroundings and makes the air expand very fast. In doing so it produces a **thunderous sound**. The upward movement of warm air and downward movement of cold air leads to stormy winds along with rainfall, lightning and thunder. These events together are called **thunderstorm**. A thunderstorm fades away when the rising column of hot air cuts off due to decreased precipitation.

D. Higher Order Thinking Skills (HOTS) Questions :

- Ans.**
1. We make holes in hoardings so that the air easily gets passes through it. As the hoardings are mostly made of cloth material they can get affected and lose their place if the air is not allowed to go pass them.
 2. In India rains are heavy in summer and less in winters because clouds are



mostly formed due to the process of evaporation. In summers the rate of evaporation is quite high in comparison to that in winters.



Light

14

Formative Assessment

A. Multiple Choice Questions :

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

B. Fill in the blanks :

- Ans. 1. A **Beam** can be represented by a number of rays.
 2. If the rays from a source of light meet at a point they are called **vectilinear**.
 3. **convex** mirrors can be used to see a magnified image of our face.
 4. For regular reflection to occur, the surface must be smooth and **Polished**.
 5. We can make a convex mirror by silvering the **plane** portion of a cut portion of a hollow glass sphere.
 6. An **angle** is formed when two or more rays meet or appear to meet at a point.

C. Write true or false :

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

D. Match the following :

Ans.	Column A		Column B
1.	Sun	—	(a) Travels in a straight line
2.	Light	—	(b) Shiny surface
3.	Mirror	—	(c) Colours of rainbow
4.	VIBGYOR	—	(d) Luminous body
5.	Lens	—	(e) User mirror
6.	Periscope	—	(f) Magnifying glass

Summative Assessment

A. Very Short Answer Questions :

- Ans. 1. **Luminous Objects** : Objects that produce their own light.
 2. A very narrow stream of light energy showing the direction of path taken by light is called a ray.
 3. Object is generally taken as an opaque object upon which when a beam of light falls an image is formed.
 4. The set of colours formed on the splitting of white light is called the spectrum of white light.
 5. A ray of light will bent a little as it passes from air to water.
 6. Concave

B. Short Answer Question :

- Ans. 1. **Rectilinear Propagation of Light** : Light travels in straight lines. If something blocks its path, it can only illuminate the part which is facing it.



2. When light falls on a smooth or polished surface, the surface reflects the light in a well defined manner. This is called regular reflection. Regular reflection takes place on a mirror. On the other hand, when light falls on a rough or uneven surface, it gets reflected and scattered in all directions. This is called diffused or irregular reflection. Diffused reflection does not give rise to image formation. Diffused reflection can take place on a wall, a wooden almirah or other surfaces.
3. (a) On the bulging side you will see your face is upright but small.
(b) (i) On the concave side you will see your face is upright and larger in size when spoon is held close and (ii) as you move the spoon away the image becomes inverted and size also becomes small.
4. We can make a converse mirror by making a lens bulging outwards. It bulges in the middle.
5. **Concave Lens :** A lens curving inwards a concave (or biconcave) lens thinner at the centre than at edges.
Convex Lens : A lens curving outwards. These are thicker at the centre than at the edges.
6. **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.

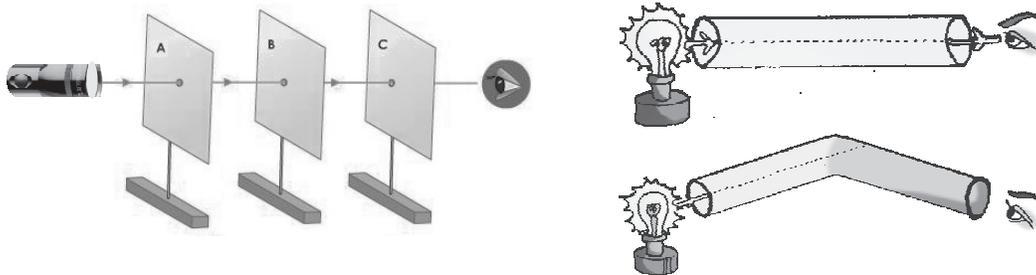
Aim : To make Newton's Disc.

C. Long Answer Questions :

- Ans.** 1. Thus, the features of an image formed by a plane mirror can be summarised as follows :
- The size of the image is equal to the size of the object.
 - The image is upright or erect.
 - The image is at the same distance behind the mirror as the object is in front of it.
 - The image is laterally inverted.
 - The image cannot be obtained on a screen. An image which cannot be obtained on a screen is called a virtual image.

Thus, the image formed by a plane mirror is a virtual image.

2. **Aim :** To show that light travels along a straight line.



Materials Required : Three cardboard squares with hole through its centre and torch.

Procedure : Mount cardboards upright, on a table in front of a lighted torch so that the light is aimed at the hole of the first square. Set up the cardboards by threading a string through them and pulling it taut. Kneel or sit down so that your eyes are at level with the hole of squares C, B and A.

Observation : Your eyes see the light through the three holes. Now move one of the squares so three the hole are no longer lined up. What happens? The eyes can no longer see the light because light travels in a straight line. So, it cannot pass through the hole if the path of the light is cut off. You may recall a very similar activity performed in Class-VI with a straight and a bent rubber tube.

Conclusion : Light travels in a straight line.

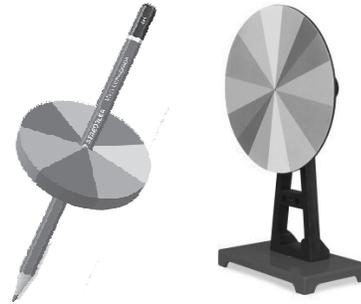
3. **Aim :** To see the recombination of seven colours of the spectrum into white light.

Materials Required : White cardboard, compass, protractor, seven colours in VIBGYOR sequence and a pencil.

Procedure : Take a piece of white cardboard and set the compass at 5 cm radius to draw a 10 cm diameter circle on the cardboard. Cut out the circle. Using the protractor, divide the cardboard circle into 7 equal sections, with each section being 51 degree. Colour the sections in the order of VIBGYOR. Now, thread a pencil through the centre of the circle with the point at the bottom. Spin the disk.

Observation : You will see that while the top is spinning at a high speed, our eyes are unable to see the colours separately and the circle seems almost white. This is because with fast rotation of the disk all the seven colours, which you have used become mixed together resulting in a whitish colour.

Conclusion : When the seven colours of the spectrum combine white light is produced.



D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself



Water : A Precious Resource

15

Formative Assessment

A. Tick (✓) the correct option :

Ans. 1. (iii) 2. (i) 3. (iv)

B. Fill in the blanks :

Ans. 1. Groundwater gets collected in the spaces between **permeable** rocks.



2. About 50% of our agricultural needs are met by **groundwater**.
3. The area from which water drains into a river or stream is its **mouth** area.
4. A **percolation** tank allows water to seep into the soil and recharge groundwater.
5. When surface water bodies get polluted, people turn to **underground water** to meet their needs.
6. Tanks are a very important source of water in **the north** in India.

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

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

Summative Assessment

A. Very Short Answer Questions :

- Ans.**
1. Rivers, lakes, ponds and tanks are surface water sources.
 2. In parts of Rajasthan, Madhya Pradesh and Bihar.
 3. Generally groundwater has been utilised by digging wells. The modern way of getting groundwater is to pump it out with the help of power-operated tubewells. Such tubewells are used widely for irrigation. Manually operated tubewells are also used for domestic purposes.
 4. It leads to scarcity of water.
 5. Some other causes of water scarcity are too much runoff due to deforestation, overuse, and pollution of rivers.

B. Short Answer Questions :

- Ans.**
1. A big part of the rain that falls over land enters the soil and fills up the spaces between the soils particles. This is what we say **soil moisture**. It sustains the plants growing on the soil. The roots of plants absorb this water and send it up to the leaves for photosynthesis. Plants would die without soil moisture.
 2. On an average, about 18% of our country is drought-prone. But, lack of rainfall is not the only causes for the scarcity of water. The other causes is: **Pattern of Rainfall** : Though we get a lot of rainfall, it is generally concentrated in the rainy season. This leads to a shortage of water after the monsoon. Also, rainfall is not even every year. Some years, the rainfall is far less than the average rainfall, this leads to a water shortage, mainly in areas which do not get much rainfall anyway.
 3. There is a very old tradition of tapping groundwater of agricultural and domestic needs. Wells and stepwells provided water for drinking and agriculture in Gujarat, Rajasthan, Madhya Pradesh, Maharashtra and Tamil Nadu. In fact, wells were a common sight in almost every part of India, except the Himalayan region.
Now a days, tubewells and hand-pumps have replaced wells. Now groundwater meets about 50% of our agricultural needs. It is also the main source of drinking water (about 85%) in villages and an important source (about 30%) in urban areas.
 4. Rain is our main source of water. It would be more correct to use the term



precipitation, which includes rain and snow. It is rain that replenishes or sources of surface water and groundwater. The scarcity of water in a place depends more on the way the people make use of rainwater than on how much rainfall the place gets. Thus, which has among the highest amount of rainfall in the world, faces a shortage of water because rain runs off fast down the deforested mountain slopes.

C. Long Answer Questions :

Ans. 1. It started in 1972, when western Maharashtra had a severe drought. Vilasrao Salunkhe, an engineer and chairman of the Western Maharashtra Development Corporation, saw a village where farmers still had enough water to grow crops. These farmers had constructed check dams across a stream the year before and had used the runoff to recharge their wells. So the drought had not affected them.

Salunkhe borrowed this idea. He took 16 hectares of uncultivable land on a hillside on lease from the temple trust of Naigaon, a drought-prone region. He and his family shifted from Pune to live in a hut on this land. With the help of engineering students and retired engineers, he raised bunds along the hillside to collect rainwater and stop soil erosion. He also constructed a percolation tank at the base of the hill and a well for drawing water further down. A percolation tank allows rainwater to go into the soil and recharge groundwater. Water was pumped out of the well to irrigate the farm area on the hill slope.

2. Do yourself

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Due to low rain-full. 2. Trapping Rainwater.



Waste Water Management

16

Formative Assessment

Ans. 1. (d) 2. (c) 3. (c) 4. (b) 5. (d) 6. (c)

B. Fill in the blanks :

- Ans.** 1. Waste water generated from industrial activity is known as **effluent**.
2. Sludge can be used as **fertilizes** after treatment.
3. **Drains** is a network of pipes used to carry sewage.
4. Secondary treatment is a **Biological** process involving decomposition.
5. **Methan** is a biogas.
6. Stage of waste water treatment to kill microorganisms is **final cleansing disinfection**.
7. Pesticides are **pests** as they cannot be acted upon by bacteria.

C. Circle the odd one out :

Ans. 1. Reduce, **replace**, recycle, reuse



2. Effluent, sewage, oil spill, **sewerage**
3. Sedimentation, **storage**, boiling, chlorination
4. Microbe, pesticide, **pollutant**, excessive fertilizer
5. Chlorine, disinfection, **ozone**, contamination.

D. Match the following :

Ans.	Column A		Column B
1.	Over population	—	(a) Water pollution
2.	Human faeces	—	(b) Water management
3.	Sedimentation, filtration, chlorination	—	(c) Waste water treatment
4.	Reuse, Reduce, Recycle	—	(d) Water scarcity
5.	Preliminary, primary and secondary treatment	—	(e) Municipal water supply

E. Write 'T' or 'F' for the following statements :

Ans. 1. T 2. F 3. F 4. T

Summative Assessment

A. Very short Answer Questions :

- Ans.
1. A manhole is a covered opening in a floor or pavement allowing access beneath especially one leading to a sewer.
 2. By boiling river.
With the use of potassium permanganate.
 3. Open drains get choked by sewage and garbage.
 4. Microbial degradation is the removing of biological contaminants that are risk to human health or to the environment.
 5. For making food and light.
 6. Advised not to throw cooking oil, paint or grease into the pitcher drain because they all choke the drains.
 7. When drain harmful substances get added to it which may change the quality of water and make it unsuitable for use. It is called water pollution.

B. Short Answer Questions :

- Ans.
1. There are following two reasons :
 1. This water can be recycled and reused for growing crops and in gardening.
 2. The organic waste matter is digested from which biogas is generated and the residue is composted the sludge is dried to be used as fertilizer.
 2. **Manholes :** It is important that waste water from different establishments like schools, offices and industries have a proper disposal system. Where does the waste water from your house go? How can it be treated before releasing it into rivers, streams and other water bodies? Waste water from different sources in your house such as wash basin, bathroom, toilet, kitchen is collected into drainage system through large holes, at the



bottom of pipes. These drains open into a sewer outside your houses. The water along with waste matter in the sewer is called sewage. These are connected to bigger drains called sewer drains that carry it out of the colony or the locality.

3. The treated sludge is nutrient rich. It is dried and is used as an excellent organic fertilizer.
4. **Preliminary treatment :**
 - Screening large solid materials like plastics, cans, rags by passing the sewage water through vertical bars.
 - Settling of grit by passing the water through grit chambers or setting tanks where sand, silt and gravel settle down.

C. Long answer Questions :

Ans. 1. Method	Action
(i) Preliminary treatment	<ul style="list-style-type: none"> • Screening large solid materials like plastics, cans, rags by passing the sewage water through vertical bars. • Settling of grit by passing the water through grit chambers or setting tanks where sand, silt and gravel settle down.
(ii) Primary treatment	<ul style="list-style-type: none"> • Waste water is then made to pass through sedimentation tanks where organic matter like faeces settle down at the bottom. This is removed with the help of a scraper. • Air is forced into the water through the shimmer. The bubble, thus formed brings up suspended floatable matter like grease and oil which is removed.
(iii) Secondary treatment	<ul style="list-style-type: none"> • This is a biological process, where the organic matter is broken down by the action of natural decomposers like bacteria to release biogas, which can be used as fuel or to produce electricity. This is referred to as activated sludge system. • Bacteria, protozoans and worms feed on the organic matter, which tends to form clumps of humus like material that settle at the bottom.
(iv) Final cleansing and disinfection	<ul style="list-style-type: none"> • Water is removed from the top. Compressed air is passed through it disinfection and disinfectants such as chlorine and ozone gas are added to kill the microorganisms. This treated water is finally released into natural water bodies like lakes and rivers.
<p>2. Drains that are not covered may get blocked with solid wastes like plastic bags, rags and gravel. Such drains are flooded with dirty water that stagnates and are polluted emitting foul smell. Mosquitoes lay eggs and breed causing the spread of diseases like malaria and dengue. Sewage wastes also carry germs that cause serious waterborne diseases like</p>	





Formative Assessment

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 plenty of humus 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. 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. decomposens

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

Summative Assessment

A. 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.

B. Short Answer Questions :

- 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.

C. Long answer Questions :

- 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. **Harmful effects of Deforestation—**
 1. Lesser rain fall by deforestation, all crops need the water, farmer depend on rain fall.
 2. **By deforestation oxygen** : carbondioxide cycle is become imbalance in atmosphere because plant take CO₂ from atmosphere and give us oxygen for breathing.
 3. Increased air pollution and soil erosion because tree's roots titan the soil.
 4. Wild animal's life become in danger because forest is the home of animals. Animals take thier food from forest.
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.

D. Higher Order Thinking Skills (HOTS) Questions :

- Ans.**
1. Trees 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.
 2. Forests are one of the most useful renewable resources on the Earth. Forests serve as the "Green Lungs" and "Water Purifying Systems" in nature. 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.

