Science

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Key Class 6 to 8

Interactive SCIENCE-6

1-Sources of Food

Exercises

Section I

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

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

B. Fill in the blanks :

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

C. Write true or false :

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

Section II

A. Very short answer questions :

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

B. Short answer questions :

Ans. 1. We food for following reasons:
- To provide energy for various activities of the body
- For growth and development of the body
- To protect the body from diseases and keep it healthy.

2. Milk, eggs, butter, cheese and honey are the five food products we get from animals.

C. Long answer questions :

Ans. 1. Five plant parts that we eat are as follows:

(a) **Root :** In some plants, the roots or parts of the root system are enlarged in order to store large quantities of starch and other carbohydrates. A tuberous root or storage root is enlarged to function as a storage organ. Examples of plants with notabl tuberous roots include sweet notato carrot.

(b) **Seed :** Seed of plants are a good source of food for animals, includ-

ing human beings because they contain nutrients necessary for the plant's initial growth. Edible seeds include cereals (such as maize, wheat and rice).

(c) **Stems :** Stems of certain plants are eaten. Many plants store carbohydrates or their stems. Potato, garlic, cinnamon and sugar cane are few examples of edible stems.

(d) **Fruits :** We eat fruits of certain plants as our food. They provide us with necessary vitamins and minerals. Apple and tomato are two of the numerous fruits of plants eaten by us.

(e) **Flowers :** Flowwers of certain plants are also a source of food for us. They flowers of plants that we include cauliflower and broccoli.

2. Special Characteristics of Herbivores

- Herbivores like cow, horse, and goat have wide, blunt teeth. Such teeth are suitable for pulling plans off the ground and grinding them.
- Herbivores like cow and camel have the ability to bring back previously swallowed food to the mouth for chewing it the second time. This helps them to absorb most of the nutrients from har-to-digest food like grass.

Special Characteristics of Carnivores

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

Special Charactersitics of Omnivores

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

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. **A A P P P A A**

Egg, butter, spices, sugar, curry leaves, honey, milk.

2. (a) Omnivore; Man
   (b) Herbivore; Goat
   (c) Carnivore, Lion
   (d) Producers; Green plants
   (e) Photosynthesis.

2-Components of Food

Exercises

Section I

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

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

B. Fill in the blanks:

Ans. 1. The **nutrients** are chemical needed by our body our proper growth and func tioning.

2. Eats are the **energy** reservoirs of the body.
3. There are about 20 known **vitamins**.
4. **Children** and **office-going** people need less carbohydrates.
5. **Kwashiorkor** is a disease which occurs in children due to protein deciency.

C. Write true or false :

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

Section II

A. Very short answer questions :

Ans. 1. The functions of carbohydrates is to give us energy.

2. Butter and fish.
3. Proteins replace old and damaged cells.
4. Milk and green vegetables.
5. Absence of sufficient water intake causes dehydration.

B. Short answer questions :

Ans. 1. Carbohydrates, proteins, fats, vitamins and minerals are the five major groups of nutrients.

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

Vitamins	**Deficiency diseases**
Vitamin A	Night blindness (Poor night vision)
Vitamin B1	Beri-beri (Nervousness, loss of appetite, paralysis)
Vitamin B2	Skin diseases

Vitamin C	Scurvy (Bleeding of gums, swelling of joints)
Vitamin D	Rickets (Weak bones, decaying teeth)
Vitamin K	Haemorrhage (Clotting of blood affected)

B. Long answer questions :

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

(i) **Carbohydrates :** Carbohydrates are the energy giving nutrients. Carbohydrates consist of carbon, hydrogen and oxygen. We get carbohydrates from foods like rice, bread, potato, rotis and sugar. Glucose, fructose and starch are some forms of carbohydrates. The biggest protion of our regular diet consists of carbohydrates. Carbohydrates burn to give us energy.

(ii) **Proteins :** Our body is made up of billions of cells. These cells are made mainly from proteins. When we grow, our body needs proteins to make new cells. Our body also needs proteins to replace old and damaged cells. Our diet shoult have enough proteins for this. Growing children and sick people rquire more proteins in their diet. Proteins are of two kinds-animals proteins and plant proteins.

- **Animals proteins** are obtained from animal foods such as milk, egg, cheese meat of fish.
- **Plant proteins** are obtained from soyabeans, pulses, groundnuts, barley, whole wheat, corn and dry fruits.

(iii) **Minerals** are nutrients that contain certain elements. All of the have particular functions to perform in the body. They are required by our body in small quantities in the diet to maintain good health. Their deficiency in our diet leads to deficiency diseases.

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

2.

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

3. A balanced diet is the diet which contains all the necessary nutrients in adequate amounts, needed for the proper functioning of healthy body. In a

balanced diet, energy giving foods (carbohydrates and fats), body-building foods (protiens) and protective foods (vitamins and minerals) are included in right amounts. Sufficient quantities of water and roughage should also the present.

Daliy Blanced Diet of a 12-Year Old Child

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

4. Kwahiorkor is common is underdeveloped countries.

   Its symptoms include

   - Stunted growth,
   - Swelling of face and ends of limbs (especially the feet).
   - Skin diseases,
   - A large pot-like belly,
   - Mental retardation, and
   - diarrhea.

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

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

   Its symptoms include

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

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. i. Iron

ii. Vitamin D (Milk, butter, green vegetables, cod liver oil, sunlight).

iii. Vitamin A (milk, butter, eggs. Cod lwer oil tomatoes, green leafy vegetables.)

2. i. Iodine

ii. Thyroid gland

iii. Goitre

iv. Because coastal people eat a loot of sea food like sea fish which contains good amount of iodine wnerat.

v. Cretinism

Exercises

3-Separation of Substances

Section I

A. Select and tick the correct option:

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

B. Fill in the blanks:

Ans. 1. **Desirable** or **undesirable** components are separated from their mixtures.

2. Hand picking should be practiced when the quantity of the **impurities** is not very large.

3. **Husk** and **stone** are the impurities present in wheat.

4. The process of setting of heavy material at the bottom is called **sedimentation.**

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

C. Write true or false:

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

Section II

A. Very short answer questions:

Ans. 1. Materials which contain two or more substances in any proportion are known as mixtures.

2. We need to separate different materials to remove undesirable substances from the useful ones.

3. Decantation is the method by which the liquid is poured out without disturbing the sediments.

4. We use the method of loading when we hae a settle down the fine particles quickly.

5. Solute is a substance that dissolves whereas solvent is the substance in which the solute dissolves.

B. Short answer questions :

Ans. 1. Hand-picking is a method of separating unwanted substances from a mixture by picking them carefully with hand. The impurities differ in shape, size, colour and appearance from the grain, and can easily be seen among the grain particles. The quantitiy of the ingredient to be separated is in lesser amount.

2. Sieving is preferred when a mixture contains particles of different sizes.

3. In our homes, rice is washed in water before being cooked. In this process, tiny bits of straw, husk, dirt and other impurities float on the top of wate whereas heavier rice grains settle at the bottom of the container. The is how process of sedimentation is used while cleaning food at home.

4. Centrifugation is a method in which mixture containing suspended particles is rotated at a high speed in a centrifuge machine. The denser particles settle down at the bottom of the container and the lighter ones stay at the top.

5. Evaporation is a method used to recover a dissolved solid component from a solution. This method utilises the difference in boling points of different components of the mixture. In this process, the solution is heated. This causes the liquid to evaporate leaving behind the solid component.

C. Long answer questions:

Ans. 1. The components of mixture are separated for the following reasons:

- To obtain two different but useful components of a mixture (e.g., butter is a useful component whichis separated from milk by churning).
- To remove harmful components or impurities of a mixture (e.g., small pieces of stones and husk are separated from rice or dal before cooking).
- To remove useless components of a mixture (e.g., tea leaves are separated from tea).
- The substances mixed together vary in size, shape, colour and many other properties.

2. **Sedimentation and Decantation :** It is common practice in homes that pulse or rice to be washed is placed in a contatner and water is poured in it. They are rubbed with hands so as to remove dirt and dust and foreign particles attached to hem. The dirt and dust get dissolved in water and the lighter foreign particles remain floating over the water. They are removed. The pulses being heavy, settle down at the bottom of the container. The pulses being heavy, settle down at the bottom of the container. The process of settling of heavy material at the bottom is called sedimentation and the collected material is called sediment. The water which forms the upper layer is slowly removed by tilting the vessel (decanted). The prcess of pouring away of water (liquid) from the container is called decantation.

   This method is also used for separating two liquids which are not miscible. The two liquids are either separated by decantation or using a separating funnel.

3. We can obtain water from muddy water from a pond by the following activity.

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

Materials Required : A beaker containing water from a pond, glass rod, en empty beaker.

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

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

   Take some mixture of common salt and chalk powder.

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

Obtaining pure salt using different methods of separation.

5. If we keep adding sugar in water and stir the solution each time, a stage comes when no more sugar dissolves, no matter how much we sir. We say that the solution has become saturated.

   Thus, a solution which cannot dissolve more of the solute at a given temperature is called a saturated solution at that temperature.

   If we heat this saturated solution of sugar and add more sugar, the sugar dissolves. In other words, we can increase the solubility of a solute by heating the solution. Thus, solubility is the capability of being dissolved.

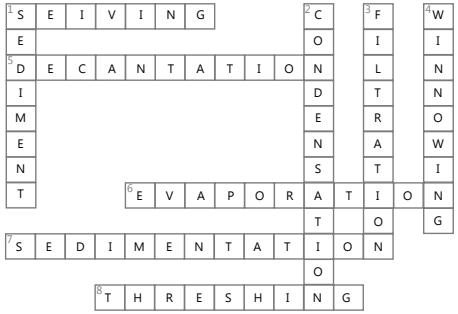
D. Higher Order Thinking Skills (HOTS):

Ans. No, hand-picking method should not be used in this case as the impurities mixed are large in number.

Tasks For You

Do and Learn

Crossword Puzzle



4-Fiber to Fabric

Exercises

Section I

A. Select and tick the correct option :

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

B. Fill in the blanks :

Ans. 1. **Animals** do not clothes to protect their body from heat cold.

2. Synthetic fibres are mainly made from **petroleum** by complex chemical processes.
3. Weaving of fabric is done weavers using machines called **looms**.
4. **Retting** is soaking of stems in water.
5. Rayon is made from cellulose obtained from **wood pulp**.

C. Match the following :

Ans.

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

D. Write two examples for each of the following :

Ans.

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

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

Ans.
1. **Rayon :** It is a synthetic fibre. Rest natural fibres.
2. **Terysilk :** It is not a polyster. Rest are.
3. **Forming :** It is not involved in the process of cloth making. Rest are.
4. **Jute :** It is a nautral fibre. Rest are synthetic fibres.

Section II

A. Very short answer questions:

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

B. Short answer questions:

Ans. 1. We wear clothes to cover our bodies. Clothes protect our bodies from heat, cold, dust and insects. They also make us look good.

2. Human beings use various kinds of materials to make cloth, for example, cotton, silk, jute, leather and fur, depending upon the climate, availability and occasion.

C. Long answer questions :

Ans. 1. **Aim :** To compare the water-absorbing capacity of cotton and nylon

Materials required : Pieces of cotton and nylon cloth (having almost the same thickness), a bangle, dropper, water and a stopwatch.


A piece of cotton cloth


A piece of nylon cloth


Bangle


Dropper


Stopwatch

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


Testing the water absorbing capacities of cotton and nylon

Repeat the same procedure with the piece of nylon.

Conclusion : Cotton soaks greater number of drops compared to nylon.

This activity proves that different kinds of cloth materials have different absorbing capacities.

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

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

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

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

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

The fibre thus separated is washed, dyed and then woven as per the needs.

Coir is used to make mats, durries, floor coverings, stuffing in mattress and for many othe things.

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

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

5. Nylon resembles silk and wool.

   Properties.

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

   Uses : Nylon is used for :

   - the manufacture of tyre cords, fabrics and ropes.
   - Making fishing nets and parachute ropes.
   - Fabricating sheets, bristles for brushes.
   - Making sarees, socks, neckties.
   - Making synthetic/elastic hosiery.
   - Making machine parts.

D. Higher Order Thinking Skills (HOTS):

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

5-Sorting Materials into Group

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. The things used to make other things are called **materials**.

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

Section II

A. Very short answer questions:

Ans. 1. We need to group or classify things around us because it makes it easier for us to locate them and work with them.

2. Man-made materials-car, television

   Natural materials –River, tree

3. Luster is the shine of a material.

4. Nitrogen

5. Conductors allow electricity to pass through them wheras insulators prevent in to pass through.

B. Short answer questions:

Ans. 1. The things used to make other things are called materials. Wood, steel and glass are examples of materials. Things may be made of one or more than one material.

2. The things which are not found in nature but are manufacture by man are called man-made or artificial things. For example, plastic, glass and steel.

3. Materials like salt and sugar which dissolve in waer are said to be soluble in water.

   Materials like sand, saw dust and wheat flour (atta) do not dissolve in water even after stirring, they are said to be insoluble in water.

4. Some materials float in water where as some materials sink. A pencil, ice, brush, plastic bottle, etc. Float on the surface of water. A coin, an iron nail, a stone etc. sink.

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

C. Long answer questions:

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

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

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

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

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

   You can see that iron has a higher density than water, whereas wood has a lower density than water. That is why a metal coin sinks while a piece of

wood of the same shape and size floats in water.

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

Appearance : Each and every materials look different from each other. Plastic looks different from aluminium and so on. There may be certain similarities between iron and aluminium which are not present in plastic. We can, thus, classify materials on the basis of appearance.

Lustre : Lustre is the shine of a material. Metals like silver and gold have a shine, whereas wood does not shine that much. Similarly synthetic clothes have a shine whereas woolen clothes do not have a shine. Materials like aluminium, iron, copper, silver and gold have luster. Wood and paper being non metals do not have luster.

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

Transparency : Different materials allow different amounts of light to pass through them depending on a property called transparency. We can see through some materials like galss but we cannot see through a wooden door. This is because some materials like glass allow light to pass through door. This is because some materials like glass allow light to pass through them. On the basis of transparency property, materials can be classified into three categories-transparent, opaque and translucent.

Electrical Property : Materials which conduct electricity are called conductors like metals such as copper, iron and silver. We use wires of copper in our household wiring. Materials which do not conduct electricity are called insulators or bad conductors of electricity like wood, rubber, plastics, air, etc. That is why electrical wires have a rubber coating.

4. The process of gases and liquids spreading into a surrounding substance is known as diffusion. If one openes a perfume bottle at one corner of the room, the smell spreads throughout the room. This is because perfume mixes with air. Gases have the highest rate of diffusion but different gases diffuse at different rates.

D. Higher Order Thinking Skills (HOTS):

Ans. 1. On the basis of density. Because some will float and some will sink.

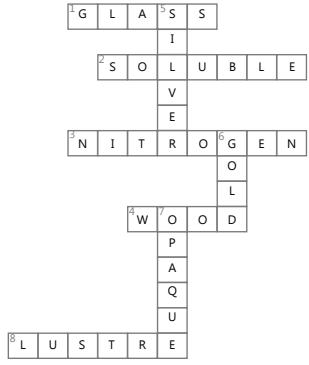
2. On the bais of hardness. As some of these are soft and some hard.

Tasks For You

Do and learn

Solve the crossword:

Ans.



Exercises

6-Changes around us

Section I

A. Select and tick the correct option :

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

B. Fill in the blanks :

1. **Changes** take place around us all the time.
2. The change which can be reserved is called a **reversible** change.
3. Change of milk into curd is a **chemical** change.
4. **Tearing of paper and freezing of water** are the physical changes.
5. Changes can be brought about by **heating** or **cooling** certain substances.

C. Write true or false:

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

Section II

A. Very short answer questions:

Ans. 1. We grow taller and our weight increase.

2. The change which can be reversed is called a reversible change. In this type of change, the initial substance can be obtained back by reversing the action.
3. Change of milk into curd is an example of irreversible change.
4. Change in which no new substances are formed are called physical change. The molecules of the substance remain exactly the same as before.
5. Rusting is the process of forming rust on iron.

B. Short answer questions:

Ans. 1. Burning of paper is an irreversible change we cannot get back the paper in its original form.

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

C. Long answer questions:

Ans. 1. Physical changes are the changes in which the molecules present in the substance remain the same but the shape, size or position of the substance changes. For example, tearing of paper is a physical change. A chemical change occurs as a result of a chemical reaction between the molecules of substances, and a new substance is formed. Thus, in chemical change, the molecules of original substances undergo changes to form molecules of new substances. For example, cooking of food is a cheamical change.

2. Most of the physical changes are reversible. Glowing of an electric bulb,

melting of ice and inflation of a hot-air balloon are some common examples of physical changes that are reversible.

However, not all physical changes are reversible. For example, breaking of glass, tearing of paper and bursting of balloon are some of the physical changes that are irreversible. Some common methods that bring about physical changes are heating, cooling (freezing), cutting, reduction in size due to repeated use, pushing or pulling to change position, etc.

3. The changes in which new substances are formed which have properties that are differen from the original substances are called chemical changes. In all these changes, new types of molecules are formed from the combination of the molecule of the original substances.

   Mostly chemical changes are irreversible changes as the new substances formed have different properties than the orginal substances.

   An example of chemical change is as follows:

   Cooking food: Cooking vegetables, rice, pulses and making rotis/breads from wheat flour are all chemical changes in which new substance are former with different new properties. Once you boil an eg you cannot revert it back to raw stage.

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

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

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

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. A blacksmith change a piece of iron into different tools by changing its size and shape. It undergoes various chemical changes.

2. Chopping of wood is an irreversible physical change. Burning of chopped wood is a chemical change.

Exercises

7-Things Around Us

Section I

A. Select and tick the correct option :

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

B. Fill in the blanks :

Ans. 1. A **cell** is the smallest unit of living things.

2. An organism's reaction to a stimulus is called **response**.

3. **Barks** of trees are also a waste product deposited outside by them.

4. Saprophytes derive nutrition from **dead** and **decayed** matter.
5. Green plants absorb **carbon dioxide** to make food.

C. Match the following :

Ans.

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

Section II

A. Very short answer questions :

Ans. 1. Orgnisms that are made up of two or more cells are called multicellular organisms.

2. All living beings is increase in size with their age. This is known as growth. Growth is one of the basic features of all living things.
3. All living things have the ability to produce more of their own kind. The ability to produce young ones of their kind is called reproduction.
4. Evolution is the process by which living things gradually change and develop over millions of years. During evolution, organisms develop abilities to cope with their environment that their ancestors did not have.
5. Scavengers are those animals that feed on dead bodices of other animals. Such as vultures.

B. Short answer questions :

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

- Living organisms show movement; non-living things do not. Thus, a tiger moves, but a stone does not.
- Living beings respire; non-living things do not.
- Living beings eat food and excrate the wastes; and non-living things do not.

2. Living things move in search of food and shelter and to escape from their enemies.
3. Plants do respond to certain stumuli, but much more slowly than animals. They respond by growing in a particular direction. For example, most plants grow towards light. There are a few plants which respond quickly to touch, sunflowers always moves towards the sun. For example, the leaves of touch-me-not (mimoval) plant close up when touched.
4. Excretion is the process of removal of waste products.

   For example, urea is produced in liver as an excretory waste by animals and is removed as urine. Barks of trees are also a waste product deposited outside by them.
5. Animals whose body temperature do not fluctuate with environment changes are known as warm-blooded animals. For example, human beings, polar bear, etc. Animals whose body temperature chages with the outside environment temperature are known as cold-blooded animals. For example, lizards, snakes, etc.

C. Long answer questions :

Ans. 1. All living organisms grow. Growth is the increase in size and volume of the body. When cells present in an organism divide, their number increases. This increase in the number of cells is responsible for increase in size. In unicellular organisms, the single cell grows in size as the organisms develops and matures. Human beings grow from babies to adults, puppies become dogs, kittens grow into cats, and seeds grow into plantlet that grow into bigger plants and trees.

Animals stop growing in size after sometimes. During this time, their body undergoes the process of development that makes their bodies more complex and mature. Plants, however, keep on growing throughout their entire life. In living things, growth is a result of internal division of cells.

2. All living organism reproduce, that is, they produce new organisms of their own kind. This process is called reproduction. Humans give birth to babies. Other animals also reproduce their young ones, for example, dogs give birth to puppies, cats to kittens, lions to cubs and so on. Some organisms reproduce through eggs. They lay eggs and their new ones hatch from these eggs. For example birds, frogs and snakes.

Most plants reproduce through seeds. They produce seeds inside their fruits. These when sown in soil, produce new plants of some species.

3. The abiotic or non-living world consists of three distinct parts.

Atmosphere : The air blanket around the Earth make up of several gases like oxygen, carbon dioxide, nitrogen, hydrogen, neon, argon and water vapours forms the atmosphere.

Hydrosphere : All the water on the Earth's surface forms the hydrosphere. Water bodies such as the seas, rivers, ponds, lakes, and glaciers are the major forms is which water is present on Earth.

Lithosphere : The lithosphere is the rock that forms the outer layer of the Earth. It extends to a depth of about 100 km.

4. The word environment comes from the word 'environ' which means, surroundings. It is also called the habitat of a living organism. The environment consists of two major components-the living world, that is the biotic component and the non-living world, that is the abiotic component.

The biotic world comprises of all the living organisms. Biotic means 'living'. Plants, animals and microbes are the major components of the biotic world.

The abiotic world consists of three major components-lithosphere, hydrosphere and atmosphere.

D. Higher Order Thinking Skills (HOTS):

Ans. 1. We can't cara a living thing because it neither reproduce nor die.

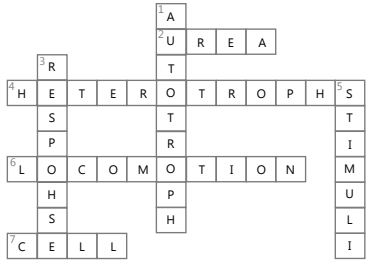
2. No, a crystal is not a living thing.

Tasks For You

Think and Tell

Solve the following crossword:

Ans.



Exercises

8-The Habitat of the Living

Section I

A. Select and tick the correct option :

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

B. Fill in the blanks :

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

C. Write true or false :

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

Section II

A. Very short answer questions :

Ans. 1. Everything that surrounds living things and affects their growth and development is called environment.

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

B. Short answer questions:

Ans. 1. The natural surrounding where a living organism lives is called its habitat or in simple words, home. Habitat provides an organism with everything it needs to survive-food, shelter and proper climatic conditions.

Forest, grasslands, deserts, mountains and aquatic habitat are the five major habitats on Earth.

2. The three major types of forests on Earth are as follows:

(a) **Tropical rainfaorests :** These are evergreen forests. These are found between the Equator and the two tropics. The temperature of these re-

gions ranges from 20°C to 35°C and the annual rainfall exceeds 200 cm.

(b) **Temperate deciduous forests :** Temperate forests occur in eastern North America,, north eastern Asia, and Western and Central Europe. The temperature of these regions regions varies from 30°C to 30°C.

(c) **Boreal forests :** These forests are also called taiga.

These forests are found in Canada, Russia, Scandinavia, China, Mongolia and northern Jpan. These forests have short summer and a long winter.

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

   The difference between a grass land and a desert are as follows:

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

     In deserts many cactus plants grow.

   - In grasslands rainfall varies from 50 to 90 cm.

     In deserts rainfall is less than 25 cm.

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

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

   (a) Changes in body (b) Changes in behavior (c) Changes in l ocation

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

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

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

   - Its mouth is adapted for grazing a variety of plants.
   - Its big chest and lungs are adaptations to low content of oxygen in the mountains.
   - It uses its strong the hooves to crush ice from frozen ground and graze on the grass below.

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

C. Long answer questions:

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

- Boreal forests receive heavy snowfall. Trees have a conical shape which allows the snow to slide off easily.
- Most trees leaves. This kind of structure protects the leaves from damage.
- Growing new leaves requires a huge amount of energy. The soil found in boreal does not contain many nutrients. Also, these regions do not receive much sunlight. Boreal forest plants are able to conserve energy

by not shedding their leaves. They also avoid growing new leaves.

- Boreal forests are so cold that the ground freezes during winter months. Because of this , the trees are not able to get water. Narrow, needle-like leaves of these trees help to conserve water.

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

Plants :

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

Animals :

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

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

A cactus has the following modifications:

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

Animals :

(a) Desert animals have thick skin to stop the loss of water from the body.

(b) Most of the desert animals have the capacity to store water and food, e.g., a camel can tolerate extreme temperature due to the stored water in its body, which helps in cooling the body.

(c) Most of the small desert animals live in burrows to save the emselves from fluctuation of temperature.

(d) Reptiles are well-suited to the desert climates. They get most of the water through their food and lose hardly any moisture from their skin

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

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

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

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

D. Higher Order Thinking Skills (HOTS):

Ans. 1. Fish have streamlined body to minimise the friction of the water and easily cut throng hit.

2. It is so because so little light reaches the floor that very few plants can grow there.

9-Getting to know Plants

Exercises

Section I

A. Select and tick the correct option :

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

B. Fill in the blanks :

Ans. 1. **Money plant** is an example of climber.

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

C. Write true or false:

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

Section II

A. Very short answer questions:

Ans. 1. Very small plants are called herbs. These plants are usually green and have delicate and tender stem.

2. There are two important systems of all followering plants.
   - The root system-part that remains under the ground.
   - The shoot system – part which grows above the ground.

3. Roots like carrot, radish and turnip store food for the plant.
4. In some plants,, the veins are parallel to each other, along the legth of the plant. This is called parallel venation.

B. Short answer questions :

Ans. 1. Three main functions of root as follows:

(a) **Anchoring the plant :** Roots help to anchor the plant firmly into the ground.

(b) **Absorption of water nutrients from the soil :** Roots help plants to absorb water and nutrients from the soil, which are essential for their survival.

(c) **Preventing soil erosion :** Roots help to bind the soil particles together, thereby preventing them from being carried away by water or wind.

2. All parts of a plant that are above the ground form the shoot system. It includes stem, branches, leaves, flowers and fruits.

3. The leaves of plants have three main functions:

(a) The leaves make foof for the plant (by photosynthesis).

(b) The leaves get rid of excess water from the plant through transpiration.

(c) The leaves carry out the process of respiration in plants (which is the production of energy from food).

4. Roots help the plants in the following ways:

- Roots help to anchor the plant firmly into the ground.
- Roots help plants to absorb water and minerals from the soil and help the plant to grow. Water and minerals reach the stem and the branches with the help of tiny tubes present in the roots and stems.
- Roots help to prevent soil erosion.

5. Herbs are small plants having a soft and delicate stem. They do not have woody stem. We can easily bend the stem of a herb. Shrubs are medium-sized plants with a hard woody stem, prancing out near the base. The stem of a shrub is hard but it is not very thick.

C. Long answer questions:

Ans. 1. The main functions of stem are as follows:

- Stem keeps the plant erect and bears the leaves, flowers and fruits. It is the main organ of support.
- Stem conducts water and minerals from the root to its leaves.
- Stem conducts food frm the leaves to the storage organs and to the growing parts of the plants.
- Green stems can also manufacture food for the plants.
- In some plants, stems are modified to perform functions like storage of food, photosynthesis, etc.

2. **Tap Root :** Some plants have a main root from which a number of branching roots arise. The main root is called the tap root and the branched out roots are called lateral roots. Some examples of plants having tap roots are mustard, rose, neem, peas, carrot.

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

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

Take a green leaf. Place it in a test tube cover it with spirit. Place the test tube in a beaker filled with water. Heat the beaker till the green colour of the leaf is completely leached and the leaf becomes colourless. Remove the leaf carefully and wash it water and put it on a sheet of white paper. Pour a few drops of iodine on it.

What do you observe? The leaf turns blue black in colour. This shows the presence of starch.

4.

C. Higher Order Thinking Skills (HOTS):

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

10-Body Movement

Exercises

Section I

A. Select and tick the correct option :

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

B. Fill in the blanks :

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

C. Write true or false:

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

Section II

A. Very short answer questions:

Ans. 1. Tissue is a group of similar cells that performs a particular function.
2. Movement is an important characteristic of the living organisms. The act or

capacity of moving from one place to another is known as locomotion.

3. The four major movable joints in our body are as following:
   (a) Ball-and-socket joint (b) pivotal joint
   (c) Hinge joint (d) Gliding joint
4. The lower jaw is the only movable bone in our skull.
5. Mucous is a slimy substance preduced by the foot of a snail.

B. Short answer questions:

Ans. 1. Different organ system in our body are:

- **Skeltal system :** It gives support to the body and protects the internal organs.
- **Muscular system :** It supplies blood to all parts of the body.
- **Respiratory system :** It involves inhalation of oxygen and exhalation of carbon dioxide.
- **Digestive system :** It helps to digest and absorb nutrients essential for the growth of the body.
- **Reproductive system :** It produces young ones.

2. Skeleton is the general f ramework of the body.
3. **Pivotal Joint :** The ball on a stick type of joint is called pivotal joint.

   A pivotal joint allows movement in many plames-up and down, side-to-side etc.

   The joint of skill to the first two vertebrae of the backbone is a pivotal joint.

   Hinge Joint : The joint which allows movement only in one plane and only up to 180° is called a hinge joint.
4. Functions of the pectoral girdle are as follows:
   (i) It allows free movement of arms.
   (ii) It protects and supports the internal organs in the upper part of the body.
   (iii) It provides surface for the attachment of muscles.
5. Cokroaches walk, climb as well as fly in the air. They have three pairs of legs which help them in walking. They also have two pairs of wings attached to the breast muscles that help them in flying.

C. Long answer questions:

Ans. 1. The joint in which the rounded end of one bone fits into the cavity (hollow space) of the other bone is called ball-and-socket joint.

   Ball-and-socket joint permits movement of the bones in all directions.

   The joints between the shoulder and the upper arm, and between thigh and hip are ball-and-socket joints.

2. Limbs allow us to perform various types of movement. We have two pairs of limbs –the fore limbs (arms) and the hind limbs (legs). Almost half of our bones are found in the limbs. There is one long bone in the upper arm called hummers. The lower arm has two bones called radius and ulna. The hummers is attached to the vertebral column by the collar bone and the shoulder blad. The longest bone in our body is the high bone or the femur. The lower leg consists of two bones the tibia and the fibula. The pelvis or his

bone that supports the legs is attached to the lower end of the backbone. The wrists, fingers, ankles and feet have a large number of small bones.

3. Have you ever felt the bones on your chest when you inhale air? If not, then take a deep breath. Hold it for a mement and feel the bones present on your chest. Can you feel the shape of these bones? These are curved and are called the ribs. There are 12 pairs of ribs, that is a total of 24 bones, forming a cage-like structure called the rib cage. The ribs are flat, thin and curved bones these are joined with the backbone at the back and with the breast bone in the front. The last two pairs of ribs are not attached in front and are hence called floating ribs. The rib cage protects important organs such as the heat and lungs as well as parts of the stomach and kidneys.

4. Muscles have the property of contraction and relaxation. It is this property of muscles which is responsible for the movement of bones. When muscles make themselves shorter (contract), the pull on the bones and move them. Muscles cannot make themselves longer (relax) again on their own. They need another muscle close by the stretch them. This second muscle does this by shortening (contracting) itself. The second muscle which stretches the first muscle (called the biceps) is called the triceps.

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

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

5. Most birds are capable of flying. The bones of the birds are hollow and very light. The bones of the birds are hollow and very light. The two hind limbs are used for walking and perching. The forelimbs of the birds are modified as wings which are used for flying. They have strong shoulder bones. The whole body including wings is covered with feathers. Strong muscles in their breast bones help birds to flatp their wings and fly. The bird has a streamlined body.

6. Snakes do not have lumbs (legs, arms , or wings). The snake has a long backbone which is flexible. They have many thin muscles, connected to the ribs, backbone and skin. The snake can curve its body into many loops. The body thus moves in a way manner because of the loops. The snake can move forward very fast, since its long body makes many loops.

D. Higher Order Thinking Skills (HOTS):

Ans. 1. Aeroplanes and boats have streamlined bodies because such bodies offer very little resistance to the flow of air water around them.

2. An earthworm cannot move on a surface made of glass because it needs to grip the surface for moving. This is not possible on glass, so it is unable to

Unit-IV : Moving Things, People and Ideas

11-Motion and Measurements of Distances

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. Invention of the **wheel** led to the development of different modes of transport.

2. When a body moves along a straight the line, its motion is called **rectilinear**.

3. A train moving in a particular direction at a constant speed show **uniform** motion.

4. **Measurement** means the comparison of an unknown quantity with some known quantity.

5. The distance of smoething from one end of the other is called **length**.

C. Write true or false :

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

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

Ans. 1. Exact answer 2. Estimation 3. Exact

4. Estimation 5. Exact 6. Estimation

7. Estimation

Section II

A. Very short answer questions:

Ans. 1. Motion is change in position of a body with time, relative to its surrounding.

2. Translatory motion.

3. Periodic motion

4. Hand-span and foot

5. Milimeter

B. Short answer questions:

Ans. 1. We need standard unit of measurement because the earlier methods of measiring things were not satisfactory.

2. When a body changes its position with respect to stationary things in its surroundings, with time, the body is said to be in motion.

When a body does not change its position with respect to the surrounding object with time, the body is said to be in rest.

3. Translatory motion is a motion in which all the parts of an object move through the same distance in same time.

4. 1m = 100 cm

125cm = 125/100m

= 1.25m

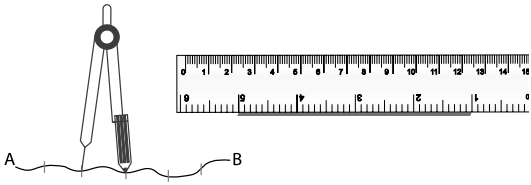
5. Differetn types of motion are-translatory motion, oscillatory motion, circular motion, vibratory motion, periodic motion, non-periodic motion, uniform motion and non-uniform motion.

C. Long answer questions:

Ans. 1. In both oscillatory and vibratory motions, the motions are repetitive and the time taken to single oscillation or vibration remains the same. The motion where an object repeats its motion after a fixed time interval is called periodic motion.

- The motion of the earth around the sun is periodic as the earth takes 3651/4 days to compete one revolution.
- The movment of the moon around the earth is repeated after every 30 days and thus is a periodic motion.
- The movment of the moon around the earth is repeated after every 30 days and thus is periodic motion.
- The movement of hands of a clock is also a periodic motion.

2. **Measuring the Leangth of a Curved Line :** The length of a curved line can be measured using a string. The string is placed along the curved line and its ends are marked on the string. The length of the string between the marked points is measured with a ruler.

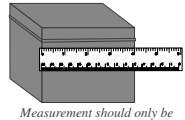


3. Precautions while Taking Measurement : While measuring length using a ruler, we should take the following precautions:

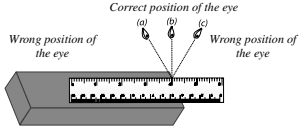
   (i) Care should be taken to keep the ruler along the length of the object.

   (ii) If the edge of the ruler is worn out or broken, the measurement should be started from any other mark that is fully clear. For example, if you measure from 2 cm mark to the 7 cm mark, the length is 5 cm (7 cm -2 cm = 5 cm)

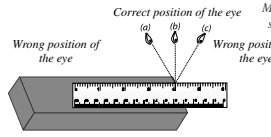
   (iii) Eyes should be exactly above the point where the measurement is to be taken. If your eyes are at different positions, you might get wrong readings.



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



Position of the eye for proper reading of the scale



Position placement of the scale with a broken edge.

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

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

   In the old days, the length of body part of the king was taken as the standard to maintain uniformity. Still, it was not enough. Till the nineteenth century various countries devised and used their own system of units. So there were many such units for the same physical quanitity. This was quite confusing as it had no uniformity all over the world. In 1960 it was recommended that a common system called the International system of Units (or SI unit system) should be used all over the world. Under this system, units are divided into two types:

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

Quantity	Unit	Symbol
Length	Metre	m
Mass	Kilogam	kg
Time	Second	s
Temperature	Kelvin	K

Area of a square = side × side (or length × length)

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

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

C. Higher Order Thinking Skills (HOTS):

Ans. 1. The Earth show three types of of motion at the same time: circular motion, periodic motion and rotional motion.

2. This is so because every person has a hand-span of different length.

12-Magnetism

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. The first magnet was discovered by a shepherd named **Magnes**.

2. **Artificial** magents can be used at any time and at any place.

3. A freely suspended magnet always aligns itself in the **north-south** direction.

4. **Repulsion** and not **attraction** is a sure test for magnetism.

5. Magnets tend to lose their properties if **handled** roughly.

C. Write true or false:

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

D. Match the following:

Ans. 1. Lodestone **(c) Natural magnet**

2. Horseshoe magnet **(a) Artificial magnet**

3. Like poles **(e) Repulsion**

4. Unlike poles **(b) Attraction**

5. ATM cards **(d) Magnetic strip**

Section II

A. Very short answer questions :

Ans. 1. The phenomenon of attraction of a magnetic material is called magnetism.

2. The most common of artificial magnetis the horseshoe magnet and the straight bar magnet.

3. The two ends of a magnet where the magnetic fore is the greatest are known as the poles of a magnet.

4. A magnetic compass is a small instrument having a freely rotating magnetised needle pivoted at this centre that indicates the direction of the Earth's magnetic poles.

5. Magnetised needle pivoted at its centre that indicates the direction of the Earth's magnetic poles.

B. Short answer questions:

Ans. 1. If we break a magnet into two pieces, we will get magnets having their own north pole and sourth pole.

2. The poles are found in the regions of magnet where is magnetic power is the strongest.

3. The two most important properties of magnets are:

(i) A freely suspended magnet always points in the north-south direction.

(ii) Like magnetic poles repel each other; unlike magnetic poles attract each other.

4. Magnets become weaker after sometime if their poles are left free. This is called-self-demagnetisation.

5. (a) Magnets will repel each other. This is because like poles (S-S) are facing each other.

(b) Magnets will attract each other. This is so because unlike poles (S-N) are facing each other.

(c) Magnets will repel each other. This is so because like poles (N-N) are facing each other.

C. Long answer questions:

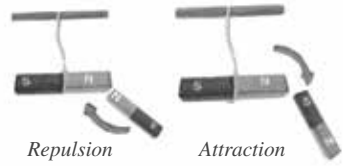
Ans. 1. A compass is a flat, circular glass box with a glass cover. A magnetised needle (free to roate) is pivoted inside the centre of the box. The box has directions marked on it such as north, south, east, west, north-east, north-west, south-east and south-west. The needle points in the north-south direction. It is used by navigators and sailors to determine directions. The copass is kept in the place where we wish to know the directions.

2. Like poles of any two magnets repel each each other, while unlike poles attract each other.

This can be shown by the following activity.

Take two magnets. Suspend one of them with the help of a string. Now, bring the north pole of the second magnet near the north pole of the suspended magnet. What do you observe? Now, bring the north pole of the second magnet near the south pole of the suspended magnet. What to you observe?

Observation		
Magnet-1	Magnet-2	Magnet-3
N	S	Attract
N	N	Repel
S	N	Attract
S	S	Repel

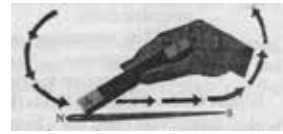


When like poles of a magnet are close together, they repel each other ie., they push apart. In other words, north pole repels north pole but attracts a south pole. Similarly, southpole will attract a north pole and repel a south pole.

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

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

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



   Procedure : Place the needl eon a table. Take the barmagnet and hold it over one end of the needle. Next, rub the entire length of the needle with the magnet. When you reach the other end, lift the magent, hold it again over the first end and rub again. Repeat this process around 30-40 times. This method is called stroking.Bring a magnetic compass near the needle. If the compass needle deflects, this means the needle has been magnetised. If the compass needle does not eflect, repeat the process of stroking. Now, bring some iron pins near the magnetised needle. Observe what happens.

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

4. Magnets tend to lose their properties if heated strongly, hammered or handled roughly.

   Magnets become weaker after sometime if their poles are left free. This is called self-demagnetisation. To keep them safe, magnets must be stored in pairs in wooden boxes, with unlike poles on the same side. The two magnets must be separated by a piece of wood. Pieces of iron called keepers are placed across both ends. A horse shoe magnet needs keeper at one end only.

   Magnets should be kept at a distance from objects with magnetic components like computer, cassettes, television, audio tape, cell phones, CD's, etc.

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

   - The door of a refrigerator has a weak magnetic strip all round it to ensure that it remains firmly shut. Magnetic latches or 'catches', are used in windows, cupboard doors, and so one. Magnetic stickers, magnetic clasps in handbags and magnetic pin/paper clip holders are some other examples of everyday uses of magnets.
   - Magnets are used to separate magnetic ores from non-magnetic rocks, magnetic substances from a mixture, and things made of magnetic mate-

rials during the recycling of waste. Ragpickers often use a long stick with a magnet attached to it to pick up scraps of iron from garbage dumps.

- Motors and generators used powerful magnetis. Loudspeakers also have powerful magnet inside them.
- Data, sound and images are stored on special surfaces coated with magnetic material in computer hard disks, floppies, and audio and video tapes. Information is also stored on the magnetic stripe on credit cards, ATM cards, airline tickets and so on.
- Magnets are used in magnetic toys and stickers.
- These are used for making magnetic compass.
- These are used incycle-dynamos, loudspeakers, motors and telephones.
- Magnetic taps are used in tape-recorders and video-recorders.
- These are used for recording computer programmes in the shape of magnetic discs.
- Used in separating magnetic materials (iron, nickel etc) from dumping grounds.
- Used by surgeons to extract iron pieces from wounds.

D. Higher Order Thinking Skills (HOTS):

Ans. 1. Ragpickers often use a long stick with a magnet attached to it to pick up s c raps of iron from garbage dumps.

2. (c)

13-Electricity and Circuits

Exercises

Section I

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

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

B. Fill in the blanks :

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

C. Match the following:

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

Section II

A. Very short answer questions :

Ans. 1. Electric current is a pollution free and very useful form of energy.

2. A torch is a portable electric lamp that has a bulb that lights up when it is switched on.

3. When the current is not table to flow through the wires, the circuit is said to be open.

4. An insulator is a material that do not allow electricity to flow through it.

B. Short answer questions :

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

2. The complete path of the flow of electric current from one terminal to the other terminal cell through the bulb is known as a closed electric circuit.

3. A battery is a combination of two or more cells that are arranged in a way that an electric circuit is completed.

4. The components of an electric circuit are knownas the elements of a circuit. They includecells, bulbs, wires and switches.

5. A bare copper wire carrying current, if touches, gives an electric shock. Such wires may also cause the fire due to short-circuting. To prevet short-circuiting and electric shocks, copper wires are covered with rubber/plastic covering.

C. Long answer questions :

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

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

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

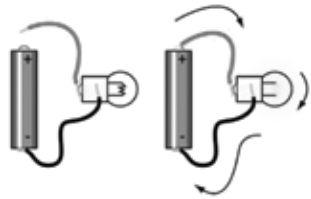
Observe the postions in which the bulb lights up and the position which it does not.

Which part of the bulb glows?

You wil observe that the bulb does not glow when the path of electricity from

one terminal of the cell to the other terminal as broken. When the is a connection between one terminal and the othe making a complete path, current flows and the bulb lights up. When the wires of the bulb are joined to the same terminal of the cell, the bulb does not glow because no current flows in such a situation. This shows the working of an electric bulb with a cell.

2. Electric current needs a closed or complete path to flow. This closed path along which electric current flows is called an electric circuit. The electric circuit in the above activity has various elements such as the cell, bulb and switch. These elements are connected together through wires. The wires connecting two elements provide the path for the electric current.



Closed circuit *Open circit*

If there is no break anywhere in the circuit, it called a closed circuit or complete circuit. Current flows easily in a closed circuit. For example, when a torch is switched on, the circuit becomes closed. Current flows in the circuit and the torch gloes.

If there is a break anywhere in the circuit, electric current stops flowing. Such a circuit is called an open circuit or broken circuit. For example, when a torch is switched off, the circuit becomes open. There is no flow of current in the circuit and the stops lighting.

3. Material which allow electricity to flow through them are called conductors (or good conductors). Silver, Aluminium Iron, Brass, Graphite etc., are conductors.

Materials which do not allow electricity to flow through them are called non-conductors or insulators. Dry wood, Sulphur, Plastics, Glass, Quatz, Dry piece of cloth are some common insulators.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. A screw-driver is made of steel. Steel is a good conductor. So electricity can easily flow through it. Plastic is an insulator and does not allow electricity to pass through it. So, the electrician's screw- driver has a plastic handle to protect him from any electrical shock while working with live wires.

2. (a) (i) Insulator (ii) Conductor
   (b) (i) Rubber eraser (ii) Paper clip (of steel)
   (c) (i) Plastic case (ii) Metal pins

Unit-VI : Natural Phenomena

14-Light, Shadows and Reclection

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Natural** sources of light occur in nature.

2. The objects which give out their own light are called **luminous bodies**.

3. Light always travels in a **straight** line.
4. A pinhole camera is based on the principle of **rectilliner** propagation of light.
5. **Plane** mirrors are used in signaling by armed forces.

C. Write true or false:

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

Section II

A. Very short answer questions :

Ans. 1. Light is a form of energy. It is an invisible form of energy which stimulates the sense of vision.

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

B. Short answer questions:

Ans. 1. Those objects which allow only some amount of light to pass through them are called translucent objects. Butter paper, smoked glass, tissue paper etc. are translucent objects. We cannot see clearly through objects.

2. If an opaque substance is kept between the source of light and a screen, the light does not pass through it. We can say that the shadow of the substance on the screen remains runlighted. The unlighted portion is the shadow.
3. The property of light of travelling in straight line is rectilner propagation of light.
4. A pinhole camera is based on the principle of rectilinear propagation of light.
5. Chair, car, tree, man, moon, Earth are some non-luminous objects.

C. Long answer questions :

Ans. 1. A pinhole camera exists innature also. Have you seen circular images of sunlight when passing under a tree covered with a large number of leaves. These images are actually the pinhole images of the sun. The gaps between the leaves act as pin holes.

2. It can be shown by the following activity:

Take a straw. Place a lighted candle on a table. Look at the candle through the straw while standing at the othe rend of the table. Can you see the candle? Now bend the straw slightly. Again look at the candle. Can you still see the candle? You will not be able to see the candle. This shows that light travels in stragith lines (Rectilinear propagation of light).

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

S.No.	Image	Shadow
1.	An image of the same colour as the object.	A shadow is always black. Some part of it may be of grey colour.
2.	It has all the details that the object has.	It is similar in shape of the object and does not give any other detail about the object.
3.	It undergoes lateral inversion.	It does not undergo lateral inversion.

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

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

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

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

5. A periscope works on the reflection of light from two plane mirrors arranged paralled to one another. The working of a periscope wil become clear from the following example : In the figure there is a tree behind a high wall which we cannot see direcly. We can, however, see this tree by using a periscope as follows: The upper hole of perscope is turned towards the object to be seen (here a tree) so that mirror M1 faces the object. And we look into the periscope from the bottom hole in front of lower mirror M2. The light rays coming from tree fall on the plane mirror M1. Mirror M1 reflects these rays of light towards the mirror M2. The mirror M2 then reflects the light towards the eye of the person looking into periscope through the lower hole. Since the light ray coming from the tree enter the eye, it is possible to see the image of the tree in the lower mirror M2 (even though the tree cannot be seen directly).

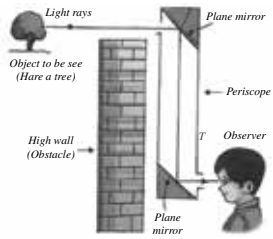


Diagram to show tthe working of a periscope

D. Higher Order Thinking Skills (HOTS):

Ans. 1. Left hand

2. No

15-Water in Our Life

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. Water in the oceans is too salty to be used for **drinking** and **irrigation**.

2. **Farmers** rely on water to sustain their agricultural crops.
3. Evaporation also depends upon **humidity** and **surface area**.
4. **Water cycle** plays an important role in global climate.
5. We should **conserve** water wherever possible.

Section II

A. Very short answer questions :

Ans. 1. About three-fourth of the Earth's surface is covered with water. That is why it is also called the watery planet.

2. We use water for drinking.
3. Water cycle is the circulation of water in nature where the water from earth evaporates, forms clouds and falls back to the earth as precipitation.
4. We can conserve water by preventing leakage of water from the taps.
5. Flood causes great damage to crops, animals and humanlife.

   Flood water can damage structures such as buildings.

B. Short answer questions:

Ans. 1. Evaporationdirectly depends on temperature. The higher the temperature the more is the rate of evaporation. In other words the rate of evaporation increases with the increasein temperature.

2. Puddles of rainwater dry up because the heat of the sun evaporates the water.
3. Clothes dry faster on a windy day because wind increases the rate of evaporation.
4. We need water for drinking, washing, irrigation etc.
5. We need to conserve water because it is very precious and available in limited quantity.
6. Water enters the air through the processes of evaporation and transpiration.

C. Long answer questions :

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

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

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

Personal/domestic needs : We need water to drink. Water that is suitable for drinking is called potable water. We also need water to bathe, wash clothes and dishes, clean our house, and to water plants.

(Apart from these uses, water is also used for transporation and recreation.) It also regulates the climate of a place and provides homes to many animals.

2. Water present on the earth, in oceans, seas, rivers, lakes and other water bodies evaporates due to the heat of the sun and moves to the atmosphere. Also, water in the form of vapour goes to the atmosphere through transpiration.

   It gets cooler when you go higher-up from the surface of the earth. The air moving up gets coller and cooler. While moving up at sufficient heights, air becomes so cool that the water vapour present in it gets condensed into tiny water droplets on dust particles. These water droplets reamin floating in the air and appear as clouds.

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

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

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

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

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

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

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

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

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

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

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

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

   Rainwater can be directed through pieces from the rooftops to the storage

pipe in the ground. From here it steeps into the soil to recharge or refill the groundwater.

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

6. Some of the steps by which we can conserve water at home are:
   - Avoid wastage of water and use it judiciously. Recycle water wherever possible.
   - Prevent leakage of water from the taps.
   - Turn off the taps when not in use.
   - Use s bucket and mug, instead of shower to have a bath.

D. Higher Order Thinking Skills (HOTS):

Ans. - This is so because a shower wasters a lot of precious water.

16-Air Around Us

Exercises

Section I

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

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

B. Fill in the blanks :

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

C. Wrtie true or false:

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

Section II

A. Very short answer questions:

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

B. Short answer questions:

Ans. 1. Wind is helpful to us in many ways:
   - It make us feel cool.
   - It helps in drying wet clothes faster.
   - It helps in pollination.

2. Composition of air is as follows:

   Nitrogen -78 per cent; oxygen-21 per cent; carbon dioxide, water vapour, other gases and sust particles – 1 per cent.

3. Air is important for us because it contains oxygen and carbon dioxide. Oxygen is required for respiration and carbon dioxide is essential for photosynthesis.

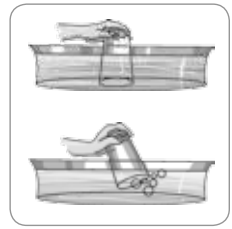
4. Industries exit smoke the causes air pollution.

C. Long answer questions:

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

Aim : To show tha air is present everywhere.

Take an empty glass bottle. It is really empty? Let us see. Invert the bottle for some time to ensure that whatever is in the bottle comes out. Did anything fall from it? Now, tilt the bottle. What happens? Let of bubbles come out of the bottle and then with a peculiar sound water enters into the bottle.



Conclusion : The bottle was not empty. Air was in it. When bottle was tilted inside water, air of the bottle came out and water rushed to fill up the vacant space. Bubbles were caused due to air escaping out of the bottle. We conclude that air occupies all the available space and is present everywhere.

2. Air contains varying amounts of water vapour depending on the weather of a place. You have learnt about the water cycle. The Sun heats up the water in seas and oceans. This water vapor in air by observing wet clothes dring on a clothesline. Where does the water from these wet clothes disappear? The water from the wet clothes forms water vapour and mixes with the air.

3. Effects of air pollution are as follow:

   (i) Excess of caron dioxide causes suffocation.

   (ii) Carbon monoxide, the deadly poisonous gas released from automobiles, aircraft engines and space rocket engines reduces oxygen carrying capacity of blood.

   (iii) Sulphur dioxide released from coal and oil combustion causes headache, chest constriction, causes headache, chest construction, irritation in the respiratory tract, vomiting, etc.

   (iv) Nitrogen oxides released from automobiles affect respiratory system in animals and defoliation leading to death of some plants.

   (v) Photochemical smog causes eye irritation, loss of vision, abdominal pain and also cancer.

D. Higher Order Thinking Skills (HOTS) :

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

Interactive SCIENCE-7

Unit-I : Food

1-Nutrition in Plants

Exercises

Section I

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

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

B. Fill in the blanks :

Ans: 1. All green plants convert **solar** energy into **chemical** energy.

2. **Autorophs** are also also known as producers.
3. Photosynthesis always occurs in the presence of **sunlight**.
4. A common plant parasite is **cuscuta** or **dodder** plant.
5. **Insectivorous** plants have developed special structures to catch insects.

C. Wrie true or false:

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

Section II

A. Very short answer questions:

Ans. 1. Photosynthesis is the process by which green plants prepare their food.

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

B. Short answer questions:

Ans. 1. Green plants make food by the process of photosynthesis.

During this process, the green plants convert simple inorganic substances like CO_2 and H_2O into glucose, in the presence of sunlight. Light energy from sunlight is captured by the ch lorophyll molecules (green pigments) present in green plants and transformed into chemical energy in their form of food (starch).

2. Organisms which make or synthesise their own food from simple raw materials are called autotrophs. As they can prepare their food from raw inorganic materials (carbon dioxide and water), they are also known as producers.

Organisms that are not capable of synthesizing their food, and are dependent on other organisms for their food requirement are called heterotrophs. As these organisms depend on others for food (plants and animals) they are also called consumers.

3. Only leaves can sysnthesise food because they contain a green coloured pigment called chlorophyll. Chlorophyll can convert solar energy into chemical energy in the form of starch (food).
4. Organisms need to take food to provide nutrients to their body cells so that they can carry out activities to keep themselves active. Autorophic nutritio and heterotrophic nutrition are two modes of nutrition in organisms.
5. Plant parasites are those plants which live on othe living organisms and

obtain their food from them. Cascuta or dodder plant is a common plant parasite.

C. Long answer questions:

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

Nutrients are the components of food such as charabohydrates, fats, proteins, vitamins and menerals.

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

Aim : To show that starch is produced during photoshynthesis.

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

Procedure :

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

Observation : The leaf turns blue-balck.

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

Strach is produced during photosynthesis

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

Examples :

- Certain fungi live in the roots of trees. The tree provides nutrients to the fungus. In return, the fungus provides certain nutrients from the soil to the tree.
- In lichens also, symbiotic relationship is seen. There is an association between a green alga and a non-green fungus. The fungus provides shelter, water and minerals to the alga. The alga, in return, provides food to the fungus. The alga, being g reen, prepares food by photoshynthesis.

Lichens

4. This can be show by the following activity:

Aim : To show that cholorphyll is necessary for photoshynthesis.

Materials required : A healthy croton plant (with variegated leaf), iodine

solution, ethyl alcohol.

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

Procedure:

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

Chlorophyll is necessary for photosynthesis

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

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

Thus, chlorophyll is necessary for photosynthesis.

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

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. (a) (i) Carbon dioxide (ii) Water
(b) (i) Glucose (ii) Starch
(c) Photosynthesis
(d) Food E
(e) Chtorophyll

2. (a) (i) Alga (ii) Fungus (iii) Lichen
(b) X is green in colour
(c) Symbiotic relationship
(d) Rhizobium bacteria and leguminous plants.

2-Nutrition in Animals

Exercises

Section I

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

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

B. Fill in the blanks :

1. Organisms take whole solid food or liquid substances in **holozoic** nutrition.
2. **Buttterfly** suck the nectar from flowers through their proboscis.
3. Oesophagus is a **hollow** tube made up of muscles.
4. A **ruminant** is an even toed animal.

5. **Teeth** are used to chew food.

C. Match the following :

1. Mosquito and louse	**(d) Parasites**
2. Hydra	**(e) A multicellular organism**
3. The tongue	**(a) A fleshy musclular organ**
4. Villi	**(b) Finger like projections**
5. Casnivores	**(c) Highly developed canines**

Section II

A. Very short answer questions:

Ans. 1. Nutrition
2. Oesophagus
3. Milk teeth or temporary teeth.
4. Ruminants
5. Amoeba

B. Short anaswer questions:

Ans. 1. Alimentary canal is a long tube running from mouth to anus of a human being (or other animals) in which digestion and absorption of food takes place. Alimentary canal is also known as gut or digestive tract. It is about 8 to 9 meters long in humans. The alimentary canal is a continuous canal which has many parts such as month (buccal cavity), oesophagus (food pipe), stomach, small intestine, large intestine, large intestine, rectum and anus. Three glands are also associated with alimentary canal. There are glands, liver and pancreas.

2. Saliva makes the chewed food wet and slippery. This makes the swallowing of food easier.

3. Nectar is the food of butterfly. It suck the nectar through its proboscis.

4. Villi are finger-like projections on the inner wall of the small intestine. These villi increase the the surface area of absorption. Villi contain blood vessels. The digested food passes through the thin walls of these blood vessels ad enters the blood stream.

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

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

C. Long answer questions:

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

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

(ii) **Digestion :** The ingested food is required to be broken down into small units to obtainenergy for maintaining life processes. This process of the breaking down of the maintaining life processes. This process of the breaking down of the bigger constituents of food into simpler and smaller units, is known as digestion. In most animals, the process of digestion includes both physical and chemical digestion. In physical di-

gestion, the big-sized food particles are broken down into smaller units. In chemical digestion, the complex substances are converted into simple and absorbable substances.

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

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

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

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

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

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

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

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

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

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

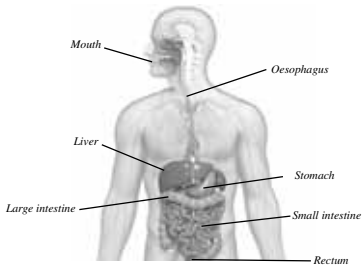
Further digestion of the food takes place in stomach. The stomach is a J shaped pouch located on the left side of the abdomen and serves as food storage. Our stomach is about 12 inches long and 6 inches wide at its widest point. An average adult can hold about 2 litres of food.

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

The digestion continues inthe small intestine. The main job of the small intestine is to absorb the nutrients during digestion. Small intestine is the longest portion of the digestive tract. It is about6 meters long. The small intestine is divided into three parts namely duodenum, jejunum and ileum. The small intestine receives various enzyme like pancreatic amylase, lipase and trypsin from pancreas, and bile from liver. Enzyme lipase converts fats to

fatty acids and glycerine (glycerol); starch is converted to sugars by amylase. Trypsin acts on proteins that are not digested in the stomach.

4.



Digestive system of humans

5. The process of digestion the ruminants can be described as follows:

   (a) Plant material is chewed a little before being swallowed by ruminants. This material is then directed into the first compartment of the stomach, called the rumen. Here, the food is broken down and partly digested before it asses to the next chamber, reticulum.

   (b) In reticulum, the food is formed into balls (cud), which are regurgitated to the mouth for further chewing. This process is called rumination and these animals are hence called ruminants. Ruminants candigest grass richincellulose, which is a type of carbohydrate that many animals and humans cannot digest. The cud is swallowed and passed to the next chamber, called omasum.

   (c) In the omasum, most water from the cud is absorbed; the remainder is dried up and passed to abomasum (or the rennet bag).

   (d) The secretions of abomasum act upon the cud and digest all the proteins found in it.

   (e) The semi-fluid mass (chyme) into which the food has now been converted, passes to the duodenum (a tube connecting the abomasum and small intestine) and the small intestine where digestion is completed and the products of digestion are absorbed.

D. Higher Order Thinking Skills (HOTS) :

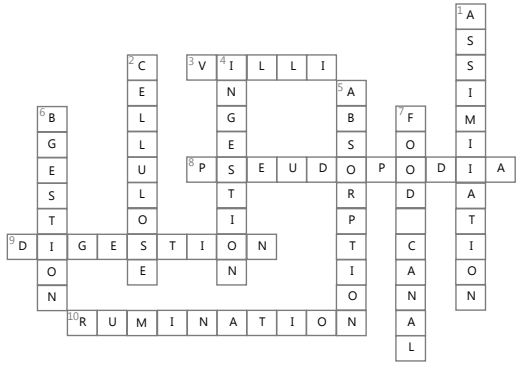
Ans. 1. Beans 2. Cellulose. Yes, it might be so.

Tasks For You

Think and Tell

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

Ans.



3-Fiber To Fabric

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. Fibres are are thin threads, either **natural** or **synthetic**.
2. **Woollen** fabrics are good insulators of heat.
3. Silk is an **animal** fibre.
4. The caterpillars are fed on **mulberry** leaves.
5. **Sericulture** is the rearing of silkworms for silk production.

C. Write true or false :

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

Section II

A. Very short answer questions :

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

B. Short answer questions:

Ans. 1. A fibre can be defined as a long, fine, continuous thread or filament obtained from plants and animals. In animals, fibres are mostlyhair growing on the body. Plant fibres like hemp, jute, cotton are based on cellulose that is used to give structure to the fibre.

Yarn is long, continuous, thread-like structure obtained by joining fibres and twisting them.

2. Wool comes from sheep, llama, alpaca, guanaco and vicuna. Cashmere from Kashmiri goats is another well-known clothing fibre.
3. The fleece along with a thin layer of skin is shaved off. This process is called shearing. Shearing is done annually in the spring of summer months. Shearing is done with a manual razor or blade, just as those used by a barer to shave off hair. Shearing is done in the hot weather so that the animals can survive without their protective coat.
4. Following types of health hazards are associated with wool industry.

In earlier days, the workers who sorted wool were often infected by bacteria that cause a fatal disease called anthrax, also known as sorter's disease. The bacteria are found in the wool of contaminated sheep and can enter the human's body through inhaled air. Nowadays, this disease occurs rarely because of the use of vaccines for prevention.

5. The properties of silk are as follows:

   Properties of Silk

   (i) It versatile and very comfortable.

   (ii) It absorbs moisture.

   (iii) It can be easily dyed

   (iv) It retains its shape and is relatively smooth.

   (v) It is the strongest natural fibre and is also lustrous.

   (vi) It has a poor resistance to sunlight exposure.

   (vii) It burns with the smell of the burning hair and unlike wool stops burning when removed from the flame.

6. Some uses of silk are :

   (i) Silk is used to make sarees, blouses, scarves, pants and ties.

   (ii) It can also be made into curtains, draperies cushion covers and sofa covers.

   (iii) It is also used in the medical field for sutures and prosthetic arteries.

C. Long answer questions:

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

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

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

2. The production of wool involves the following steps:

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

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

Washing (scouring) : The sheared skin is washed thoroughly with soap or detergents parts of the body. So it is sort out into separate piles of similar

nature. This process is called grading or scouring.

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

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

3. **(a) Woolen System :** In this system, the woolen fibres of of mixed lengths are carded and then spun to form woolen yarn. The fabrics made from such a yarn do not have smooth finished surface.

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

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

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

D. Higher Order Thinking Skills (HOTS) :

Ans. (a) silkmoth

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

(c) Silk

(d) Mulberry tree

4-Heat

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Sun** is the primary source of heat energy on Earth.

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

C. Match the following:

Ans.

1.	Heat	**(c) A form of energy**
2.	Clinical thermometer	**(e) The celecius scale**
3.	Convection	**(b) Transfer of heat in liquids**
4.	Conduction	**(a) Transfer of heat in solids**
5.	Radiation	**(d) Transfer of heat in gases**

Section II

A. Very short answer questions:

Ans.

1. We wear woolen clothes in winter because they keep us warm.
2. Our normal body temperature is 37°C
3. Conduction is the movement of heat through a solid object from hot to the cold region.
4. Land breeze is a breeze that blow towards the sea from land at light.

B. Short answer questions :

Ans.

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

   At night the reverse process occurs. Land cools faster than sea. Warmer air above sea rises faster than the air above land. Cooler air from the shore replaces this. This results in the land breeze.

C. Long answer questions:

Ans.

1. **Conduction :** It is the spontaneous transfor of heat energy from a region of

higher temperature to a region of lower temperature. Therefore, conduction acts to equalise temperature differences. It is also described as heat energy transfer from one material to another by direct contact.

Convection : Liquids and gases are together called fluids, since both can flow. In the case of fluids, the molecules themselves carry energy from a hotter region to a colder region. This process of heat transfer is called convection.

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

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

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

3. For this we can do the followingactivity.

   Aim: To know about conductors and insulators:

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

   How can you say so?

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

   (a) Copper and iron are conductors of heat as compared to iron.

   (b) It shows that copper is a betterconductor of heat as compared to iron.

4. Importance of convection currents is as follows:

   - Ventilators and exhaust fans are usually near the ceiling of a room because the air we breathe out is warmer and lighter than ordinary air. It rises and escapes through the ventilator or exhaust fan, and cold, fresh air enters through the windows.
   - Hot smoke and gases from industrial furnaces rise and escape through chimneys, much as the smoke escaped through the chimney in the shoe box.
   - Heaters, blowers and heat convectors heat a room by setting up convection currents.

- Heaters, blowers and heat convectors heat a room by setting up convection currents.
- The sea and land breezs which blow in costal areas are actually convection currents. The sea takes longer to get heated than does the land. So the land is hotter than the sea during the day. The air in contact with the land becomes hot and rises, and the cooler air above the sea rushes in towards the land to take its place. This sets up a convection current, which we call a sea breeze. After sunset, the land cools much faster. The air above the sea is warmer than that above the land moves out towards the sea. We call this a land breeze.
- Birds use convection currents of air to rise high and glide effortlessly without flapping their wings.

5. Applications of heat radiation are as follows:
   - White and light-coloured clothes are more comfortable in summer because they light-coloured clothes are more comfortable in summer because they reflect most of the sun's radiant heat.
   - The base of the cooking vessel is painted black so as to absorb most of the heat energy provided and cook the food in less time.
   - Electric room heaters have a polished metallic surface behind the heating coil. This surface reflects most of the radiant heat falls on it and gives effective heating to the room.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. On doing this the temperature of the thermometer will rise dramatically.

2. It is so because plastic is an insulator and it will prevent the transfer of heat from pan to the hand off a person.

5-Acids, Bases and Salts

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Elements** are considered to be pure substances.

2. The acids classified as **organic** and **mineral** acids on the basis of source.
3. **Strong bases** are the bases which are soluble in water.
4. **Phenolphthalein** and **methyl orange** are the two most common synthetic indicators.
5. Slats have high **melting** and **boiling** points.

C. Write true or false :

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

Section II

A. Very short answer questions :

Ans. 1. Lactic acid and oxalic acid.

2. Aluminium hydroxide
3. China rose
4. When an ant or a bee stings, formic acid (or methanoic acid) gets injected into the skin. This acid causes irritation and swelling.
5. Sulphuric acid (H2SO4)

B. Short answer questions:

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

C. Long answer questions:

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

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

2. On the basis of source, acid are classified as following:
   (a) Organic acids : The acid which are derived from plant or animal products, are called organic acids. For example, citric, acid, tartaric acid, oxalic acid, lactic acid, acetic acid and malic acid.
   (b) Mineral acids : The acids which are derived from derived from minerals, are called mineral acids. For example, nitric acid, sulphuric acid, hydrochloric acid and phosphoric acid.
3. Properties of acids are as following:

(a) Most acids are sour in taste. The sour taste of many unripe fruits, lemons and sour milk, is caused by the acids in them.

(b) They are generally good conductors of electricity.

(c) Most of the mineral acids, such as sulphuric acid and nitric acid, have a corrosive action on skin, cloth, paper or wood, metals such as iron and zinc. So acids are stored glass containers instead of metal containers.

(d) Except carbonic acid all mineral acids cause burn on the skin.

(e) Most of the acids are solublie in water.

4. Applications of two important bases can be given as under:

(a) **Sodium hydroxide (NaOH) : It is used:**

- to manufacture washing soap and detergents.
- in textile industry.
- in the manufacture of rayon, medicines and paper.
- in refining edible oils.

(b) **Calcium hydroxide [Ca(OH)2] : It is used:**

- In the manufacture of bleaching powder.
- For whitewashing.
- As a dressing material for acid burns.
- as antidote for acid poisoning.
- in the preparation of mortar and plasters.
- to detect the presence of carbon dioxide gas.

5. Neutralisation reactions are quite common in every day life.

(a) **Insect stings :** When an ant or bee stings us, it is painful and very irritable. This is because of the secretion of formic acid from the insect's mouth. For relief, we can immediately applybaking soda (a base) on the affected area. Baking soda neutralizes the acid and gives instant relief. Wasp sting on the other hand is basic. So, vinegar (acetic acid) is used for relief from wasp stings.

(b) **Acidity :** Excess hydrochloric acid in our stomach can cause indigestion and is painful. To treat such indigestion caused by acidity, antacid tablets such as milk of magnesia (magnesium hydroxide) are used to neutralise the excess acid.

(c) **Treating wastes from factories :** When acidic wastes from factories are disposed off in rivers, they are first treated with bases to neutralise them. Prevents the river water from getting acidic, as acidic substances may harm aquatic life.

(d) **Preventing tooth decay :** When you brush your teeth using a toothpaste, which contains bases, any kind of acid present in the mouth or teeth cavities is neutralided. This helps in preventing tooth decay.

(e) **Treating soil :** Most of the plants grow best in neutral soil, but excessive use of fertilisers makes the soil either acidic or basic. This affects the growth of plants, thereby affecting the productivity adversely. In such a situation, neutralisation reactions help in the following ways:

Acidic soil is treated with bases like slaked lime (calcium hydroxide) to nullify the effect of the acid.

Basic soils are neutralized by adding large quantities of acidic substances like composted manure.

D. Higher Order Thinking Skills (HOTS) :

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

(ii) B and C

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

6-Physical and Chemical Changes

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. Matter is made up of **atoms** and **molecules**.

2. **Physical** change is generally reversible.

3. **Exothermic** reactions take place with evolution of heat energy.

4. The chemical reaction in **which an** element replaces another element in a compound is called **displacement reaction**.

5. During **melting**, a solid is dissolved in water.

C. Write true of false:

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

Section II

A. Very shot answer questions :

Ans. 1. Solid, liquid and gas are the three states of matter.

2. Iron is covered with zinc to prevent rusting. This is a non-corrosion metal.

3. When an iron object is left outside in the rain, a reddish brown layer is deposited on its surface. This is due to the presence of rust which forms naturally due to a chemical reaction. The process of formation of rust is called rusting.

4. Short answer questions:

Ans. 1. Matter is anything that occupies space and has weight (as against energy like light or electricity which does not occupy space).

2. (a) **Sublimation :** Process in which substances can be converted from solid state to gaseous or vapour state without going in to the liquid state. These substances again condense to become solid on cooling. Naphthalene is an example.

(b) **Melting :** When a substance changes its state from solid to liquid it is said to melt. Melting point is a particular temperature when this happens, the solid and the liquid states of the substance are at an equilibrium, at this temperature.

(c) **Freezing :** When as substance changes its state from liquid to solid state. Freezing point is a particular temperature and may or may not be the same as melting point.

(d) **Boiling :** It is state for a liquid when the maximum vapour pressure of the liquid is equal to external pressure that the liquid is under. For a substance it is a constant temperature.

3. Characteristics of physical change are as follows:
   - Only physical properties of a substance undergo change.
   - Physical changes are generally reversible.
   - No new substance is formed.
   - A very small amount of energy is either absorbed or evolved during a physical change.

4. **Exothermic reactions :** Some reactions takes place with evolution of heat energy. Such reactions are known as exothermic reactions.

   Example : Burning of coal.

   Endothermic reactions : Some reactions take place with absorption of heat energy. Such reactions are known as endothermic reactions.

   Example : Photosynthesis in plants (Heat energy is used)

5. (i) Decomposition reaction (ii) Displacement reaction

   (iii) Combination reaction (iv) Precipitation reaction

   (v) Displacement reaction

6. Galvanisation is a process in which we deposit a layer of metal like chromium or zinc iron surface. Both chromium and zinc are corrosion free metals. In this way rusting is prevented.

C.Long answer questions:

Ans. 1. During the conversion of milk into curd many reactions involving proteins, organic acids, and fat take place. The taste and other properties of curd are different from those of the milk. It is not possible to obtain milk from the curd. Thus, we can say that, curding of milk is a chemical change.

2. Different types of chemical reactions are as follows:

   Combination Reaction : The chemical reaction in which two or more simple substances (reactants) combine to form a complex compound is called combination reaction.

   Look at the following examples of combination reaction.

   (i) Burning of magnesium ribbons in presence of oxygen (of air) is a example of combination reaction. Magnesium oxide is the product of this reaction.

   Magnesium + Oxygen Magnesium oxide

   2Mg + O2 2MgO

   (ii) Burning of carbon with oxygen (of air) giving carbon dioxide is another example of combination reaction.

   Carbon + Oxygen Carbondioxide

   C + O2 O2

3. **Decomposition Reaction :** The chemical reaction in which a compound breaks down to two or simple substances is called decomposition reaction. These types of reactions require energy which is given in the form of electricity.

   Following are some common examples of decomposition reaction.

   (i) The chemical name of lime is calcium carbonate. If you heat up lime to a certain temperature, it will produce calcium oxide or quick lime and carbon oxide.

   Calcium carbonate + Carbon dioxide Calcium oxide

   CaO + CO2 CaCO3

   (ii) When current is passed through water, it gives off its constituent elements hydrogen and oxygen in their gaseous states. This process is called electrolysis.

   Water Hydrogen + Oxygen

   2H2O 2H2 O2

4. **Displacement Reaction :** The chemical reaction in which an element replaces another element in a compound is called displacement reaction.

   (i) For example, on reacting zinc with copper sulphate we get copper and zinc sulphate. Here, being more reactive than copper, replaces copper from copper sulphate.

   Zinc + Copper sulphate Zinc sulphate + Copper

   Zn CuSO4 ZnSO4 Cu

   (ii) Aluminium being more reactive then iron, replaces iron from iron sulphate solution forms aluminium sulphate.

   Iron sulphate + Aluminium

   2FeSO12AI Aluminium sulphate + 3Fe

   AI (SO4)3 + 3Fe

5. **Precipitation Reaction :** The chemical reaction in which two different compounds react with each other in solution and leads to the formation of a compound that settles down at the bottom of the solution is called precipitation reaction.

   For example, reaction of silver nitrate solution with potassium bromide solution leads to the formation of red coloured precipitate of silver bromide.

   Silver itrate + Potassium bromide Silver bromide + Potassium nitrate

   AgNO3 KBr AgBr KNO3

D. Higher Order Thinking Skills (HOTS):

Ans. 1. a. (i) Hydrogen (ii) Oxygen (iii) Stream

b. (i) Chemical change (ii) Physical change

2. a. (i) Baking soda (ii) Vinegar

b Acetic acid (c) Chemical change (d) Carbon dioxide

7-Weather Climate Adaptation of Animals to Climate Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Weather** gives us information about the atmosphere at given place and time.

2. Afternoon is the **hottest** and early morning is the **coldest** time of the day.
3. The **climate** varies from region to region.
4. The Siberian crane migrates from **Russia** to **India** in winters.
5. **Monkeys** have a long and coiled prehensile tail.

C. Write true of false:

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

Section II

A. Very shot answer questions :

Ans. 1. The day-to-day condition of the atmosphere at a place with respect to physical conditions like humidity, temperature, rainfall and speed of wind is known as weater.

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

B. Short answer questions:

Ans. 1. Whether is a complex phenol men on that includes variations in factors such as temperature, rain fall and humidity over a short period of time. It is basically a daily phenomenon and is the nature of the atmosphere at any given point of time.

Climate tells us about the average weather pattern of a place over a period of time. It is a long term phenomenon which tells about the average temperatures, rainfall or humidity levels over a along period of time.

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

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

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

- Relative humidity is always expressed in percentage, i.e., if relative humidity is 100%, it means, the air is saturated with water vapour.

- Relative humidity is measured by a device called hygrometer.
- Relative humidity varies with the temperature. It keeps changing throughout the day and is represented as maximum and minimumrelative humidity. It also changes with the season.

3. Weather report in the newspaper provides us information on temperature, precipitation, wind, pressure and humidity.
4. Three adaptations as found in animal living in polar regions are as follows:
   (i) Animals living in polar regions are usually white or light coloured. It make them hard to recognize.
   (ii) Most animals living in polar region hibernate during winter and utlise the energy from the food already stored in them.
   (iii) The fat under the skin gives them protection from cold.

C. Long answer questions:

Ans. 1. Elements of weather are as follows:

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

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

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

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

Relative humidity is always expressed in percentage, i.e., if relative humidity is 100%, it means, the air is saturated with water vapour.

Relative humidity is measured by a device called hy grometer.

Relative humidity varies with the temperature. It keeps changing throughout the day and is represented as maximum and minimum relative humidity. It also changes with the season.

Rainfall : When air with 100% humidity cools down, its water vapour condenses, i.e., changes into water droplets. The mass of water droplets forms clouds/. Further colling these droplets to pour down as rain. At high altitudes where temperature is very low, water d roplets freeze and come down as snowfall.

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

Benefits of Weather Forecasting

- It allows people to prepare for bad weather.
- It is helpful to protect life and property.
- It is helpful to plan activities and events.
- It helps farmers to plan various agricultural activities.

3. The following adaptations help the polar bear to live successfully in extremely cold conditions.
   - The body of the polar bear is covered over by a thick coat of white fur.
   - It helps the animal to hide itself from the enemies because its colour merges with the background i.e., white snow. This adaptation also helps the polar bear to hunt its prey easily.
   - It has two thick layers of fur. Beneath the fur is a thick coat of fat. The fat insulates the body from cold and keeps it warm.
   - Polar bear is a good swimmer. It has wide and large paws that help it to swim. These also help it to walk easily on the snow.
   - The body of polar bears, is so insulated that they have to move slowly and rest often to avoid getting overwarm.
   - On warm days, on account of physical activities, they require cooling. They go into the water for swimming and can remain under water for long durations.
   - Polar bear has a strong sense of smell so that it can locate its prey easily.
4. Animals living in rainfroests show following adaptation in feeling habits. Although animals in tropical have a wide variety of food available, but there is lot of competitions for food. As a result, many animals have adapted to a particular food which is not eaten by other animals. These animals have developed several methods for obtaining food.
   - Most tropical rainforest animals are herbivores due to plenty of vegetation around them.
   - The bird toucan has a long and large beak. This helps it to reach fruits on the braches of a tree on which it cannot sit.
5. By the following we can say that a chameleon is adapted to live in its habitat.
   - Chameleon is an arboreal lizard.
   - Its tail is long and prehensile.
   - It has a great gripping power due to its fused fingers in groups of three and two.
   - The eyes are are very large, they move in all directions, better adapted for binocular vision. The chameleon sees front with its right eye, and behind with its left eye.
   - Its tongue is large, sticky and rolled up as tape inside the mouth.
   - It has the capacity to change its skin colour to that of the background to hide itself.
   - On finding a suitable prey the chameleon at once shoots its tongue out to catch the prey. The tongue is then rolled up back into the mouth.

D. Higher Order Thinking Skills (HOTS) :

Ans. (a) (i) Polar bear (ii) Penguin

(b) Surroundings covered with ice and show.

(c) The thick layer of fat insulates the body of these animals against heat loss and kees them warm in extremely cold climate.

(d) Animal Q (It is a penguin)

8-Winds, Storms and Cyclones

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. (a) The effects of **wind** on objects can be observed.

(b) The greater the pressure difference, the **faster** air moves.

(c) The **warm** air rises in the equatorial regions of Earth.

(d) During winter, wind blows from the **land** towards the **sea**.

(e) **Hurricanes** are violent and cause severe damage to life and property.

C. Write true or false:

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

Section II

A. Very short answer questions :

Ans. 1. Thunderstorm, hurricanes and tornadoes.

2. Wind is air that moves.

3. The temperature of the land is higher than that of water in oceans because land heats up quickly than water.

4. A thunderstorm is a storm accompanied with lightning and thunder. It is produced by a cumulonimbus cloud, usually producing gusty winds, heavy rain and sometimes hail.

5. Cyclones of the temperate latitudes, especially in Europe are often called depressions (since they are systems with low pressure centres).

B. Short answer questions:

Ans. 1. Air exerts pressure because the force of the Eart's gravity pulls the molecules of the air towards the ground.

2. The uneven heating on the Earth (which produces winds) can take place under two situations:

(i) Uneven heating between the Equator and poles of the Earth, and

(ii) Uneven heating of land and water of oceans.

3. Cyclone is a storm which develops on the sea and has high speed winds swirling around a low pressure centre called the eye of the storm. The high speed winds revolve in anti-clockwise direction in Northern hemisphere and in clockwise direction in Southern Hemisphere.

The moist air over the seas and oceans gets heated up by sunrays. The warm air carrying moisture rises up. This creates a low pressure area. The warm air condenses as it rises up to form clouds. The heat released due to condensation of water vapour warms the air around. The air tends to rise and causes a drop in pressure. More air rushes to the centre of the storm. This cycle is repeated, resulting in a system of low pressure region with high-speed winds revolving around it. This weather condition is referred to as cyclone.

4. Tropical cyclones in the Gulf of Mexico, the Caribbean Sea and western Pacific Ocean are known as Hurricans.

   These winds are violent and cause severe damage to life and property.

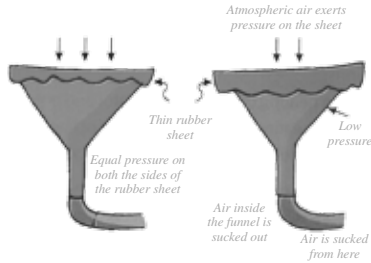
C. Long answer questions:

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

Aim : To show that air exerts pressure.

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

Procedure : Take a funnel and tie a piece of thin rubber sheet over its mouth. Connect the stem of the funnel to a rubber tube. When the open to the atmosphere, the rubber sheet is flat. Now suck the air out from the funnel. What do you see? The rubber sheet over the funnel gets depressed. This is because when air from the funnel is sucked out, there is very little air inside. The atmosphere air exerts pressure on the rubber sheet and it gets depressed.



Demonstrating the effects of pressure due to air

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

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

3. Precautions to be observed during a thunderstorm are as under:
   - The best lace is to stay indoors with all the doors and windows shut.
   - If a forest, do not lie down. Take shelter under a small tree.
   - If you are in a pool, get out and take shelter in a building.
   - If in a car or bus, close the windows and stay inside.
   - Do not use an umbrella having a metallic handle.
   - Do not take shelter under an isolated tree.
   - Do not sit near a window.

4. Some damaging effects of cyclones and destruction caused by them are given below:
   - Cyclones push water and produce water waves causing floods.
   - The low pressure in the eye of cyclone lifts water to a height of up to 12m. It appears like a wall of water. This water wall enters low-lying coasted areas and causes severe loss of life and property.
   - It causes loss of fertility of the soil.
   - High speed winds of a cyclone can damage buildings, telephone and electricity systems, uproot trees and other destruction.

D. Higher Order Thinking Skills (HOTS):

Ans. 1. Winds blow towards the equator in the two latitude belts of 0°-30°N and 0-30°S. This is so because of the rotation of the Earth on its axis.

2. If the Earth rotate from east to west the entire pattern of wind would get reversed.

9-Winds, Storms and Cyclones

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. Soil supports different varieties of **plants** in different areas.

2. **Top soil, sub-soil** and **parent rock** are the three main layers of soil.

3. Sandy soil is highly **porous** because the particle size is large.

4. The amount of water a particular soil can absorb is called its **water absorption capacity**.

5. **Clayey soil and loamy soil** have a greater water retention capacity.

C. Match the following:

1.	Sandy soil	**(b) Large particles**
2.	A home for living organisms	**(d) All kinds of soil**
3.	Clayey soil	**(e) Small particles and packet tight**
4.	Upper layer of the soil	**(a) Dark in colour**
5.	Middle layer of the soil	**(c) Lesser amount of humus**

Section II

A. Very short answer questions:

Ans. 1. Soil is the uppermost layer of the Earth's crust and is usually composed of a thin layer of mineral particles, and a layer of dead and decayed plant and animal remains called humus.

2. Soil is formed from rocks by the process of weathering. In weathering rocks are broken down very slowly by the action of sun's heat, wind, rain, flowing river water, etc., to form fertile soil. These tiny rock particles then mix up with

humus to form fertile soil. The nature of any soil depends on the rocks from which it has been formed and the type of vegetationthat grows in it.

3. Soil is very important for plants as all types of plants grow in the soil.
4. Water, time and temperature are three factors responsible for soil erosion.
5. Sandy soil is not good for crops as it is day, well aerated and light.

C. Long answer questions :

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

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

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

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

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

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

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

Deforestation (cutting down and removal of all or most of the trees in a forested area) is a major cause of soil erosion. Apart from this, excessive farming and over-grazing by cattle also result in soil erosion. If a piece of land is left uncultivated for a very long time, it may turn into a barren land as the top soil is left uncovered and hence prone to getting carried away by strong winds and flowing water.

Therefore, cutting of tree and deforestation should be prevented.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. Clay soil is used for making pots.

2. In that case there would be no life as plants (the producers) cannot grow in the absence of soil.

10-Respiration in Organisms

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Respiration** involves the taking in oxygen.

2. Aerobic respiration occurs in the presence of **oxygen**.

3. Breathing involves the movement of the **diaphragm** and the **rib cage**.

4. **Earthworms** breathe through their skin.

5. Stomata with nearby cell is known as **Stomata apparatus**.

C. Write true or false :

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

Section II

A. Very short answer questions:

Ans. 1. The process of breaking down of the food materials inside the body with the release of energy is known as respiration.

2. Aerobic respiration and anaerobic respiration are the two types respiration.

3. Exhalation is the process of expelling out of carbon dioxide.

4. In humans, lungs are present in the thorax (chest) and are protected by the ribcage.

B. Short answer questions:

Ans. 1. The basic difference between aerobic respiration and anaerobic respiration is that aerobic respiration occurs in the presence of oxygen where food (glucose) is broken down into carbon dioxide and water. As oppose to this, anaerobic respiration takes place in the absence of oxygen.

2. Carbon dioxide, water and energy are the end products of respiration.

3. The breathing rate increases after physical activity to take in more oxygen as the requirment of it is more.

4. Lunge are the organs of respiration in human beings. They are present the thorax (chest) and are protected by the rib cage. A dome-shaped muscle is present beneath the lungs.

C. Long answer questions:

Ans. 1. The word aerobic means that oxygen is needed for this chemical reaction. In this process, the food molecules are combined with oxygen and get oxidised

inside cell. These food molecules are then broken down into carbon dioxide and water, and energy is released. All food molecules contain carbon, hydrogen and oxygen atoms. The process of oxidation converts the carbon to carbon dioxide (CO_2) and the hydrogen to water (H_2O). At the same time, this process sets free energy which the cell can use to drive other reactions. Aerobic respiration can be summed up by the following equation:

$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O +$ Energy

Although the energy thus produced is used for variety of processes, some of it always appears as heat. In 'warm-blooded' animals (birds and mammals) some of the heat released is retained to maintain their body temperature. In 'cold-blooded' animals (reptiles and fish) the heat may build up for a time and allow the animals to move about faster. In plants the heat is lost to the surroundings as fast as it is produced.

2. You must have seen your chest going up and down as you breathe. During inhalation the ribs move up and outwards and the diaphragm moves down. These movements increase the volume of the chest cavity. The volume of the lung increases and the pressure inside the lungs decreases. As a result air rushes into the lungs. The lungs inflate as they fill with air. The chest expands during inhalation.

   During exhalation, ribs moves down and inwards and the diaphragm moves up. This air inside the lungs is pushed out due to increase in pressure inside the lungs.

3. We know that food provides us with energy. This energy is requird to carry out various activities. The food that we consume is broken down into simpler forms during digestion. The digested food is then absorbed and the blood transports it to different parts of the body. How is energy released from the food? It is released by the process of energy released from the food? It is released by the process of respiration. The food has stored energy which is released during the process of respiration. Hence, all living inhalation and exhalation are as follows:

4. Differences between inhalation and exhalation are as follows:

   Inhalation : During inhalation, the rib muscles contract and the front ends of the ribs move up and outwards. The diaphragm, which forms the floor of the chest cavity, moves down and becomes somehwat straight. This increases the volume of the air-tight chest cavity and creates pressure inside the lungs. Air rushes from outside through the trachea to the air sacs and alveoli.

Inhalation

   Exhalation : During exhalation, the ribs move up and the diaphragm relaxes, becomes convex and the abdominal organs take their original position. The capacity of the chest decreases, the lungs become compressed and the pressure in them rises. The air from the lungs rushes out through the air passages.

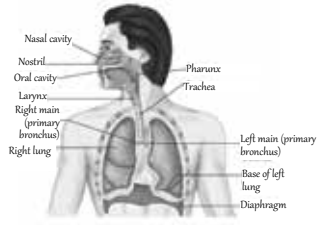
Exhalation

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

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

Organs of the Respiratory System

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



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

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

The completes the process of respiration.

D. Higher Order Thinking Skills (HOTS):

Ans. 1. This is so because it may charm their growth.

2. This is so becaue at light a tree take in oxygen and release charbon dioxide.

11-Transportation in Animals and Plants

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. The organs that transport substances together form th **ecirculatory system**.

2. **Aorta** carry blood from the heart to all parts of the body.

3. The blood is pumped through the **pulmonary artery** to the lungs for reoxygenation.

4. **Kidneys** are the most important organ of the excretory sysstem in humans.

5. The upward movement of water and minerals in plants is called **ascent of sap**.

C. Write true or false:

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

Section II

A. Very short answer questions :

Ans. 1. Circulatory system is very important as it moves substances throughout our body with the help of flood.

2. Heat, blood vessels and blood are the parts of the circulatory system.
3. Plasma is a straw-coloured liquid consisting of 90% water and nutrient contents like glucose, oxygen, carbon dioxide, urea, various types of proteins, hormones, etc. dissolved in it.
4. Stethoscope is used for listening to the heart beat.

B. Short answer questions:

Ans. 1. Blood consists of a liquid part called plasma in which three types of cells float-red blood corpulscles (RBCs), white blood corpuscles (WBCs) and the blood platelets.

2. Pulse is the rhythmical movement of the arteries as blood is pumped through them by the beating of the heart. Pulse rate is number of pulse beats per minute. The pulse rate is teh same as the rate of heart beat, i.e., 70-72 per minute.

3. Heartbeat is the regular contraction and relaxation. In an adult human being, the heart umps out blood to the arteries about 70 times per minute.

4. Not all the water absorbed by the plant is used up. The excess water is given out by the plants in the form of water vapour through the stomata present in the leaves. The process is called transpiration.

C. Long answer questions :

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

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

Blood carries or tranports the following substances:

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

The circulatory system inhumans consists of:

(i) heart (ii) blod vessels (arteries, veins and capillaries), and

(iii) blood.

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

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

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

3. At times the kidneys of a person get damaged due to infection. The toxic materials start accumulating in the blood. Dialysis is a method of removing these toxic materials from blood through an artificial kidney. This is done periodically.

4. Water is absorbed from soil by root hair. They are in close contact with water between the soil particles. Water and dissolved minerals move from root hair to the cells of root cortex and then to the xylem vessels by the process of diffusion:

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

D. Higher Order Thinking Skills (HOTS):

Ans. 1. Plant absorb more water than they required to keep themselves cool.

2. Veins have walves to prevent back flow of blood. They carry impure blood to heat.

12-Reproduction in Plants

Exercises

Section I

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

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

B. Fill in the blanks :

Ans 1. **Reproduction** is the most important characteristic of living organisms.

2. Yeast can also be seen under a **microscope**.

3. Ginger is a modified swollen underground stem called **rhizome**.

4. In **bryophyllum** buds are present in the margins of leaves.

5. The male reproductive part of the flower is the **stamen**.

C. Write true or false:

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

Section II

A. Very short answer questions:

Ans. 1. Asexula and sexual are the two modes of reproduction.

2. Common forms of asexual reproduction are Budding, Fission, Fragmentation and Spore formation.

3. A colony is chain of yeast cells formed in a very short time.

4. Asexual reprodcution in plants involves simple division of the plant body into two or more plants or the formation of spores under ufavourable conditions, i.e., harsh environmental conditions which are not suitabel for a plant to survive.

5. If the pollen lands on the stigma of the same flower, it is called self pollination. When the pollen of a flower lands on the stigma of another flower of the same plant, or that of a different plant of the same kind it is called cross pollination.

B. Short answer questions:

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

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

2. Buds are formed in yeast is formed by the division of the nucleus of the parent body.

3. If a piece of bread is kept in a warm and moist place, mass of fine thread-like structures which are the hyphen grow from the spares after they have settled on it. At the tips of the hyphen, spores are formed.

4. Vegetative propagation by stems takes place in a number of plants like potato, ginger, turmeric, sugarcane, onion, mint, strawberry, grasses, banana and gladiolus.

Let us study the stem of a potato.

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

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

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

C. Long answer questions:

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

- The new plants (daughte plants) obtained by vegetative propagation under the same conditions are genetically identical to the parent plant.
- Fruit trees or flowr plants grown by this method start giving fruits and flowers in lesser time those grown from seeds.
- Plants which do not produce seeds can be easily grown by this method.
- This method is more economical and less time consuming.

2. A plant produces a large number of seeds that grow into new plants. If the seeds get scattered only around the plant, they will not be able to grow since each o ne of them will compete for space, sunlight and minerals. Due to lack of these requirments in a limited space, they may die. Therefore, it is necessary to disperse the seeds over a large area.

Following are the ways of dispersal :

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

(ii) **Dispersal by Water :** The seeds and fruits to be dispersed by water

usually develop floating devices in the form of spongy or fibrous outer coats. The fibrous fruit of coconut is capable of floating long distances in the sea without suffering any injury. In lotus, the spongy receptacle, bearing the fruits on its top, floats about in water and drifts according to the currents of water.

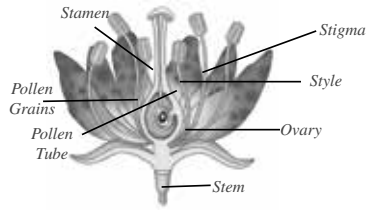
(iii) **Dispersal by animals :** It is common in such fruits and seeds which have spiny structures with hooks. The hooks stick to the bodies of passing animals and are carried away several kilometers before they are rubbed off and fall to the ground. Examples are explosive fruits are balsam, pea and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

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

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

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

The third whorl of the flowr is androecium. It consists of stamens which represent the male reproductive organ of the flower. The number of stamens varies in different varieties of flowers, but all are composed of two main parts the filament and the anther. The anther part of the stamen prossesses numerous pollen grains which produce male gametes. The fourth whorl of the flowr is gynoecium. It consists of carpels or pistils which represent the feamle reproductive organ of the flower. Each carpel consists of a basal swollen portion called ovary, a narrow stalk-like portion called style, and a single or many lobed structure at the top of style, the stigma. The ovary contains many ovules. The female gamete is present inside the ovule. The ovule develops into a seed.



Structure of a flower

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

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

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

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

It also has some disadvantages, which are as:

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

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

D. Higher Order Thinking Skills (HOTS):

Ans. 1. She is not telling the truth. Every flower has a pistil.

2. It will grow auto a new plant.

Unit-IV : Movig Things. People and ideas

13-Motion and Time

Exercises

Section I

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

Ans. 1. d 2. b 3. b

B. Fill in the blanks :

Ans. 1. The terms **motion** and rest are relative terms.

2. **Christian Hugens** made the first pendulum clock in **1656**.
3. **Winding clock** and **wrist watches** are refinements of the pendulum clock.
4. Speedometer records the speed of the vehicle in **km/h**.
5. The **gradient** of the graph gives the speed of the object.

C. Write true or false:

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

Section II

A. Very short answer questions :

Ans. 1. A player playing a football.

2. Time is a passage of a period.
3. Sundial, water clock and sand clock were the instruments used to measure time during ancient times.
4. Origin is a point of intersection in a graph where OX and OY intersect. It is represented by O.

5. The distance time graph will be in the form of a curved or zigzag line.

B. Short answer questions :

Ans. 1. Average speed is the speed the we get after dividing the 'Distance travelled' by 'Time taken'. It gives us an idea how a vehicle run during a journey.

2. Periodic motion is a motion which repeats itself after a fixed interval of time.

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

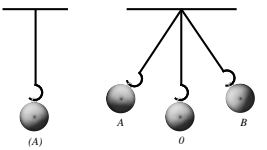
C. Long answer questions :

Ans. 1. When a body is in motion there is ofen a need to measure the quality of this motion with respect to time. A body moves faster than anothe rbody if travels larger distance with the elepse of same time interval. In the same way there is a need to measure the elapse of time between two events.

Many of you board the school bus early in the morning at the bus stops in yor colony. While the bus is driving past, the position of bus changes with respect to other objects like trees, houses and lamp posts by the roadside. Thus the bus is said to be in motion, as it changes its position relative to the surrounding and with the elepse of time. CHildren sitting in the bus are in motion relative to houses, trees and other objects on the roadside, but they are stationary relative to each other.

The terms motion andrest are thus relative terms and are dependent on who and where the obsever is.

2. A simple pendulum consists of a small metallic ball (or a stone) called a bob suspended from a rigid stand by a thread. Figure (A) shows the pendulum in the rest position. This positionis also called its mean position. When the bob of the pendulum is pulled to a side and released, it begins to move, to and fro, at fixed intervals. This back and forth motion of a simple pendulum is an example of periodic or oscillatory motion.



A simple pendulum

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

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

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


hourglass

D. Higher Order Skills (HOTS).

Ans. 1. Second is the standard unit of time.

2. Speed is the ratio of distance travelled to the time taken.

14-Electric Current and Its Effects

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. We cannot of imagine life without **electricity**.

2. We use some standard **symbols** to show the circuit diagrams.
3. **Electricity** cannot flow in an open circuit.
4. The **heating** effect of correct has many practical applications.
5. The movement of the ironcauses the hammer to hit the **gong**.

C. Write true or false:

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

Section II

A. Very short answer questions :

Ans. 1. Electricity is stream of moving electrons in a conductor.

2. The continuous path of an electric current is called an elctric circuit.
3. We use fuse in electricla circuits to safeguard the circuit from being damaged when excess flow of current passes throgh it.
4. A battery is a combination of cells arranged in a definite pattern.
5. Tungsten
6. Electromagnet is a temporary strong magnet. It consists of a piece of soft iron with an insulated copper wire around it.

B. Short answer questions :

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

2. 

Closed Circuit

3. A fuse works on the heating effect of current. The electric fuses are inserted in the main electrical circuits. There is maximum limit of the current that can safely flow through a circuit. When the current flowing exceeds this safe limit, the fuse melts quickly and break the circuit. Thus, an electric fuse is a device that limits the current in an electric circuit. It prevents damages to electrical circuits and possible fires.
4. The strength of the electromagnet depends upon:

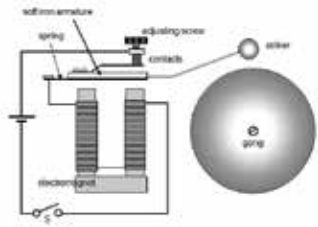
- The amount of electric current passing
- The number of turns of a coil.

5. Miniature circuit breakers give better protection than fuses because they brak the circuit authomatically when the current flowing the circuit exceeds its limit for which MCB is connected.

C. Long answer questions :

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

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



An electric bell

- When the bell is pressed the contact touches the iron strip and the circuit is completed.
- The current starts flowing through the coil.
- The electromagnet becomes magnetised and the soft iron armature is attracted towards the electromagnet. The movement of the iron causes the hammer to hit the song.
- This movement braks the circuit at point P, so that the current stops flowing and switches off the electromagent.
- The spring pulls the armature back to its original position, the circuit is remade and the process starts over again. This is how the bell rings.

2. **Electric Bulb :** An electric bulb has a thin coiled wire made up of tungsten known as a filament. The bulb is filled with an iert gas at low prssure to prolong the life of the filament. The bulb is filled with an inert gas at low pressure to prolong the life of the filament. Tungsten has high resistance to current. When a current is passed through the filament, it gets heated to such a high temperatue that it starts glowing. Since tungsten has very high melting point, it does not melt even when white hot.

   Electric Iron : It is an appliance used for ironing clothes. It has an upper part which is grooved. The groove contains a coil made up of high resistant wire. The coil of wire is known as element. When a current is allowed to pass through the iron, its element becomes red hot and release heat. The metal plate and the element are separated by an insulator made of heat, it prevents the flow of current from the element to the metal plate. But it allows the heat to flow through it to the metal part. Finally the metal part becomes hot.

3. Some of the very prominent uses of electromagnets are as following:
   - Electromagnets are used on cranes in steel-works and scrap yards.
   - They are also used by doctors to remove 'foreign bodies' like iron filing frm a patient's body, particularly from the eye.
   - Some modern trams and trains used electromagnets. The Maglev trian at Birmingham airport rides just above the surface of the track. It is held

ther by electromagnets. The ride, therefore, is very smooth and quiet because the train stays 15 mm away from the track and does not touch it. A part from being quiet, this saves wear and tear on the wheels and the track.

- Electromagnets are also used in electric bells, loudspeakers, television, televgraphs, telephones, audio and video tape recorders and players, etc.

D. Higher Order Thinking Skills (HOTS) :

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

15-Light

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. We get diffused reflection from a **rough** surface.

2. A smooth polished surface that can return the rays of light incident on t to form a clea image is called a **mirror**.
3. Convex and concave mirrors can both form **diminished** images.
4. A leans is made of a **transparent** aterial.
5. **Sun** light consists of many colours.

C. Write true or false :

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

Section II

A. Very short answer questions:

Ans. 1. A light ray is a line that is drawn to represent the straight line path of light.

2. An image is formed when a beam of ligh falls on a opaque object.
3. A real image is an image that can be obtained on screen.
4. Cncave and convex are the two spherical mirror.
5. Violet, Indigo, blue, green, yellow, orange and red.

B. Short answer questions :

Ans. 1. An image formed by plane mirror is:

- Erect
- Virtual, i.e., it cannot be obtained on a screen.
- Of the same size as that of the object.
- At the same distance from the mirror as the object is in front of it.
- The image appears to be formed behind the mirror.

2. This interchange of sides from left to right and vice cersa between the object and its image is called lateral inversion.

3. A real image can be obtained on a screen but a virutal image cannot be obtained on a screen.

4. **Uses of Concave Mirror**

- Used in head lights of cars/torches/scooters/seach lights.
- Used by doctors for examining eyes, ears, nose and throat.

Uses of Convex Mirrors

- These mirrors are used to see rear view or side view in cars and scooters. They view a large area much wider than that of a plane mirror.
- These mirrors help the driver to see the traffic comming from behind.
- Used in shops/malls for surveillance.

C. Long answer questions:

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

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

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

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

2. (i) Concave mirrors are used in torches and headlight to reflect the light of bulb to create a powerful beam of light.

Concave mirrors are used as shaving mirrors as used as shaving mirrors as these magnify the image and image is upright, when the mirror is held close.

(iii) Convex mirrors are used as rear view mirrors in automobile as the images are erect and field of view is wide. However the distance of the objects in the mirror appear farther than they are.

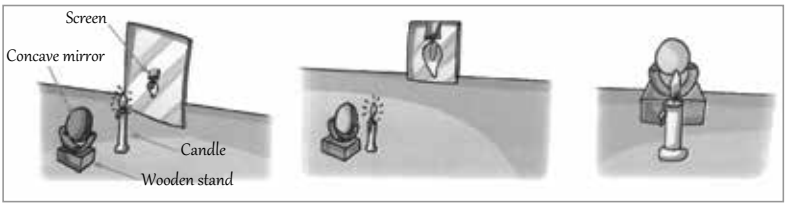
(iv) Convex mirrors are used in street lights to spread the light over a large.

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

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

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

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



Shift the candle a little towards the mirror. Observe the image when the distance of the object changes. Now place the candle at different distance and not the changes in the image on the screen. Bring the candle very close to the mirror as well and note your observation.

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

D. Higher Order Thinking Skills (HOTS):

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

Unit-VII : Natural Resources

16-Water : A Precious Resource

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Sea and ocean** water is highly salty.

2. All the three states of water are **reversible** or **interchangeable**.
3. The level of **ground water** is called the water table.
4. Excess of **rainfall** in an area causes floods.
5. **Rainwater harvesting** is an effective tool of water managment.

C. Write true or false:

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

Section II

A. Very short answer questions:

Ans. 1. Canal and tube well.

2. Auqifer are water-bearing rocks readily transmitting water to wells and springs.

3. Dam is a wall type structure built to hold water back.

4. In order to conserve water run off from roads I would build drains to let water reach a pond.

B. Short answer questions:

Ans. 1. The level of ground water is called the water table. The level of water table varies from place to place. It also varies from season-to-season. It falls down during summers and rises during rainy seasons.

2. Food is a situation that take place due to the excess of rainfall. Drought is a situation that take place due to the absence of rain for a long time.

3. Sea water is not fit for human consumption as it is saline is nature.

4. Depletion of water table means going down of water in the nature.

5. This is an innovative technique of watering direcly the individula plant, insead of the entire area under cultivation, as with flood irrigation. Thus, water is used economically, saving upto 1/3rd of the water. Drip irrigation decreases water requirment and labour and also minimizes the water loss due to evaporation.

C. Long answer questions:

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

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

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

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

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

2. The causes of depletion of know as the as follows:

Increasing Population : The need of drinking water and its use for various domestic purposes has increased with increase in population. There is more demand for construction of houses, roads and buildings. This has led to decrease in open areas leading to reduced seepage of water in the ground.

Lots of water is required for construction work. At times ground level water is used for this purpose. This has led to depletion of ground waer and fall in waer table becauses not only has the usage of this water gone up bu tat the same time seepage of water has also reduced.

Increasing Industries : Water is used by all the industries. With increase in the number of industries, the demand of water has also increased. Industreis are the greatest of water, as almost everything that we use needs wate in its production process. Be it processing, cleaning transportation etc. Water used by most of the industries is ground water. This has put a heavy load on the underground water resulting in water table level falling down every year.

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

3. The process of seeping of rain water and water from other soures such as rivers, ponds and lakes into the soil, filling up empty spaces and cracks deep below the ground is called infiltration. It is a continuous process and and the groundwater gets recharged. Ground water is pure as it gets filtered through many layers of sand, rock and soil.

4. **Defroestation :** In the name of urbanization, more and more forests are being cleared for construction of houses, offices, shopping malls, etc. This has led to slowdown of the natural process of ground water replenishment. Trees and plants increase the absorption of water by soil by slowing down the flow of water.

5. Rainwater harvesting is the process of capturing and storing rainfall to prevent its run off, evaporation and seepage its efficient utilization and conservation. Rainwater harvesting is an effective tool for utilizing the huge amount of high quality water, which otherwise goes as waste to the sea or in case of urban areas-down the drain. In designing a rainwater harvesting system, the key concept is capturing rainfall run offs from the roof of buildings and roads and creating artificial connectivity to sub surface water in hygienic condition.

   Components of Rainwater Harvesting:

   (i) Catchments Area (ii) Conduit

   (iii) Filtration System (iv) Strange System

   (v) Reuse System

D. Higher Order Thinking SKills (HOTS) :

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

17-Forests and Waste management

Exercises

Section I

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

Ans. 1. b 2. a

B. Fill in the blanks :

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

2. **Food chain** involves transfer of energy.

3. The materials that can be recycled collected in **blue bins**.

4. Plastic and iron scrap are the examples of **non-biodegradable wastes**.

Section II

A. Very short answer questions :

Ans. 1. A food web is a system of interdependent food chains used to represent the various relationships of organisms.

2. Three reasons for deforestation are :

(a) Growing population

(b) Industridisation

(c) Coverting forest into residential locations.

B. Short answer questions:

Ans. 1. Recycling involves collecting waste materials and processing them to make new products.

2. Plastic, paper, metals, glass and water.

3. Forests are useful to us in th following ways;

(a) Forest maintain temperature, humidity and regulate rainfall.

(b) Forests are rich source of wood for fuel and timber nuts, fruits, seeds and medicnal plants.

(c) Forests decrease the run off rate off rainwater and thus prevent soil ersion.

(d) Forests recycle water into the atmosphere which fall as rain to replenish the ground water.

(e) Forests put a check on strong winds and reduce the occurrence of dust storms.

C. Long answer questions :

Ans. 1. Since forests are helpful in various ways to the living beings on the Earth, they should be conserved. Below are given some measures to conserve forests.

- Deforestation should be prohibited.
- Wastage of timber and fuel wood should be avoided.
- Alternative sources of energy, such as biogas should be used to supplement fuel wood.
- Forests fires should be prevented.
- Pests and diseases of the forest trees should be controlled chemically and biologically.
- Reforestation of the deforested areas should be practiced.
- Large afforestation should be done in areas that are unfit for agriculture.

2. Forests form a part of th ecosystem. These self sustaining and self regulatory units of nature. The interactions among organisms in the forest ecosystem is depicted in the form of food chain. Food chain involves trasfer of energy through the process of eating and being eaten. The green plants trap solar energy and convert it into chemical energy which is stored as carbohydrate. The plants further transer their energy to animals after being eaten. The animals may in turn be eaten by other animals and in this way energy is transferred at all levels. The transfer of energy through a series of organisms each feeding on the preceding organisms is called food chain.

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

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

D. Higher Order Thinking Skills (HOTS):

Ans. 1. I would dispose off day leaves by composting. It will recycle them into useful manure.

2. Yes. This is so because he help us in protecting our all important limited resources.

Interactive
SCIENCE-8

Unit-I : Food

1-Crop Production and Managment

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. The **crop** refers to anything produced from soil.

2. The process of loosening and turning up of the soil is called **tilling** or **ploughing**.

3. **Farmyard maure** is the most valuable organic matter commonly applied to the soil.

4. **Pesitcides** include insectcides and rdenticides.

5. Fish liver oil is rich in vitamin **A** na dvitamin **D**.

C. Write true or false:

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

Section II

A. Very short answer questions:

Ans. 1. Agriculture is the technology of food production from plants by sowing seed in the soil and obtaining, procuring and storing plant produce.

2. Some commonly used implements are
   - Plough - Seed drill - Khupa
   - Hoe - Cultivator

3. Broadcasting is the method of sowing seeds manually by hand in the field.

4. We need to protect crops from pests nd diseased because they harm the crop plants and bring down the production.

5. The nitrogen fixation involves the fixing of the atmospheric nitrogen into simple nitrogen compounds such as ammonia an oxides of nitrogen by the action of atmospheric factros such as lighting or by simple living organisms such as free-living nitrogen-fixing bacteria.

B. Short answer questions:

Ans. 1. The early man was a nomad and lived in caves. He wandered in small groups from place to place for food and shelter. He used to gather fruits, nuts, leaves,stems and roots. He also used stone tools for hunting animals and ate them raw. Therefore, the early man was called a hunter-gatherer. Around 10,000 BC man b y chance discovered that seeds can be sown to grow plants. This was the beginning of agriculture and also the beginning of settled life. Man settled close to river banks and water bodies, and thus farming communities developed. Gradually, man discovered tilling, planting and harvesting the right species of plants and rearing animals for his needs.

2. Some important and commonly used manures are:

   Farmyard manure : This type of manure mainly consists of animal dung, straw, leaves etc.

   Green manure : It consists of agricultural wastse, commonly from the leguminous crops which is ploughed back into the soil.

   Compost manure : Compost in made from the cattle-shed wastes and dry leaves etc.

3. Transplantation method has the following advantages:
   - Transplantation enables selective cultivation of healthy seedlings. This results in better crop production.
   - Transplantation permits better root penetration into soil.
   - Transplantation allows better shoot development.

4. **Sprinkler system :** This method is used where the soil cannot retain water for long or where sufficient water is not available. Rotating nozzles are attached to perpendicular pipes at regular intervals. Water is sprinkled on crop as if it is raining.

Drip system : This system involves providing water drop by drop at the roots of the plants. Thus water is not wasted. This system is practiced in regions where water availability is poor.

5. Though we get most of our food from crop plants, animals also provide us food. The food provided by animals consists of milk, eggs and meat. The food obtained from animals is very rich in proteins. In fact, animal food provides certain proteins which are not present in plant foods. Most of the food obtained from animals also contains a good amount of fat but it contains very little of carbohydrates.

C. Long answer questions :

Ans. 1. Two of the agricultrual implements are as follows :

Plough : The plough is used for loosening and turning of the soil. Ploughs are made of wood or iron. Traditiona ploughs, made of wood or iron, are driven by animals or by a tractor. The tractor plough is called cultivator.

A plough contains a thick triangulr iron strip called ploughshare. The main part of the plough is a long of wood whichis called ploughshaft. There is handle at the lower end of the shaft and a beam at the upper end. The beam is placed over the animal necks.

Nowadays, plough made of iron are being used.

Hore : The implement called rod of wood or iron. A storng broad and bent plate of iron is fixed at one end of the long rod. This bent plate acts like a blade. At the other end of the rod a beam is attached. The beam is placed on the bullocks necks.

2. **Differences between a Anure and a Fertilizer.**

S.No.	Manure	Fertilizer
1.	A manure is natural substance which i formed from dead, decaying organic matter and animal wastes.	A fertilizer is a salt or an inorganic c ompound which is formed in factroies to chemicals.
2.	A manure provides more than one nutrient to the soil.	A fertilizer provides a specific nurtient to the soil.
3.	A manure acts very slowly on soil.	A fertilizer is quick in action.
4.	If applied in l arge quantities, it does not harm the plant.	If applied in large quantities, it may spoil the plants.

3. Organisms such as rodents and insects which and damage crops are called pests. Insects such as termites eat the roots of plants. Locusts fly in swarms, attacking the sugar cane and wheat crops. Pests can be controlled by spraying chemicals knowsn as pesticides.

Pdesticides include insecticides and rodenticides. Insecticides like DDT (Dichloro Diphenyl Trichloroethane), BHC (Benzene Hexachloride or gammaxene) and malathion kill insects while rodenticides like zinc phosphide and warffarin kill rodents.

Microorganisms bacteria, fungi and viruses cause numerious diseases in crops. For exampmle, wheat rust, smt and potato blight are caused by fungi.

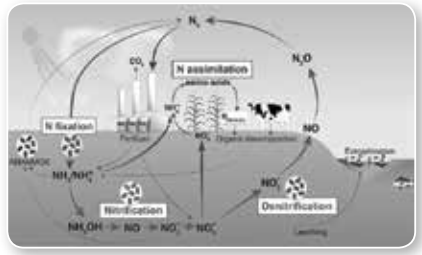
Whlting of plants is caused by a bacterium which blocks xylem, the water conducting tussue in plants.

Fungi are destroyed by spraying fungicides like copper sulphate, Biological control of pests involves the use of an organism to kill the pests.

4. Proper storage of food grains keeps away pests. Some ways to prevent pests from damaging food grains are :
   - Grains should be stored in airtight containers in a cool dry place.
   - Dried neem leaves and turmeric are sometimes used when storing food grains as they keep pests such as insects away.

   Conditions : Right leavesls of temperature and moisture must be maintained to prevent growth of of pests. The grains should be properly dried in the sun to reduce moisture content before they are stored. Large-scale storage is done in huge granaries and silos.

5. Nitrogen is an important consitituent of proteins, the body-building foods and the nucleic acids, the carriers of the genetic information from one generation to the next. However, though required for growth and development, most living organisms cannot utilize it directly, despite its 78% presence in air by volume.



Nitrogen cycle

It has first to be transformed into nitrogen-rich compounds. The different ways used to fix nitrogen in gaseous state back into the atmosphere on decommpositon of nitrogenous compound make up the global nitrogen cycle.

The nitrogen cycle involves three steps :

Nitrogen fixation, nitrification and denitrification.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. The sprinkler system uses the last drops of water. It provides water to all the plants simultaneously. No water is wasted in this system of irrigation.

2. (a) The reason could be lack or proper irrigation facilities, unanailabity of a high yielding variety of seeds, fertilizers etc.

   (b) The yield was increased due to sustained efforts of formers to increase the production.

2-Microorganisms : Friend and Foe

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Microbiology** is the branch of science that deals with the study of microorganisms.

2. Bacilli is the most common shape of **bacteria**.
3. The size of **viruses** ranges from 0.015 to 0.2 microns.
4. Ioding is produced by the marine brown algae called **chlorella**.
5. A paramecium is covered with short hair-like structures called **cilia**.

C. Write true or false :

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

D. Match the micro-organisms in column A with their in column B:

Ans.	A	B
1.	Bacteria	**(g) Prdoucing antibiotics**
2.	Rhizobium	**(a) Fixing nitrogen**
3.	Lactobacillus	**(b) Setting of curd**
4.	Yeast	**(c) Baking of bread**
5.	A protozoan	**(d) Causing malaria**
6.	A virus	**(f) Causing AIDS**
7.	Penicillium	**(e) Causing cholera**

Section II

A. Very short answer questions:

Ans. 1. Microorganisms are tiny organisms which can be seen only through a microscope.

2. Microorganisms can be classified into following five groups:
   - Bacteria - Viruses - Algae
   - Fungi - Protozoans

3. Diseases like poliomyelitis, chciken-pox, AIDS, mumps, common cold, influenza and mealses are caused in humans by viruses.
4. Protozoans are unicellular animals without chlorophyll. Amoeba and paramecium are examples of proteozoans.
5. The period of time which a food item can be kept before it is too old to be sold is called its shelf life.

B. Short answer questions :

Ans. 1. Bacteria are found in all the places wherever life is possible. They are in the air you breathe, the food you eat, and the soil upon which you walk.They are on almost anything you touch. A large number of bacteria also occur in animal and human bodies.

2. Fungi are a large group of organisms. Fungi are plants-like heterotrophs. They are like plants because they are stationary. They heterotrophic because they do n ot have chlorphyll. They obtain their foo from dead organic matter or living organisms.
3. The harmful effects of fungi are as follows:
   (a) **Decay of wood :** Some fungi grow on timber-yielding plants such as sal, teak, deodar, etc. These fungi secrete decomposing enzymes and cause heart rot.

(b) **Plant diseases :** Some fungi infect many economically impmortant plants and minimise the yield of food considerably. For example, potato blight is caused by a fungus. Rust of wheat is a fungal disease which is spread by air and seeds.

4. Food preservation is the process of treating food in order to slow down or strop its spoilage, thereby maintaining its nutritive value, texture and flavour.

5. In freeze-drying, food is frozen and kept in vacuum (in the absence of air). In vacuum, water (ice) sublimes, i.e. changes from the solid to vapour (gaseous) state directly. This process is used to make instant cofee and store fruits such as apples.

C. Long answer questions"

Ans. 1. This can be proved by the given activity:

Observation of microorganisms present in water

- Collect water from different sources, like drain, well, canal, lake, pond and river in clean glass test tubes.
- Allow these samples to settle down.
- Observe first with naked eye and then with a with a magnifying glass.
- Put a drop of water (from each sample one by one) on a glassslide and observe it under a microscope.

What do you observe?

- You will observe that many small organisms may be seen under a microscope. These organisms could not be when observed through the naked eye.
- Write the number and type of organisms observed in different sources of water.
- What conclusion can you draw from this activity?

2. Some of the harmful effects of bacteria are as follows:

(a) **Food poisoning :** Numerous bacteria are found in the food preparations. Some of these excrete toxic substances and cause food poisoning. This counterated by modern methods of canning, refrigeration and freezing.

(b) **Human diseases :** Many bacteria are parasites which infect teh human body and cause various diseases. These include tetanus, tuberculosis, diphtheria, anthrax, leprosy, etc.

(c) **Plant diseases :** Many plant diseases are caused by bacteria. Blight of paddy, citrus canker, soft rot, bacterial rot (tandu), etc., are some diseases caused by bacteria.

3. Economic importance of algae is as follows:

- Aquatic as well as terrestrial animals including human beings consume green algae as food.
- Brown algae specially the kelps and red algae are used as fodder.
- Many brown algae when added in land increase the fertility of the soil.
- Some blue-green algae fix the atmospheric nitrogen.

- Algae like Chlorella are used in fish cultivation.
- Iodine is produced by the marine brown algae (Laminaria).
- Alginobtained from brown algae is used in the manufacture of ice-creams and in artificial silk industry.
- Agar-agar, a gelatin-like substance, is used as a soldifying agent in the preparation of medicines and some food products.
- In sewage-treatment plants, algae are used to help break down sewage into harmless chemicals.

4. Protozoans are classified according to the way they move. Some protozoans move by changing their shape, some move using cilia, while the others move using flagella.

   An Amoeba moves by changing its shape sending out pseudopodia. Pseudopodia are finger-like projections in its body. The name means false feet. A pseudopodium forms in any direction. Thus, Amoeba moves in that direction. Amoebas also used pseudopodia to obtain food, which may be other protists or dead matter. When an Amoeba locates a food particle, its pseudopoodia surround and trap the food particle and some water food. Food inside the vacuole is broken down to provide energy and material for the growth.

   A paramecium is covered with short hair-like structures called cilia. It uses cilia for movement. It moves through water by beating its cilia. Along one side of a paramecium is a groove lined with cilia. Food enters the cell along the groove. The food is digested inside cacuoles.

5. Two methods of food preservation are :

   Refrigeration and Freezing : Refrigeration at low temperatures is a method that slows down the activity of microorganisms. Bacteria and fungi cannot thrive at low temperatures as enzymes (any numerous proteins produced in the cells which accelerate the metabolic processes of an organism) remain inactive at a low temperature. Therefore, food takes a longer time to decay and its nutritive value is also preserved for long. Freezing is used for preserving fresh fruits, vegetables, meat and fish.

   Freezing food is a common method of food preservation. It slows down food decay and checks growth of bacteria.

   Generally, refrigeration and freezing do not affect the flavour or texture of teh food but often cause the become mushy.

   Canning : Storing the cooked and sterilised in air-tight containers is anothe method of preserving it. Since cannign makes the food completely sterile, it does not decay until the can (sealed container) is opened. James, pickles, fish, vegetables, etc. are canned and sold in the market.

D. Higher Order Thinking Skills (HOTS):

Ans. 1. Viruses, unlike other microorganisms, do not have a well body and othe rstructures like nucleus or mitochondria.

2. That is so because in summer bacterai grows faster due to increase in temperature.

3-Synthetic Fibres and Plastics

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Cellulose** is made of large number of glucose molecules.

2. Nylon is mixed with **wool** to make it last longer.
3. Synthetic clothes should not be worn in the **summer**.
4. Repeated **heating** and **cooling** do not alter chemical nature of plastics.
5. **Bakelite** is hard, stiff and a poor conductor of heat and electricity.

C. Write true of false :

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

Section II

A. Very short answer questions :

Ans. 1. Man-made fibras are those fibres that are artificially made and synthesised.

2. Nylon
3. Acrylic is used for making sweaters, shawls, blankets and carpets.
4. Hydrophobic is a word used for a substance that repel moisture (e.g., sweat) and do not absorb it.
5. Plastics and be moulded into the desired shape.

B. Short answer questions :

Ans. 1. Polymerisation is the process of joining monomers repeatedly to form polymers.

2. Nylon is used to make stockings for women. It is also used to make swimwear , ropes, combs, zip fasteners, hooks and even machine parts.
3. Synthetic fibres have many advantages over natural fibres:
   (i) Synthetic fibres do not depend either on an agricultural crop as cotton, flax and jute do or on animal farming as silk and wool do.
   (ii) Synthetic fibres are much stronger, and hence more durable than natural fibres. They dry easily and have faster colours.
   (iii) Synthetic fibres and not easily upon by moisture, chemicals or bacteria.
   (iv) They are generally cheaper than natural fibres.
4. Thermoplastics are called so because they can be heated and colled again and again to mould into different shapes.
5. Unlike iron, platics do not react with water and air. Therefore, they do not corrode easily. That is why they are used to store different kinds of chemicals.

C. Long answer questions :

Ans. 1. Nylon is a polymer which was developed after World War II. The first fully-synthetic fibre, it was made without using any naturla material. It was prepared from coal, water and air. The word 'nylon' is formed' from the initial letters of New York (NY) and London (LON), as it was first produced in these citites. It is one of the strongest, most elastsic and lightest fibres. Nylon was first used to make stockings for women. It remains stable and strong even when wet. It absorbs very little water. Thus, it is most suitable for making fishing nets. It absorbs very little water. Thus, it is most suitable for making fishing nets. Nylon is not affected by the action of bacteria and fungus. Nylong fabrics do not f orm wrinkles. It is also used to make swimwear, ropes, combs, zip fasteners, hooks and even machine parts. Nylong is mixed with wool to make it last longer.

It is the strongest among all fibres hence it is also used to make parachutes and ropes for rock climbing.

2. Polyester fibres include terylene, terene, etc. These fibres are generally obtained from petroleum petroleum products and generally contain the ester group in their main chian.

Polyesters may be produced in numerous forms such as sheets and three diemsnional shapes. Fabrics made from polyester are more durable, affordable, strong, crease resistant, mothproof, easy to wash, stain resistant and dry quickly. These fibres are generally bleded with other fibres to form better quality fabrics like polycot (mixture of polyester and cotton), polywool (mixture of polyester and wool), terrycot (mixture of terylene and cotton).

3. Synthetic fibres under from the following disadvantages :

(i) Clothes made of pure synthetic fibres are garishly lustrous.

(ii) Synthetic fibres melt before burning. So clothes made of such fibre stick to the skin when in contact with a flame, causing burns. Therefore,

(iii) Synthetic fibres are generally hydrophobic, i., they repel moisture (e.g., sweat) and do not absorb it. They do not allow enough circulation of air either. So clothes made of synthetic fibres are not compfrotable to wear as they do not allow sweat to evaporae easily. Natural fibres are hydrophilic, i.e., they absorb moisture. They also allow the circulation of air. Therefore, clothes made of natural fibres are comfortable to wear as they allow sweat to evaporate.

(iv) Some electrical charge accumulaes on synthetic fibres due to which they cling together as well as to the skin. The electrical charge irritates the skin.

4. **Thermoplastics :** They are the plastics which soften easily on heating and harden on cooling. They can be heated and cooled again and again to mould into different shapes. Polyethene, PVC, polystyrene, perspex, and teflon are some of the examples of thermoploastics. These are used for manufacturing toys, combs, electric cables, pipes, packaging materials, wind screens of cars, and nonstick cookwares.

Thermosetting Plastics : These are the plastics that can be softened by heating only once. Once they are moulded and hardened, cannot be softened again on heating. Bakelite and melamine are the two main example of thermosetting plastics. They can maintain their shape and size even at every high temperatures.

5. We can take following measures to limit the harmful effects associated with the plastics.
   - Avoid the use of plastics as far as possible.
   - Buy products without or little plastic packaging.
   - Use bags made of cotton or jute or recycled paper when you go for shopping.
   - Collect and dispose off biodegradable and non-biodegradable wastes separately.
   - Do not throw plastic wastes in the streets, on the pavent or in drains.
   - Try to minimize the use of plastic materials, e.g., use a steel lunch box instead of a plastic one.
   - As a responsible citizen remember the 4R principle-Reduce, Reuse, Recycle and Recover.
   - Develop environment friendly habits.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. It is said that use of synthetic fibres actually helps in conserving forests because they do not required natural materials such as wood. This prevents the cutting of forests.

2. (a) Melamine (b) Teflon (c) Bakelite
   (d) PVC (e) Bakelite (f) Polystyrene

4-Metals and Non-Metals

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Ores** are the minerals from whcih metals can be extracted conveniently and profitably.

2. Non-metals cannot be beaten into thin **sheets** or **foils**.
3. Magnesium burns in air to form **magnesium oxide**.
4. **Copper** does not react with hydrochloric and but reacts with sullphuric acid.
5. A **less** reactive metal cannot replace a **more** reactive meal.

C. Write true or false :

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

Section II

A. Very short answre questions :

Ans. 1. Iron, copper, silver, gold, tin, aluminium, mercury, etc. are examples of metals.

2. - Sulphur is mined in its free state or as sulphide ore from the Earth's crust.

- Chlorine gas is produced by the electrolysis of common salt.

3. This property of metals is known as sonority.
4. This element is non-metal.
5. Mg +O MgO

B. Short answer questions :

Ans. 1. Two physical properties on the basis of whcih metals can be distinguished from non-metals are as follows :

(i) **Physical State :** All metals are generally solid at room temperature, except mercury and g allium which are liquid at room temperature. Iron, copper, aluminium, gold, silver are some of the examples of metals.

Non-metals may be solid, liquid or gases at the room temperature. For example, carbon, sulphur and phosphorus are solid non-metals, bromine is a liquid non-metal whereas hydrogen, oxygen, nitrogen and chlorine gaseous non-metals.

(ii) **Lustre :** Metals are lustrous, that is, they have a shining surface and can be polished. Non-metals are not lustrous nor do they have a shiny appearance except iodine and graphite which are lustrous in appearance.

Metals, except sodium and potassium, have high densities. Sodiuni and potassium have much lower densities.

2. (i) **Hardness :** Non-metals usually have low densities and are soft. Diamond, however, is an exception. Diamond is the hardest natrual substance known.

(ii) **Ducitility :** The property by virtue of which metals can be drawn into wires is called ducitility. Non-metals are brittle and cannot be drawn into a wire.

(iii) **Conduction of heat and elecricity :** Almost all metals conduct heat and electricity. But non-metals do no conduct electricity. Graphite is an exception. It conductis electricity in spite of being non metal.

3. Element A is non-metal.
4. Metals react with bases to form salts and hydrogen gas.

Metal + Base Salt + Hydrogen

Aluminium is metal and sodium hydroxide is a base. When aluminium is heated with sodium hydroxide solution, then sodium aluminate (salt) and hydrogen gas are formed:

Sodium hydroxide Aluminium Sodium aluminate Hydrogen

(NaOH) (Al) (NaAlO2) H2

Zince metal also reacts with sodium hydroxide solution to form hydrogen gas. Thus, aluminium and zinc are the two common metals which react with bases (like sodium hydroxide) to produce hydrogen gas. In general we can say that : Some metals react sodium hydroxide to produce hydrogen gas.

5. In displacement reactions, a more reactive metal replaces a less reactive metal from its compound. However, vice versa is not possible i.e., a less reactive metal cannot replace a more reactive metal.

C. Long answer questions :

Ans. 1. Like metals, most non-metals occur in nature in a combined state. However, some non-metals occur both in a free state and a combined state:

Oxygen and nitrogen occur in a free state in air and in a combined state in the Earth's crust.

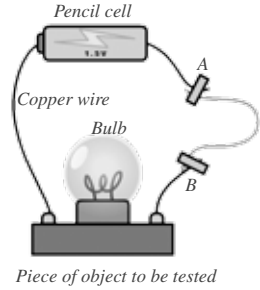
Sulphur occurs in a free as well as a combined state in the Earth's crust.

Five out of the six noble gases, i.e., helium, neon, argon, krypton and xenon occur only in a free state in nature.

2. We can show this with the helps of follow activity:

Take a smal sample of aluminium wire, copper wire, coal piece sulphur, iron nail.

- Connect a pen light cell as shown in the diagram with the help of connecting wires.
- Connect the two free ends of the copper wire to the objects one by one. See of the bulb glows or not.
- Record your observations.



s.no.	Meterial	Good conductor/Poor conductor
1.	Aluminium	Good conductor
2.	Coal piece	Poor conductor
3.	Sulphur	Poor conductor
4.	Iron nail	Good conductor

You will notice that metals are good conductors while sulphur and coal are bad conductors of electricity.

Metals are, thus, used for making electrical cables and wires.

Graphite which is non-metal is an wxception to the rule that non-metals are poor conductors of electricity.

3. Metals react with oxygen to form their oxides. Different meals react with oxygen under different conditions.

Metal + oxygen metal oxide

Sodium reacts with oxygen at room temperature to form sodium oxide. Magnesium on heating, burns in air to form magnesium oxide (MgO).

The metallic oxides formed are basic in nature and turn red litmus solution blue.

Have you seen a greenish deposit on the surface of copper vessels, when exposed to air for long?

This occurs due to the formation of a mixture of copper hydroxide and copper carbonate which is green in colour.

$2Cu + H_2O + CO_2 + O_2 \; Cu(OH)_2 + CuCO_3$

4. Five characteristics of metals and non-metals are as follows :

Metals : (i) Most metals of metals and non-metals are as follows :

have a metallic shine called lustre. (iii) Most metals are hard (iv) Most metals can be drawn into thin wires. (v) metals react with air, i.e., oxygen to form metal oxides.

Non-metals : (i) Most non-metals are in their gaseous state at room temperature. (ii) Non-metals do not have lusture. (iii) Most non-metals are soft. (iv) Non-metals are neither malleable, non ductile (v) Non-metals react with oxygen to form acidic oxides.

5. Metals and non-metals are an integral part of our day-to-day lives. We use doors, windows and zincand airplanes made of aluminium. We use coins made of metals like copper, zinc and nickel. Similarly, non-metals such as helium, carbon, nitrogen, oxygen, neon, sulphur and chlorine also play a very important role in our lives. Oxygen gas is used in pencils. Metals and non-metals are used in a number of ways like in making tools, machines, automobiles, ships, houses, malls, bridges, jewellery, utensils, electrical wire, in making alloys and so on.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. Reaction a. will not occur because is less reactive than zinc.

2. a. Aluminium; zinc b. Hydrogen

5-Coal and Petroleum

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Inexhaustible natural** resources are not likely to get exhausted by human activities.

2. Most minerals are obtained from **lithosphere**.
3. Coal gas in an excellent **gaseous** fuel.
4. Petroleum is separated into useful substances by **fractional distillation**.
5. **Natural gas** release more energy than any other fuel.

C. Write true or false :

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

Section II

A. Very short answer questions :

Ans. 1. Things occurring naturally on, above and under the surface of the Earth are known as natural resources.

2. Peat, lignite, bituminous coal and anthracite and the four varieties of coal.
3. Petroleum oil is found beneath the layers of rocks.
4. Fractional distillation is a process of the separation of petroleum into different fractions.
5. We should conserve fossil fuels as they are limited in quanity and will exhaust sooner or later.

B. Short answer questions :

Ans. 1. The resources wich are present in the unlimited quantity in nature and are not likely to get exhausted by human activities are called inexhaustible natural resources.

2. Minerals are the backbone of industry. Most minerals are obtained from lithosphere (the upper layer of the Earth). Some important minerals are,

   - Rocks salt - Mica - Coal - Petroleum
   - Metals and their ores - Limestone - Sand
   - These minerals were due to very slow processes taking place inside the Earth.
   - These minerals are distributed in the Earth's crust differently.
   - These minerals are mined from the Earth, and processed to obtain useful products.

3. Coal was formed by the decomposition of large land plants and trees buried under the Earth about 300 million years ago. This happened as follows: About 300 million years ago, the Earth had dense forests in low-lying wet land areas. Due to natural processes like earthquakes, volcanoes and floods, etc., these forests were buried under the surface of Earth. As more soil deposited over them, they were compressed. The temperature also rose as they sank deeper and deeper. Due to high pressure and high temperature inside the Earth, and in the absence of air, the wood of buried forest plants and trees was slowly converted into coal. This process is called carbonisation.

4. The major products (or fractions) of petroleum refining are petroleum gas, petroleum ether, gasoline, kerosene, disel, lubricating oil, paraffin wax, pitch or tar, petroleum cake.

   - Petroleum gas is used as domestic cake.
   - Gasoline is used as motor fuel.

5. When natural gas is compressed by applying pressure, it is called compressed natural gas. It is used in heating.

C. Long answer questions :

Ans. 1. The materials obtained from nature are classified as natural resources. On the basis of their availability, various natural resources can be broadlydivided into two categories exhaustible and inexhausible.

Exhaustible Natural Resources : The natural resources which can be exhausted as a result of human consumption are called exhaustible natrual resources. For example, coal, petroleum, water, forests, minerals, natural gas, etc.

Inexhaustible Natural Resources : The natural resources which are not liekly to be exhausted due to human activities and are present in unlimited quanties are called inexhaustible natural resources. For example, air and sunlight.

2. **Coal is a Source of Energy :** Coal in mainly carbon. When heated in air, coal burns and produces mainly carbon dioxide gas. A lot of heat energy is also produced during burning of coal. This can be written as:

Carbon + Oxygen Carbon dioxide + Heat

(Coal) (From air)

Coal is important because it can be used as a source of heat as such(just by burning it), or it can be converted into other forms of energy such as coal gas, coke or electricity. The real source of energy of coal is the solar energy (or Sun's energy). This is because the plants and threes which decomposed to form coal grew on the Earth by absorbing sunlight energy during the process of photosynthesis.

3. Petroleum oil is found beneath the layers of rocks. It is a viscous dark coloured liquid which occurs deep inside the Earth. It is formed from the reamins of tiny organisms living in the sea, that died millions of years ago. The marine organisms died and their bodies sank of the bottom of the sea. Gradully they got covered with sand and clay. Enormous heat and pressure and absence of air over millions of years, transformed the dead organisms into petroleum and natural gas.
4. We can conserve fossile fuels by the following ways:
   - Drive at constant and moderate speed.
   - Switch off engine at traffic lights or at other places, where you have to wait.
   - Maintain correct air pressure in the tyres.
   - Get your vehicle serviced regularly.
   - Use good quality petrol and engine oil.

   Remember that the burning of fuels is also a major cause of air polution which is turn causes global warming. So, minimise the use of fuels.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. P : Natural gas; Q : Methane; R : Hydrogen; S : Compressed natural Gas (CNG)

2. Petroleum is called black gold because in the modern world its importance is equal to that of gold.

6-Compbustsion and Flame

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Combustion** is the process of burning of a substance in the presence of oxygen.

2. Paper, wood and kersoene are categorized as **combustible** substances.
3. **Carbon dioxide** gas is not a supporter of combustion.
4. Luminous zone is the pale **yellow** coloured zone.
5. **Pollutants** in the air cause many diseases and reactions in human beings.

C. Match the following:

Ans.

1.	Wood	**(b) Partial combustion**
2.	Ignition temperature	**(c) Inflammable substances**
3.	Insufficient air	**(a) Incomplete combustion**
4.	Yellow flame	**(e) Non-luminous**
5.	Compounds of sulphur	**(f) Acid rain**
6.	Carbon dioxide	**(d) Fire extinguisher**

Section II

A. Very short answer questions :

Ans. 1. Combustion is a chemical reaction whcih involves the burning of fuel in the presense of air or oxygen that is accompained by the production of heat or both heat and light

2. The three conditions necessary for combustion are:
   (i) Presence of a combustible substance
   (ii) Presence of a supporter of combustion
   (iii) Attainment of ignition of kindling temperature of the combustible substance

3. The lowest temperature at which a substance catches fire and starts burring is called its ignition temperature.

4. The amount of heat energy produced on complete combustin of a kilogram of fuel is called its calorific value.

5. Only solid and liquid fuels which vapouriese on heating burn with a flame.

B. Short answer questions :

Ans. 1. The substance whcih catch fir eeasily and give a lot of leat and light are called combusitble substances. In simple word, combustibel substances are actually food for fire. For example, paper, cloth, alcohol, ether, kerosene oil burns and LPG are some combustible substances.

2. A substance burns abvoe its ignition temperature or kindling temperature.

   The ignition temperature, therefore, is the temperature at or above which a substance starts burning. Every substance has a definite ignition temperature which may be as low as 35°C (white phosphorous) or as high as 260°C (red phosphorous).

3. Sometimes, a large volume of gas is liberated in combustion beside the production of heat and light. The sudden evolution of large quantities of gas creates of heat and light. The sudden evolution of large quantities of gas creates excessive pressure that produces a load noise. Such combustion is known as an explosion.

4. A flame is a region where combustion of fuel takes place.

   When a fuel undergoes combustion, the products obtained depend on the amount of oxygen available for combustion. If there is enough oxygen to support combustion or burning process, the combusiton is called complete combustion. For example, methane on complete burning in sufficient oxy-

gen gives carbon dioxide, water and energy.

Methane (CH_4) + Oxygen (O_2) Carbon dioxide (CO_2) + Water (H_2O) + Energy

A simple example can be seen in the combustion of hydrogen and oxygen, which is a commonly used reaction in rocket engines. The result is water vapour.

Hydrogen (H_2) + Oxygen (O_2) Water vapour (H_2O) Water vapour (HO) + Energy

If there is insufficient oxygen to support combustion or burning process, the combustion is called incomplete combustion. When methane is allowed to burn in insufficient oxygen, the products obtained are carbon monoxide, water and energy.

Methane (CH_4) + Oxygen (O_2) Carbon monoxide (CO) + Water (H_2O) + Energy

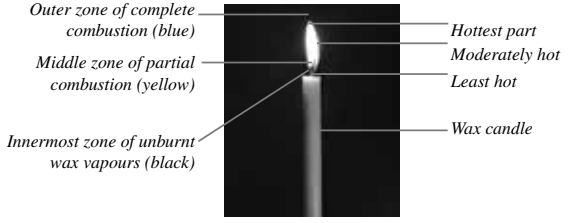
C. Long answer questions :

Ans. 1. Carbon dioxide gas is not a supporter of combustion. Carbon dioxide being heavier than oxygen envelops the fire and cuts off the the supply of oxygen. The fire, thus, extinguishes in absence of the supporter of combustion. Generally, carbon dioxide also does not harm the electrical appliances.

CO_2 can be stored at high pressure as liquid in clylinders just as LPG is s tored in cylinders. When CO_2 is released from the cylinders, it e xpands a lot and enveloops the fire besides also bringing down the temperature of the fire. This is the reaso n CO_2 is is widely used as a fire extinguisher.

2. **A good fuel is one :**
   - That is easily available and cheap.
   - That burns easily in air at a moderate rate.
   - That proudces a large amount of heat.
   - That does not produce any poisonous and irritating fumes furing burning.
   - That leaves no ash no burning.
   - Whose ignition temperature is above room temperature.

3. There are three zones of a candle flame.



The candle flame

(i) **The innermost zone :** It appears black and is the dark zone of a candle. No combustion occurs here because of lack of oxygen. It contains unburnt wax and is the least hot region of the candle flame.

(ii) **The middle zone :** Partial combustion of wax vapours, with a blue colour flame. The wax burns here completely and produces carbon dioxide,

water vapour and heat. This region is the hottest part of the candle flame.

(iii) **The outer zone :** This is the region of complete combustion of wax vapours, with a blue colour flame. The wax burns here completely and produces carbon dioxide, water vapour and heat. This region is the hottest part of the candle flame.

4. All carbon-containing fuels, such as wood, coal, petrol, diesel, kerosene, LPG, when burnt, produce gases like carbon monoxide, carbon dioxide, oxides of nitrogen and oxides of sulphur. In addition to these gases, generally in most solid fuels, smoke is also produced.

   These gaseous products and unburnt carbon particles cause air-pollution. These solid fuels, such as wood, coal, after burning also leave behind ash.

   This ash, if not disposed off properly, may cause air and reactions in human beings. Effects of the various pollutants on human beings are summarized below:

S.no	Air pollutant	Effects
1.	Dust	Allergic reactions
2.	Smoke	Respiratory problems
3.	Carbon monoxide	Respiratory problems , may even lead to death
4.	Carbon dioxide (excess)	Greenhouse effect : atmospheric temperature rises
5.	Oxides of sulphur	Damage lungs, produce acid rain and cause corrosion
6.	Oxides of nitrogen	Lung congestion, produce smog

5. There are four types of combustion ;

   (a) **Rapid combustion :** Combustion that takes place at a very fast rate is called rapid combustion. In this type of combustion, both heat and light are released.

   Examples :

   (i) Burning of LPG (ii) Burning of petrol

   (iii) Burning of dry grass (iv) Burning of a matchstick

   (v) Burning of a magnesium ribbon or wire.

   (b) **Slow combustion :** Combustion that takes place at a slow rate with steady production of heat called slow combustion.

   Examples :

   (i) Rusting of iron

   (ii) Bright shining surface of copper becoming dull

   (c) **Spontaneous combustion :** Combustion that occurs without the aid of any external heat knowsn as phosphorus catch fire without any external heat. These substances undergo slow oxidation by air and during this process heat is evolved. This heat accumulates in the substance till its ignition temmperature is attained. At this point, it burns spontaneously.

(d) **Explosion :** Sometime, a large volume of gas is liberated in combustion besides the production of heat and light. The sudden evolution of large quantities of gas creates excessive that produces a load noise. Such combustion is known as an explosion. Bursting of crackers is the best example of explosion. The same type of combustionis used for exploding rocks and mountains for making roads, and the explosive used is dynamite.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. Carbon monoxide is more dangerous than carbon dioxide as it contains higher amount of carbon particles which harm our respiratory system.

2. Dried grass catches fire easily as its ignition temperature is much lower compared to that of green and fresh grass.

Unit-III : World of the Living

7-Conservation of Plans and Animals

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Overuse** or **wastage** of resources must be avoided.

2. Increase is population has led to large scale cutting of **trees**.

3. Dependence on **wood** as a fuel shold be reduced.

4. **Red Data Book** lists rare species and those in danger of extinction.

5. Chipko Movement was started in a village in the **Himalayas**.

C. Write true or false :

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

Selection II

A. Very short answer questions :

Ans. 1. The wise and judicious use of natural resources is called conservation.

2. Biodiversity help to regulae climate, rainfall and wind.

3. Removal of top layer of the soil gets converted into a desert. It is called desertification.

4. The large number of plants living a particular area are called the flora of a place.

The large number of animals in a particular area are called the faunna of a place.

5. Migration is seasonal is seasonal movement of animals fromone habitat to another because of climate changes.

B. Short answer questions ;

Ans. 1. Following are the two aims of conservation.

(i) To ensure a continuous availability of useful plants, animals and materials for futrue generations.

(ii) To preserve the quality of our environment.

2. The term **flora** is used to indicate the different plans growing in a particular area. The animals found in that area form the fauna. For example, let us assume that the following living organisms area present in a particular area : mango jamun, sunflower, pea, cow, elephant, dog, crow and bull.

   Flora of the given particular area is represented by mango, Jamun, sunflower and pea plants, while cow, elephant, dog, crow and bull constitute the fauna of that area.

3. The human activities such as cultivation of land building of settlements (houses) are not allowed in a wildlife sanctuary. Poaching (hunting) is strictly prohibited.

4. The factors responsible for habitat destruction are :

   Deforestation, industrialisation, construction of dams and natural disasters such as earthquakes, floods, droughts and cyclones.

5. National parks, wildlife sanctuaries and biosphere reserves are the protected areas established under the Wildlife Protection Act (1972).

C. Long answer questions :

Ans. 1. Plants and animals are important to each other, to human beings as well as to the environment in which they live. All the components of our environment, an ecological balance. Different organisms are dependent on each other directly or indirectly.

   Plants are a source of food (cereals, vegetables, pulses, fruits, nuts, oils, tea, coffee and spices), medicines, fodder, fibres, timber, fertilizers, rubber, etc.

   Animals provide a number of products such as meat, fish, egg, milk, honey, ivory and silk.

   Biodiversity is also important in the following ways:

   - Help to regulate climate, rainfall and wind
   - Purify air and water
   - Help in cycling of nutrients
   - Help to preserve fertile soil
   - Form food chains and foodwebs; therby maintaining a balance in the availability of food to all life forms.

2. Due to deforestation, soil erosion takes place due to wind and moving water. Loss of top soil will reduce the fertility of the soil as it is rich in humus and nutruents.

   That is how deforestation causes desertification.

3. Red Data Book is a catalogue which lists rare species and those in danger of exinction.

   The nine categoreis in the JUCN Red List of threatened species are given below :

- Extinct	- Nearly threatened	- Extinct in the wild
- Least concern	- Critically endagered	- Data deficient
- Endangered	- Note evalutated	- Vulerable

4. Wildlife sancturaries are areas reserved for the protection of animals only. Killing (poaching) and capturing of animals strictly prohibited. Three wildlife and sanctuaries along with their states are :

(a) Sanjay Gandhi Wildlife Sanctuary (Tamil Nadu)

(b) Mudiumalai Wildlife Sanctuary.

(c) Dandeli Wildlife Sanctuary (Karnataka)

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. a. Endemic species (b) Endangered species (c) Tiger (d) Extinct species (e) Dinosaur

2. a Yak; Kashmir stag; snow leopard (b) Black buck; Kashmir stag; Lion toiled macaque; Snow leoparde (c) Dodo; Dinosaur

8-Cell-Structure and Functions

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. Discovery of cell is linked with the invention of **microscope**.

2. Most **plants** and **animals** are multicellular organisms.

3. A **tissue** is group of cells performing similar funcitions.

4. Nucleus is surrounded by a thin membrane called the **nuclear membrane**.

5. the nucleus in **bacteria** is not well organised.

C. Write true or false:

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

Section II

A. Very short answer questions:

Ans. 1. Cell is structural and funcitonal unit of life.

2. Cell wall is an additional covering around the membrane in plant cells.

3. The various parts of a nucleus are :

- Nuclear membrane - Nucleoplasm
- Nucleoulus - Chromosome

4. Golgibodies synthesize, store and secrete many substances.

5. Bacteria and blue green algae

B. Short answer questions :

Ans. 1. The cells were discovered by Robert Hooke in 1665 when he observed a thin slice of cork under his microscope. He noticed that the cork has large number of small compartment or boxes joined together to form a honeycomb-like structure. Hooke called these little boxe cells.

2. Some cell organelles found in animal or plant cell are given below :

- **Lysosomes** are present in animal cells and help in cellular digestion.
- **Centrosomes** are present only in cells. Centrosomes play a role in the reproduction of cells.
- **Plastids** occure in plant cells only.

3. The structure of nucleus differs in bacteria and othe rorganisms. In bacteria, the nucleus is not well organized. The nuclear material is not surrounded y a n uclear membrane. Such cells which lack a nuclear membrane are called prokaryotic cells. The organisms with prokaryotic cells are called prokaryotes. Bacteria and blue-green algae are prokaryotes. All organisms other than bacteria and blue-green algae hae a well organized nucleus with a nuclear membrane. These organisms are called eukaryotes and the cells as eukaryotic.
4. The different kind of plastids are as follows:
   - **Chloroplasts** are green due to the presence of chlorophyll. These help in the synthesis of food by photosynthesis.
   - **Leucoplasts** are colourless plastids. Leucoplsts help in the storage of food.
   - **Chormoplasts** are coloured (e.g., red, yellow) plastids. These are responsible for the colour of flowers, fruts (tomatoes, carrots etc.)

C. Long answer questions :

Ans. 1. Cells greatly vary in size, shape number:

Size : Cells exist in a variety of sizes. Most cells are so small that many thousands may fit on the head of a pin. However, not all cells are small. Eggs of birds are single-celled. The largest cell is the egg of on ostrich. The cell size has no relation with the size of body of an organism.

Spape : According to the functions they perform, cells assume different shapes.

For example, nerve cells help to carry messages in the body. These cells are long and have a branched head. Nerve cells are the longest cells in our body-they may be more than a metre long. Muscle cells are cyclindrical or spindle-shaped. The white blood cells present in our blood can change their shape. This helps them to kill germs by engulfing them. Amoeba can also change its shape with the help of projections on its body, known as pseudopodia. The pseudopodia (singular : pseudopodium) help the Amoeba to capture its food and move from one place to another.

Number : The bodies of orgnisms may consist of one or many cells. Organisms whose body consists of a single celled are called unicellular organisms. Examples of unicellular organisms are Amoeba, paramecium, euglena and bacteria. In a unicellular organism, the single cell performs all the necessary functions like feeding, digestion of food, respiration, excretion, movement and reproduction.

There organisms are called consisting from a few cells to billion cells. These organisms are called multicellular. Most plants and animals are multicellular organisms. Human body has trillions of cells (thousand billion).

2. Nucleus is the most important component of the cell, being considered its brain. It is a small, spherical or oval shaped floating within the cytoplasm and

located in the centre of the cell. It is surrounded by a thin membrane called the nuclear membrane. The nuclear membrane like the cell membrane is also porous and allows the movement of materials between the cytoplasm and the inside of the nucleus. The fluid present inside the nuclear membrane is called nucleoplasm. Present inside the nucleus is a small spherical body called nucleolus, whcih can be seen with a amicroscope of important role in:

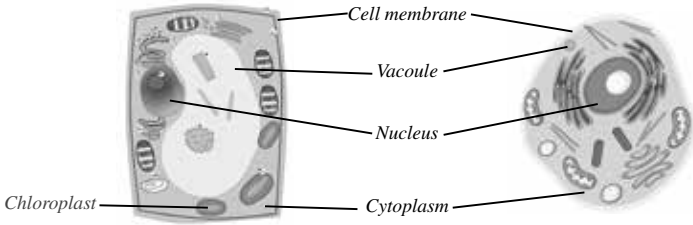
- Cell division
- Transmission of hereditary characters from one generation to another
- Controlling all the life functions taking place in the cells

3. Chromosomes are thread like structures that are present in the nucleolus. They carry genes which help in inheritance or transfer of character from parents to the off springs.

4. (a) **Cell Membrane :** It is the outer covering of the cell. The cytoplasm and the nucleus are enclosed within the cell membrane. It is semi-permeasble in nature i.e. selected materaials can enter or leave the cell. Cell membrane is also known as plasma membrane. It separates the cells from one anothe and also the cells from the surrounding medium. It provides protection to the interanal cell organelles, besides providing shape and rigidity to the cells.

   (b) **Cytoplasm** is a transparent, jelly-like material which fills the cell between nucleus and cell membrane. Cytoplasm is a kind of chemical factory of the cell. Here, new substances are built from materials taken into the cell, and energy is released and stored. In fact, most of the chemical reactions which keep the cell take place in the cytoplasm.

5. Although plant and animal cells have the same basic structure, there are certain difference between them.



S.no.	Plant cell	Animal Cell
1.	Cell wall is present.	Cell wall is absent.
2.	Cell membrane is present.	Cell membrane is present.
3.	Central vacuole is present.	Large number of vacuoles smaller in size are present.
4.	Plastids are usually present.	Plastids are absent.
5.	Lysosomes are absent.	Lysosomes are present.
6.	Centrosomes are absent.	Centrosomes are present.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. Chloroplasts are found only in plants and not in animals because plants need them to make their own food.

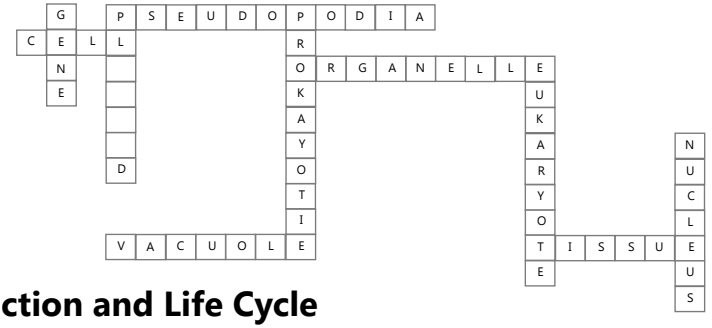
2. The slide with a cell wall was that of a plant. This is so because animal cells do not contain cell wall.

Tasks For You

Do and Learn

Solve the crossword

Ans.



9-Reproduction and Life Cycle

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Zygote** develops into a new individual.

2. The method of reproduction through the fusion of male and female gametes is called **sexual reproduction**.

3. **Foetus** is the stage of embrvo in which all the **body parts can be identified**.

4. The process of formation of an offspring from a zygote is known as **development**.

5. The technique of **cloning** requires two inds of cells.

C. Write true or false :

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

Section II

A. Very short answer questions :

Ans. 1. Reproduction is the process by which living organisms produce young ones of their own kind.

2. Zygote is the fusion product of two gametes which develops into a new individual.

3. The male reproductive organs consist of a pair of testes (singular testis), two sperm ducts and a penis.

4. Development is the process of formation of an offspring from zygote.

5. Birds, lizard, butterflies, hen, crow are some oviparous animals.

B. Short answer questions:

Ans. 1. Living beings reproduce to produce young ones that resemble them. It helps them to continue their life forms.

2. **Asexual Reproduction :** In this type of reproduction, only a single parent is involved. It takes place when there is plenty of food available and conditions are good. Organisms such as Amoeba, hydra, yeasts, starfish, sponges, and worms reproduce asexually.

   Sexual Reproduction : This method involves two parents, the male and the female. Most of the plants and animals including human beings reproduce sexually. In this method, male and female gametes (reproductive cells) fuse together to form a fertilzed eggs called zygote which develops into a new individual.

3. Fertilisation is the process of fusion of a male gamete and a female gamete to form a zygote. Life of every sexually reproducing organisms begins as a single-celled zygote. The zygote undergoes cellulaar division and develops into an embryo. The embryo eventually develops into a new individual.

4. The fertilization that take place outside the body is called external fertilization. For example, frog and fish undergoes external fertilization.

5. In Amoeba, the nucleus divides into two nuclei. The body then divides into two parts, each part receiving a nucleus. Further stretching of the body leads to the formation of two daughter cells. Thus, two amoeba are produced from a single Amoeba.

C. Long answer questions :

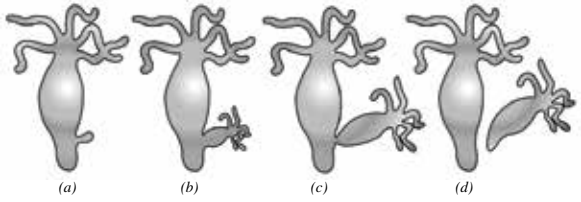
Ans. 1. Human beings are the most complex animals. They hae a complex mechanism of reproduction. The male and the female parents have permanent and separate sex organs. The male sex organ produces the male gamete called the sperm, and the female sex organ produces the female gamete called egg or ovum. The sperm and the ovum fuse to form a fertilized egg called the zygote.The sperm and the ovum fuse to form a frtilized egg called the zygote. The process of fusion of the sperm and the ovum is called fertilization. The zygote them goes through specific changes and finally develops into a new indiviual. The method of reproduction through the fusion of male and female gametes is called sexual reproductdion.

2. The male parent produces male gametes (male sex cells) called sperms in his testes each day. The female parent produces the female gametes (female sex cells) called ova (or eggs) in her ovaries. Each oveum is a round structure, of the size of a pin's head. It is many times larger than a sperm, having a lot of cytoplasm. One ovum or an egg cell is released from one of the ovaries approximately every 28days.

   The sperms (or male gametes) in the tests of a man are intrduced into the vagina to the woman through penis during copulation (or mating). In sperms are motile, so these come up through cervix into the uterus and then pass into the oviducts. The oviduct contains an ovum or egg cell released by te ovary during ovulation. Only one sperm fuses with the ovum (or egg) in the oviduct. The sperm nucleus and the egg nucleus fuse together. This fusion of a male gamete and a female gamete is called fertilization.

3. Asexual reproduction only involves a single parent to produce new individuals. Since only one parent is involved, the offspring is similar to the parent. The followig are two very common method of asexual reproduction.

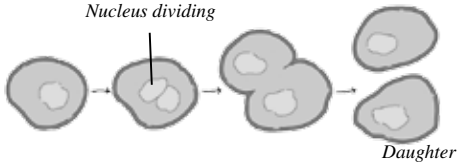
Budding : Under normal conditions the body of Hydra develops one or two bulges called buds. These buds gradually grow and after some time get detached from the parent body. Each bud develops into an adult similar to that of the parent. This type of asexual reproduction is called budding.



Hydra reproducing by the method of budding

Binary Fission : This kind of reproduction is mostly seen in Amoeba. Amoeba is a single -celled organism containing a nucleus. The process of fission starts by the division of nucleus into two. This is followed by the division of cytoplasm. Each daughter Amoeba receives a nucleus each. Thsus two daughter Amoeba are produced from one parent Amoeba.

Multiple fission and regeneration are some other methods of asexual reproduction which you will study in higher classes.



Binary fission in Amoeba

10-Reaching the Age of Adolescence

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. During childhood, children grow **intellectually, emotionally** and **socially**.

2. Appearing of **adam's apple** marks the end of adolescence.
3. The stoppage of **menstruation** is called menopause.
4. **Iodine** is required in the production of thyroxine.
5. Person **hygiene** is very important during adolescence.

C. Write true or false:

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

Section II

A. Very short answer questions :

Ans. 1. The stage of growth from birth to about 2 years of age is called infancy.

2. Voice box is protruding structure in males that is after referred to as Adam's apple.

3. Adolescence usually starts from the of 11 years and lasts upto the age of about 18-19 years.

4. Testosterone and estrogen are the two sex hormones, which bring about changes in boys and girls respectively during pberty. Testosterone is produced by testes in males, and estrogen by ovaries in females.

5. Pituitary Gland is referred to as the master gland.

B. Short answe questions :

Ans. 1. Menarche is the first menstrual flow that begins at pberty. It marks the beginning of the menstrual cycle.

2. At puberty, the voice box or larynx begins to grow. In boys, it protrudes out in the throat region as Adam's apple. Appearance of Adam's apple marks the end of adolescence.

3. Males and females can be differentiated on the basis of the sex organs which are present right from birth. During puberty, other differences also start developing. The characters which develop during puberty and help to distinguish a male from a female are called secondary sexual characters.

4. When an ova is released from the ovary, the lining of the uterus becomes thicker, so as to receive the egg. If the egg is not fertilised, the lining of the uterus along with the egg and blood vessels are shed off. Thus is known as menstruation or periods.

5. Each cell of a male has one X and one Y chromosome.

C. Long answer questions :

Ans. 1. The endocrine system consist of several glands. These glands are located at specific places inside our body. These glands release hormones which travel insdie our body and reach a particular body part such as a cell, tissue or organ through the blood stream. The particular body part is called the target site. The target site then responds to the hormone.

The sex hormones are under the control of hormones from the pituitary gland.

(i) Hormone producing cell → hormone secreted in the blood → Hormone reaches the target site and acts.

How hormones act?

(ii) Hormones from the pituitary stimulate the testes and ovaries to release testosterone to estrogen → Hormone reaches target site through the blood stream → the They stimulate changes in the body at onset of puberty

2. In females, the reproductive phase begins at the time of puberty and con-

tinues to about 45-50 years. Every month, each ovary release ovum in the fallopian tube. This is called ovulation. If the ovum gets fertilised b sperm, a single-celled zygote is formed. However, if the ovum does not get fertilised, the ovum (or the egg) and the lining of the uterus shed as blood through vagina. This bleeding hapens for 4-6 days and is called menstruation or more commonly periods. The first menstruation that happens after attaining puberty is called menarche. This series of steps involving ovulation adn menstrucation is called menstrual cycle. It occurs once in a month.

It may vary from person-to-person. Every female experiences menstrual cycle until the age of 50years, after which they go through menopause. Menopause is the end of the reproductive phase of the females.

3. Secondry sexual characters in males :
   - Development of facial hair in the form of mousache and beard.
   - Development of hair under the armpits, on the chest and in the pubic region.
   - Voice becomes deeper as the voice box enlarges.
   - Shoulders becme broader.
   - Body becomes muscular.

Secondary sexual characters in females :
   - Development of breasts.
   - Development of hair under the armpits and in the pubic region.
   - Development of curves in the body.
   - Beginning of the menstrual cycle.

4. Because of rapid physical and mental growh during adolescence, the nutritional requirments of the body inscrease tremendously. It is, therefore, very important to eat a balanced diet during these growing years. This helps the bones, muscles and other of the body get adeuqate nourishment for growth.

   A balanced diet means a diet that contain the nutrients carbohydrates. proteins, fats, vitamins and minerals in requisite proportions. Milk, green leafy vegetables, fruits, nuts and meat are good foodstuffs for adolescents. Girls s tart menstruating at this stage. It is, therefore, important for then to have food rich in iron and calcium.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. Adlolescent girls should have an iron rich diet to compensate the blood loss during menstruation.

2. This is so because junk food doesn't provide nutrient to body.

Unit-IV : Moving Things, People and ideas

11-Force and Pressure

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. The direction in which a body is pushed or called the **direction of force**.

2. Force can change the **shape** of an object.

3. **Gravitational** force exists everywhere in the universe.

4. The force acting on a unit area of a surface is known as **pressure**.

5. **Atmospheric pressure** is defined as the pressure exerted on an object by the weight of the air above it.

C. Write true or false :

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

Section II

A. Very short answer questions :

Ans. 1. Force is any push or pull which moves a thing.

2. - Force can make moving object stop.

   - Force can change the direction of a still or a moving object.

3. Newton is the SI unit of force.

4. Spring balance is an example of an elastic force.

5. Iron, cobalt and aluminium.

B. Short answer questions :

Ans. 1. Rolling of chapati, and breaking down bricks

2. Four key effects a force a force can produce are as follows.

   (i) It can make a moving object stop.

   (ii) It can change the direction of a still or moving object.

   (iii) It can change the speed of a moving object.

   (iv) It can change the shape of an object.

3. (a) **Contact force :** The force that can act on objects by direct or physical contact are called contact forces. Muscular force, and friction are examples of contact forces.

   (b) **Non-contact force :** The force which cna be exerted from a distance without touching the object is called non-contact force. Magnetic force, electrostatic force and gravitational force are examples of non-contact force.

4. When a rubber band is stretched, in increases in length.

5. Friction is useful in walking and writing on a blackboard.

C. Long answer questions ;

Ans. 1. The different effects of force are as follows :

It can make a moving object stop : While catching a ball thrown by your friend, you apply a push and the moving ball comes to a stop.

It can change the direction of a still or a moving object

- You apply a push to an almirah to make it face a different direction.

- A football player kicks (pushes) a football to make it move in a different direction, over to another player of his team.

It can change the shape of an object

- Every day, your mothe rolls down a ball of kneaded flour into a chapati (different shape) by applying a push. You might have played with moulding clay of different colours, making it into so many different shapes of fruits, animals, etc. Here also, a push is applied by you.
- You might have seen labourers breaking bricks or stones into smaller pieces, by hitting them with a hammer. Again, the shape of the bricks or stones is getting changed due to a push (hitting).

2. For this do the following activity :

Liquids exert equal pressure at the same depth

Take a tin can or a plastic bottle. Drill a few holes all around it near the bottom. The holes must be at the same height from the bottom. Fill the bottle with water. What do you observe?

What rushes our from all the holes and falls at the same distance from the can.

This shows that liquids exert equal pressure in all directions at the same depth.

3. (a) **Muscular force :** When we lift a bucket of water or push a cart, kick a ballor wall or run we use muscular force. Digestion of food, bending of our body, breathing; are all carried out due to the force exerted by the muscles.

Similarly, animals like bullocks, hourses, donkeys and camels also use muscular force to do heavy work such as pulling a cart or a togna, ploughing, carrying hevy load, etc.

(b) **Gravitational force :** The force acting between any two books, between a book and a table, betwen you and your friend, between Earth and the moon etc., is gravitational force.

Gravitational force exists everywhere in the universe.

Earth has a thrown mass. So it attracts every object towards it. That is why a ball thrown upwards ultimately comes down, a ripened fruit falling from a tree falls down to the earth.

(c) **Friction force :** Friction is also a type of contact force. The force acting between two surfaces in contact with each othe which opposes the motion of one body over the other, is called friction or force of friction. The force of friction always acts on all moving objects and its direction is always opposite to the direction of motion.

(d) **Electrostatic force :** Rub a plastic pen or comb into your dry hair and then hold it near some tiny pieces of paper. What happens? The tiney pieces of paper get attracted towards the plastic pen or comb.

The tiny pieces of paer get attracted due to the force exertd by the electrostatic charge on the pen or comb.

4. We can show this with the help of following experiment :
   - Take a balloon. Inflate it. Leave the mouth open. What happens? The air moves out and the balloon deflates.
   - Take a balloon, prick it with a needle to make holes. Can you fill air in it? The answer is No.

   The above activity shows that air exerts pressure in all directions and also on the walls of the container.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. This so because the pressure of water is at the gratest at the depth of the dam. Thicker walls make it possible to withstad the pressure.

2. A person wearing a pointed heel will hurt more. That is so because due to less content area, pressure will increase manifold.

3. Broader straps increase the contact area, there're spread the pressrue, making it more comfortable.

12-Friction

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Friction** resists the relative motion of two surfaces in contact.

2. Friction is caused due to **interlocking of irregularities** in the two surfaces.

3. The force of friction depends on the **nature** of the surfaces in contact.

4. When a body is at rest, the force of friction is called the **static** friction.

5. **Soap** solution also acts as a lubricant.

C. Write true or false :

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

Section II

A. Very short answer questions :

Ans. 1. Friction is a natural force that resists the relative of two surface in contact. It is always exerted in a direction that opposes motion.

2. We rub our hands against each other to warm them up in chilled winter morning. This shows that friction can produce heat energy.

3. State friction is the force of friction between two surfaces which balances the force applied on the object to push it.

4. When an object (like a wheel) rolls over the surface of anothe robject, the resistance to its motion is called rolling friction.

5. Tyres of automobiles have treads which provide a better grip with the ground.

B. Short answer questions :

Ans. 1. Interlocking of irregulariteis in the two surfaces in contact causes friction.

2. When an external force is applied to start a relative motion, the interlocking of surfaces gets off thus, causing less frictional force. That is why once the motion starts the frictional force acting between the surfaces in contact decreases, so that a smaller force is required to maintain a uniform motion. That is why friction is less than the static friction.

3. Streamlining means a properly shaped body that can easily move through air or water. Streamlined shape minimises the friction between the object and the medium in which it is moving.

4. The force of friction depends on the nature of the surface in contact. This is because rough surfaces are more irregular than smooth surfaces. So the force of friction is greater in rough surfaces than in smooth.

5. Friction is a necessary evil as we can walk, write or drive only because of friction. We cannot walk or write a highly smooth surface. The firction between two surfaces help us to do so.

C. Long answer questions :

Ans. 1. Some of such examples are as follows :

- You rub your hands against each other to warm them up in chilled winter mornings.
- To light a matchstick, you rub its head on the rough side of the matchbox. By doing this, some heat is generated and the combustible material on the head of the match stick starts burning.
- To light a matchstick, you rubits head on the rough side of the matchbox. By doing this, some heat is generated and the combustible material on the head of the matchtick starts burning.
- When wind blows through a tree, the tree impedes the flow of the wind. This causes the wind and transforms it into noise of leaves and branches as the wind blows, through them.

2. **Rolling Friction :** The force of friction that exists between two surfaces when a body rolls over the other body is called rolling friction.

   Rolling reduces friction. That is why it is easy to move a heavy box when it is fitted with wheels. We will need to apply a lot of force, if it is without wheels.

   Sliding Friction : The force of friction acting between two bodies when they slide on one another with a uniform speed is called sliding friction.

3. Some advantages of friction are as follows :

- We are able to walk, run, play, etc., due to friction between the ground and the soles of our footwears. This is the reason why patterns or grooves are made on the soles of shoes to increase friction. This prevents the person from slipping.
- Can you now guess why it easier to write on a plain paper than on a glazed/waxed paper?
- It is due to friction between the road and surface of tyre that you are able to drive safely. It there was no friction, automobiles could not be

started or stopped or turned to change direction of motion.

- You are able to tie a knot or fix a nail on a chair or write, or cnstruct a building.
- You will also not be able to hold on to things. If a vessel is greasy or has a film of oil on it, it is difficult to hold it.

4. The friction between two surfaces can be reduced by the following methods.

(i) **By polishing the surfaces :** Rough surfaces can be made smooth by polishing. Pplishing removes 'hills' and 'valleys' from the surfaces. Therefore, polishing of the sufraces reduces the friction.

(ii) **By applying oil or grease on the surfaces (or b y lubrication) :**

Oil/grease forms a thin layer between the two surfaces. Thus, a lubricant (oil/grease) separates the two surfaces. This reduces the chances of interlocking of the two surfaces and thus reduces the friction.

Soap solution also acts as a lubricant. That is why we tend to slip on the floor if it is covered with soap solution.

(iii) **By sprinkling a soft, slippery fine powder on the surfaces :** A small quantity of fine powder on a wooden or floor etc., reduces friction. That is why small quantity of talcum powder is applied on carron board. Graphite powder is used in machines to reduce friction.

(iv) **By using wheels, ball-bearings or roller-bearings :** When a body rolls over a surface, the force of friction is much leser than that on a flat surface. That is why, friction is being reduced by using wheels, ball-bearings or roller-bearings in machines.

(v) **By stremlining the body of an object :** Properly bodies (called streamlined) experience less friction from air water. Bodies of aeroplanes, rockets, ships, etc., streamlined. Birds and fish also have streamlined bodies.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. Floor B offers greater friction (because it makes the moving pencil cell stops at a lesser distance of 20 cm).

2. (a) Sliding friction (b) Static friction (c) Rolling friction

13-Sound

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Non-living** things also make a variety of sounds.

2. The SI unit of frequence of sound is **hertz**.

3. Unpleasant sound is called **noise**.

4. Sound cannot travel through **vacuum**.

C. Write true of false :

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

Section II

A. Very short answer questions :

Ans. 1. Frequency is the total number of complete vibrations by an object in one second.

2. Sound can be produced by making the objects move to and to and fro or back and forth. The to and to or back and forth motion of an object is called vibration.

3. Larynx also known as voice box produces sound in humans.

4. The range of audible frequence in lumans is 20 Hz to 20,000 Hz.

5. The loudness of sound is measured in the unit of the decibels (dB).

B. Short answer questions :

Ans. 1. The velocity of sound depends on amplitude, frequency and wavelength. Amplitude is the loudness of the sound. Frequency is the pitch of the sound and wavelength is just as it sound the length of the sound wave.

2. Noise pollution is the unwanted and displeasing human created sound that distrupts the environments.

3. Stringed instruments are these instruments in which sounds is produced by the vibrating string. For example, violin, guitar and sitar.

4. Noise can lead to many health hazards.

- It may cause partial or permanent hearing loss.
- It increases nervous tension, irritation and high blood pressure.
- It may also cause lack of concentration in work or studies.
- Loud noise during night-time disturbs our sleep.

5. The voices of men, women and children are different because of the differences in pitch and frequency. Females produce a sound of high frequency and high pitch. The sound produces, thus, is said to be shrill. Males, on the other hand, produce a sound of low frequency and low pitch. The sound is said to be gruff or deep. Children too produce shrill voice.

C. Long answer questions :

Ans. 1. The characteristics of sound are as follows :

Amplitude : Amplitude is the loudness of the sound. The amplitude or v olume of a sound wave is the amount of pressure exerted by a sound s ource to air molecules. The higher the pressure is, the harder the molecules will collide and the farther the wave will travel. Amplitude is measured by how high the crest (top) of the wave and how low the trough (bottom) of the wave goes from the median line.

Frequency (v) : The frequency of sound depdens on th enumber of vibrations per second made by the vibrating object.

A commonly used unit of frequency is the Hertz (abbreviated Hz), where 1 Hertz = 1 vibration/second

Pitch : Pitch is a term used o describe the frequency of sound waves. if you increases the frequency of sound (there are more wavelengths in a second),

you get a higher pitched sound. When you decrease the frequency, you get a lower pitched sound.

Wavelength (?) : This is the distance between are compression of air particles and the next compression.

The more sound waves are produced every second, the closer the compressions are. Consequenctly, the higher the frequency of the waves is the lower their wavelength will be.

2. Amplitude is defined as the maximum displacement of particle from its rest position. Amplitude determines the loudness of of a sound. When the amplitude of a vibrating body is high, the sound produced is loud. For example, when we st rike a d rum using less force, the vibration, and thus the amplutude, is less, so a soft sound is produced. When we use a greater force to strike the drum, the vibration, is more and so the amplitude, is more, and so a loud sound is produced.

3. Varous sources of noise pollution and its effects are as follows :

Sources

(a) **Idustrial Sectors :** Machinery, a basic unit of factories is the main cause of noise pollution in commercial sectors. As the machineries become old their noise pollution also increases.

(b) **Noise from Vehicles :** In addition to air pollution vehicles also cause noise pollution. Moreover when old vehicles are not maintained properly their contribution to the noise level increases manifolds. Transport vehicles like truck, bus, rail, car, scooters, aeroplanes etc. all cause sound pollution. Aeroplanes flying at lower altitudes cause noise pollution.

(c) **Noise in surrounding :** In our surrounding noise is produced by loud speakers used in different functions and rallies organised by various political parties. Loud music played in cars, shouting of street hawkers, noise produced during the construction of building also add to noise pollution.

(d) **Fire Crackers :** Fire c rackers explode with a sharp and loud sound. THese high intensity c rackers are the sources of sound pollution.

(e) **Gadgets for entertainment :** Radio, tape, recorders, transistors, television etc. when played on high volumes contribute to sound pollution.

(f) **Domestic appliances :** Coolers, air conditioners, washing machines, mixer cause sound pollution.

Noise Hazards : Naoise can lead to many health hazards.

- It may cause partial or permanent hearing loss.
- It increases nervous tension, irritation and high blood pressure.
- It may also cause lack of concentration in work or studes.
- Loud noise during night-time distrubs our sleep.

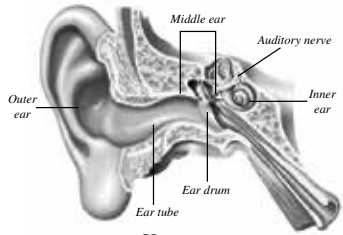
4. For this, do the following :

Take a clean by dry glass tumbler. Place a cell phone in it. Ask someone to call on the phone. Listen to the ring carefully. Surround the rim of the tumbler with your hands. Put your mouth on the opoening be-

tween your hands. Ask your friend to cal you on the cell phone again. Lissten to the ring, while you suck air from the glass tumbler. Is there any difference in teh v olume of sound as you suck air? What happens to teh sound when you remove your mouth from the tumbler?

The sound becomes fainter as you suck air. You would not hear any sound if all the air in the tumbler could be sucked. The sound needs a medium to travel. It cannot travel in vaccum. Vaccum means complete removal of air from a vessel.

5.



Human ear

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. This is because sound is carried by the waves to a greater distance and more clearly. As soudn travels better in liquids than in air.

2. Amplitude of a vibrations small, so feeble sound; Amplitude of vibrations large, so loud sound.

Unit-V : How Things Work

14-Chemical Effects of Electric Current

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Conductivity** of electricity allow current to pass through them.

2. An **LED** stars emitting light even when a very weak current flows through it.

3. Distilled water does not conduct **electricity**.

4. Cations are positivels charged and anions are **negatively** charged.

5. **Electroplating** is widely used to prevent corrosion.

C. Write true or false :

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

Section II

A. Very short answer questions :

Ans. 1. The materials, whcih allow electric current to pass them, are conductros of electricity.

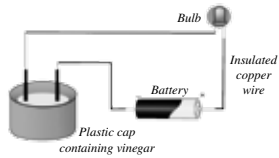
While, materials, which do not allow electric current t pass through them easily, are insulators.

2. An LED is an electronic device. It starts emitting light even when a very weak current flows through it.
3. No, distilled water does not conduct electricity.
4. Electrolysis is a processes of producing chemical reastions in liquids by passage of electric current. The magnets there into an electromagnet due to it.
5. Distilled water is pure water with no salts added in it. Due to absence of salts, electricity can not pass through it. Tap water, on the other hand, contains small amounts of salts. These salts make it a good condcutor of electricity.

C. Long answer questions :

Ans. 1. For this, following activity can be done :

Carry out the activity under the supervision of an adult. Take a small amount of vinegar in a plastic bottle cap and dip the two copper wires in it as shown in the two copper wires in it as shown in te figure. Ensure that the two free ends of the wire do not touch each other and care 1cm apart. Does the bulb grow?



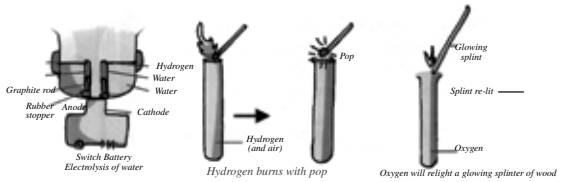
The bulb glows. This indicates that vinegar is a good conductor of electricity.

Repeat teh above activity using lemon juice. Is lemon juice also a good conductor of electricity or not?

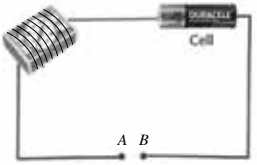
When the liquid between the two ends of the tester electric current to pass, the circuit is completed and the bulb glows. When the liquid does not counduct electricity, bulb will not glow.

2. Take a plstic vessel. Drill two holes at its bottom and set rubber stoppers in these holes.
   - Insert carbon electrodes in these rubber stoppers and connect these electrodes to 6 vold battery and a switch.
   - Fill the vessel with water such that the electrodes are immersed. Add a few drops of dilute sulphuric acid to the water in the vessel.
   - Take two graduated test tubes filled with water and invert them over the two carbon electrodes.
   - Switch on teh current.
   - After sometime you willoberve the formation of bubbels at both the electrodes. These bubbles displace water in the graduated tubes.
   - Once the test tubes are filled with the respactive gases, remove them carefully.
   - Test these gases one by one by bringing a burning splinter of wood close to the mouth of test tubes.
   - What happens in each case? When gas is present in each test tube?
   - What do you think has happened?
   - The electricity has chemical effect on the water and has split it into oxygen and hydrogen. The volume of hydrogen gas is twice that of oxygen and hydrogen. The volume of hydrogen gas is twice that of oxygen and so the formula for water is H_2O.

- Electolysis of water Hydrogen burns with a pop. Oxygen will relight a glowing splinter of wood



3. Carry out the activity under the supervision of an adult. Place a magnetic compass in an empty match box tray. Wrap an electric wire round the tray a number of times. The two free ends of the wire are used to connect the other components. One end is connected tot eh battery. Connect the other end of the terminal of the battery to another piece of wire. Now join the two ends of the wire for a deflect. You may repeat the activity using different liquids like tap water, milk, oil, honey, etc.



Note : Always wash and dry the ends of the tester after testing a liquid.

4. The process of depositing a thin layer of one metal on top of anothe metal with the help of electric current is called electroplating.

When an electric current is passed through a copper sulphate solution, copper sulphate dissociates into copper and sulphate. Free copper gets deposited on the cathode. To make up for-this loss of copper in the solution, an equal amount of copper from the anode dissolved in the solution and this proces continues. In other word, copper gets transferred from the anode to the cathode.

In electroplating, the object to the made the cathode and the metal to be deposited on the object is made the anode. The solution contains dissolved salts of the metal to be deposited.

Electroplating is a common application of chemical effects of electric current.

5. Applications of electropolating in our day to life are as follows :
   - It is widely used for coating metal objects with a thin layer of different metals. For example, chromium plating is done on many objects such as kitchen gas burners, bath taps, etc.
   - Electroplating is widely use to prevent corrosion. For example, chromium has a shiny appearance and it does not corrode.
   - Jewellers electroplate silver and gold on less expensive metals.
   - Tin cans used for stroing food are made b y electropolating tin on iron.
   - Iron is coated with zinc to protect it from corrosion and prevent formation of rust.

Disposal of waste from electroplating factories is a major problem as it is highly polluting. It must be disposed off in accordance to the laid down guidelines.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. He do so because water can very easily conduct electricity and it can add fuel to fire.

2. Electroplating is hazardous to the environment, as it releases small particles of metals that accumulated and creates problems.

15-Some Natural Phenomena

Exercises

Section I

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

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

B. Fill in the blanks :

Ans. 1. **Atoms** rare made of protons, neutrons and electrons.

2. An electrically **neutral** object can be charged by various methods.
3. The process of transferring charge from a charged object to the Earth is called **earthing**.
4. During a thunderstorm seek shelter in a vehicle with **closed** windows.
5. **Earthquakes** are also caused due to volcanic eruptions.

C. Write true or false :

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

Section II

A. Very shor answer questions :

Ans. 1. Like charges repel each other.

2. Lightning conductor.
3. Charging by conduction.
4. The intensity of an earthquake is measured by an instrument called Richter scale.

B. Short answer questions :

Ans. 1. Electrical charges are ato ms having either positive charge or negative charge. These conducted electricity to an uncharged body.

2. We can charge a b ody by friction by rubbing the two bodies aganst each other. This produces an equal and opposite charge in both the bodies.
3. During lightening the best shelther is a vehicle with closed windows.
4. Charging by induction means to charge a body by brining a charged body near it, but not touching it.
5. An earthquake is a sudden movement or trembling of the Earth which lassts for a brief period. It is caused due to distrubance deep down inside the crust. Earthquakes occur all over the Earth all the time. They may range from mild tremors that are not noticed to massive ones causing wide spread destruction and damage to buildings, bridges, dams and life.

C. Long answer questions :

Ans. 1. An object having no electric charge on it is called an uncharged object. An uncharged object does not have any effect on other objects. An object having electric charge on it is called a object. A charged object attracts other uncharged objects. This point wil become clear from the following example.

If we take a glass rod and bring it near some tiny pieces of paper, it will not have any effect on them. If, however, the tiny pieces of paper, then the glass rod attracts the tiny pieces of paper towards itslef. These observations can be explained by saying that initially the glass rod is electrically neutral or uncharged (having no electric charge) , so it h as no effect on the tiny pieces of paper. But when the glass rod is rubbed with silk cloth, then it gets electric charge. The electrically charged glass rod exerts a force on the tiny pieces of paper and hence attracts them. From this example we find that a glass rod rubbed with silk acquires the ability to attract small, uncharged pieces of paper. The objects showing this this effect (of attracting other objects) are said to be electrically charged or just charged. The process of giving electric charge to an object is called charging the object.

2. (i) **Charging by conduction : I**f we touch a charged object to an uncharged one, the electric charge will flow from the charged object to the uncharged one. This method of charging a body is called charging by conduction. The body being charged will acquire the same charge as the body charging it.

   (ii) **Charging by induction :** We can also charge a body bringing a charged body near it, but not touching it. The charged body induces the same charge that it has on the uncharged body. This method of transfer of charge is called induction.

3. **Aim :** To observe whether a neutral body can be charged or not.

   Take a balloon, an eraser, a plastic scale, an ebonite rod, a glass rod and a metal rod. You can add more items to the list.

   Now rub these objects with different materials like a woollen sweater, a silk cloth, a polythene bag, dry hair, etc. and bring them close to small pieces of pape.

   Note your observatios below :

Nature of charge induced in a neutral body

Object	**Rubbed with**	**A ttracts/does not attract pieces of paper**	**Charged/neutral**
Balloon	Polythene bag, dry hair, silk cloth, sweater		
Eraser	Sweater		
Platic scale	Dry hair, sweater		
Ebonite rod	Sweater		
Glass rod	Silk cloth		
Metal rod	Poythene bag, sweater		

   By the given activity we can conclude that a neutral body can be charged.

4. We can take the following precautions agains the lighting:

Inside

- Stay away from doors and windows.
- Avoid being near electrical outlets, appliances or equipments.
- If the thunderstorm is present, do not plug or unplug TVs, telephones, stereos or other electrical appliances.
- Stay away from plumbing, avoid running water and do not take a shower or bath.
- Do not use corded telephone except for emergency purposes.

Outside

- If caught outdoors, seek cover indoors as quickly as possible.
- Do not stand under a tree for cover because taller and moist objects are more prone to lightning strike.
- Seek shelter in a vehicle with closed windows.
- Do not use an umbrella, lawn mower, bicycle or similar objects.
- Avoid metal objects like fences, benches or tall poles.
- If swimming or boating, seek shelter on land as quickly as possible.
- If caught in an open field, crouch low, with your head bent in between your arms and legs close together.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. This happens because of charging by friction.

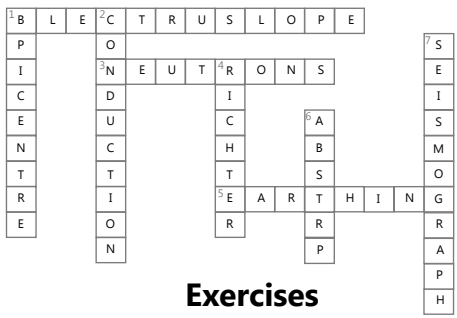
2. An umbrella has an iron spike. This can conduct electricity and we may get injured.

Tasks For You

Think and Tell

Complete the following diagram :

Ans.



16-Light

Exercises

Section I

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

Ans. 1. c 2. d 3. a

B. Fill in the blanks :

Ans. 1. **Reflection** is the phenomenon of bouncing back of light into the same medium.

2. The angle between the incident ray and the normal is called the **angle of incidence.**
3. In a plane mirror, the image is formed **behind** the mirror.
4. **White** sunlight consists of seven colours.
5. Deficiency of vitamin causes **might blindness**.

C. Write true or false :

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

Section II

A. Very short answr questions :

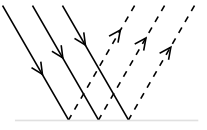
Ans. 1. The incident ray, the reflected ray, and the normal at the point of incidence lie on the same plane.
2. We call it angle of reflection.
3. Real image
4. Cornea
5. Sclera

B. Short answer questions :

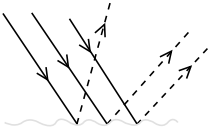
Ans 1. Laternal inversion means tha the right side of object appears as left and the left side of the object appears right.
2. Regular reflections and decreases the size of the pupil to regulate the amount of light that enters the pupil. The iris gives the distinctive colour to the eye.
4. Myopia or short-sightedness. Such a defect is seen in young persons. In such cases, the image of the distant object falls in front of the retina. A person suffering from this defect. Persons suffering from long-sightedness have diffculty in reading. In this case, image of the object falls behind the retina.
5. When light rays apper to meet behind the mirror or screen, virtual image is formed.

C. Long answer questions :

Ans. 1. Reflection of light from a smooth surface is called regular reflection. The image formed is clear and sharp in this case.



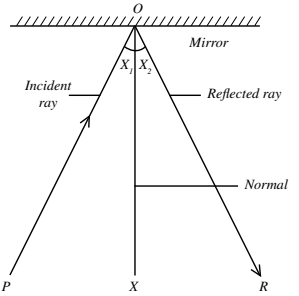
Regular reflection



Diffused reflection

When ligh rays fall on a rough, irregular surface, the reflected rays are not parallel, but are reflected in different directions. The image formed is not clear and sharp.

2. **Angle of reflection :** The angle between th reflected ray and the normal is the between the reflected ray and the normal is the angle of reflection. X2 shows the angle of reflection for the reflected ray RO.



Reflection of light

Angle of incidence : The angle between theincidenete ray and the normal is called the angle of incidence. X1 shows the angle of incidence for the incident ray PO.

The angle of incidence is always euqal to the angle of reflection.

3. The entire sheet of paper spread on the table represents one plane. The incident ray, the normal at the point of incidence, and the reflected ray lie in the plane of the paper. When the paper is b ent, a plane different from the plane in which the incident ray, reflected ray and normal lie is created. The reflected ray of light does not lie in the ew plane formed due to the bent sheet.

   Can you tell what this indicates?

   This suggests that the incident say, the reflected ray and the normal at the point of incidnce, all lie in the same plane.

   Thus, the two laws of reflection are :

   First law : The incident ray, the reflected ray, and the normal at the point of incidence lie on the same plane.

   Second law : The angle of incidence is equal to the angle of reflection.

4. The characteristics of image formed b y a plane mirror as follows :
   (i) The image is formed behind the mirror.
   (ii) It is a virtual image which cannot be taken on the screen.
   (iii) The size of the image and the obect is the same.
   (iv) The image formed by the plane mirror is erect and not inverted. That is why you see yourself upright in plane mirror and not inverted.
   (v) The image will be formed as far behind the mirror as the object is in front of it. That is why you find that when you move closer to the mirror your image also seems to move closer. Similarly, when you move away from teh mirror, your image also seems to move away.
   (vi) The image formed by a plane mirror is laterally inverted.

5. Braille is a code, which enables blind persons to read and write. A blind Frenchman, Louis Braille, invented it in 1829 and adoped in 1932.

   There is a Braille code for common languages, mathematics and scientific notations. Bralle is comprised of a rectangular six-dot cell on its end, with up to 63 possible combinations of the Braille dots within a cell represent contractions of two or more print letters and Braille characters take up three times as much space as print. This method is based upon recognition of characters by touching which are them memoriesed.

D. Higher Order Thinking Skills (HOTS) :

Ans. 1. This is so because new stainless steel utensils show regular reflection that gives a clear image.

2. He may have sufering from long-sightdness and was feeling difficulty reading.