



Based on the Syllabus prescribed by National Council
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Science Path

Help Kit
6-8



EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- | | | |
|--------------|---------------------|--------------|
| 1. (d) wheat | 2. (a) salt | 3. (b) sugar |
| 4. (b) moong | 5. (c) human beings | |

B. Write 'T' for the true statement and 'F' for the false one:

- | | | | | |
|------|------|------|------|------|
| 1. T | 2. F | 3. T | 4. F | 5. T |
| 6. F | 7. T | 8. F | | |

C. Give your answer in one word :

- | | | |
|-----------------|--------------|---------------|
| 1. Omnivore | 2. Sprouting | 3. Ingredient |
| 4. Mari culture | 5. Honey | |

D. Answer the following questions in brief :

- Fruits :** Mango, apple, banana
Vegetables : Cabbage, tomato, potato
- Omnivores eat both plant and animals.
- Carbohydrates like sucrose, glucose, lactose nutrient are present in honey.

4. Animals Product

Milk
Egg
Meat
Honey

Sources

Cow
Hen
Goat
Honey bees

E. Answer the following questions in detail :

- Bees collect nectar from flowers and store it for in their hives.
After some day nectar convert in honey.
- | | |
|-----------------|--------------|
| Plants | Parts |
| (i) Carrot | Root |
| (ii) Potato | Stem |
| (iii) Spinach | Leaves |
| (iv) Wheat | Seeds |
| (v) Cauliflower | Flower |
- The following differences are there among herbivore, carnivore and omnivore.

Herbivore : Herbivorous animals eat only grass and other green plants.

Eg-Horse, deer, cow

Carnivore : Carnivorous animals eat flesh of other animals.

Eg-Lion, tiger, wolf

Omnivore : Omnivorous animals eat both plants and animals.

Eg-Human beings, bear, crow

4. We get different foods such as, Eggs, Honey, Meat etc. from animals.

5. The two main sources of food are plants and animals.

Plants : Fruits, Vegetables, cereals, pulses etc.

Animals : Chicken, milk, mutton, prawns, fish, eggs, shrimp etc.

HOTS QUESTIONS

1. Different crops grow in different climates. People who lived in different climates in India eat different types of food according to their climates.

2. Decomposers like fungi, and bacteria feed on dead plants and animals and decompose them. They make our surrounding clean by eating dead bodies of different animals.



2

Components of Food

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- | | | |
|------------------|----------------|------------|
| 1. (a) starch | 2. (b) sugar | 3. (b) egg |
| 4. (b) vitamin B | 5. (a) calcium | |

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

- | | | | | |
|------|------|------|------|------|
| 1. F | 2. T | 3. F | 4. T | 5. F |
|------|------|------|------|------|

C. Fill in the blanks using the correct words :

- | | | |
|-----------|-------------|-----------|
| 1. starch | 2. Fats | 3. warmth |
| 4. Iron | 5. balanced | |

D. Give your answer in one word :

- | | | |
|-----------|--------------|--------------|
| 1. Fats | 2. Vitamin C | 3. Diarrhoea |
| 4. Iodine | 5. Vitamin D | |

E. Answer the following questions in brief :

1. Major five nutrients present in food are carbohydrate, fat, protein, vitamin and mineral.
2. Proteins are called body-building foods because proteins are needed to our body to make new cells, to replace worn out and damaged cells.
3. (i) Simple carbohydrates
(ii) Complex carbohydrates
4. We must not wash fruits and vegetables after peeling or cutting them because results in the loss of vitamins and minerals. The skin of many fruits and vegetables are rich in vitamins and minerals.
5. **Symptoms of scurvy :** Gums disease, bleeding gums, wounds take long time to heal.

F. Answer the following questions in detail :

1. **Test for the presences of starch in a food item.**
Take a small quantity of food or raw material which is to be tested. Add 2-3 drops of dilute iodine solution. We observe some change in colour. If the colour changes to blue black, it indicates starch.
2. Children need more proteins than adults because proteins are known as body-building substances. It make new cells in our body children body needs more protein because they are growing in nature as compare to adults.
3. A diet that contains adequate amount of important nutrients like carbohydrates, fat minerals, vitamins and water necessary to maintain good health is called a complete or balanced diet. The balanced diet is different for everyone. It depends on various factors like age, sex, physical activity of a person.
 - A young child needs to eat more protein-rich food; as the growth during early childhood is rapid.
 - A labourer doing hard work needs more of carbohydrates and fats, as he needs more energy.
4. Diseases that are caused due to the lack of essential nutrients such as proteins, vitamins and minerals that the body cannot make from other foods are called deficiency diseases.
 - **Deficiency of Proteins :** Lack of proteins causes stunted growth, swelling of face, discolouration of face, skin diseases and diarrhoea.

- **Deficiency of Carbohydrates :** Lack of carbohydrates in their diet causes the person to become thin and weak.

When the diet is deficient in both proteins and carbohydrates for a long time, growth may stop completely.

5. Just like vitamins minerals are also required by our body in very small amounts. They are required for proper growth of the body and to stay healthy. Minerals are of many types.
 - Dairy products like milk, cheese are rich in calcium which are required for healthy teeth and bones.
 - Green leafy vegetables like spinach are rich in iron which is necessary for the formation of haemoglobin.
 - Fish is rich in iodine which helps in the secretion of thyroid hormone.

HOTS QUESTIONS

1. Child who eats fried foods is fatter than a child who eats roasted snacks because fried food have high quantity of oil. Oil is the main source of fat. Fats are stored under the skin and other parts of our body.
2. We must include salad in our diet because salad have the nutritive value and minerals and water. Salad is also a good source of roughage.

Unit-II : Materials



3

Separation of Substances

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (c) sugar
2. (d) winnowing
3. (a) hand picking
4. (d) sedimentation
5. (a) filtration

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

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

C. Give one word for each one of the following :

1. Hand picking
2. Winnowing
3. Sieving
4. Filtration

D. Answer the following questions in brief :

1. The Principle used in the separation of components in

mixtures is that each component has a unique property which is not shared by any other component.

2. Pure substances are made up of one kind of molecules only.
3. Sieving is a method which is used to separate constituents of a mixture having particles of different sizes by using a sieve. If the components of a mixture are of different sizes, they can be separated by sieving. Sieves are used in construction sites to remove pebbles from sand.
4. A saturated solution is the solution in which no more of the solute can be dissolved.
5. Farmers separated husk from grains by wind or blowing air, this method is called winnowing. The mixture is allowed to fall from a height by standing at a height. The wind blows away the husk/chaff which are light, while the grains fall vertically down forming a heap.

E. Answer the following questions in detail :

1. **Need of Separation :** We separate substances from mixture for several reasons :
 - To remove undesirable constituents or non useful components e.g., removing tea leaves from tea, removing curry patta from dishes.
 - To remove harmful components or impurities-e.g., removing stones from pulses.
 - To obtain useful components-e.g., churning milk to butter, separating petrol and kerosene from crude oil.
 - To get pure substances we need pure substances for research work, to manufacture a large number of articles which are used everyday.
2. Take a beaker and fill 100 mL of water in it. Now, add one tablespoonful of sugar in it. Stir it well. Sugar gets completely dissolved in it. Now add one more tablespoonful of sugar in it. What do you find? Sugar still dissolves completely in it. In we can say that 100mL of water with 1 tablespoonful of sugar is an unsaturated solution, as it is able to dissolve more sugar in it. Proceed further; keep on adding sugar in this solution till you reach a point when no more sugar gets dissolved in it. This is called saturation point and the solution is called saturated solution.

You will find that in spite of stirring, a few sugar particles will always be left undissolved at the bottom of the beaker containing saturated solution.

3. **Winnowing** : The method used to separate chaff from the grains by wind or blowing air is called winnowing. The mixture is allowed to fall from a height by standing at a height. The wind blows away the husk/chaff which are light, while the grains fall vertically down forming a heap. The chaff forms a heap at a small distance from the heap of grains.
4. We can use hand picking or sieving method to separate a mixture of sand and pebbles. The hand picking method should be practised when the quantity of the impurities is not very large. This is the simplest method of separation. Second method, filtration also done on small as well as large scale. We can use sieving for separation of sand and pebbles in a mixture.
5. **Saturated solution** : A saturated solution is the solution in which no more of the solute can be dissolved. However, if you now heat that solution and stir, you can dissolve more sugar in that solution.

We can increase solubility of most substances in water by increasing the temperature of the solution.

HOTS QUESTIONS :

1. When our mother preparing lemonade she dissolves sugar in little plain water and then adds cold water and ice to it. Because in cold water, molecules are closer than they are normal plain water so sugar molecules can't mix in cold water. But plain water molecules have much space so sugar molecules mix in this water easily.



4

Fibre to Fabric

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (a) jute 2. (b) stem 3. (c) rayon
4. (a) India 5. (c) seed pods

B. Write 'T' for the true statement and 'F' for the false are :

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

C. Fill in the blanks by using the correct words :

- | | | |
|-------------|-------------|---------|
| 1. material | 2. largest | 3. yarn |
| 4. cotton | 5. spinning | |

D. Give your answer in one word :

- | | | |
|------------|-------------|---------|
| 1. Charkha | 2. Ginning | 3. Wool |
| 4. Coir | 5. Shearing | |

E. Answer the following questions in brief :

1. The process of making yarn from fibres is called spinning.
2. Cotton, Jute, Silk.
3. Any material made from yarn or fibres by weaving, knitting or felting is called fabric. Whereas yarn is a thread spun by twisting fibres together.
4. a. Weaving b. Knitting
5. a. Carpet b. Jute bag

F. Answer the following questions in detail :

1. **Knitting :** Knitting involves making fabric by forming a series of connected loops of yarn by using knitting needles or machines. In this process, a single yarn is used to make a piece of fabric. It can be done by hand or on machines. Knitted fabrics stretch more than woven fabrics. They are used to make t-shirt, socks, etc.

Weaving : Weaving involves making fabric by arranging two sets of yarn. Weaving of fabric is done by weavers using machines called looms. The looms are either hand operated or power operated.

2. Natural fibres are obtained from plants or animals. Cotton and jute are obtained from plants whereas silk and wool fibers are obtained from animals.

Synthetic fibers are made by man, which are not obtained from plants or animals eg: nylon rayon, polyester and acrylic are synthetic fibres. They are mainly made from petroleum by complex chemical process.

3. Take a small piece of cotton cloth. Pull out a loose thread or yarn from the edge of the piece. You can pull one by using a needle in case no loose thread is seen.

You will see that cloth is made up of a number of threads or yarns.

4. Cotton is obtained from the cotton boll that grows on the cotton plant. It is obtained from the soft, white, fluffy cotton fibre growing around the seeds of the plant. Fibers are separated from the seeds by combing. This process is called **ginning**. Earlier, ginning was done by hand. Now a days, machines are used for ginning.

Spinning of cotton yarn : The fibers are cleaned and made into long thread-like strands. The process of making yarn from fibers is called spinning. Fibres from the bundle of cotton are drawn out and then twisted to make a yarn. This process holds the fibers together.

Yarn to fabric : 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 fabric is done by weavers using a machines called looms. The looms are either hand operated or power operated.

Knitting : Knitting involves making fabric by forming a series of connected loops of yarn by using knitting needles or machines. In this process, a single yarn is used to make piece of fabric.

5. **Jute :** Jute is a fibre obtained from the bark of the jute plant. It is one of the cheapest natural fibers. It is mainly grown in the states of Bihar, West Bengal and Assam in India during the rainy season. It can be grown best in sandy and clayey soil. It is harvested after six months when it is in the flowering stage. The stalks of the harvested plant are tied in bundles and immersed in water for about 20 days. This is called retting. The fibres are then separated by hand.

HOTS QUESTIONS

- School uniforms mostly made of cotton fabric because school timing is very long and cotton fibre is absorbent and make children feel comfortable. It is also lighter than other fabric.

**EXERCISES****A. Multiple Choice Questions (MCQs) :**

Choose the correct answer for each of the following:

1. (c) lustre
2. (c) have both mass and take up space.
3. (d) cardboard
4. (c) mustard oil
5. (d) stainless steel spoon

B. Fill in the blanks by using correct words :

1. objects
2. plastic
3. Metals
4. Plants
5. properties

C. Give your answer in one word :

1. Transparent
2. Yes
3. Metal
4. Glass

D. Answer the following questions in short :

1. Table, chair, boat.
2. All materials occupy space, and have mass.
3. Materials like salt and sugar which dissolve in water are called soluble. Materials like sand and, saw dust don't dissolve in water even after stirring, they are called insoluble.
4. Take a white paper sheet. Look at a lighted bulb through it. Now spread a teaspoon of oil on one portion of the paper. Now look at a lighted bulb through the oil patch. You will see that the bulb is more clearly lighted than before. This is because the paper has now become translucent.
5. Some items like cotton, sponge and wool which can be compressed or pressed easily are called soft materials. Items like iron, stone, etc. which cannot be compressed or pressed easily are called hard materials.

E. Answer the following questions in detail :

1. Materials that allow light to pass through them are called transparent. 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. They allow light to pass through them only partially. Some examples are frosted glass in bathroom

windows, butter paper, tissue paper, etc.

2. Density is the mass per unit volume of a substance. If we weight equal volume of wood, metal (iron) and water, it will be seen that iron is the heaviest and wood is the lightest. Thus, some substance like iron or sand which are dense than water sinks in water, whereas substances like wood, cork and sawdust, which are less dense than water float on water.
3. We can classify materials on the base of following five properties.

Appearance : Each and every materials look different from each other. Plastic looks different from paper, paper appears different from wood, iron looks different from aluminum and so on. 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 do not shine that much. Similarly synthetic clothes have a shine whereas woollen clothes do not have a shine. Materials like aluminium, iron, copper, silver and gold have lustre. Wood and paper being non metals do not have lustre.

Hardness : 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. Thus, materials can be classified on the basis of hardness.

Roughness : 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.

Solubility : Materials like salt and sugar which dissolve in water said to be soluble in water are called soluble. Materials like, sand, saw dust don't dissolve in water even after stirring, they are said to be insoluble.

4. Take a container and half fill it with water. Add some milk to it. Stir and let the container stand for some time. Observe whether milk mixes with water or not. Repeat the same with other liquids such as oil, lemon juice, kerosene and ink. Record your observations. It will be seen that some liquids like milk mix completely with water and are said to be miscible liquids.

Liquids that do not mix with each other are called immiscible liquids like oil and water.

HOTS QUESTIONS

1. Dry spices are stored in glass containers because this makes it easier to find what we need.



6

Changes Around Us

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (c) both reversible and irreversible
2. (b) irreversible
3. (d) burning paper
4. (a) reversible physical
5. (c) melting of wax

B. Write 'T' for the true statement and 'F' for the false one:

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

C. Fill in the blanks by using the correct words :

1. time
2. physical
3. cold
4. size
5. substance

D. Answer the following questions in brief :

1. Changes that can be reversed are called reversible changes.
2. Burning of paper is an irreversible change because after burning paper convert into ash and ash can't be convert in paper.
3. Making small balls out of the dough and rolling them out is a reversible change.
Frying the poories is a irreversible change.
4. Cutting of potato is a physical charge and cooking a potato is a chemical change.
5. On heating substance increase in size. This kind of change is called expansion and the objects is said to have expanded.
Expansion can take place in all three states of matter.

E. Answer the following questions in detail :

1. Physical Change	Chemical change
i. No new substance is formed.	i. New substance is formed.
ii. The properties of substance remain the same.	ii. The properties of substance change.
iii. It is mostly reversible	iii. It is mostly irreversible.

Example : Breaking of a glass **Example :** cooking of food.

2. Most of the physical changes that we see around us are reversible. It is so because in a physical change no new substance is formed. The fundamental characteristics of a substance remain the same. As such by reversing the conditions we can obtain the original substance. For example, when we make an aeroplane from paper. We merely fold the paper in the desired shape. By unfolding the aeroplane we can get back the original paper. But some physical changes are irreversible in nature. We cannot obtain the original substance even by reversing the conditions. For example, sharpening of pencil is an irreversible change. In no condition we can obtain unsharpened pencil.

Examples are:

3. **Chemical Change :** Changes in which new substances with different properties are formed are called chemical changes.

Example of Chemical Changes

Burning : Smoke and gas like carbon dioxide and water vapour are given out and ash is left behind after burning a piece of paper. The molecules of ash are different from that of paper. Thus, a new substance is formed. It is a chemical change.

4. **Property of expansion and contraction is useful in daily life:** Some materials expand on heating and some contract on cooling. Maximum tools have an iron ring which fits into a wooden handle. The ring is usually slightly smaller in size than the wooden handle. When the iron ring is heated, it expands in size and can be easily fitted into the ring. On cooling, the iron ring contract and fits tightly on the handle. Similarly, this property is also used to fix a metal rim on a wooden wheel of a cart. The metal rim is slightly smaller in size. It is heated so that it expands and is fitted on the wheel. Cold water is poured on it to cool it. It contracts on cooling and fits tightly on the wheel.
5. **Changes when different substances are mixed :** We have observed that when sugar is mixed with water, it dissolves to form a solution. We have already studied that we can get back the sugar from the solution by evaporation. Thus the change is reversible. It is a physical change as molecules of sugar and water do not undergo any change.

Thus, we see that heating and mixing of substances bring about a change. Some of the changes are reversible and some are non reversible.

HOTS QUESTIONS :

1. Blacksmith heat up the iron pieces and beaten till they get proper shape by this blacksmith change a piece of iron into different tool.
2. Chopping of wood is a physical change but burning of chopped wood is a chemical change.

Unit-III : The World of the Living

The living Organisms and Their Surroundings



7

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (c) plants
2. (d) pond
3. (c) hilly areas
4. (c) cactus-hills

B. Give your answer in one word:

1. Habitat
2. Living
3. Water
4. Sea water

C. Answer the following questions in brief :

1. Changes in the structure or behaviour of an organism that allow it to survive in a particular habitat are called adaptations.
2. The characteristics of living things are as following :
 - Taking food, • Growth, • Respiration
 - Respose to Stimuli
3. **Terrestrial organisms** : Plants and animals who living on land are called terrestrial organisms. **Aquatic organisms** : Plants and animals who live in the water are known as aquatic organisms.
4. Roots in aquatic plants like water lettuce, helps in floating and hang submerged in water.

D. Answer the following questions in detail :

1. Camels have special features to survive in the deserts.
 - It has long legs to keep the body away from the heat of the

sand. Its hooves are covered with a large sole which helps it to move easily on soft sand.

- It stores fats in its hump. It utilises this food during shortage and is able to survive without food for long periods.
- It can drink a large quantity of water at one time and then stay without water for a long time.
- It excretes a small amount of urine, its dung is dry and it does not sweat. It thus loses very little water from its body.

2. **Characteristics of Living Things**

(a) Taking Food : All living things need food to grow and survive. Green plants make their own food, by the process of photosynthesis. Animals depend on others for food. Organisms use the energy obtained from plants for growth as well as for other life processes that go on inside them.

(b) Growth : Living things grow. Growth in living things is irreversible. You must have noticed that you are also growing taller and bigger. A puppy grows into a dog, a kitten into a cat, a chicken into a hen, etc. Similarly plants also grow.

(c) Respiration : The process by which living things utilize oxygen to release energy, stored in the food they eat, is called respiration. Land animals like cows, horses, dogs and cats breathe like us. Water animals like fish breathe the oxygen dissolved in the water. They breathe through the gills.

Plants also breathe by taking in oxygen and giving out carbon dioxide.

(d) Response to stimuli : All living things respond to a stimulus. The change in our surroundings that produces a response in an organism is called stimulus. An organism's reaction to a stimulus is called a response. The main stimuli to which living organisms respond are touch, chemicals, heat, light and sound.

3. **Plants in deserts show following adaptations :**

- They have long roots that can go deep inside the soil in search of water.
- Some plants have fleshy stems which store water in them e.g., cacti. The stem is covered with a thick wax which prevents loss of water.
- Desert plants lose very little water through transpiration.

The desert plants have very few leaves or these are present in the form of spines. This prevent loss of water through transpiration. Photosynthesis is carried out by the stems.

4. A variety of animals like the snow leopard, seal fish, penguin and polar bear are found in polar region.
- Animals (like the polar bear) living in polar region, have thick skin or fur to protect them from cold. They have long hair to keep them warm.
 - They go to sleep in the winter months. This is known as hibernation.
 - Animals usually have shorter legs, tails and ears to reduce heat loss.
 - Some animals have a deposit layer of fat under the skin which keeps them warm in extreme cold conditions of polar region.

HOTS QUESTIONS :

1. It is said so because plants give out oxygen during photosynthesis.



8

Getting to Know Plants

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- | | | |
|---------------|--------------------|---------------|
| 1. (a) herb | 2. (c) maize | 3. (c) carrot |
| 4. (a) mango | 5. (c) stamen | 6. (d) ovary |
| 7. (d) flower | 8. (d) money plant | |

B. Write 'T' for the true statement and 'F' for the false one:

- | | | | | |
|------|------|------|------|------|
| 1. T | 2. T | 3. F | 4. T | 5. F |
|------|------|------|------|------|

C. Give your answer in one word :

- | | |
|------------------------------|-----------------------|
| 1. Shoot system, Root system | 2. Coriander, Mustard |
| 3. Jasmine, Rose | 4. Carrot, Turnip |
| 5. Petal, Sepal | |

D. Answer the following questions in brief :

1. Functions of the Root

- 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.

- Roots help to prevent soil erosion.
2. **The Shoot System :** All parts of a plant that are above the ground form the shoot system. It includes stem, branches, leaves, flowers and fruits.
 3. The main function of the leaves to produce food with the leaf of photosynthesis. Leaves help in the process of photosynthesis and transpiration.
 4. Roots help to fix plants to the ground and in the absorption of water and minerals from the soil.
 5. **Herbs :** They are very weak and small plants, usually less than one metre high. They have green, soft and flexible stems. Examples of herbs are coriander, mustard, wheat, mint etc.
Shrubs : Shrubs are woody, small bushy plants. They are medium-sized plants (1-3 m high), having hard stems. They are bushy with the stem branching out near the base. Examples of shrubs are rose, lemon and jasmine.

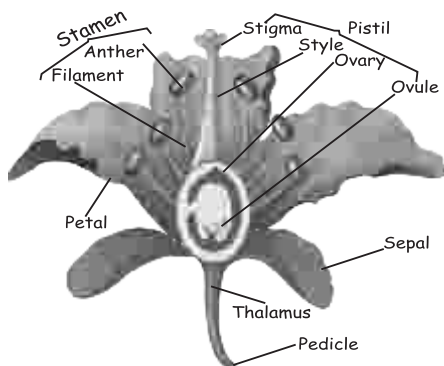
E. Answer the following questions in detail :

1. **Functions of the stem :**
 - The stem keeps the plant upright.
 - Stems transport water to all parts of the shoot system.
 - Stems provide support to the different parts of the plant.
 - In some plants, the stem is underground. Examples are potato, onion and ginger. They store food prepared by the leaves.
 - Stems of some plants like cactus are modified to make food. The green stem performs all the functions of the leaves.
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 and barley.
3. Take a green leaf. Place it in a test tube and 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 in water and put it on a sheet of white paper. Pour a few drops of Iodine on it.

After some time observe it. The leaf turns blue black in colour. This shows the presence of starch.

4.



HOTS QUESTIONS: Parts of a flower

1. All flowers are not pollinated by insects because some flowers has self pollenation and a sexual reproduction like, by bud, by seed, by root, and by leaf.



9

Body Movements

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (c) shoulder
2. (b) ligament
3. (c) fixed joint
4. (a) cartilage
5. (d) legs

B. Write 'T' for the true statement and 'F' for the false one :

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

C. Give your answer in one word :

1. Heart, Lungs
2. Wrists and ankles
3. Tail fins
4. Jaw
5. Snail

D. Answer the following questions in short :

1. Kinds of joints are as follows :

- (a) Ball and socket joint
 - (b) Pivotal joint
 - (c) Hinge joint
 - (d) Gliding joint
 - (e) Fixed joint
2. Human skeleton consists of the following four basic parts :
 - (a) The skull
 - (b) The backbone
 - (c) The ribs
 - (d) The limbs
 3. Cartilage act as a shock absorber and prevents rubbing of bones against each other at the joints.
 4. Tiny hair like bristles present on the lower surface of an earthworm's body provides good grip on the ground.
 5. The place where two bones meet or are joined together is known as a joint.

E. Answer the following questions in detail :

1. Our head is joined to the neck by the pivotal joint. This joint allows movement of the head in all directions. We can move our head up and down and sideways. In this joint, the rounded surface of one bone fits into a dent in the other bone. The head rests on this ring.
2. We have two pairs of limbs—Hind limbs and fore limbs. The thigh bone called the femur is attached to the hip bone through the hip joint. The ankles and the feet also have a number of bones.
The upper arm has a long bone called the humerus. The lower arm has two bones. The wrist and the hand also have several bones.
3. Ribs are flat curved bones. They join the backbone and the chest bone together to form a cage called the rib cage. The rib cage protects the heart and the lungs. There are 12 pairs of ribs. The last two pairs are not attached to the breast bone and are called floating ribs.
4. The skeletal system along with the muscular system helps in movement. Bones cannot move by themselves. The muscles have the ability to move. The muscles work in pairs. To move a bone in one direction, two sets of muscles are needed. When one muscle contracts, the bones is pulled in that direction. The other muscle of the pair relaxes. Similarly, to move the bone in the opposite direction, the relaxed muscle contracts while the first muscle relaxes. Thus, muscles move bones only by contracting and never by relaxing.

5. 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 flap their wings and fly. The bird has a streamlined body and hollow bones which also help the bird to fly.
6. Snakes do not have limbs (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. Each loop pushes against the ground to make the body move forward. The body thus moves in a wavy manner because of the loops. The snake can move forward very fast, since its long body makes many loops.

HOTS QUESTION :

1. Aeroplanes and boats have streamlined bodies like that of a fish because that shape allows the aeroplanes and boats to cut through the air and water efficiently as the air and water resistance is reduced.
2. The earthworm can't move on a surface made of glass because the body of the earthworm is made of many segments joined end to end. The earthworm moves due to repeated expansion and contraction of its muscles. Earthworm has tiny hair like bristles on the lower surface of its body which provide good grip on the ground. But in case of glass no grip is formed. So Earthworm can't move on glass surface.

Unit IV. Moving Things People and Ideas

Motion and Measurements of Distances



10

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (d) A merry go round 2. (a) A pin wheel
3. (a) rectilinear motion 4. (c) metre 5. (b) 100 cm

B. Write 'T' for the true statement and 'F' for the false one :

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

C. Write two examples for each of the following :

1. (i) Train moving on tracks.
(ii) A car moving on a straight road.
2. (i) A stone tied to a string and whirled along.
(ii) A car moving along a curved path.
3. (i) Motion of the blades of a fan.
(ii) Rotation of the earth on its axis.
4. (i) Motion of a clock pendulum.
(ii) Motion of a swing.
5. (i) Ball falling on a ground.
(ii) A boy sliding down a slope.

D. Answer the following questions in brief :

1. Inventions of wheel and the steam engine brought about revolutionary changes in the field of transport. They made the transport of goods and people easier than earlier.
2. An object is in motion if it changes its position with time, in relation to a stationary object in its surroundings.
3. A type of motion in which all the parts of an object move the same distance in a given time is called a translatory motion.
Eg-car, bus, or a train move as a whole.
4. Length of a table = 125 cm
1 m = 100 cm
when convert in m = $\frac{125}{100} = 1.25$ m
5. The different types of motion are as follow :
 - (i) Translation Motion
 - (a) Rectilinear Motion
 - (b) Curvilinear Motion
 - (ii) Rotational Motion
 - (iii) Periodic Motion
 - (iv) Non Periodic Motion

E. Answer the following questions in detail :

1. A type of motion that repeats itself after equal interval of time, is called periodic motion. Examples : motion of a clock pendulum, motion of the earth, motion of a swing, motion of the needle of the sewing machine, a branch of a tree moving to and fro, string of a guitar or table being beaten.
2. It can be seen that 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 considering whether a body is in motion or not, we take stationary objects such as houses, trees, poles, etc on the surface as reference. When a body does not change its position with respect to the surrounding objects with time, the body is said to be in rest.

3. **Precautions while measuring a Instrument with a Scale :** A metre scale is used to measure the length of piece of a cloth. The following steps need to be followed while measuring length with a scale.

- The measuring instrument (scale) must be placed exactly along the length to be measured. It must be kept parallel to the body.
- At times, the end of the ruler may be broken and the zero mark may not be clearly visible. In such cases, use any other major mark of the scale like 1 cm or 2 cm. Subtract this reading from the final reading to get the length of the object.
- Position your eye exactly above the point where measurement is being taken.

4. **Standard units of Measurement :** Different countries had their own unit of measurement. So for the sake of uniformity and convenience, scientists all over the world decided to accept a basic set of units for the measurement of physical quantities. This set of units is known as the International System of units (SI units). In this system, the standard units of length, mass and time are :

metre : It is the standard unit of length. It is written as 'm'.


kilogram : It is the standard unit of mass, written as 'kg'.

second : It is the standard unit of time, written as 's'.

HOTS QUESTIONS:

1. Rotational Motion and Periodic motion
2. Hand span is not a reliable system of measurement because different persons have different length of their hand.

**EXERCISES****A. Multiple Choice Questions (MCQs) :****Choose the correct answer for each of the following:**

1. (c) An iron nail 2. (c) Wood 3. (a) electrical energy
 4. (a) copper 5. (d) 

B. Fill in the blanks by using the correct words :

1. electricity 2. torch 3. source
 4. glow 5. graphite

C. Give your answer in one word :

1. No 2. Filament 3. No
 4. Chemical reaction 5. Switch 6. Non-metal
 7. Insulator

D. Answer the following questions in brief :

- The movement of electrons makes electric current flow, and the pathway through which electrons move is called electric circuit.
- 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 circuit.
- An electric switch is a simple device that is used to open or close an electric circuit.
- Cells, bulbs, wires and switches.
- A torch gets its energy from a source known as cell.

E. Answer the following questions in detail :

- An electric bulb is made up of a spherical glass case which is fixed on a metallic base. If you look closely, you will find a thin, coiled wire inside the bulb. This wire is called filament and it is made up of tungsten. It is this filament which glows when a bulb is switched on. The filament is supported by two thick wires on two sides when in this filament high electricity flow through the tungsten wire it gets heated and glows. An

electric bulb is considered to be fused if its filament breaks; as this breaks the circuit and so the bulb does not glow.

2. The movement of electrons makes electric current flow and the pathway through which electrons move is called electric circuit. A cell kept close to a bulb will not make it glow. So to light up a bulb we need a connecting medium. When we connect the two ends of a cell to a bulb using copper wires, the bulb glows. This happens because the copper wires provide the electric current to flow from the positive terminal of the battery to the negative terminal through the bulb. 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. If we disconnect or cut off one of the wires, the bulb will not glow. This is because the current is not able to flow through the wires. The circuit is said to be broken or open.



Bulb connected to two wires



Closed circuit



Open circuit

3. **Conductors and Insulators** : Some materials allow electricity to pass through them whereas some do not. The materials that allow electric current to pass through them are called conductors. **Eg** : All metals such as copper, gold, silver etc. The materials which do not allow electric current to pass through them are called insulators. **Eg** : Rubber, wood, paper etc.
4. **Making switch** : We take two board pins, paper clip, cardboard/thermocol, two wires. Now take the cardboard/thermocol and insert a board pin into the ring of a paper clip. Ensure that the safety paper clip is free to move around. Now, fix the other board pin in such a way that the free end of the paper clip can touch it. The paper clip acts as the switch. Complete the current by connecting an electric cell and a bulb. When the end of the paper clip touches we boxed pin, the bulb will glow.

HOTS QUESTIONS

1. An electrician wears rubber slippers/shoes when repairing switches because rubber is an insulator of electricity.
2. If we touch a bare wire with our hands we will get an electric shock.



12

Magnets

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (a) north-south
2. (d) iron
3. (d) maximum at both the poles
4. (b) computer
5. (b) iron
6. (c) paper clip

B. Fill in the blanks by using the correct words :

1. magnets
2. loadstone
3. magnetic
4. two
5. Repulsion

C. Give your answer in one word :

1. Greek
2. Non-magnetic
3. Yes
4. Two poles
5. Loadstone
6. Wooden boxes
7. No
8. Keepers
9. No.
10. Yes

D. Answer the following questions in brief :

1. Magnet is a piece of iron, nickel or cobalt that can attract iron-containing objects.
2. Magnet have two poles north and south. If we break a magnet into two pieces. We will get two separate magnets each having north and south poles.
3. North pole of a magnet located at north direction and south pole of magnet located at south direction.
4. (i) Magnets exert more magnetic force at the ends as compared to the middle.
(ii) A magnet always comes to rest in North-south direction.
5. Magnets become weaker after sometime if their poles are left free. This is called self demagnetisation.

E. Answer the following questions in detail :

1. A magnetic compass is an instrument that uses a magnet to find directions.

It is a flat, circular glass box with a glass cover. A magnetised needle (free to rotate) 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 compass is kept in the place where we wish to know the directions.

2. Magnets have several uses. Three of them are as follows :
 - They are used to pick iron pieces from waste.
 - They are used in pin holders, in some pencil boxes, magnets are fitted to close the lids tightly, they are used in magnetic stickers, in closing mechanism of refrigerator doors etc.
 - In audio and video tapes and computer hard disks to store information.
3. 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. Now, bring the north pole of the second magnet near the south pole of the suspended magnet. Now we observe the experiment.

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

It shows flat like poles of a magnet are close together, they repel each other i.e., they push apart. In other words, north pole repels north pole but attracts a south pole. Similarly, south pole will attract a north pole and repel a south pole.

4. Place an iron bar on a table. Take a strong magnet. Place one end of its poles near one edge of the bar. Move the magnet along the iron bar to the other end, without lifting the magnet. Raise the magnet and bring it back to the starting position. Repeat the process at least 30 times. Remember to



move the magnet in the same direction every time. Test the iron bar if it has become a magnet by bringing a pin near it. If not, repeat the process. In this way, you can convert an iron nail, a needle or a blade into a magnet.

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

Magnets become weaker after sometimes 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.

HOTS QUESTIONS:

1. Ragpicker fitted magnets in to the sticks because magnet attract the piece of metals easily.

Unit VI. Natural Phenomena



13

Light, Shadows and Reflections

EXERCISES

A. Multiple Choice Questions (MCQs):

Choose the correct answer for each of the following:

1. (c) Wood 2. (a) earth 3. (a) black
4. (c) rectilinear propagation 5. (d) glass

B. Write 'T' for the true statement and 'F' for the false one:

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

C. Give your answer in one word:

1. Non-luminous object 2. No 3. Not 4. No
5. Transparent 6. No 7. Black
8. Reflection 9. Yes 10. Non-Luminous

D. Answer the following questions in brief:

1. Some objects through which we can see but not very clearly are called translucent objects. These objects allow light

partially to pass through them. Examples are tissue paper, butter paper, cellophane paper and plastic.

2. When light falls on an opaque object, the rays of light cannot pass through the object and the area behind the object appears dark as this area does not receive any light from the source. This area of darkness behind an object where the light is not able to reach is known as the shadow.
3. The property of light travelling in straight line is rectilinear propagation of light.
4. Pin hole camera is based on the principle of rectilinear propagation of light.
5. Chair, table, pen, earth, moon etc.

E. Answer the following questions in detail :

1. We know that a pin hole camera exist in nature 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 pin hole images of the sun. The gaps between the leaves act as pin holes.
2. Take a big thermocole sheet. Fix a comb on one side and a mirror on the opposite side. Place a sheet of black paper between the comb and the mirror. Now, direct a beam of light from a torch through the comb. You will observe a pattern. This shows that light travels in straight line and is reflected by the mirror.
3. Differences between Shadow and Image:

Shadow

1. Size of the shadow can be larger or smaller than that of the object.
2. Always black irrespective of the colour of the object.

Image

1. Size is same as that of the object.
 2. Shows the details of the colour of the object.
4. **Reflection of Light :** When light rays fall on an object they are bounced back. This bouncing back of light rays is called reflection of light. The amount of light reflected from an object depends on the surface of the object whether it is smooth or rough. Opaque objects reflect maximum light. We can see ourselves in the mirror because of reflection. We can also see reflection of objects in water like plants, trees, buildings, etc.

Reflection of light causes the formation of images.

5. **Characteristics of Shadow :**

1. The size of the shadow varies depending on the size of the source of light and the distance between the object and the source of light
2. The shadow gets smaller as the distance between the object and the source of light increases.
3. No shadow is seen at a stage, when the distance between the screen and the object becomes too big.
4. Our shadow changes in length and direction during the day as the sun changes its position in the sky.

HOTS QUESTION :

1. In left hand.
2. No because reflection of light needs light rays to fall on mirror.

Unit VII. Natural Resources



14

Water

EXERCISE

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- | | | |
|---------------------|--------------|------------|
| 1. (c) well | 2. (a) rain | 3. (a) dew |
| 4. (c) condensation | 5. (b) river | |

B. Fill in the blanks by using the correct words :

- | | | |
|---------------|-----------|----------|
| 1. two-thirds | 2. seas | 3. earth |
| 4. trans port | 5. clouds | |

C. Give your answer in one word :

- | | | |
|----------------------|----------------|------------------|
| 1. Yes | 2. Drought | 3. Transpiration |
| 4. Rain | 5. Temperature | 6. No |
| 7. wind | 8. Yes | 9. Fog |
| 10. Water Harvesting | | |

D. Answer the following questions in brief :

1. Temperature affect evaporation in a big way. With the increase and decrease in temperature the rate of evaporation also increases and decreases.

2. Puddles of rain water dry up because after rain weather becomes sunny and hot, these puddles disappear as the water dries up due to evaporation.
3. Clothes dry faster on a windy day, because winds increase the rate of evaporation. The water present in the clothes rapidly change into vapour resulting in their drying up faster.
4. **Dew** : Tiny drops of water that form on cool surface at night, when atmospheric vapour condenses.
Fog : It is the coating or deposit of ice that may form in humid air in cold conditions, usually overnight.
5. There is a very small percentage of water on our planet is usable. It is very important to conserve water.
6. Evaporation, transpiration.

E. Answer the following questions in detail :

1. We cannot live without water. Besides being essential for life, water is used for drinking, cleaning, wasting and many other purposes :
 - For cultivation and irrigation of plants.
 - It is stored and used in dams to generate electricity.
 - It is used in industries.
 - It is used as a medium of transport.
2. We see that water converts into water vapour, and goes into the air by evaporation and transpiration. It condenses and forms clouds and then comes back to the ground as hail, rain or snow. Water droplets in the clouds keep bumping against one another, and sometimes stick to form bigger drops. When these drops become too heavy to float in the air, they drop down back to the earth as rain. The water that comes down as rain, in time, evaporates and goes up to form clouds, again. This leads to form a cycle known, as water cycle. Four steps are involved in the water cycle— evaporation, condensation, precipitation and flowing back to ocean. This is a continuous process. It plays an important role in global climate.
3. **Formation of Clouds :**
Water enters into the air through the process of evaporation and transpiration.
The water vapour being lighter than air rises up. The higher air is cooler. As water vapour rises up, it begins 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 drops 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.

4. Sometimes it does not rain for a long time which affects the soil, plants, animals and humans. The soil becomes dry as it continues to lose water through evaporation and transpiration. Rivers and ponds dry up. The level of water in the well and ground water decrease drastically. Some of the wells may dry up.

The availability of water reduces. Crops cannot grow properly. Such a condition is called drought.

5. Rain water harvesting is a good method to conserve water. The process of collecting and storing rainwater from roofs or a surface catchments is called rainwater harvesting.

We can use harvested water for various purposes including drinking, washing watering plants, in toilets, etc.

Rain water harvesting can be done in two ways :

- Drain harvesting
- Roof top rain water harvesting

6. Since only a small percentage of water on our planet is usable, it is very important that we use water carefully.

Hence, it has become extremely important not to waste water and to use it wisely and carefully. We need to take urgent steps to conserve water.

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 a bucket and mug, instead of shower to have a bath.
- Prevent overflow of overhead water and storage tanks.
- By rain water harvesting.

HOTS QUESTIONS :

1. We must use a bucket and mug to have a bath instead of shower because shower fall a big amount of water and by mug we can use limited water according to our need.

**EXERCISES****A. Multiple Choice Questions (MCQs) :**

Choose the correct answer for each of the following:

1. (a) oxygen
2. (d) Water vapour
3. (e) all of these
4. (d) 0.03%
5. (c) carbon dioxide

B. Match the following columns :

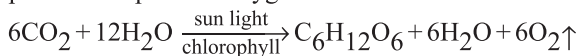
1. (e)
2. (c)
3. (a)
4. (b)
5. (d)

C. Give your answer in one word :

1. Oxygen
2. Carbon dioxide
3. Atmosphere
4. Gills

D. Answer the following questions in brief :

1. Plants are called producers of oxygen because plants take CO_2 from atmosphere and complete the photosynthesis process and produce oxygen:



This reaction shows that plants produce Oxygen.

2. When the wind blows very strongly i.e., at a very high speed, it is called a storm. Storms can uproot trees or even blow off the rooftops.
3. The smoke in the air comes from the vehicles and factories and burning fire.
4. The amount of water vapour in the air is called humidity.
5. Our earth is surrounded by a thick layer of air called atmosphere.
6. The main gases present in the air are nitrogen (about 78% by volume) and oxygen (about 21% by volume). The remaining 1% approx consists of carbon dioxide, water vapour, helium, argon, smoke and dust particles.

E. Answer the following questions in detail :

1. Take some water in a beaker. Heat it gently. Observe the 'inner' surface of the vessel. Do you see tiny bubbles on the inside of the vessel? These bubbles are of air that was dissolved in water.



Initially when we heat water, air dissolved in it escapes. On further heating, water begins to boil and starts evaporating. The bubbles now formed are of steam and not of the air dissolved in water.

2. Take a glass of water. Add few ice cubes in it. Let it stand for some time at room temperature. What do you observe after a few minutes? You will see small droplets of water on the outer surface of the glass. This is because of the water vapour present in the air that condenses on the cold surface of the glass and forms the drops of water.
3. In rainy season, we see earthworms coming out of the soil. This is because when it rains heavily, water fills up all the spaces occupied by air in the soil. This makes it difficult for them to breathe and they have to come out of their burrows for respiration.
4. **The Oxygen Cycle :** Percentage of oxygen in the air remains the same, though a lot of it gets removed from the air during respiration and combustion.
This is because plants produce oxygen during photosynthesis which is added to air. Plants also use oxygen for respiration. However, the amount of oxygen produced during photosynthesis is much more than that used up in respiration. The balance of oxygen in the air is maintained by consumption of oxygen through respiration in plants and animals and by its release during photosynthesis. This is called the oxygen cycle. This also shows that plants and animals are inter-dependent on each other.
5. **Uses of Air :** Air is useful to us in many ways :
 - Aeroplanes, sail boats, balloons, parachutes, gliders work in air.
 - Birds, insects and bats fly due to air.
 - Air helps in the dispersal of seeds.
 - It helps in the pollination of several flowers.
 - Air helps in winnowing.

HOTS QUESTIONS:

1. Plants appear more green after rains because plants' leaves become dustless and stomata pores are opened.
2. Carbon dioxide

EXERCISES**A. Multiple Choice Questions (MCQs) :**

Choose the correct answer for each of the following:

1. (d) chemical energy 2. (a) oxygen 3. (c) Lichen
4. (d) rhizobium 5. (b) parasite

B. Write 'T' for the statement and 'F' for the false one:

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

C. Fill in the blanks by using the correct words :

1. chlorophyll 2. energy 3. starch
4. cacti 5. soil

D. Answer the following questions in brief :

1. Nutrition is the process of taking in food by an organism and its utilisation by the body.

The mode of nutrition is of following types:

- (i) Autotrophic (ii) Heterotrophic

2. **Parasitic Plants :** Parasitic plants live on other living organism and obtain their food from them.

Saprophytic plants : Saprophytic plants take in nutrients in solution form from dead and decaying matter.

3. All plants cannot prepare their own food because all plants do not contain chlorophyll.
4. Autotrophic nutrition.
5. CO_2 , H_2O , chlorophyll, sunlight.

E. Answer the following questions in detail :

1. Leaves are referred to as main food factories of the plant. Since the leaves prepare food, it is necessary that the raw materials must reach there. They make their own food from carbon dioxide and water in the presence of chlorophyll (a green pigment) and sunlight. This process is called photosynthesis.
2. **Symbiotic Plants :** There are some plants which live in association with other organisms and share shelter and nutrients. Both the plants gain from each other. Such plants are called symbiotic plants, and the relationship is called

symbiotic relationship.

Lichens show symbiotic relationship. In lichens, a green algae and a non-green fungus. The algae is an autotroph and provides food to the fungus. Fungus provides shelter, water and minerals from the soil to the algae.

3. In pitcher plant, the leaves are modified into a pitcher like-structure with a lid. The tip of the leaf is modified to form a lid which can open and close the mouth of the pitcher. The inside of the pitcher is lined with downward pointing hair that do not allow the trapped insect to escape. The lid closes, once an insect enters the pitcher. The pitcher secretes digestive juices that digests the insect.
4. The plants that take in nutrients in solution form from dead and decaying matter are called Saprophytic plants. These plants have no leaves at all. They cannot carry out photosynthesis. Examples are mushrooms, moulds and yeast. Mushrooms secrete digestive juices on the dead and decaying matter and covert it into a solution. They then absorb the nutrients from it. The mode of nutrition in such plants is saprophytic nutrition and the plants are called saprophytes.



Pitcher plant showing pitcher and lid

5. We all know that plants get nutrition from the soil. Since crops/plants are continuously grown in the soil, the amount of nutrients in the soil decline. Manures and fertilizers are added by the farmers to replenish the nutrients in the soil. Usually crops require a large amount of nitrogen. We can grow leguminous plants like gram, moong, beans, peas etc in the fields. Rhizobium bacteria which lives in the roots of leguminous plants can take in atmospheric nitrogen and convert it into a soluble form in the soil. In this way, the farmers do not need to add nitrogen fertilizers to the soil to restore nitrogen content where leguminous plants are grown.

HOTS QUESTIONS:

1. A pitcher plant is both an autotroph and a heterotroph because pitcher plants usually green in colour so it called autotroph and

its leaves are modified to trap the insects this shows heterotrophic nutrition.

2. If we coat the leaves of a green plant with oil then its stomata will be closed and photosynthesis and evaporation process get stop and plant will dead.



2

Nutrition in Animals

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) incisors 2. (c) mouth 3. (b) starch
4. (b) liver 5. (b) stomach

B. Write 'T' for the statement and 'F' for false one:

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

C. Fill in the blanks by using the correct words :

1. organisms 2. process 3. 9-10
4. ingestion 5. liver

D. Answer the following questions in brief :

1.

Name of teeth	Functions
Incisor	Cutting and biting
Canine	Piercing or tearing
Premolar	Chewing and grinding
Molar	Chewing and grinding
2. Ruminants and not humans able to digest cellulose because these animals have four chambered stomach. In this one part is called rumen. Rumen contains a number of bacteria, and other microbes which break down the cellulose. These bacteria are not present in humans and hence they cannot digest cellulose.
3. In intestine some finger like projections are present which are known as villi. The surface of the villi absorb the digested nutrients, which are then transported through the blood vessels to the different organs where they are utilized to build proteins and other complex substances. This is called assimilation.
4. Pancreas produces pancreatic juice which acts on the carbohydrates, proteins and fats and helps in their breakdown into simpler forms.

5. The wind pipe and the food pipe lie close together. But inside the throat the two share a common passage. During the act of swallowing, a flap like structure called epiglottis closes the opening of the wind pipe. This prevents the entry of food into the wind pipe. If we talk or eat in a hurry or laugh, the food particles can enter the wind pipe and we cough, get hiccups or feel a choking sensation.

E. Answer the following questions in detail :

1. The nutrients present in the digested food are absorbed by the finger like projections on the inner wall of the small intestine. These finger like projections are called villi. These villi increase the surface area of the small intestine for absorption of the digested nutrients. The villi have a network of very fine blood vessels called capillaries.

The surface of the villi absorb the digested nutrients, which are then transported through the blood vessels to the different organs where they are utilized to build proteins and other complex substances.

2. **Tongue :** Tongue is a fleshy, muscular organ. It is attached at the back to the floor of the buccal cavity and free at the front. It can thus be moved in all directions. The main functions of the tongue are :

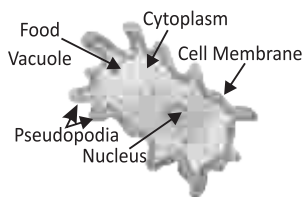
- It helps to mix saliva with the food.
- It helps in swallowing food.
- It tells the taste of the food with the help of taste buds.
- It helps us in talking



Taste buds on the Tongue

The surface of the tongue is rough due to the presence of thousands of taste buds which help to detect four different types of taste—sweet, salty, sour and bitter.

3. **Feeding and Digestion in Amoeba :** Amoeba is a unicellular organism. It has a cell membrane, a rounded nucleus and many bubble-like vacuoles in its cytoplasm.



Amoeba

Amoeba feeds on microscopic organisms. When it senses food, it pushes out the pseudopodia which engulf the tiny particles of food. The food is trapped in a food vacuole.

The digestive juices are secreted into the food vacuole; and help in breaking down food into simpler substances. The digested food is absorbed and assimilated and the amoeba grows in size. The undigested food is thrown out by the vacuole.

4. The largest gland of our body is the liver. It is reddish brown in colour and is situated on the right side on the upper abdomen. It secretes bile juice which helps in the digestion of fats. Bile is stored in an organ called gallbladder, which is sac like. The gall bladder is connected to the liver with the bile duct.
5. **Digestion in Grass-Eating Ruminants:** All of you know that herbivores eat mainly grass or green plants. The cow, buffalo, horse etc. Keep chewing continuously even when they are not eating. They swallow their food after chewing once and store it in the part of the stomach called rumen. Here, the food is partially digested. It is called cud. When the animal is resting, the cud is brought back into the mouth in small lumps and chewed. This process is called rumination. The animals are called ruminants. During rumination, cud mixes with the saliva and after chewing, it goes into the stomach. These animals eat grass which is rich in cellulose. These animals have a four-chambered stomach called rumen. The rumen contains a number of bacteria and other microbes which break down the cellulose. The cellulose of the grass is then digested in caecum, a large sac like structure between the small and the large intestine by symbiotic bacteria.

HOTS QUESTIONS:

1. Adults tell us not to talk or laugh while eating food because food particles can enter the wind pipe and we cough, get hiccups or feel a choking sensation.
2. We must drink a lot of water when we have diarrhoea because in this condition the passage of frequent loose or liquid stools. which causes shortage of water in the body.

**EXERCISES****A. Multiple Choice Questions (MCQs) :****Choose the correct answer for each of the following:**

1. (d) all of these 2. (a) shearing 3. (b) horse
4. (d) sheep 5. (b) cocoon

B. Write 'T' for the true statement and 'F' for the false one :

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

C. Give your answer in one word :

1. Gujarat 2. Fleece 3. Sericulture
4. Keratin

D. Answer the following questions in brief :

1. The diet is given to sheep for good growth of shiny hair is corn, pulses, jowar, oil-cakes and minerals.
2. Shearing is not painful because the uppermost layer of the skin which is shaved off is dead.
3. Some fibres are obtained from animals known as animal fibres. Eg. wool and silk are obtained from animals.
4. We wear woollen clothes in winter because woollen clothes are made of wool which trap the air and it does not allow the body heat to escape. Due to which woollen clothes keep us warm during the cold weather.

E. Answer the following questions in detail :

1. The sheared skin along with the hair is thoroughly washed in tanks to remove dust, dirt and grease. This process is called scouring.
The small soft fluffy fibres called fuzz (burrs) are picked up from the hair. The remaining fibres are again scoured and dried. The wool is now ready to be drawn into fibres.
The natural fleece of sheep and goat is white, brown or black in colour. The fibres are now dyed in desired colours.
The dyed fibres are now passed through metal teeth to straighten them. This process is called carding. They are then rolled into yarns. The longer fibres are made into wool for sweaters and the shorter fibres are spun and woven into

woollen cloth.

2. The pupa of silkworm holds itself by weaving a net around its body to form a ball like structure by swinging its head from side to side. During this movement of its head, the caterpillar secretes a sticky fluid (a protein called fibroin). This fluid hardens on exposure to air and forms a long thread of silk. This thread gets wrapped around the body of the silkworms to form a ball like structure called cocoon.

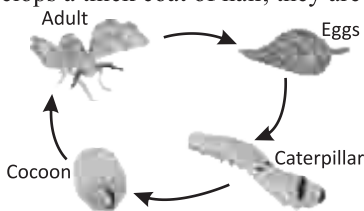
3. **Rearing and Breeding of Sheep :** Sheep are herbivorous animals. They eat grass and leaves. The wool yielding sheep are given protein-rich food such as mixture of corn, pulses, jowar, oil-cakes and minerals, In winters, sheep are kept indoors and fed on leaves, grains and dry fodder.

In India sheep are reared in the hilly areas of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Arunachal Pradesh, Sikkim and in the plains of Punjab, Haryana, Rajasthan and Gujarat.

Some breeds of sheep have a thick growth of hair on their body which yield good quality wool in large quantities. The sheep are 'selectively bred' by choosing the parents of the sheep with the desired characteristics.

When the reared sheep develops a thick coat of hair, they are shaved off.

4. There are four stages in the life-cycle of a silk moth-egg, caterpillar (larva), pupa and adult. The female silk moth lays about 300 to 400 eggs at a time on mulberry leaves. They hatch in larvae within 3-5 days. The larvae are called caterpillars or silkworms. The caterpillars are fed on mulberry leaves and they grow in size and the silkworm is ready to enter the next stage of its life cycle called pupa. The pupa holds itself by weaving a net around its body to form a ball like structure by swinging its head from side to side. During this movement of its head, the caterpillar secretes a sticky fluid (a protein called fibroin). This fluid hardens on exposure to air and forms a long thread of silk. This thread gets wrapped around the body



Life cycle of a silkworm

of the silkworms to form a ball like structure called cocoon. The silkworm now turns into a pupa. It continues to develop inside the cocoon. At the end of the pupal stage, the young moth flies out cutting open the cocoon.

HOTS QUESTIONS:

1. Silk is so expensive because in order to gain silk from silk worms they must be killed and their silk winded up tight to make silk that is strong enough to make clothes. This is an expensive process and the silk worms are rare and hard to find.



4

Heat

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) -10°C to 110°C
2. (a) 37°C
3. (d) liquid and gases both
4. (c) radiation
5. (a) absorb heat

B. Write 'T' for the true statement and 'F' for false one:

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

C. Fill in the blanks by using the correct words :

1. clinical
2. 37°C
3. thermometer
4. solid
5. temperature

D. Answer the following questions in brief :

1. Heat is a form of energy which causes the sensation of hotness or coldness.
2. Conduction, convection and radiation
3. The substances which allow heat to flow through them are called good conductors of while the substances which do not allow heat to pass through them easily are called bad conductors of heat or insulators. Metals are good conductors of heat like iron, aluminum. Wool, plastic, cotton, glass, straw, clay, rubber, bakelite are some example of insulators.
4. Thermometer is a device used to measure the temperature of a body.
5. We jerk a clinical thermometer before use by this level of mercury thread can be brought back in thermometer.

E. Answer the following questions in detail :

1. Take round bottomed flask. Fill it with water up to $\frac{2}{3}$ rd. Gently place a crystal of potassium permanganate into the flask. Heat the flask with the help of a bunsen burner.
When flask is heated, water near the flame becomes hot. It rises up. The cold water from the sides moves to take the place of this water. This water now gets heated and it rises and again the water from the sides moves down. This way the whole water gets heated. This activity shows that water transfers heat by the movement of molecules from hotter to colder areas by convection.
2. **Conduction** : Conduction is a process of heat transfer in which heat travels from molecule to molecule from the hot end to the cold end. The molecules of solids do not themselves move from their position during conduction.
Convection : In liquid and gases, heat is transferred by convection. The method by which heat is transferred the hotter part to the colder part by actual movement of hot particles in it is called convection.
Radiation : Direct transfer of heat from a hot body to a cold body having no contact between them and without the help of any medium is called radiation. Radiation needs no medium. Transfer of heat by radiation can occur even in vacuum.
3. Precautions to be observed while reading a clinical thermometer are as follows :
 - Wash the thermometer well, preferably with an antiseptic solution both before and after use.
 - Hold the thermometer from its top end and read the mercury level.
 - Ensure that the mercury level is below 35°C before use. If the level is above 35°C, bring down by giving a few jerks to the thermometer.
 - Place the bulb of the thermometer under the tongue for one minute.
 - After one minute, take the thermometer out and note the reading.
 - Read the thermometer keeping the level of mercury along the line of sight.
 - Be careful, while using a thermometer. It can break easily.

Do not hold the bulb when nothing down the temperature.

4. **Sea Breeze and Land Breeze :** In coastal areas, during day time the breeze blows from the sea to the land, it is called sea breeze. This is because during the day the land gets heated up faster than the water. The air over the land becomes hotter and rises up. The cooler air from the sea moves towards the land to take its place.
At night, exactly the opposite condition takes place. The land cools down faster than the sea water. Therefore, the cool breeze from the land blows towards the sea. This is called land breeze.
5. In winters, we wear woollen clothes because wool is a bad conductor of heat (insulator) it allows body's heat to be trapped inside. Moreover the air present in between the wool fibres prevents the flow of our body heat to the surroundings, so we feel warm. Thus, white and light-coloured clothes are more comfortable in summers as they reflect most of the sun's heat.

HOTS QUESTION :

1. When we dip clinical thermometer in a cup of hot boiling tea, the level of mercury will go up.
2. A frying pan is provided with a plastic handle because plastic is an insulator of heat.



Acids, Bases and Salts

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) Lime water
2. (a) Soap
3. (a) indicator
4. (b) organic manure

B. Write 'T' for the true statement and 'F' for the false one :

1. F
2. T
3. F

C. Fill in the blanks by using the correct words :

1. water
2. Turmeric
3. neutralisation
4. Farmers

D. Answer the following questions in brief :

1. **Acid :** Items such as orange, lemon juice, curd, vinegar,

tamarind and amla taste sour. The sour taste of these items is due to the presence of a substance called acid. Thus, acids are those substances, that are sour in taste.

Base : Substances which are bitter in taste and soapy to touch are called base.

2. Basic nature
3. Hydrochloric acid (HCl) + Sodium hydroxide (NaOH) \longrightarrow Sodium chloride (NaCl) + water
4. Substance which helps us to identify an acid or a base is called an indicator.

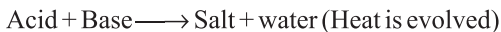
E. Answer the following questions in detail :

1. **Naturally Occurring acids :** The acids which occur naturally in foods are called naturally-occurring acids. Here is a list of naturally occurring acids and the substances in which they are found.

Acid	Substances in which it is found
Acetic acid	vinegar, tomatoes
Tartaric acid	grapes, tamarind, raw mango
Citric acid	lemons, citrus fruits

Mineral Acids : In addition, there are some acids which are obtained from minerals. We call them mineral acids. They include hydrochloric acid, sulphuric acid, nitric acid and phosphoric acid.

2. Neutralisation is the reaction between an acid and a base. When an acid is added to a base, they neutralise each other's effect. During the neutralisation process, salt and water are produced with the evolution of heat.



The salt formed may be acidic, basic or neutral in nature.

The reaction between vinegar and baking soda is also a neutralisation reaction.

3. Each and every substance cannot be tasted. Moreover, it may be dangerous to touch an unknown substance. To test if a given substance is acidic or basic, there are special kinds of substances called indicators. They change their colour when added to an acidic or basic solution.

Natural Indicators—Lichens, litmus.

Synthetic Indicators—Phenolphthalein, Methyl orange

4. China Rose or Hibiscus (Gudhal) is a flower whose petals are used as a natural indicator for identifying acids and bases. Take some petals of china rose in a beaker. Add warm water to it. Keep the mixture for sometime till the solution becomes coloured (pink). The coloured water acts as an indicator. The acidic solutions turn to magenta colour and the basic solution turn to green colour when the china rose indicator is added.

HOTS QUESTIONS :

1. We must brush our teeth using a toothbrush to neutralise the acidic effect of oranges as toothpastes have basic substances in them.
2. The darkening and yellowing of Taj Mahal is due to the acid rain.



6

Physical and Chemical Changes

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (c) Carbon dioxide
2. (d) Watering
3. (c) Freezing of water
4. (a) NaOH
5. (b) Sharpening a pencil

B. Fill in the blanks by using the correct words :

1. Physical
2. Chemical
3. rusting
4. iron
5. solid

C. Give your answer in one word :

1. Galvanisation
2. Stainless steel
3. Evaporation
4. Chemical change
5. Chemical change

D. Answer the following questions in brief :

1. **Physical Change** : Physical change generally reversible.
Chemical change : Chemical changes are generally irreversible.
2. Water and oxygen are two essential requirements for rusting.
3. Iron gates are painted because iron form rust in the presence of oxygen and water which damage the iron. But paint make a thick layer which covers the iron gate and saves the iron for long time.

4. $\text{CO}_2 + \text{Ca(OH)}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
(milky)
5. Carbon dioxide when passed through lime water, turns it milky. Due to the formation of a new substance calcium carbonate.

E. Answer the following questions in detail :

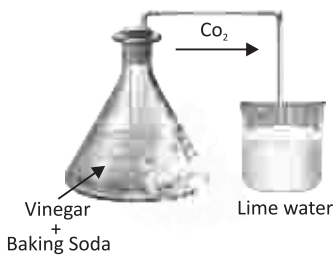
1. **Chemical Changes :** When two or more substances react in such a way that an entirely new substance is formed, it is called a chemical change.

Characteristics of a chemical change :

- New substances with different properties is formed.
- Chemical change is irreversible.
- A large amount of heat is either evolved or absorbed.

Burning of paper, spoilage of food, germination of seed, curdling of milk, ripening of fruit burning of gas, bursting of crackers, digestion of food, burning of candle are all examples of chemical changes.

2. Take about 5 ml of vinegar in a conical flask. Add a pinch of baking soda to it. You will hear a hissing sound and will see bubbles of gas coming out of the flask. Pass this gas through freshly prepared lime water as shown in the figure.



You will observe that the lime water turns milky.

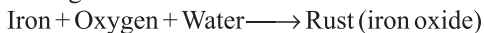
Carbon dioxide gas is produced when baking soda is added to vinegar.

- (a) Vinegar + Baking soda \longrightarrow carbon dioxide + other substances

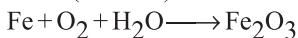


Thus, in all the above activities, we have seen new substances being formed. They are all examples of chemical changes.

3. When an iron object is left outside in the rain or in the open for some days, 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.



(from air)

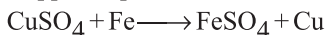


from the above equation, it is seen that both oxygen and water are necessary for formation of rust. The layer of rust falls off slowly and fresh metal surface is exposed to further rusting. This gradually weakens the iron object.

Some commonly used methods for prevention of rusting are :

- Applying a coat of grease or paint. They, however, need to be applied regularly.
 - **By Galvanization** : It is the process of depositing a layer of zinc on an iron object. Zinc forms a layer of zinc oxide on reaction with air and thus forms a barrier between iron and The atmosphere.
4. Take one beaker of acidified solution of copper sulphate and drop an iron nail in it. Wait for half an hour. Compare the colour of the solution with normal solution of copper sulphate solution. You will notice that the colour of the solution changes from blue to green due to the formation of copper sulphate, a new substance. A brown coloured layer is also seen on the iron nail.

Copper sulphate + Iron \longrightarrow Iron sulphate + Copper



(blue) (grey) (green) (brown)

HOTS QUESTIONS :

1. Rusting is more severe in coastal areas because humidity is very high in costal areas.
2. We are advised not to play with fire works because it show a

Unit III. The World of the Living

Weather, Climate and Adaptations of Animals to Climate



7

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (c) weather
2. (b) humidity
3. (a) hot and dry

B. Write 'T' for the true statement and 'F' for the false one :

1. F 2. F 3. T

C. Match the following :

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

D. Answer the following questions in brief :

1. Temperature, wind, speed, humidity, rainfall.
2. Sibirain crases migrate to India from Russia in winter season, for warmer place in India.
3. Western Ghats and Assam in India.

E. Answer the following questions in detail :

1. **Weather :** Atmospheric condition with respect to the daily changes in temperature, relative humidity, rainfall, pressure and wind condition is called weather at that place.

Weather Forecast : It is the prediction of the weather condition for a place over a short period of time. Meteorologists use computer technology and data collected from satellites and earth stations to predict weather. It is helpful to us in many ways.

- It helps us to plan our daily activities.
- It helps people to prepare for bad weather.

2. **Adaptlation in penguins :** Penguins spend most of their time in the icy water of Antarctica. They also have adapted themselves to the climate.

- Penguins huddle together in groups to stay warm and fight enemies.
- Its body is white coloured and merges well with the white background.
- The penguins feathers are densely packed, with no gaps between them. They also have a lot of fat to protect them from cold.
- Penguins are also good swimmers. They have a streamlined body and the feet have webs. they have flattened flipper-like wings. These features help them in swimming.
- They also have very small ears which help them retain heat.
- The female penguin lays eggs and male penguins huddle together to protect the eggs from severe cold. Once the

eggs are hatched, both parents feed the young ones.

3. **Special features of a polar bear:**

- It has two thick layers of white fur to keep it warm, thus it is not easily visible in the snow background. As a result of the white fur, its predators and prey are unable to see it.
- It has a thick layer of fat called blubber under its skin that keeps it warm by insulating its body from the cold.
- It has long hair between the pads on its feet. This helps it to walk on ice without feeling cold.
- It has a strong sense of smell that helps it to locate the prey at a distance.
- It has flat and broad paws which helps it not only to swim well but also walk with ease on snow.
- It can close its nostrils during swimming and thus it can remain under water for long periods.
- It has small ears that help it retain as much heat as possible.
- During winters polar bear hibernates. During this period they live on stored food.
- The polar bear has to move slowly and rest often to avoid getting overheated.
- The polar bear also swims regularly to cool themselves on warm days.

4. Elephant is commonly found in Indian tropical rain forests. It has a number of adaptations. Some of which are :

Large Trunk : It uses its trunk as a nose and has a strong sense of smell. It also uses its trunk for picking up food.

Tusk : The tusk are modified teeth. They are straight as curved ones may get caught in the branches. They can tear the bark of trees and eat them. The elephant has no problem regarding availability of food.

Large ears : It has large ears which helps it to hear even the slightest sound. They help it to remain cool in hot and humid weather as it can flap them to create a cooling effect.

HOTS QUESTIONS :

It is more humid in Mumbai than in Delhi because Mumbai is situated near the sea due to which its atmosphere contains more humid air.

**EXERCISES****A. Multiple Choice Questions (MCQs) :**

Choose the correct answer for each of the following:

1. (c) monsoon wind
2. (a) hot humid area
3. (b) typhoon
4. (a) anemometer
5. (d) all of these

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

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

C. Give your answer in one word:

1. Wind
2. Tornado
3. Wind speed
4. Centre of the storm

D. Answer the following questions in brief :

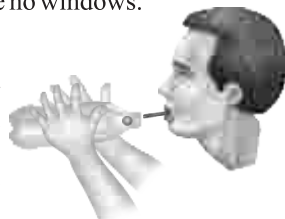
1. Air moves from a region of high air pressure to the region having low air pressure. This moving air is called wind.
2. a. Uneven heating of the earth surface between the equator and the poles.
b. Uneven heating of land and water.
3. a. Do not sit near the window.
b. Do not take shelter under an isolated tree.
4. This can happen if the roofs are weakly attached to the buildings loose their place due to the increased wind speed that is accompanied by reduced air pressure.

E. Answer the following questions in detail :

1. Take an empty tin. Pour water in it till half full and heat it till the water starts boiling. Continue heating for some more time. Close the lid. Allow it to cool under tap water in a sink or keep it in a shallow basin and pour cold water over it.
You will notice that the container gets deformed. Why does the tin gets deformed? This is because when the can is heated, steam is produced which drives out the air from the container. When water is poured over the can, some steam in the can condenses into water and this reduces the amount of air inside. The air from outside exerts more pressure than that exerted from inside the can. As a result, the can is deformed.
2. 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 formed a cyclone.

3. During a tornado, shut the doors and windows and take shelter under a table or a work bench so that debris cannot reach. Bow down on knees protecting your head and neck. There are special tornado shelters. They have no windows.
4. Take a wide mouth bottle. Crumble a piece of paper to form a ball. The ball should be smaller than the mouth of the bottle. Hold the bottle horizontally as shown in the figure. Place the paper ball just inside the mouth of the bottle.



When you blow air inside the bottle, the air near the mouth has greater speed. This results in low pressure in this area. The pressure is higher inside the bottle. The air inside the bottle pushes the ball out.

HOTS

1. Hoardings have holes because these holes help the wind to pass through them. By this, during high speed of wind, hoardings remain fix at same place.
2. Houses have ventilators near the roof because hot air is lighter than cold air so it goes up to the roof side. To pass this hot air ventilators are made near the roof.



9

Soil

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) clay
2. (a) top soil
3. (b) clayey
4. (a) sandy soil
5. (c) loamy soil

B. Match the following columns :

1. (b) 2. (c) 3. (a) 4. (e) 5. (d)

C. Fill in the blanks by using the correct words :

1. soil 2. things 3. A-horizon
4. loamy soil 5. moisture

D. Answer the following questions in brief :

1. Minerals, water, gases, organic matter, micro organisms.
2. Soil formation is a slow, stepwise process and it takes thousands of years to form a layer of soil just a few centimetres thick. It is a result of continuous breaking down of rocks by a process called weathering. Weathering is the disintegration of rocks on the earth's surface caused by exposure to natural forces such as wind, water, forest, roots of plants etc.
3. Soil is important for the growth of a diverse variety of plants, trees and flowers. Soil helps the plants by holding the root firmly, and providing water and nutrients so that they can prepare their food. Soil is essential for agriculture.
4. (i) Deforestation
(ii) Overgrazing in forests
(iii) Floods and heavy rains
5. Sandy soil is not good for crops, because particles of this soil is large. The water retention of this type of soil is poor.

E. Answer the following questions in detail :

1. Loamy soil is useful for crops because this soil is perfect for growing plants. It is a mixture of sand, clay and silt. Silt is a deposit in river beds. The size of silt particles is in between those of sand and clay. Loamy soil has the right water-holding capacity and has enough space for air. It also contains humus.
2. Differences between clayey, sandy and loamy soil :

Sandy Soil

- Contains more than 60% sand and less than 10% clay.
- Sand particle size are big. Diameter greater than 0.2 mm.
- They are coarse to touch.
- Have large space between sand particles.
- Sandy soil can hold air, but cannot hold much water.
Not good for plant growth.

Clayey Soil

- Contains more than 60% clay.
- Clay particle size are very small. Diameter less than

0.002mm.

- They are smooth and sticky.
- Have very little space between the clay particles.
- They can hold water but cannot hold much air.
- Not good for plant growth as soil cannot hold air for roots to breathe.

Loamy Soil

- Consists of a mixture of sand, clay, silt and humus.
- Particle size are intermediate between the two.
- Diameter between 0.2 mm and 0.002 mm. They are partially gritty and smooth.
- The space between particles is intermediate between the two.
- They have the right water holding capacity and are well aerated.
- Loamy soil are good for farming and gardening and is best for plant growth.

3. **Soil and Crops** : The properties of soil vary from place to place. Different type of soil are found in India. In some places you will find sandy soil, in other places clayey soil, while in some other loamy soil. That is why different crops are found in different places.

- Loamy and clayey soil are both suitable for growing wheat and gram. Both the soils can retain water.
- Paddy is grown in clayey soil as it has good water retaining capacity.
- Lentils and pulses require water with good drainage. Hence loamy soil is the best.
- Cotton requires sandy-loam which drains water easily and can hold plenty of air.
- Sugar cane can be grown in all types of soils.

4. **Top Soil or A-horizon** : It is the uppermost layer of the soil. It consists of fine particles and is usually dark in colour. It is rich in humus and minerals. This layer is very fertile and provides nutrients to the growing plants because of the high humus content. It is soft and porous and can hold water. This layer provides shelter for many living organisms like earthworms, fungi, bacteria, rodents, moles and beetles. The roots of small plants are completely embedded in the top soil.

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

HOTS QUESTIONS :

1. Clayey soil is used for making pots.
2. Life is not possible in absence of soil.



10

Respiration in Organisms

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (a) lactic acid
2. (c) 15-18
3. (a) upwards
4. (c) gills
5. (a) aerobic respiration

B. Write 'T' for true the statement and 'F' for the false one :

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

C. Match the following columns :

1. (e)
2. (d)
3. (b)
4. (c)
5. (a)

D. Answer the following questions in brief :

1. **Aerobic respiration** : The process of respiration which occurs in the presence of oxygen is called aerobic respiration.
Anaerobic respiration : Respiration which complete in the absence of oxygen is called Anaerobic respiration.
Carbon dioxide, energy and water are the end products of respiration.
3. When the body works hard, breathing rate increase as the energy requirement increase. As a result more oxygen is supplied to the cells and more food is broken down to supply energy.
4. nostrils, nasal cavity, trachea, bronchi, lungs.

E. Answer the following questions in detail :

1. **Anaerobic respiration** : Respiration without oxygen is called

anaerobic respiration.

In this process very little energy is produced. Glucose is broken down to ethyl alcohol and carbon dioxide with the production of energy.

Glucose $\xrightarrow{\text{anaerobic respiration}}$ alcohol + carbon dioxide + energy

We can respire anaerobically, but for only a very short time, when we perform heavy and vigorous exercises and the demand of energy increases but the supply of oxygen is limited.

Glucose $\xrightarrow[\text{(in muscle)}]{\text{anaerobic respiration}}$ lactic acid + energy

Anaerobic respiration takes place in certain organisms like yeast and some bacteria. They can survive even in absence of air and are called anaerobes.

2. **Inhalation :** We have seen our chest going up and down as we 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.

Exhalation

During exhalation, ribs moves down and inwards and the diaphragm moves up. This reduces the volume of the chest cavity and the lungs contract. The air inside the lungs is pushed out due to increase in pressure inside the lungs.

3. Just as machines need energy to run, all living things need energy to do work. All living organisms are made up of a number of cells. Each cell performs various functions of life, such as nutrition, excretion and transportation. To perform these functions, cells need energy. Our body requires energy when we are eating, running, reading or even when we are sleeping.
4. This energy is produced in the body from the food we eat. The food has stored energy which is released during respiration. Therefore, we respire to produce energy needed by the body for various activities.

The process of taking in air rich oxygen is called inhalation

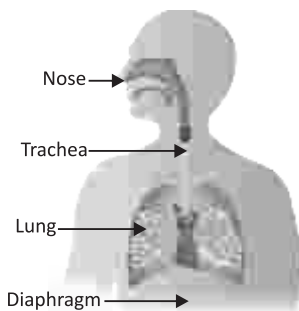
and the process of giving out air rich in carbon dioxide is called exhalation.

Respiration is a continuous process which goes on till one lives. As long as there is life, respiration takes place. The number of times a person breathes in one minute is called the breathing rate. During breathing, inhalation and exhalation take place alternately and continuously. The breathing rate of a normal individual at rest is 15-18 times per minute. The breathing rate is not constant. It depends on the oxygen requirement of the body.

5. The human respiratory system consists of the following :

- Nostrils
- Nasal cavity
- Trachea
- Bronchi and
- Lungs

When we breathe in, the air enters our nose through the nostrils. The air we breathe in may contain dust, pollens, smoke etc. Our nasal cavity contains hair which entrap the dust particle and other irritants and prevent them from reaching the lungs. At times these particles may get past the hair in the nasal cavity, they then irritate the nasal cavity and we sneeze. Sneezing throws out these foreign particles from the air inhaled. From the nasal cavity, the air reaches the lungs through the trachea (wind pipe) and bronchi (singular bronchus). One bronchus enters each lung.



Human Respiratory system

Lungs are present in the chest cavity. They are surrounded by ribs on all the sides. A large muscular sheet called the diaphragm forms the floor of the chest cavity. The diaphragm muscles and the rib cage move during the breathing process.

Lungs are present in the chest cavity. They are surrounded by ribs on all the sides. A large muscular sheet called the diaphragm forms the floor of the chest cavity. The diaphragm muscles and the rib cage move during the breathing process.

HOTS QUESTIONS:

1. Potted plants should not be watered too much because these causes water logging in the soil due to which root cells become unable to respire and plants can die.
2. Human being take oxygen and out CO_2 , we get O_2 from plants. Plants also do respiration and give out CO_2 in day night

also so we should not sleep under a tree at night due to more percentage of CO_2 , enter the tree.



11

Transportation in Animals and Plants

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) WBC's 2. (a) Kidney 3. (a) Water

B. Write 'T' for the true statement and 'F' for the false one :

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

C. Answer the following questions in brief :

1. Various components of blood are plasma, red blood cells, white blood cells, platelets.
2. The blood flows in one direction only in the veins because the veins are thin walled. There are valves present in the veins which prevent back flow of blood. Blood thus, flows towards the heart only.
3. Blood is the major means of transport of all necessary materials to different parts of the human body.
 - Digested food from the small intestine to the other parts of the body.
 - Oxygen from the lungs to the cells of the body.
 - Waste material for removal from the body.
4. The process of removing toxic wastes from the body is called excretion.
5. The excess water is given out by the plants in the form of water vapour through the stomata present in the leaves. This process is called transpiration.

D. Answer the following questions in detail :

1. There are following composition of blood :

Red blood cells : (RBC's or Erythrocytes)

They contain a red pigment called haemoglobin. Haemoglobin combines with oxygen from the lungs to be Transported to various body parts and ultimately to the cells. Haemoglobin gives red colour to the blood and is the carrier of oxygen.

White blood cells (WBC's or Leukocytes)

They help to fight infection. They provide immunity to the body against diseases and infection. They are larger than the RBC's and do not contain haemoglobin.

Platelets : When you fall down and there is a cut, blood flows out. But after sometime, the bleeding stops. A dark red clot is formed. This is due to another type of cells present in the blood called platelets. They are small, colourless and irregularly shaped.

2. **Blood Vessels :** Blood flows in our body through a complex system of tubes called blood vessels. There are three types of blood vessels :

(a) Arteries

(b) Veins

(c) Capillaries

Difference between Arteries and veins :

Arteries : These are the blood vessels that carry blood from the heart to all parts of the body. This blood is rich in oxygen. The only exception is the pulmonary artery which carries blood from the heart to the lungs and is deoxygenated. Arteries have thick, elastic walls as the blood flow is rapid and at high pressure. They are deeply placed inside the skin.

Veins : Veins carry blood rich in carbon dioxide or deoxygenated blood from the various parts of the body back to the heart. The veins are thin walled. There are valves present in the veins which prevent back flow of blood. Blood thus, flows towards the heart only. Veins are situated just under the skin and can be seen as greenish-blue tubes on your hands and legs. Pulmonary vein, however carries oxygen rich blood from the lungs to the heart.

3. **Function of heart :** The main function of the heart is to pump the blood to the various parts of the body. It works non-stop. The heart has four chambers. There is a partition between the chambers. In the heart prevents mixing of the blood rich in oxygen and the blood rich in carbon dioxide.
In the heart the left side has oxygenated blood and the right side contains de-oxygenated blood.
4. **Dialysis :** At time the kidney of a person get damaged due to infection. The toxic materials start accumulating into the blood. Dialysis is a method of removing these toxic materials from blood through an artificial kidney. This is done

periodically.

5. **Transport of Water and Minerals :** Water is absorbed from the soil through roots. The root has many hair called root hair which increase the surface area of absorption of water and minerals dissolved in water. The root hair absorb water present in between the soil particles.

From the roots, water and nutrients move through pipe-like structures present in plants. The pipes or vessels are made of special tissue. These special pipes made of vascular tissue for transporting water and minerals in the plant are called xylem. Xylem forms a continuous network of channels connecting the roots to the tips of the leaves passing through the stem and branches.

HOTS QUESTIONS:

1. If there were no platelets in blood than after any cut on our body, bleeding can't stop because platelets stop the bleeding and formed a dark red clot. Due to which excessive bleeding from our body can become fatal to our life.
2. We sweat more in summers than in winter because in hot weather as in summer our body need cooling to remain active. For this in high temperature our body sweat more which is secreted by sweat glands.



12

Reproduction in Plants

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- | | | |
|----------------------|----------------|------------|
| 1. (b) fruit | 2. (c) budding | |
| 3. (a) fertilisation | 4. (c) animals | 5. (d) bud |

B. Write 'T' for the true statement and 'F' for false one :

- | | | | | |
|------|------|------|------|------|
| 1. F | 2. T | 3. F | 4. T | 5. F |
|------|------|------|------|------|

C. Fill in the blanks by using the correct words :

- | | | |
|--------------|------------------|-------------|
| 1. parent | 2. fragmentation | 3. filament |
| 4. reproduce | 5. two | |

D. Answer the following questions in brief :

1. Wind, water, animals, explosion.

2. The process of fusion of male and female gamete to form a zygote is called fertilisation.
3. There are many methods of asexual reproduction :
 - (i) Budding
 - (ii) Fragmentation
 - (iii) Spore formation
 - (iv) Vegetative propagation
4. There are following steps involved in the sexual reproduction of plants :
 - Pollination
 - Fertilisation
 - Formation of seeds
 - Formation of fruit
 - Germination of seed
5. **Sexual reproduction :**
 - (i) In this reproduction male and female both parent are involved.
 - (ii) It complete by a zygote formation.
- Asexual reproduction :**
 - (i) In this reproduction only a single parent is involved.
 - (ii) It complete by budding, by fragmentation etc.

E. Answer the following questions in detail :

1. Advantages of vegetative propagation :
 - Plants take less time to grow. They bear flowers and fruits earlier than those produced from seeds.
 - New plant obtained is identical to the parent plant.
 - Only one parent is required.
 - Seedless plants can be obtained.
2. **Seed Dispersal :** The process by which seeds are scattered to different places is known as seed dispersal. If the seeds of all the plant were to fall at the same place and grown, there would be hundreds of new plants growing close together. They would compete with each other for light, water, and minerals. Many would not be able to survive the tough competition and would die. Seed dispersal prevents this over crowding and helps plants to invade new habitats.
Seed dispersal is carried out by agents such as wind, water, animals and explosion.
 - (a) **Wind :** Seeds of some plants like grass are very light, winged seeds such as those of drumstick and maple, hairy seeds of madar and sunflower are blown by the wind to far off places.
 - (b) **Water :** Seeds and fruits of some plants have structures

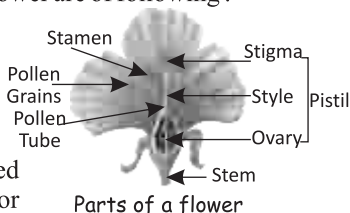
which enable them to float in water. Fruits like water lily, coconut or palm float in water. They are able to float because of a spongy or fibrous outer coat.

- (c) **Animals** : Some seeds and fruits have hooks, barbs, spines, or bristles which stick on skin of animals or clothes of humans and are carried to far off places. Examples are xanthium, tribulus and urena.
- (d) **Explosion** : In some plants like balsam, castor seeds, peas and bean plant, the fruit burst with a sudden jerk and the seeds are scattered to far off places.

3. The reproductive parts of a flower are of following :

Sepals : The outermost part is called the sepals or calyx which protects the flower in its bud stage. It is usually green in colour.

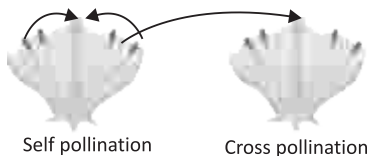
Petals : The brightly coloured part is called the petals or corolla.



Stamen : The male reproductive part is called the stamen. A stamen has two parts : a filament and anther. Anther contains the male sex cells, i.e., pollen grains.

Pistil : The female reproductive part is called the pistil. It contains the female sex cell called the ovule or the egg. A pistil has three parts : a swollen base ovary, a tubular style, and a sticky stigma.

4. 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.



Types of pollination

Self Pollination : Insects visit the flower and carry away pollens on their bodies. If the pollen lands on the stigma of the same flower, it is called self pollination.

Cross Pollution : 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.

HOTS QUESTIONS :

1. No she is not telling the truth. There is no pistil less flower.
2. If we put a cutting of money plant in a glass of water, it will develop after some days.

Unit IV. Moving Things. People and Ideas



13

Motion and Time

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) Motion of a train
2. (a) km/hr
3. (d) metre scale

B. Write 'T' for the true statement and 'F' for the false one :

1. F
2. F
3. T

C. Answer the following questions in brief :

1. Distance covered in a particular time is called average speed.
2. Periodic motion : is a motion that repeats itself at regular intervals. **eg :** motion of a pendulum
3. String, Metallic ball, iron stand

D. Answer the following questions in detail :

1. **Uniform Motion :** A body is said to have uniform motion when it travels equal distances in equal intervals of time. In other words, when a body moves with a constant speed in a straightline, its motion is said to be uniform.

eg. : If a boy cycling for 50 meters in 10 seconds and in each second cover 5 meters than we can say that the boy moves in a uniform motion.

Non-Uniform Motion : A body is said to have non-uniform motion when it travels unequal distances in equal intervals of time. In other words, when a body moves with changing speed in a straight line, it motion is said to be non-uniform motion.

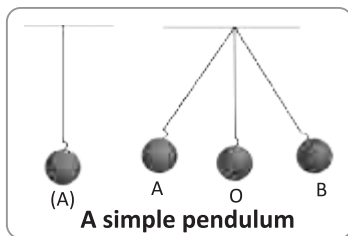
eg : A vehicle rarely moves with the uniform speed throughout its journey. It starts from the rest (zero speed) and gradually picks up the speed. This shows non-uniform motion of the vehicles.

2. From a distance time graph we can determine the speed of an

object if the object is covering the equal distance in equal time the distance time graph will be in the form of a straight line which shall indicate that the object will moving with a constant speed i.e., it is in uniform motion. on the other hand if the distance time graph is not in straight line, it indicates that the object is not moving in a uniform motion.

3. **Simple Pendulum** : A simple pendulum consists of a small metallic ball (or a stone) called a bob suspended from a rigid stand by a thread.

Figure (A) shows the pendulum in the rest position. This position is



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

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

HOTS QUESTIONS:

1. Second is the standard unit of the time.
2. **Speed** : Speed is the distance travelled by an object in unit time.

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

Unit V. How Things Work



14

Electric Current and Its Effects

EXERCISES

- A. **Multiple Choice Questions (MCQs) :**

Choose the correct answer for each of the following:

1. (c) electric bell
2. (a) —|—
3. (d) fuse

B. Write 'T' for the true statement and 'F' for the false one:

1. T 2. F 3. F

C. Fill in the blanks with the correct words :

1. electric 2. strip 3. single

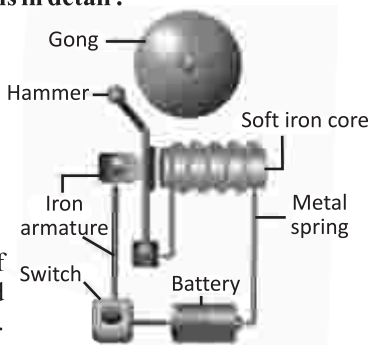
D. Answer the following questions in brief :

1. Cell, bulbs, wires, switches, battery etc.
2. (i) Magnetic effect of electric current.
(ii) Heating effect of electric current.
3. Electric fuse is a safety device that protects the electric appliance from damage and prevents fire. These are wires made of some special material which melt quickly and break when large electric currents are passed through them.

E. Answer the following questions in detail :

1. The electric bell is based on the magnetic effect of electric field. An electric bell has an electromagnet that pulls a strip of iron that makes the hammer to hit the gong to ring the bell.

An electric bell consists of two soft iron rods mounted on a non-metallic strip. The connecting wire is wound on the rods like a



An electric bell

coil. The coil acts as an electromagnet. The iron strip is connected to a hammer at one end. The other end of the wire is connected to a contact screw through a switch. When the iron strip is in contact with the screw, the current flows through the coil, which becomes an electromagnet. It attracts the hammer towards it. The hammer strikes the gong of the bell to produce a sound. The current flowing through the coil stops. This happens because the connection between the hammer and the contact screw breaks.

The coil stops behaving like an electromagnet. It no longer attracts the iron strip. The hammer returns to its original position due to the spring action. The hammer strikes the gong every time the circuit is completed.

2. When an electric current flows through a wire, a part of the electrical energy is converted into heat energy and the wire gets heated. This is called heating effects current.



Electric
toaster



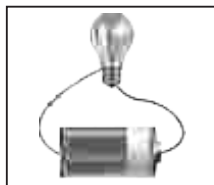
Electric
heater



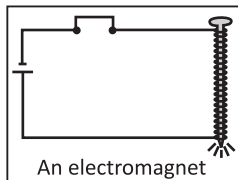
Lit filament
in a bulb

This heating effect of current is used in several appliances which we use at home like electric iron, hot plate, electric toaster, electric hair dryer, electric kettle, geyser and electric oven.

Make an electric circuit using an electric cell, a bulb, a switch and connecting wires. Keep the switch in the 'OFF' position. The bulb does not glow. Touch the bulb. Now put the switch in the 'ON' position. The bulb will glow. After one minute, put the switch in the 'OFF' position and touch the bulb. What do you feel? The glass of the bulb gets heated.



3. Take an iron nail about 6-10 cm long. With an insulated flexible wire, tightly tie a coil on the nail. Connect the free ends of the wire to the two terminals of a cell through a switch. Switch on the current.



An electromagnet

Place some pins near the nail. After some time the nail behaves like a magnet. The pins cling to the nail when electric current flows through it. When the current is switched 'OFF', the pins drop, as the coil loses its magnetism. Such a coil is called an electromagnet.

HOTS QUESTIONS:

- A fuse made of a long wire should have a low melting point so that it can easily melt when more current passes through it and temperature increases.

A. Multiple Choice Questions (MCQs) :
Choose the correct answer for each of the following:

1. (d) convex lens
2. (c) real image
3. (a) concave mirror

B. Write 'T' for the true statement and 'F' for the false one :

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

C. Answer the following questions in brief :

- C. Answer the following questions in brief :**
1. An image formed by a plane mirror is :
 - Erect
 - Virtual, i.e., it cannot be obtained on a screen.
 - Of the same size as that of the object.
 - At the same distance from the mirror as the object is in front of it.
 - The image appears to be formed behind the mirror.
 2. The images formed on a plane mirror interchange sides only. However, the image does not appear upside down. This interchange of side from left to right and vice versa between the object and its image is called lateral inversion.
 3. **Real Image :**
 - The image can be obtained on a screen.
 - It is formed, when at least two rays of light coming from an object actually meet at a point after reflection from the mirror.
 - It is formed on the same side of the mirror, where the object is placed.
 - The image is always inverted.
 - Size of the image depends upon the distance of object from the mirror.

- The image cannot be obtained on a screen.
- It is formed, when at least two rays of light coming from an object appear to meet after reflection from the mirror.
- It is always formed behind the mirror.

- The image is erect.
 - Size of the image is :
 - a. Same in plane mirror.
 - b. Enlarged or of same size in concave mirror.
 - c. Smaller in convex mirror.
4. **Uses of concave mirrors :**
- Used in head lights of cars/torches/scooters/ search light.
 - 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.

D. Answer the following questions in detail :

1. Difference between concave, convex and plane mirror are as follows :

Nature of image formed			
Mirror	Real/Virtual	Upright/inverted	Size
Plane	Virtual	Upright	Same size as that of the object
Concave	Real except when the object is very close to the mirror, then image formed is virtual	Inverted when real, upright when virtual	Depending on the position of the object from the mirror. It could be diminished, enlarged or of same size as of the object.
Convex	Virtual	Upright	always diminished

2. Ambulance is written in an inverted manner on an ambulance so that when the driver of a vehicle in front of the van looks in the rear-view mirror of his/her vehicle, he will read it as Ambulance. It is due to lateral inversion. By this he/she will then allow the ambulance to go ahead by making way for it.
3. **Formation of Images in a Concave Mirror**
Fix a concave mirror on a stand and place it on a table.

Place a white sheet of paper in front of it. This will act as a screen. It would be better if the paper is pasted on a cardboard sheet.



Real images formed by a concave mirror

Place a lighted candle at a distance of about 50cm from the mirror.

Try to get the image of the flame on the screen by changing the position of the screen. What kind of image is formed?

Move the lighted candle closer towards the mirror at different distances. Again adjust the white screen to obtain the image of the candle flame on it. What do you observe? Record your observations in the tabular form. When the candle is placed very near to a concave mirror, a virtual image is formed behind the mirror. The image is erect and magnified.

In other cases, real, inverted image is formed smaller than the size of the object. Size of the image increases as the lighted candle is brought closer to the mirror.

HOTS QUESTION :

- Concave and convex mirrors are called spherical mirrors because they are a part of a sphere.

Unit VII. Natural Resources



16

Water : A Precious Resource

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- (c) 3%
- (a) Aquifer
- (d) All of these
- (b) Salty
- (a) remains constant

B. Write 'T' for the true statement and 'F' for the false one :

- T
- F
- F
- T
- T

C. Fill in the blanks by using the correct words :

- water
- vapour
- work
- vast
- resource

D. Answer the following questions in brief :

1. Solid (ice), liquid (water), gas (water vapour)
2. At places, the ground water gets collected between the layers of hard rocks below the water table. Such huge reservoir of water is called aquifer.
3. Sea water is not fit for human consumption because sea water is very salty so it is very harmful for our body.
4. **Depletion of Water Table :** When the ground water pumped out is equal to that replenished by seepage of rain water, the water table remains unchanged. However, water table may go down if the water is not sufficiently replenished. This is called depletion of water table.
5. Drip irrigation is a reliable method to save wastage of water. It is a technique by which water is supplied directly at the base of the plant with the help of narrow tubes. This type of irrigation system employs the method of watering the roots of the plants drop by drop. This method saves a lot of water.

E. Answer the following questions in detail :

1. Causes of Depletion of Water Table

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.

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

Agricultural Activities : India is basically an agricultural country. Most of the farmers of our country depend upon rain for irrigation of their crops. This leads to decline in the level of water table.

Deforestation : In the name of urbanization, more and more forests are being cleared for construction of houses, offices, shopping malls, etc. This has led to slowdown of the natural process of ground water replenishment.

2. 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.

The process of seeping of rain water and water from other sources such as rivers, ponds and lakes into the soil, filling up empty spaces and cracks deep below the ground is called infiltration. It is a continuous process and the groundwater gets recharged.

3. Most of India's population lives in villages and is dependent on agriculture. We, therefore, need a lot of water to grow crops. Agriculture in our country is dependent on rainwater. Due to erratic rainfall or monsoons not in time, farmers have to depend on other water resources for irrigation. They irrigate their crops by wells, canals, rivers and tube wells. The increasing use of groundwater has resulted in depletion of water table and has put extra pressure on groundwater.
4. 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. **Three methods to save water are as follows : Rain Water Harvesting :** Rainwater should be used to recharge the ground water, instead of allowing it to flow away. This is known as rain water harvesting.

In India, ancient practice of storage of water and water recharge were bawris, step wells, johads. Bawri was the traditional way of collecting water. The revival of bawris have helped in managing the water needs of the people despite scanty rains in many places.

Managing Wastage of Water : Leakage of water is the main reason for wastage of water. There should not be any leakage in the supply line. You might have seen water supply pipes leaking and a lot of water flowing out through the pipes. It is the duty of the civic authorities to prevent such wastage of water. Leaking of taps at houses is another major cause of wastage.

Drip Irrigation : Drip irrigation is a reliable method to save wastage of water. It is a technique by which water is supplied directly at the base of the plant with the help of narrow tubes. This type of irrigation system employs the method of watering

the roots of the plants drop by drop. This method saves a lot of water.

HOTS QUESTIONS :

If there are a large number of tube wells in our area, the water table of ground water will go down and that will cause depletion of ground water.



17

Forest and Waste Management

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) Renewable natural resource
2. (c) large scale felling of trees
3. (a) Biodegradable

B. Fill in the blanks :

1. Forests
2. Food chain
3. blue bins
4. non biodegradable

C. Answer the following questions in brief :

1. **Food Web :** Many food chains are found in forest that are interlinked to form food web.
2.
 - (i) Increasing population
 - (ii) Increasing the industries
 - (iii) Increasing urbanisation.
3. **Recycling :** Collecting waste materials and processing them to make new products is called recycling of wastes.
4. Plastic bags, paper, iron, glass, clothes etc.

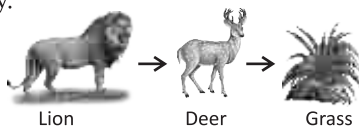
D. Answer the following questions in detail :

1. **Importance of Forests :** Forests are storehouse of biodiversity and provide important support system for mankind. They are useful to us in the following ways :
 - (i) Forests maintain temperature, humidity and regulate rainfall.
 - (ii) Forests are a rich source of wood for fuel and timber nuts, fruits, seeds and medicinal plants.
 - (iii) Forests decrease the run off rate of rainwater and thus, prevent soil erosion.
 - (iv) Forests recycle water into the atmosphere which fall as

rain to replenish the ground water.

- (v) Forests put a check on strong winds and reduce the occurrence of dust storms.
2. Following are some of the ways to conserve forests :
- Excessive felling of trees should be stopped, whenever any number of trees are cut, the same number of trees should be planted.
 - Over-grazing by cattle should be prevented.
 - Forest fires should be controlled.
 - Use of fuel wood should be discouraged. Biogas should be employed for cooking.
 - Social forestry programme should be encouraged. Under this programme, the waste lands should be utilized to produce firewood, fodder and timber. This programme is a boon to rural community.

3. **Food Chain :** Forests form a part of the ecosystem. These are self sustaining and self regulatory units of nature. The interactions



Food Chain

- among organism in the forest ecosystem is depicted in the form of food chain. Food chain involves transfer of energy through the process of eating and being eaten. The green plants trap solar energy and convert it into chemical energy which is stored as carbohydrate. The plants further transfer their energy to animals after being eaten. The animals may in turn be eaten by other animals and in this way energy is transferred at levels. The transfer of energy through a series of organisms each feeding on the preceding organisms called food chain.
4. **Recycling Biodegradable Substances :** Biodegradable waste can be recycled by the method of composting. This is one of the oldest forms of disposal. It is a natural process that recycles the nutrients in the waste to yield manure or compost. It ensures that the waste is not carelessly thrown left to decay. The manure obtained is very rich in nutrients and is an excellent medium for growing plants. Apart from being clean, cheap and safe, it also reduces the amount of disposable waste.
- Recycling Non-Biodegradable Substances :** Over the last few years, we have started buying a number of products

packaged in cans, aluminium foils, plastics and other such non-biodegradable items. We then throw away the packaging. This has led to an immense increase in the amount of non-biodegradable wastes. That is why reuse and recycling of these wastes has become very essential. Recycling of 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.

HOTS QUESTIONS :

1. We would prefer to dispose of dry leaves in our garden composting then burning because burning of leaves pollute the environment but composting leave prepare humus soil. Which work as a manure for the soil.
2. Kabadiwala, is a friend of environment because he take all the waste of our home to recycle it. By this he decrease the level of wastes in our society.

Crop Production and Management

1

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- | | | |
|--------------|---------------|--------------------|
| 1. (b) silos | 2. (b) wheat | 3. (a) drip method |
| 4. (a) NPK | 5. (c) trowel | |

B. Write 'T' for the true statement and 'F' for the false one :

- | | | | | |
|------|------|------|------|------|
| 1. T | 2. T | 3. F | 4. F | 5. F |
|------|------|------|------|------|

C. Match the following columns :

- | | | | | |
|--------|--------|--------|--------|--------|
| 1. (b) | 2. (a) | 3. (e) | 4. (d) | 5. (c) |
|--------|--------|--------|--------|--------|

D. Answer the following questions in brief :

- Kharif Crops :** Rice, Cotton
Rabi Crops : Mustard, Linseed
- The supply of water to crops at regular intervals is called irrigation. Methods of irrigation of two types:
 (i) Traditional method (ii) Modern method
- Grains should be sown at a right depth, neither too deep nor too shallow. If planted very deep, they will not germinate. If planted too near the surface, they will be eaten away by birds. Grains must be sown at a proper distance from each other to avoid overcrowding. If space is too little, plants will not get sufficient sunlight, nutrients and water from the soil. If the spacing is too large, precious space is wasted.
- The seeds of some plants like paddy, chilly, tomato, brinjal are not sown directly into the field. They are first sown in nurseries and then transferred into the field manually, when the seeds are four to six weeks old. This is known as transplantation. This method has several advantages. It helps the farmers :
 - to select healthy seedlings and space them properly.
 - to ensure that wastage of space is avoided.
- Sometimes, undesirable plants called weeds grow along with the crop. Weeds need to be removed as they start competing

with the crops for air, sunlight, water, space and nutrients.

The process of removing weeds from the field is known as weeding. Farmers use different methods to remove weeds. Tilling before sowing seeds helps in uprooting and killing weeds. They dry up and mix with the soil. Manual methods of weeding involves uprooting the weeds manually. This is done using tools like khurpi. Weeds can also be uprooted with the help of a seed drill.

Weeds are also controlled with the help of chemicals called weedicides.

E. Answer the following questions in detail :

1. **Ploughing :** It is the process of loosening and turning of soil using a tool or an implement called the plough. A plough can be made of wood or iron. Ploughs are either drawn by bullocks or by tractors. The wooden plough has been in use for thousands of years in agriculture. But in recent years, this is being replaced by the iron plough. Tractor is the latest cultivator used commonly nowadays. Although tractor is expensive when compared to other tools but it saves time and labour.

Levelling : Broken down with a plank called leveller. The process of making the soil surface even and smooth is called levelling. Levelling prevents soil erosion and helps in uniform irrigation of the field.

2.

S. No.	Manures	Fertilizers
1.	It is an organic substance. It is a natural substance obtained from plant and animal waste.	It is an inorganic salt.
2.	It can be prepared in fields.	It is prepared in factories.
3.	It increases the humus content of the soil.	It does not increase the humus content of the soil.
4.	It is not very rich in plant nutrients.	It is very rich in plant nutrients.

3. Sowing can be done either manually or mechanically using a seed drill : **Manual Sowing :** This process involves direct sprinkling of seeds into the soil. The process of sowing seeds by hand is called broadcasting. In this method, seeds are not uniformly distributed. This method also does not ensure that

all seeds are sown at an appropriate depth. Seeds of bazra, maize and wheat are sown by this method.

Using a Seed Drill : Sowing by traditional tools like seed drills is the easiest method. This method ensures uniform distribution of seeds and also seeds are sown at a proper depth. It also ensures that seeds are covered with the soil after sowing. This method is also faster and more economical.

4. **Preparation of Soil :** The soil acts as a medium for germination of seeds and the growth of crops. It provides water and minerals to the plants. This refers to loosening and turning of the soil. This is an important process.

Ploughing is done by a tool called a plough.

The soil is tilled with the help of plough. Plough is a tool made up of iron or wood. The wooden plough has an iron tip, which penetrates into the soil. These days iron ploughs are used. Ploughs are drawn either by bullocks or other animals like horses and camels or through a tractor.

At times the ploughed field may have big pieces of soil called crumbs. They need to be broken down with a plank called leveller. The process of making the soil surface even and smooth is called levelling. Levelling prevents soil erosion and helps in uniform irrigation of the field.

5. **Crop Protection from Weeds :** The process of removing weeds from the field is known as weeding. Examples of some weeds are grass, amaranth, bathua (chenopodium) and wild oat. Farmers use different methods to remove weeds. Tilling before sowing seeds helps in uprooting and killing weeds. They dry up and mix with the soil. Manual methods of weeding involves uprooting the weeds manually. This is done using tools like khurpi. Weeds can also be uprooted with the help of a seed drill.

Weeds are also controlled with the help of chemicals called weedicides. Weedicides destroy the weeds without affecting the crops. Metachlor 2, 4 –D, Dalapon, Butachlor are some of the commonly used weedicides. Weedicides are diluted with water and sprayed on the plants by water sprays. Weeding is carried out before plants produce flowers and fruits.

HOTS QUESTIONS :

1. It paddy is sown in rabi season it will not grow as it needs high

amount of water for its growth. In rabi season water is not available much.

2. Silos used for storing cereals should be clean and dry because moisture spoil the cereals and become more susceptible to attack by microorganisms.



Microorganisms

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) protozoa
2. (b) alcohol
3. (c) Anton Van Leeuwenhoek
4. (a) tetracycline
5. (d) fermentation

B. Write 'T' for the true statement and 'F' for the false one:

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

C. Give one word for each one of the following :

1. Housefly, Female Anopheles mosquito
2. Bacteria
3. Apple scab is a plant disease which caused by fungus.
4. Jam, jellies

D. Answer the following questions in brief :

1. Bacteria, fungus, protozoa and algae are the major groups of microorganisms.
2. Food poisoning, typhoid
3. Certain bacteria and fungi are used in the production of medicines called antibiotics. These medicines kill or stop the growth of disease-causing microorganisms.
4. Blue-green algae is capable of converting the atmospheric nitrogen into nitrates and nitrites thereby increase the soil fertility.
5. Bacteria, staphylococcus, salmonella, Clostridium botulinum can cause food poisoning.

E. Answer the following questions in detail :

1. Micro-organisms are useful to us in various ways.
 - (a) In the preparation of bread, cake, curd, etc.
 - (b) In the production of alcohol.

- (c) In the cleaning of the environment by decomposing organic matter into harmless and useful substances by some bacteria.
 - (d) In the preparation of some medicines.
 - (e) In agriculture, for improving the soil fertility by fixing nitrogen from the atmosphere.
2. A vaccine is a preparation of a weakened or killed disease causing microbes needed to immunise against a particular disease. When a disease-causing microbe enters our body, our body produces antibodies. These antibodies fight and destroy the disease causing microbes and remain in the body to fight future infection by the same microbe. Several diseases like cholera, tuberculosis, small pox and hepatitis can be prevented by vaccination.
 3. In the curd presents a number of microorganisms. The bacterium *Lactobacillus* present in curd converts milk into curd. It multiplies in milk and converts it into curd. Take a bowl of warm water. Add a teaspoon of curd to it. Stir well and cover the bowl with a plate. Leave the bowl undisturbed for 5-6 hours. What do you see? The milk has changed into curd.
 4. The process of preventing the spoilage of food items by the action of microbes using physical or chemical methods is called food preservation.
Some common methods of food preservation are :
 - (i) **Heat and Cold Treatments** : Boiling kills many microorganisms. Milk and water are thus boiled to kill harmful microbes that may be present in them. We also keep food in the refrigerator as microbes cannot thrive at low temperatures.
 - (ii) **Pasteurisation** : Pasteurisation is a technique of preserving milk, whereby milk is heated to about 70°C for 15-30 seconds and then suddenly chilled and stored. This process kills the microorganisms.
 - (iii) **Dehydration** : The removal of water from fruits and vegetables is called dehydration. Removal of water slows down the growth of microorganisms.
 - (iv) **By Using Salt and Sugar** : Jam, Jellies and squashes are preserved by sugar. High concentration of sugar slows down the bacterial growth and prevents food spoilage.
 5. The atmospheric nitrogen has to be first converted into

nitrogenous components before it can be utilised by plants and animals. This is done by certain bacteria and blue green algae present in the soil.

Nitrogen compounds are then taken up by roots of plants and used for the synthesis of plant proteins. Animals obtain nitrogen by feeding on plants. When plants and animals die, the bacteria and fungi present in the soil convert the nitrogenous waste into nitrogenous compounds. Some denitrifying bacteria convert part of them into free nitrogen gas. This nitrogen escapes into the atmosphere.

Thus, the atmospheric nitrogen gets cycled in nature and its level remains more or less constant in the atmosphere.

HOTS QUESTIONS :

1. Antibiotics are used against bacteria and fungi because cold and flu are caused due to viruses. Due to which no vaccine formed against cold and flu.
2. Microorganisms are present in air. The air from sealed packets has been removed by evacuation and flushed with oxygen - free nitrogen.

Unit II. Materials



3

Synthetic Fibres and Plastics

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- | | | |
|-----------------|---------------|----------------------|
| 1. (b) nylon | 2. (a) rayon | 3. (a) thermoplastic |
| 4. (a) bakelite | 5. (d) cotton | 6. (a) polythene |

B. Match the following columns :

- | | | | | |
|--------|--------|--------|--------|--------|
| 1. (c) | 2. (e) | 3. (d) | 4. (a) | 5. (b) |
|--------|--------|--------|--------|--------|

C. Fill in the blanks with the correct words :

- | | | |
|-------------|-----------|----------|
| 1. polymers | 2. Rayon | 3. Nylon |
| 4. terylene | 5. wonder | |

D. Answer the following questions in brief :

1. Fibres that are made by human beings are called synthetic fibres. **Eg**-Rayon, nylon, polyester.

2. **Polymer :** Polymers are tiny chain like molecules.
3. **Uses of nylon fibre :** For making saris, socks, ropes, tents, tooth brushes, fishing, nets, car seat belts, etc. It is strongest among all fibres, hence it is also used to make parachutes and ropes for rock climbing.
4. **Disadvantages of clothes made from synthetic fibres :**
 - (i) They catch fire easily.
 - (ii) They are non-biodegradable.
 - (iii) Synthetic clothes are uncomfortable in hot and humid weather as they do not absorb sweat.
 - (iv) They require careful ironing as they melt easily.
5. We should not wear nylon clothes when working in a kitchen because they can catch fire easily.

E. Answer the following questions in detail :

1. Advantages of Synthetic Fibres

Synthetic fibres have the following advantages :

- They do not shrink.
- They do not wrinkle easily.
- They dry quickly, requiring little ironing.
- They are more durable and less expensive.

Disadvantages of Synthetic Fabrics

Synthetic fibres have the following disadvantages :

- Synthetic clothes are uncomfortable in hot and humid weather as they do not absorb sweat.
- They catch fire easily.
- They require careful ironing as they melt easily.
- They are non-biodegradable.

2 Properties of Plastics

- Plastic are non-reactive.
- Plastics do not react with air and water. hey are non-biodegradable. They do not corrode easily. Hence they are used in homes and laboratories for storing chemicals.
- Plastics are light weight.
- **Plastics are strong and durable :** The are thus used widely to make household articles and in industry. They are generally cheaper than metals.

Plastics are poor conductors : Plastics are poor conductors of heat and electricity. Hence they are used in making handles of cooking vessels, making containers

used in microwaves. This is the reason why electrical wires have a plastic covering.

3. It is said 'No to plastics' because plastic is non-biodegradable. It means it takes many-many years to decompose. It causes environmental pollution by accumulation. Burning of plastic give off gases and smoke which are dangerous. It also causes soil pollution. The pollution caused by plastics can be reduced by the following ways :

(i) Reducing the usage of plastic.

(ii) Recycling of used plastic and reuse it.

4. Differences between thermosetting plastic and thermoplastic :

Thermosetting Plastic

- i. Thermosetting plastics are the polymers in which chains get highly cross-linked which do not break while heating.
- ii. Once moulded thermosetting plastics cannot be remoulded.
- iii. It is a poor conductor of heat and electricity.
- iv. It can resist fire and can withstand heat better than most plastics.

Examples : Bakelite, melamine.

Thermoplastic

- i. Thermoplastics are long chain polymers with no cross linking. Heating also does not produce any cross linking between the chains.
- ii. Thermoplastic melts when exposed to heat and can be moulded.
- iii. Thermoplastics can be processed repeatedly.
- iv. They can be recycled.

Examples : Polythene, PVC, polystyrene, nylon, polyesters, etc.

5. We should avoid use of plastics as far as possible. We can minimise the damage to the environment by the following ways :

- Do not accept plastic bags when you go out for shopping. Instead use cotton, jute or reusable cloth bags.
- Do not throw plastic waste at road side or in water bodies.
- Use separate bins to dispose biodegradable and non-biodegradable wastes at homes and schools.
- Recycle plastic waste. Most thermoplastics can be

recycled.

- Remember to use the 4 R formula to minimise damage to the environment by plastics.
- Reduce, • Reuse, • Recycle and • Recover

HOTS QUESTION :

1. We think it is said that use of synthetic fibres actually helps in conserving forests because we mostly use chair, table, framing. We made all this products by wood. So we cut the forests so, it is a very good to made these products by synthetic fibres to conserve the forest.
2. We think plastic containers are used to store item in the house because they are light in weight, low priced, available in all shapes according to things which are stored and have good strength and easy to handle.



4

Metals and Non-metals

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (d) Iron
2. (b) Copper
3. (d) Iodine
4. (a) Graphite
5. (b) Mercury

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

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

C. Give one word for each one of the following :

1. Sodium
2. Phosphorous
3. No
4. Iron

D. Answer the following questions in brief :

1. If sodium metal is kept exposed to air, it will react with various components of air and get spoiled. In order to prevent its reaction with the moisture and other gases of air, sodium metal is stored under kerosene.
2. When sulphur react with oxygen they formed sulphur dioxide.
$$\text{S} + \text{O}_2 \longrightarrow \text{SO}_2$$
3. When a more reactive metal replaces a less reactive metal from its compound it called displacement reaction.

4. Copper vessels turn green with the passage of time because the formation of basic copper carbonate on its surface in the presence of air which is green in colour.
5. Metals are used for making metal cables because metals are the good conductor of electricity.

E. Answer the following questions in detail :

1. Differences between metals and non-metals on the basis of physical properties are as follows:

Characteristics	Metals	Non-Metals
Physical state	Solids except mercury is a liquid.	Solids or gaseous except bromine which is a liquid.
Conductivity	Good conductors of heat and electricity except lead which is a poor conductor.	Poor conductors except graphite which is good conductor.
Density	High density (except sodium, potassium)	Low density.
Ductility	Ductile	Non-ductile.
Hardness	Hard (except sodium, potassium which are soft metals.)	They are soft except diamond.
Lustre	Lustrous	Non-lustrous or dull except diamond and iodine that have lustre.
Malleability	Malleable	Non-malleable and brittle.
Melting points and boiling points	High melting and boiling points except sodium and potassium.	Low melting and boiling points except graphite.
Sonority	Sonorous	Non-sonorous
Tensile strength	High tensile strength.	Low tensile strength.

2. **Reaction with oxygen :** Metals react with oxygen to form their oxides. Different metals react with oxygen under different conditions.

Metal + oxygen \longrightarrow Metal oxide

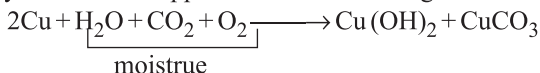
Sodium reacts with oxygen at room temperature to form sodium oxide. Magnesium on heating, burns in air to form magnesium oxide (MgO).

The metallic oxides formed are basic in nature and turn red

litmus solution blue.

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.



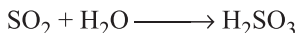
Non-metals : They also react with oxygen to form non-metallic oxides.



Sulphur burns in oxygen to form sulphur dioxide.

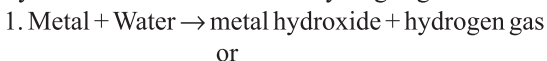


When sulphur dioxide is dissolved in water, sulphurous acid is formed which turns blue litmus red.



Generally oxides of non-metals are acidic in nature.

3. (a) Copper is less reactive metal than zinc so copper cannot displace zinc from its salt solution.
(b) Immersion rods are made of metallic substance because metals are good conductor of heat.
(c) Phosphorous is stored under water because phosphorous react very fast with atmospheric oxygen and catches fire.
4. **Reaction with Water** : Most metals react with water under various conditions. However, most metals produce a metal hydroxide or metal oxide and hydrogen gas.



Phosphorous is a very reactive non-metal. It easily catches fire when exposed to air, hence it is stored in water to prevent its contact with atmospheric oxygen.

Reaction With Acids : Metals react with an acid to form a salt and hydrogen gas is produced. When a burning match stick is brought near the mouth of the test tube containing metals, a pop sound is produced. This is due to production of hydrogen gas. Non-metals do not produce hydrogen gas. Copper does not react with hydrochloric acid even on heating but reacts with sulphuric acid.

Reaction with bases : Most metals do not react with bases. Metals react with sodium hydroxide to produce hydrogen gas. The reaction of non-metals with bases are complex.

5. **Uses of Metals and Non-Metals**

Metals

Iron : Used for making bridges, locomotives, ships, rails, utensils, surgical instruments.

Gold and silver : For making jewellery.

Copper : Electrical wires and cables, utensils, coins.

Aluminium : Electrical wires and cables, utensils, alloys, picture frames.

Zinc : As a protective coating for iron.

We can say that metals are used in making machinery, automobiles, trains, aeroplanes, furniture, industrial gadgets, cooking utensils, jewellery, etc.

Non-Metals

Phosphorous : In firework industry, match stick, fertilizers.

Graphite : In pencils, zinc-carbon batteries.

Iodine : Iodised salt, tincture of iodine (antiseptic).

Chlorine : For bleaching; purifying water.

Oxygen : For respiration and combustion.

Sulphur : In manufacturing gun power, sulphuric acid and sulphate.

Hydrogen : As a fuel, for synthesis of ammonia and methyl alcohol.

HOTS QUESTIONS :

1. Temple bells are made of metal and not wood because metals are sonorous and produce a sound on beating, whereas wood is not sonorous.
2. Sodium is stored under kerosene and not water because sodium is very reactive with atmospheric oxygen and catches fire easily.



5

Coal and Petroleum

EXERCISES

A. **Multiple Choice Questions (MCQs) :**

Choose the correct answer for each of the following:

1. (c) Sun

2. (a) Peat

3. (a) Coal tar

4. (a) Petrol

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

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

C. Match the following columns :

1. (e) 2. (d) 3. (a) 4. (c) 5. (b)

D. Answer the following questions in brief :

1. The process of conversion of plants and animals, buried inside the earth to coal is called carbonisation.
2. **Exhaustible :** Petroleum, Natural gas
Non exhaustible : Sunlight, air.
3. Peat, Lignite, Bituminous and Anthracite.
4. **Coal Gas :** It is a gaseous fuel obtained as a by-product of the process of manufacturing coke. It consists mainly of hydrogen, methane and carbon monoxide. All three gases are combustible. It is an excellent gaseous fuel.
5. Paraffin wax, asphalt.

E. Answer the following questions in detail :

1. **Formation of Coal :** Carbonisation is the process of formation of coal (as coal contains carbon). About 300 millions of years ago during the carboniferous age, there were dense forests in the low lying wetland areas. Due to various natural processes, the trees died and were buried under the soil. They were covered with more soil and were compressed. They got buried deeper and deeper into the soil. Anaerobic thermal degradation of the cellulosic material of trees/big plants took place due to high temperature and under pressure and in this way they were slowly converted to coal.
2. **Uses of natural Gas :** Natural gas consists mainly of methane. It has the following main uses.
 - It is used for the generation of electricity.
 - Natural gas is stored under high pressure as compressed natural gas (CNG), which is used as a fuel for transport vehicles. It is less polluting. In Delhi buses run on CNG.
 - LPG can be supplied through pipes and can be used as a fuel directly in homes and factories. LPG is being supplied through pipes in Vadodara and some parts of Delhi also.
 - It is used to produce hydrogen and ammonia. Ammonia in turn is used to manufacture urea.
 - It is used as a raw material for manufacturing a number of

chemicals and fertilisers.

3. Various fractions obtained during refining of petroleum and their uses :

S. No.	Constituent	Uses
1.	Liquified petroleum Gas (LPG)	Used as domestic gas in its liquified form
2.	Petrol	Fuel in automobiles, aviation fuel, dry cleaning
3.	Kerosene	Fuel for lamps, stoves and air jets
4.	Diesel	Fuel in heavy motor vehicles and generators
5.	Fuel oil	In power stations and ships
6.	Lubricating oil	In lubrication
7.	Paraffin wax	Used in candles and ointments, vaseline, etc.
8.	Asphalt	Making roads

4. **Conservation of Petroleum** : Keeping in mind the limitations of, the need of the hour is to conserve them to the extent possible. They cannot be renewed through a rapid cycle. We have seen that it takes millions of years for the dead organisms to get converted into petroleum. The reserves of petroleum, natural gas and coal will last only for a few hundred years. Therefore, we must take proper steps to conserve these natural resources. We must use existing resources judiciously and try to use renewable energy sources like wind, solar energy and bio fuels. The Petroleum Conservation Research Association (PCRA) have given certain tips on how to conserve petrol/diesel :

- 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.

HOTS QUESTIONS:

1. CNG is an environment friendly gas as it does not produce ash or smoke. It is pollution free gas. It reduces smoke and pollution. It produces only carbon dioxide and water on

burning.

2. Petroleum is known as black gold because it is a viscous dark black coloured liquid which occurs deep inside the earth. It is present in a limited quantity. It is highly valuable in today's world. Due to this it is compared with gold.



Combustion and Flame

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

- | | | |
|------------------------|---------------|------------|
| 1. (c) cement | 2. (a) Oxygen | 3. (a) LPG |
| 4. (a) Sulphur dioxide | 5. (c) kJ/kg | |

B. Write 'T' for the true statement and 'F' for the false one :

- | | | | | |
|------|------|------|------|------|
| 1. T | 2. F | 3. F | 4. F | 5. T |
|------|------|------|------|------|

C. Match the following columns :

- | | | | |
|--------|-----------------|--------|--------|
| 1. (f) | 2. (d) luminous | 3. (a) | 4. (e) |
| 5. (b) | 6. (c) | | |

D. Answer the following questions in brief :

1. Kerosene
2. The necessary conditions for combustion are :
 - (i) Presence of a combustible substance.
 - (ii) Presence of a supporter of combustion : Adequate supply of a supporter of combustion (e.g. oxygen) is necessary.
 - (iii) Attainment of ignition temperature.
3. **Explosion** : When mixture of combustible material and air completely burns in short period of time in a closed space to produce large amount of sound, light and heat energy is known as explosion.
4. A substance starts burning only after it has attained a certain minimum temperature. The lowest temperature at which a substance catches fire is called ignition temperature. Different substances have different ignition temperatures.
5. Difference between combustible and non combustible substances :

Combustible :

1. These substance burn in air or oxygen to produce heat and light.

Ex-Charcoal, magnesium

Non-combustible :

- These substance do not burn in air or oxygen to produce heat and light.

Ex-sand, water

E. Answer the following questions in detail :

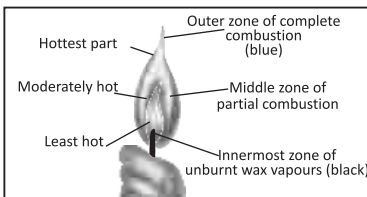
1. Fire extinguishers make use of carbon dioxide gas as it is not a supporter of combustion. Carbon dioxide being heavier than oxygen envelops the fire and cuts off the supply of oxygen. The fire thus extinguishes in absence of the supporter of combustion. Generally, carbon dioxide also does not harm the electrical appliances.

CO_2 can be stored at high pressure as a liquid in cylinders just as LPG is stored in cylinders. When CO_2 is released from the cylinders, it expands a lot and envelops the fire besides also bringing down the temperature of the fire. This is the reason CO_2 is widely used as a fire extinguisher.

2. Characteristics of an ideal fuel :
 - i. The fuel should be cheap and easily available.
 - ii. The fuel should be easily stored and transported and should be safe in handling.
 - iii. The fuel should have high calorific value.
 - iv. It should produce very small amount of residues, as ash.
 - v. It should not cause pollution on burning.
 - vi. Fuel should have low ignition temperature but well above the room temperature.
 - vii. The fuel should burn at a slow rate with controlled combustion. Among all the fuels gaseous fuels are the best like CNG. There is probably no fuel that could be considered as an ideal fuel.
3. A candle flame can be divided into three different coloured zones, depending on the amount of oxygen available.

Outermost Non-Luminous Zone (blue) : This is the hottest part of the flame. This zone emits very little light. In this zone, wax undergoes complete combustion because there is plenty of oxygen around it.

Middle Zone : This zone is bright, yellow and luminous. It is less hot than the outer zone. Here there is incomplete combustion of water vapour due to low oxygen.



Different zones of a Candle

Carbon particles are produced. This zone emits the most light. This is the dark zone.

Inner Zone : This is the dark zone, it is the coolest part of the flame. Since oxygen is not available in this zone, no combustion takes place here. The zone is dark and emits no light.”

4. **Hazards of Burning Fuels :** When we burn fuel, harmful products are produced. With increase in population, the fuel consumption has also increased with harmful effects on the environment.
 - Carbon containing fuels like wood, coal, petroleum when burnt release unburnt carbon particles. These fine pollutants cause air pollution leading to respiratory diseases and asthma.
 - Solid fuels also leave behind ash, which if not disposed off properly can cause air and water pollution.
 - Incomplete combustion of fuels give carbon monoxide gas. Exposure to it can lead to headache, dizziness and can even cause coma and death. This is why we should not burn coal in a closed room or sleep in a room with burning coal fire in it.
5. **Types of Combustion :** Combustion can be divided into three types :
 - Rapid combustion
 - Spontaneous combustion
 - Explosion

Rapid Combustion : In this type of combustion, large amount of heat and light are produced in a very short span of time. Examples are combustion of LPG, kerosene, petrol.

Spontaneous Combustion : In this type of combustion, substances suddenly burst into flame on their own, without application of any apparent cause. Example white phosphorous which burns in air at room temperature.

Explosion : In this type of combustion, heat, light and sound

are produced accompanied by the liberation of a large amount of gas. Bursting of fireworks is an example of explosion. Explosions can also take place if pressure is applied on the cracker.

HOTS QUESTIONS :

1. When carbon monoxide is inhaled it combines with hemoglobin of the blood and form carboxyl hemoglobin this saturate the blood and hence blood can't carry more oxygen resulting suffocation and high blood pressure sometimes causes death of the organism. So it is a poisonous gas.
2. Dried grass catches fire more easily as compared to green and fresh grass because the ignition temperature of dried grass is lower than that of fresh grass.

Unit III. The World of the Living

Conservation of Plants and Animals



EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) Kaziranga
2. (b) fauna
3. (a) Panchmarti
4. (b) asiatic lion
5. (d) endangered plants and animals

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

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

C. Fill in the blanks with the correct words :

1. planet
2. biosphere
3. flora
4. 400
5. 80

D. Answer the following questions in brief :

1. The number and variety of plants, animals and other organisms, their interrelationships and their relation with environment that exist is known as biodiversity.
2. **Flora** : The large number of plants living in a particular area are called flora of a place.
Eg-Sal, teak, Mango

Fauna : The large number of animals living in a particular area are called fauna of a place.

Eg. Chinkara, Blue bull, Cheetal.

3. Killing, poaching and capturing.
4.
 - Increased requirement of land for agriculture, for construction of roads, houses, factories and dams. This is happening because of increase in population.
 - Increased requirement of wood for making furniture, in construction, in making paper, etc. Wood is also being used as a fuel.
5. Sanctuaries, National parks, biosphere reserves.

E. Answer the following questions in detail :

1. **Conservation of Forests and Wildlife :** The preservation and careful management of plant and animal species in order to prevent their extinction is called conservation. Our life depends on forest in several ways. Biosphere is that part of the earth in which living organisms exist or which supports life. All living things depend on each other. Due to this reasons it is our need to conserve forests and wildlife.
2. Roots of trees bind the soil particles together. 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 nutrients. Removal of top layer of the soil exposes the lower hard and rocky layers and over a period of time, fertile soil gets converted into a desert. It is called desertification. Which is done due to do forestation.
3. **Red Data Book :** The International Union of Natural and Natural Resources (IUCN) works towards assessing the global conservation status of plants and animal species. The first Red Data Book on animals was published in 1991. IUCN maintains a comprehensive list known as the IUCN Red list of threatened species. Here, species are classified into nine categories, on the basis of criteria like the rate of decline, population size and the area of geographical distribution. The nine categories in the IUCN Red List of threatened species are given below :
 - Extinct
 - Extinct in the wild
 - Critically endangered
 - Nearly threatened
 - Least concern
 - Data deficient

- Endangered
- Vulnerable
- Not evaluated

4. **Wildlife Sanctuary** : Wildlife sanctuaries are protected forests all across the world to preserve certain plant and animal species. They provide protection and suitable living conditions to wild animals. Killing of animals (poaching) or capturing of animals is strictly prohibited in these areas. There are more than 400 wildlife sanctuaries in India. Indian sanctuaries have broad based level forests, mountain forests and bush land in the deltas of big rivers like Ganga. Some famous wildlife sanctuaries in India are :
- Gir in Gujarat (Asiatic Lion, Sambhar, Cheetal)
 - Khaziranga in Assam (Indian rhinoceros)
 - Sariska in Rajasthan (Tiger)
 - Bharatpur Bird Sanctuary in Rajasthan (Siberian crane)

HOTS QUESTIONS :

Wild life sanctuaries are a better way of conserving animals than zoos because wildlife sanctuaries are protected forests all across the world to preserve certain plants and animals species. They provide protection and suitable living conditions to wild animals.



8

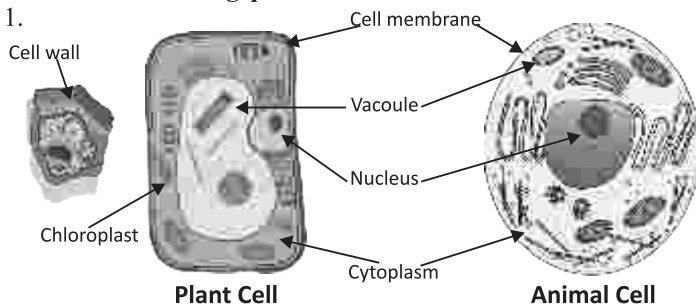
Cell—Structure and Functions

EXERCISES

- A. Multiple Choice Questions (MCQs) :**
Choose the correct answer for each of the following:
- (a) cell
 - (b) chromosome
 - (a) protoplasm
 - (b) chlorophyll
 - (d) animal
- B. Write 'T' for the true statement and 'F' for the false one :**
- F
 - T
 - T
 - T
 - F
- C. Match the following columns :**
- (d)
 - (c)
 - (e)
 - (b)
 - (a)
- D. Answer the following questions in brief :**
- Cells is the smallest structural unit of living organism.
- Variation :** Variation in size variation in shape.

2. Cytoplasm of the cell contains cell organelles.
3. There are following difference between prokaryotic and eukaryotic cells :
 - (i) **Prokaryotic cells** : The nucleus of these cells does not have a nuclear membrane and is not well organised. For example, bacteria and blue-green algae.
 - (ii) **Eukaryotic cells** : These cells have a well organised nucleus with a nucleus membrane. All the organisms other than bacteria and blue green algae are eukaryotes.
4. Chloroplast, chromoplast, leucoplasts.
5. **There are following components of cell** : Cell membrane, cytoplasm, nucleus, plastids, protoplasm mitochondria.

E. Answer the following questions in detail :



Plant cell		Animal Cell	
1.	Cell wall present.	1.	Cell wall absent.
2.	Cell membrane present.	2.	Cell membrane present.
3.	Central vacuole present.	3.	Large number of vacuoles smaller in size are present.
4.	Plastids are usually present.	4.	Plastids are absent.
5.	Lysosomes are absent.	5.	Lysosomes are present.
6.	Centrosomes are absent.	6.	Centrosomes are present.

2. **Cells vary in size** : The cell size may vary from a millionth of a metre to a few centimeters. The largest cell is the egg of an ostrich which is 17 cm in diameter. There is no relationship between cell size and organism size.

Cells vary in shape : Cells exist in different shapes. They can be oval, round rectangular, polygonal, spherical or elongated.

Some cells are pointed at both ends. Some cells like nerve cells are branched.

Cells vary in number : The bodies of organisms may consist of one or many cells. Organisms whose body consists of a single celled are call 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.

3. **Structure of Nucleus :** It is the most important component of the cell being considered its brain. It is a small spherical or oval shaped body 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 nucleolus. Present inside the nucleus is a small spherical body called nucleolus, which can be seen with a microscope of higher magnification. Besides, thread like structures called chromosomes are also present in the nucleoplasm. They carry genes which help in inheritance or transfer of characters from parents to the off Springs.

Nucleus plays an important role in :

- Cell division
 - Transmission of hereditary characters from one generation to another.
 - Controlling all the life functions taking place in the cells.
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-permeable in nature i.e., selected materials can enter or leave the cell. Cell membrane is also known as plasma membrane. It separates the cells from one another and also the cells from the surrounding medium. It provides protection to the internal cell organelles, besides providing shape and rigidity to the cells.
- (b) Cytoplasm :** It is a jelly-like fluid that fills up the part of the cell between the cell membrane and the nucleus. All life function take place in the cytoplasm. A number of components

5. We can find chromosome in the nucleus in a cell. The nucleus contains a number of chromosomes. The number of chromosomes is specific for every individual. Chromosomes are thread-like structures. They are the seat of genetic material of the cell, the genes. Genes are coded messages which bring in the similarity between one generation and the next generation from parents to the offsprings.



Chromosomes

- It controls all metabolic activities of the cell.
- It is responsible for cell division.
- It is responsible for transmission of hereditary material from one generation to the other.

1. Chloroplasts are found only in plants and not in animals because plants are green by the presence of chlorophyll. They help in the photosynthesis but in case of animals, chlorophylls are absent and no photosynthesis takes place.
2. Plant cell has cell wall and a large central vacuole. But in case of animal cell no cell wall. By seeing the cell wall we can decide the cell is a plant cell not animal cell.



Reproduction in Animals

EXERCISES

A. Multiple Choice Questions (MCQs):

Choose the correct answer for each of the following:

1. (a) one 2. (c) Testes 3. (a) Humans

B. Write 'T' for the true statement and 'F' for the false one :

- 1.T 2.T 3.F

C. Match the following columns :

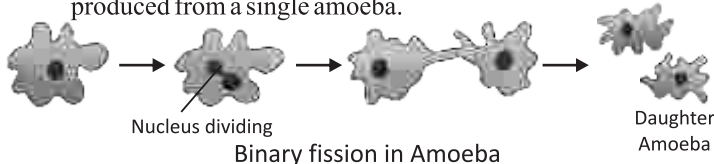
- 1.(c) 2.(a) 3.(b)

D. Answer the following questions in brief :

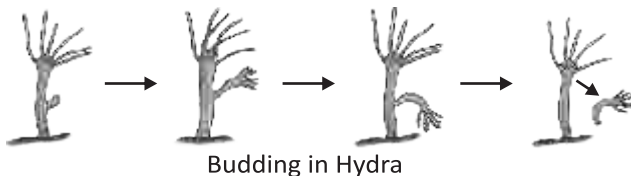
1. Reproduction is one of the most important characteristics of living organisms. It is essential for the continuation of species. If we do not produce ones of our kind, the living world could come to an end.
2. (i) **Sexual Reproduction** : In sexual reproduction, two parents are required to produce a new organism. Most plants and mammals reproduce sexually.
(ii) **Asexual Reproduction** : Asexual reproduction occurs in microorganisms, plants and animals. In this type of reproduction, new individual is formed from cell(s) of a single parent.
3. **Metamorphosis** : The transformation of a larva into an adult through drastic changes is called metamorphosis.

E. Answer the following questions in detail :

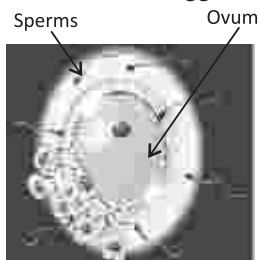
1. **Amoeba Reproduces by Binary Fission** : Amoeba is a unicellular organism. In amoeba, the nucleus divides into two nuclei. The body then divides into two parts, each part receiving a nucleus. Further stretching of the body leads to the formation of two daughter cells. Thus, two amoeba are produced from a single amoeba.



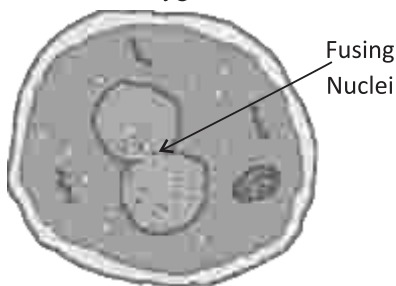
Reproduction by Budding in Hydra : First a bulge is formed on the body of the organism known as the bud. The bud grows to form a baby hydra. The nucleus of the parent body divides and one of it goes into the bud. The baby hydra then separates from the parent. Since in this case new individuals develop from the buds in hydra, this type of asexual reproduction is called budding.



2. **Fertilization** : The first step in the process of reproduction is fertilization. The fusion of the male and the female gamete to produce a new organism is called fertilization. This takes place when the sperm comes in contact with an egg and one of the sperms may fuse with the egg. In humans, fertilization takes place in the body of the female. During fertilization, the nucleus of the sperm and the egg fuse to form a single nucleus. The fertilized egg so formed is called a zygote.



Fertilisation



Zygote

3. In humans, fertilization takes place in the body of the female. During fertilization, the nucleus of the sperm and the egg fuse to form a single nucleus. The fertilized egg so formed is called a zygote. The zygote formed as a result of fertilization divides repeatedly to give rise to a ball of cells and moves towards the uterus. On reaching the uterus, it gets embedded in the wall of the uterus for further development. The developing zygote is now called an embryo. The cells form groups which develop into different tissues and organs of the body. From eight weeks after fertilization till birth, the developing baby is called a foetus. The embryo develops body parts such as hands, legs, head, eyes, ears, etc. When the development of the foetus is complete, the mother gives birth to the baby. It takes about 36-40 weeks for a human child to fully develop in the uterus.

HOTS QUESTION :

1. It is possible to collect eggs of lizard, butterfly and frogs because they lay many eggs in one time. But we can't collect eggs of cow or humans because they don't lay eggs, they give birth to a baby.

2. Fish lays hundreds of eggs because all eggs don't get fertilized.



Reaching the Age of Adolescence

EXERCISES

A. Multiple Choice Questions (MCQs):

Choose the correct answer for each of the following:

1. (c) gland
2. (b) 18-19 years
3. (b) ovulation

B. Fill in the blanks with the correct words :

1. adolescence 2. hardly 3. emotional

C. Match the following columns :

1. (a) 2. (c) 3. (b)

D. Answer the following questions in brief:

1. The period between childhood and adulthood is called adolescence. It is between the age of 11 to 19 years.
2. The height increases during puberty because due to the elongation of bones of the arms and legs in both girls and boys at the time of puberty.
3. Some adolescents get pimples on their face because during this period sebaceous glands increased their activity and secrete oil on their face due to which adolescents may get acne and pimples on their face.

E. Answer the following questions in detail :

1. Change in body during puberty :
 - (i) In boys the muscles develop and shoulders become broad.
 - (ii) In girls pelvic bones grow and hips broaden. Breasts start getting enlarged.
 - (iii) Both girls and boys reach their maximum height at 18 years.
 - (iv) The boys voice box or larynx increases in the size.
 - (v) The secretion of sweat glands and sebaceous gland (oil gland) increases leading to increased sweating.
 - (vi) In girls and boys reproductive organs develop completely.
 - (vii) One may be attracted towards the opposite sex.

2. **Reproductive Phase of Life in Humans**

Adolescents become capable of reproduction when their testes and ovaries begin to produce gametes.

In females, the reproductive phase begins at puberty (10-12 years) and lasts till 45-50 years, whereas in male it begins at puberty (14-15 years) and lasts till he is healthy.

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 the blood vessels are shed off. This is known as menstruation or periods. It causes bleeding in women. Menstruation occurs once in about 28 days and the menstrual flow lasts for 4-7 days. The period from one menstruation to another is called the menstrual cycle. The menstrual cycle begins around puberty and is called menarche. The menstrual cycle stops when the woman is around 45-50 years. The stoppage of menstruation is called menopause.

3. Drug abuse is a common problem among adolescents worldwide. Adolescents undergo a lot of changes both mental as well as physical. At times they feel confused and insecure due to stress. In order to get relief from this, adolescents start taking drugs. In case someone suggests that you take drugs, just say 'No'. Once a person takes drugs, it becomes a habit and he becomes a drug addict. Therefore, one must avoid them at all costs. They harm the body in the long run, ruin health and happiness.

AIDS is another dangerous disease caused by HIV virus. It destroys the defence-mechanism of the body. It is spread by sharing syringes used for injecting drugs. It can also be transmitted to an infant from an infected mother through her milk. It also spreads through sexual contact with an infected person.

HOTS QUESTIONS :

1. Adolescent girls should have an iron rich diet because iron builds blood. Iron is needed at this stage.
2. Adolescents should not eat too much of junk food because they are deficient in nutrients like proteins, minerals and vitamins.

EXERCISES**A. Multiple Choice Questions (MCQs) :****Choose the correct answer for each of the following:**

1. (c) electrostatic force 2. (a) increases
3. (c) the edges have small area

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

1. F 2. T 3. T

C. Match the following columns :

1. (c) 2. (a) 3. (b)

D. Answer the following questions in brief :

1. i. Magnetic force ii. Electrostatic force
 iii. Gravitational force
2. Stretching a rubber band, pulling a spring.
3. It indicates that resultant force (net force) acting on it is zero.

E. Answer the following questions in detail :

1. Force as a push (when an object is moving away by applying force)
 - Pushing a door to open it
 - A lady pushing a pram
 - A vegetable vendor pushing a vegetable cart
 - A boy kicking a football

Force as a pull (when an object is moving towards the applied force)

- A horse exerts a pull to move a tonga
 - Pulling a door to open it
 - Drawing a bucket of water from a well
 - Opening a drawer of a table
2. We can prove that water pressure increases with the depth of water by the following activity. Take a tall can (empty talcum powder can). Make 3 holes in it on one side at different heights. Fill the can with water and observe what happens? Water from the lowest hole comes out with greatest pressure and hence it travels maximum distance, whereas water coming out from the highest hole falls nearest due to least pressure of water. Water from middle hole falls in between.

3. We know that earth is surrounded by air. This envelope of air is called atmosphere. Air is a mixture of gases. Like gases, air also exerts pressure on earth due to its weight. Atmospheric pressure is defined as the pressure exerted on an object by the weight of the air above it.

We can't feel this pressure because the pressure of the blood and that of fluids in our body balances out this atmospheric pressure.

HOTS QUESTIONS :

1. A dam is thicker at the base than the top because water pressure is more at the depth as compared to surface level due to which it controls and resists the water pressure.
2. According to rule, pressure exerted is inversely proportional to the area of contact. By this we can say that a pointed heel will hurt more as compared to a flat-soled shoe.
3. Shoulder bags having broader straps are more comfortable than those having thin straps because increasing area decreases the pressure.



12

Friction

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (c) rolling friction
2. (a) friction is low
3. (c) force

B. Fill in the blanks with correct words :

1. Rolling
2. friction
3. wasted

C. Give one word for each one of the following :

1. Friction force
2. Frictional
3. Roughness

D. Answer the following questions in brief :

1. **Sliding Friction** : The force required to keep an object moving with the same speed is a measure of sliding friction.
2. Friction always acts in a direction opposite to the direction of motion. If force is applied along the left, friction acts along the right and vice-versa.
3. The frictional force exerted by fluids (liquid and gases) is called drag.

E. Answer the following questions in detail :

1. We can minimise friction between two surfaces by the following ways:

By applying oil or grease on the surface :

When you apply oil or grease between the moving parts of a machine, a thin layer is formed between the two surfaces and as such the two surfaces do not directly rub against each other. The movement becomes smooth as interlocking of the two surfaces is avoided to a large extent. The substances which reduce friction are called lubricants.

Examples : applying oil on the hinges of the door or oiling a sewing machine, applying grease on the moving part of a motor or a bicycle.

By using wheels, ball bearings :

Ball bearings change sliding friction to rolling friction. The force of friction when a body is rolled on a surface is much less than that when pushed on a flat surface. Small metal balls made of stainless steel, brass or ceramic are placed between moving parts to reduce friction.

By sprinkling a soft, fine powder on the surface :

This is the reason why talcum powder is sprinkled on carrom boards and graphite powder is applied to the moving parts of a machine.

2. **Causes of Friction :** Frictional force comes into play only when two surfaces are in physical contact and is therefore, a contact force.
 - No solid surface is perfectly smooth— There are a large number of irregularities present on the two surfaces in contact. Some are more rough than others. In other words, all solid surfaces are rough, only the degree varies. When an object moves over another surface, the irregularities in the two surfaces interact with each other and oppose the relative motion between the two objects. Since a rough surface has more irregularities, the force of friction is greater if the surface is rough. Thus, friction is caused due to interlocking of irregularities in the two surfaces.
 - When two rough surfaces come in contact with each other, there are few places where the two surfaces meet. The atoms or molecules present at the contact point attract each

other due to electrostatic forces. It is this force of adhesion which opposes the motion of the two objects, this gives rise to frictional force.

3. **Kinds of Friction**

There are three kinds of friction. They are :

- Static friction
- Sliding friction
- Rolling friction

Static Friction : Static friction comes into action when we try to move an object which is at rest. In other words, when we increase the applied force, the force of friction also increases and the body remains stationary. Thus, the static friction is a measure of the force required to overcome friction to start moving on object at rest.

Sliding Friction : The force required to keep an object moving with the same speed is a measure of sliding friction.

Sliding friction is slightly less than static friction.

This is the reason why it is easier to move a box which is in motion than to move one which is at rest.

Rolling Friction :

The force of friction offered when rolling an object on the surface of another object is called rolling friction. Rolling friction is smaller than sliding friction. The friction offered by a rolling marble is an example of rolling friction.

HOTS QUESTIONS :

1. Because the peel of banana is slippery and the force of friction becomes low.
2. People rub their palms in winter when they feel cold because by rubbing friction produces heat that make us feel warm.



13

Sound

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (d) vacuum 2. (b) hertz 3. (d) 20-20,000 Hz

B. Write 'T' for the true statement and 'F' for the false one :

1. F 2. F 3. T

C. Match the following :

1. (b) 2. (c) 3. (a)

D. Answer the following questions in short :

1. Sound is produced by vibrating objects.
2. Sound which is pleasing to the ear is called musical sound. But unpleasant sound is called noise.
3. Frequency = $\frac{\text{Oscillates}}{\text{Second}} = \frac{25}{5} = 5$

E. Answer the following questions in detail :

1. **Sounds Produced in a larynx :** Sound is produced by the voice box or the larynx in humans. It is situated in the neck at the upper end of the wind pipe.

If we place our fingertips on the throat we will find a hard bump which moves when you make noise or swallow. This is the voice box. The sound produced is controlled by vocal cords. They are stretched across the voice box in such a way that they leave a narrow slit between them for passage of air. Muscles attached to the vocal cords can make the vocal cords loose or tight. When air from the lungs is forced out through the slit, the vocal cords vibrate to produce sound. The quality of voice varies depending upon whether the muscles are tight and thin or loose and thick.

2. **Noise Pollution :** Just like air and water pollution, noise pollution is also harmful. Major causes of noise pollution are sound of vehicles, bursting of crackers, machines, T.V's, radio, music system played at high volume, loud speakers, etc.

Harmful Effects of Noise Pollution : Prolonged exposure to loud noise can lead to temporary or permanent impairment of hearing. Lack of sleep, hypertension, anxiety, etc. are some other health problems caused due to noise pollution.

How to control noise pollution:

- Noise producing industries should be set away from residential areas.
- Do not play loud music.
- Avoid use of loud speakers.
- Use horns minimally.
- Installation of silencing devices in aircraft engines, automobiles, industrial machines and home appliances.
- Plant trees along roads and buildings as they act as noise absorbers and cut down sounds reaching the residents.

3. With the help of following activity, let us study how the vocal cords work.

- Take two small rubber strips of the same size.
- Place the two strips on top of each other and stretch them tightly.
- Blow air through the gap between the two strips.



Notice a sound.

Sound is produced as air passes through the two strips. Now repeat the activity without stretching the rubber strip. Do you observe any change in the quality of sound produced?

The vocal cords work in the same manner.

HOTS QUESTIONS:

1. Humans cannot hear the sound of the whistle used in dog training because it is ultrasonic sound and the sound is outside our audible range.
2. We are not able to hear all sounds produced by animals because some animals produce ultrasonic sounds and infrasonic sounds, they are outside our audible range.

Unit V. How Things Work

Chemical Effects of Electric Current

14

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) cathode
2. (a) cathode
3. (a) pure water

B. Fill in the blanks with the correct words :

1. negative
2. distilled
3. electroplating

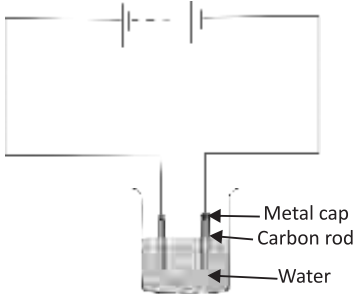
C. Give one word for each one of the following :

1. Silicon
2. Electrons are present around the nucleus in different orbits.
3. Light Emitting Diode

D. Answer the following questions in brief :

1. Tap water, lemon juice
2. The two poles by which an electric current (electrons) enters or leaves the electrolytes are called electrodes. They are usually made of metals or graphite. They are connected to the terminals of a cell or a battery.
3. The process of causing chemical changes on passing electricity through some conducting liquid is known as chemical effects of current.

E. Answer the following questions in detail :

1. Take two discarded cells and take out the carbon rods from them carefully. Clean the metal caps with sand paper. Take two copper wires and wrap them around the carbon rods and join them to a battery. These are our two electrodes. You can substitute iron nails (6 cm long) for carbon rods.  Passing current through water. Take water in a beaker. Add a teaspoon of salt or few drops of lemon juice to make the water more conducting. Position both the electrodes in the beaker in such a way that the metal caps or the carbon rods are outside the water. Wait for 3-4 minutes. Observe the electrodes carefully.

You will see tiny gas bubbles near the electrodes connected to the negative terminal of the cell due to the formation of hydrogen gas. Chlorine gas will be produced at the electrode connected to the positive terminal of the cell but since the reaction is extremely slow it is not visible.

The passage of an electric current through a conducting liquid causes chemical reactions. The resulting effects are called chemical effects of current.

3. **Electroplating :** The process of deposition a thin layer of one metal on top of another 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 gets dissolved in the solution and this process continues. In other words, copper gets transferred from the anode to the cathode.

Electroplating is done for many purposes :

- Electroplating is used to coat a metal having some special property like wear resistance, corrosion protection, aesthetic qualities which the object metal does not possess.
- Silver and gold are used in electroplating jewellery made of cheaper metals, cutlery and statues to give them good appearance at a much lower cost.
- Zinc coating is used to protect iron from rust and corrosion.
- Iron is electroplated with tin in the making of tin cans used in storing food, as tin reacts less with food compared to iron.

HOTS QUESTIONS :

1. This is so because water is a good conductor of electricity. To be remained safe from electric shock a fire man shuts off the electrical supply of the area before putting out the fire with a water hose.
2. Disposal of waste from electroplating factories is a major problem as it is highly polluting. These substances get mixed with the air and water and pollute it in big way. Electroplating is hazardous to the environment.



15

Some Natural Phenomena

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (b) conductor
2. (d) metal rod
3. (a) seismic zone

B. Write 'T' for the true statement and 'F' for the false one:

1. F
2. F
3. F

C. Give one word for each one of the following :

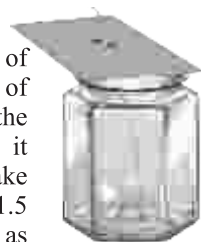
1. Silk
2. Focus
3. Charged object

D. Answer the following questions in brief :

1. The loud noise heard during lightning is called thunder.
2. When the plastic refill is rubbed with a polythene piece, it acquires a small electric charge by friction. The object which acquires the charge is called the charged object. Static electricity produced by this method is called charging by friction.
3. Lightning conductor is a device which consists of a long copper rod with sharp spikes at its upper end. The lower end of the rod is connected to a large copper or aluminium piece buried deep inside the Earth.

E. Answer the following questions in detail :

1. Take an empty jam jar. Cut a piece of cardboard slightly bigger than the mouth of the bottle. Make a hole in the centre of the cardboard. Take a paper clip and open it completely as shown in the figure. Now take two strips of aluminium foil of about 1×1.5 cm each. Hang them on the paper clip as show in the figure. Charge a refill by rubbing on your hair and bring it near the end of the p a p e r c l i p .



A Simple
Electroscope

The two foil strips repel each other.

You can repeat the activity using different charged bodies like a refill, balloon, ebonite rod.

2. **Lightning :** Lightning is a spectacular sight in nature. You know, that air currents move upwards and water droplets move downwards during a thunderstorm.

Due to this movement, the charges in the water molecules of the cloud separate in such way that the positive charges concentrate near the upper edges of the clouds and the negative charges near the lower edges of the clouds and the negative charges near the lower edges. These charges keep building up. Air, as we know, is an insulator, but when the magnitude of accumulated charges builds up, the insulating property of air breaks up and it is no longer able to resist their flow. The negative and positive charges meet resulting in the production of streaks of bright light and sound. The process is

called electric discharge.

3. **Lightning safety**

- Rush to a safer place on hearing thunder.
- Wait before coming out of the safe place for sometime after hearing the last thunder.

Outside the House

- Open vehicles like cycles, scooters, motobikes, tractors are not safe. Open places, shelters in parks are also not safe. Do not run across large open field or high ground.
- Do not lie down on the ground. It is better to squat low on the ground with your hands on your knees and head between your head.
- Do not take shelter under a tree. In case they get struck by lightning, there is a danger of getting burnt.

If Inside the House

- Unplug all electrical appliances like TVs, computers, etc.
- Avoid contact with running water and, hence, do not take a bath.
- Do not touch metallic objects like metal pipes, railing or electric wires.

HOTS QUESTIONS :

1. A crackling sound is heard while taking of nylon clothes because nylon is electrical charged by static friction of our body.
2. We should not carry an umbrella when a thunderstorm is predicted because umbrella has a metallic rod which can catch the electric current fall from thunderstorm.



16

Light

EXERCISES

A. Multiple Choice Questions (MCQs) :

Choose the correct answer for each of the following:

1. (a) all of these 2. (c) marble 3. (a) red

B. Fill in the blanks with the correct word :

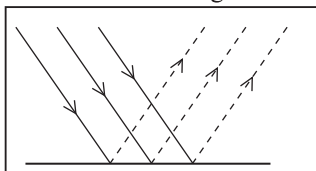
1. reflection 2. dispersion 3. same

C. Match the following columns :

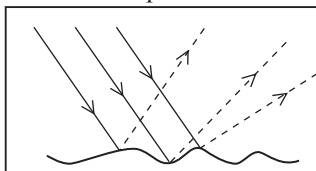
1. (b) 2. (d) 3. (e) 4. (c) 5. (a)

D. Answer the following questions in brief:

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 or irregular reflection

When light 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.

This is called irregular or diffused reflection.

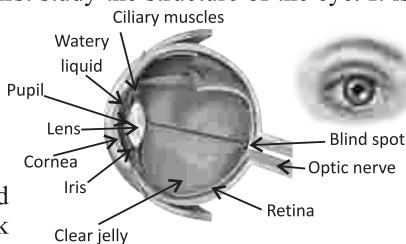
2. The process of splitting up of white light in to many colours is called dispersion.
3. The abnormalities in the normal vision of the eye are called defects of vision.

E. Answer the following questions in detail :

1. Characteristics of the Image Formed by a Plane Mirror :
 - i. Image is virtual. It means the image cannot be taken on a screen.
 - ii. Image is of the same size as that of the object.
 - iii. Image is formed as far behind the mirror as the object is in front of it.
 - iv. Image is laterally inverted. It means left hand side of the object appears as right hand side of the image and vice versa.
 - v. Image is erect.
2. **Human Eye** : Eyes are very important part of our body. It is very delicate. Let us first study the structure of the eye. It is spherical in shape.

Cornea : It is a very thin transparent membrane which covers the front of the eye.

Iris and pupil : Behind the cornea is a dark coloured muscular



Human Eye

structure called iris. The central circular opening in the iris is called the pupil.

The pupil appears black in colour because no light is reflected from it. The size of the pupil is controlled by the iris. The iris increases 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.

Eye lens : Behind the pupil is the eye lens. It is a convex lens made up of a transparent jelly-like material.

Retina : In the back of the eyeball is a lining called the retina. The eye lens focuses the image of the object on the retina. The retina contains several nerve cells. The retina has two types of cells called rods and cones.

- The rod shaped cells are sensitive to brightness or darkness or dim light.
- The cone shaped cells are sensitive to colours.

Blind Spot : There are no rods and cones at the point where the optic nerves leaves the eye, so no vision is possible at this spot. This is called the blind spot.

3. Foods rich in vitamin A are :

- (i) Vegetables such as raw carrots, broccoli, green vegetables (spinach).
- (ii) Milk and milk products like curd, cheese, butter.
- (iii) Eggs.
- (iv) Fruits such as mangoes and papayas.
- (v) Cod liver oil.

HOTS QUESTIONS :

1. We get a clear image from new stainless steel utensils and not from old stainless steel utensils because reflection of old stainless steel is irregular due to which no clear image is formed.
2. He is suffering from short sightedness or myopia.