

Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. In humans lower jaw is movable. It helps to chew and grind the food.
 2. All living organisms show movements. We can observe many movements in our body. For example, our teeth chew and grind the food, the heart beats to circulate the blood to all parts of the body. We see objects around us by moving our eye balls. The chest moves up and down when we breathe.
 3. Biceps and triceps are the two types of muscles that are involved in the bending and straightening of arms.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

- Ans.** 1. (d) 2. (d) 3. (d) 4. (c) 5. (b) 6. (b) 7. (c) 8. (d) 9. (a) 10. (c) 11. (a) 12. (a) 13. (c) 14. (a) 15. (b)

C. Fill in the blanks :

- Ans.**
1. The bones at the elbow are joined by a **hinge** joint.
 2. The part of a skeleton where two or more bones meet is a **joint**.
 3. A Cockroach has three pairs of **legs**.
 4. The spinal cord is a part of the **nervous** system.
 5. Joints of the bones help in the **movement** of the body.

D. Write True or False for the following statements :

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

E. Tick the odd-one out giving reasons :

- Ans.**
1. Snail, Cockroach, Fish, Crab.
 2. Spine, Rib cage, Biceps, Skull.
 3. Fins, Wings, Seals, Head.
 4. Pivotal joint, Hinge joint, Tibia, Gliding joint.

Section 2 : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.**
1. Locomotion : The movement of an organism bodily from one place to another is called locomotion. Locomotion involves the whole body but only a particular body part is used for locomotion.
 2. Skeletal system : The human skeleton or skeletal system is made up of

206 bones. A baby has 300 bones in all. But as it grows, some of the bones fuse together or join. Before we learn more about bones and the joints where they are joined together.

3. Cartilage : At the joints between two vertebrae a pad of flexible material called cartilage is found.
4. Pivotal joint : In such joints one bone twists or rotates against another. The skull resting on the vertebral column is an example. This type of joints allow movements in many planes up and down and sideways etc.
5. Muscular system : Muscles are attached to the bones. This makes it possible for the bones to move at the joints. The muscular system consists of muscles. These muscles help in movement.
6. Flopping : Flapping : The other type of flight of a bird is called flapping. It is an active flight, the bird beats the air with its strong wings. The flight feathers attached to the wings are of great help. Birds also have streamlined bodies, feathers and hollow bones, which make them well suited for flying.
 - i. The bones of the hind limbs of the birds are typical for walking as well as perching. Their shoulder bones are strong.
 - ii. The breast bones are modified to hold massive flight muscles which are used to move the wings up and down.

G. Answer the following questions in short :

- Ans.**
1. Movement is the change in the position of any part of the body with respect to its axis. Whereas the movement of an organism bodily from one place to another is called locomotion.
 2. Running through the centre of the chest is the breastbone, or sternum. Joined to it are 10 pairs of strong, flexible bones called ribs. The ribs curve around and join the chest vertebrae at the back, to form a protective cover for the lungs and heart, called the ribcage. Another two pairs of ribs are joined only to the backbone. These are called floating ribs. The ribs are attached to the sternum in such a way as to allow the ribcage to expand when we inhale, or breathe in.
 3. Ball and socket joints : These joints are found where the rounded head of one bone fits into the cup shaped socket of another bone. These joints are found at the hips and shoulders. These joints allow movement in all directions.
 4. An earthworm has a long cylindrical body made up of many rings or segments joined end to end. It has a liquid skeleton. On the under-surface of the body, a number of minute bristles are present that help the earthworm to get a firm grip on the ground. Muscles attached to these bristles help to contract the body.
 5. Stream lined body, hollow bones, wings and feathers are the four features present in birds which enable them to fly.

H. Answer the following questions in detail :

- Ans.** 1. Muscles are attached to the bones. This makes it possible for the bones to move at the joints.

The muscular system consists of muscles. These muscles help in movement.

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

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

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

2. The joints in the body are divided into three main groups.

(i) Immovable or Fixed Joints

These joints do not allow any movement between the bones. For example, the bones of the skull (except the lower jaw bones) are interlocked with each other and held together by fibrous cartilage, which do not allow any movement.

(ii) Slightly Movable Joints

These joints allow very little movement due to the presence of a pad of flexible cartilage between their ends. For example, joints present between adjacent vertebrae in the backbone or spine allow only slight movements. This kind of joint provide more support.

(iii) Freely Movable Joints

Most of the joints in the human body are freely movable.

Movable joints can be further classified into the following different types, depending on the type and extent of movement they allow :

Ball and socket joints : These joints are found where the rounded head of one bone fits into the cup shaped socket of another bone. These joints are found at the hips and shoulders. These joints allow movement in all directions.

Pivotal joint : In such joints one bone twists or rotates against another. The skull resting on the vertebral column is an example. This type of joints allow movements in many planes up and down and sideways etc.

Hinge joints : These are the joints which allow movement in one plane only, like the hinges on the doors and windows. One example is your elbow, which allows the forearm to move up and down. Hinge joints are found at the jaw and in your fingers. The movement by this joint is not more than 180° . The knee joint is also an example of this joint. The wrist has double hinge joint.

3. The bones of our body act as framework or give it shape. Without bones, our body could be a shapeless mass, say like the body of a snail. The bones give our body support.

The bones also protect delicate internal organs. For example, the skull protects the brain, which lies inside it, and the ribs protect the heart and lungs.

The third function of the bones is to help us move. It is the movement of the bones that helps us bend, run, walk, and so on. As you will read later in this chapter, the muscles attached to the bones help them move. All vertebrates move with the help of bones and muscles.

The long bones in our body, for example, the ones in the arms and legs, have another function. These bones have a hollow centre, containing a soft tissue called marrow. The marrow helps to make fresh blood.

4. The backbone is also called the vertebral column or spine. It extends from the base of the skull to the hip. We stand erect because of the backbone and the very strong back muscles. It is composed of 33 small, ring like vertebrae joined end on end. The first twenty four vertebrae are joined serially by elastic like material called cartilages. It forms a hollow bony tube. The main nerve cord passes through it. The vertebrae can move over each other. This allows us to bend twist our back as shown.
5. (a) Cockroach : A cockroach can walk and jump as well as fly. It has three pairs of jointed legs. Its body is covered with a hard covering or the outer skeleton. It is a hard, jointed, external covering that encloses the muscles and organs of the insect. It has several joints which are supported by muscles, helping in movement. Arising from this upper part of the body is a pair of wings. These help in flying. The muscles of a cockroach also coordinate movements of their wings and legs.
(b) Snail : Snails have a soft body, which they can pull back into their shell. They have a large, flat foot, which helps them move forward. The foot secretes a slimy substance, which helps the snail glide over the ground, dragging its heavy shell with it. The movement of the foot is controlled by muscles attached to it.
(c) Fish : Observe a fish while it moves in an aquarium. You will find that the head and tail of the fish are smaller than the middle portion of the body. The body tapers at both the ends. The shape is called streamlined. Most fish have a streamlined-shaped body, This kind of shape helps a fish

to overcome the resistance offered by water as it cuts through it making it easier for the fish to swim through water. The fish moves in a wave-like manner. This movement is made possible by strong muscles attached to the flexible backbone. During swimming, muscles make the front part of the body curve to one side and the tail part moves towards the opposite side. The fish forms a curve or a loop as shown in the figure given below. Then quickly the body and the tail curve to the other side. This produces a jerk and pushes the body forward. A series of such jerks make the fish swim ahead. This is helped by the fins present in its body. Fish have fins on their body which help to keep the balance of the body and to keep direction while swimming. They also act as 'brakes' when the fish needs to stop on the way. The tail fin acts like a rudder to change the fish's direction while swimming.

(d) Snake : One surprising characteristic of a snake is its ability to move rapidly without legs. The snake's body is covered by a special structure called scales. It moves by crawling on its belly.

A snake has a long vertebral column, which is made up of 100 to 400 vertebrae connected by ball and socket joints. Each vertebra is connected to a pair of ribs, which are also connected to belly scales at the bottom. Strong muscles attached to the ribs, vertebrae and belly scales are responsible for the movement of a snake's body.

A snake moves by turning its body into several loops on alternate sides. Each loop of the snake gives it a forward push by pressing against the ground. Since its long body makes many loops and each loop gives it this forward push, the snake moves forward very fast. Snakes do not move in a straight line. They move in a wave-like manner.

6. The birds generally fly. They show two different kinds of flight, (a) gliding and (b) flapping

(a) Gliding : While gliding, the bird has its wings and tail spread out. In this type of flight the bird uses air currents for going up and down.

(b) Flapping : The other type of flight of a bird is called flapping. It is an active flight, the bird beats the air with its strong wings. The flight feathers attached to the wings are of great help. Birds also have streamlined bodies, feathers and hollow bones, which make them well suited for flying.

i. The bones of the hind limbs of the birds are typical for walking as well as perching. Their shoulder bones are strong.

ii. The breast bones are modified to hold massive flight muscles which are used to move the wings up and down.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Formative Assessment-2

A. Answer the following questions orally : 1½

- Ans.**
1. All living organisms show movements. We can observe many movements in our body. For example, our teeth chew and grind the food, the heart beats to circulate the blood to all parts of the body. We see objects around us by moving our eye balls. The chest moves up and down when we breathe.
 2. In most of the desert plants, the leaves get modified into spines. These pointed structures protect the plants from their enemies. Example : Prickly pear, Opuntia (cacti).
 3. The two examples of irreversible changes that take place due to heating are as :
 - (i) Burning of paper
 - (ii) Bursting of a cracker

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. (c) 2. (d) 3. (c) 4. (c)

C. Fill in the blanks :

- Ans.**
1. The spinal cord is a part of the **nervous** system.
 2. Cacti plants are called **desert** plants.
 3. Leaves are **green** in colour while roots are **non-green**.
 4. Sugar, when heated, forms **charcoal** and **water**.

D. Write True or False for the following statements :

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

E. Match the following :

- Ans.**
- | | | |
|-------------------------|---|-------------------------------|
| 1. Milk changes to curd | → | (i) slow change |
| 2. Temporary change | → | (ii) Irreversible change |
| 3. Change of seasons | → | (iii) Physical change |
| 4. Rusting of iron | → | (iv) Can be compressed easily |
| 5. Air | → | (v) Chemical change |

F. Tick (✓) the odd-one out giving reason : 4

- Ans.**
1. Forest fire, Eruption of volcanoes, Floods, Formation of Curd
 2. Sepal, Anther, Flowers, Pistil
 3. Fins, Wings, Seals, Head
 4. Potato, Pea, Gram, Mango

Summative Assessment-1

A. Name the following :

- Ans.** 1. Autotroph 2. Nutrients 3. Matter 4. Winnowing

B. Define the following terms :

- Ans.**
1. **Omnivore :** These are the animals which eat both animal flesh and plant products. Dogs, cats and crows are examples of omnivores.
 2. **Handpicking :** If the mixture comprises solids of different colours, shape or sizes, it can be separated by handpicking. You have seen your mother picking stone pebbles from rice or pulses or from wheat or other foodgrains. This method is normally used when the amount of impurities present is small and the material to be cleaned is also less in quantity.
 3. **Spinning :** The raw cotton is supplied to industry in the form of bales. This cotton is converted into yarn through the following steps. The process of making yarn from fibres is called spinning.
The raw cotton is loosened and cleaned from straw and dried leaves etc.
The cleaned cotton is then fed into a machine. Here the cotton fibres are combed, straightened and converted into a rope-like loose strand. This strand is called sliver.
The strand of cotton fibre (or sliver) is converted into yarn on spinning machines.
During spinning, the strand is pulled and twisted at the same time. Thrusting makes the yarn stronger.
 4. **Lustre :** The materials which have a special shine on them are said to be lustrous and the special shine on them is called lustre.
 5. **Configuration :** The method of separating lighter and heavier particles from the liquid by rotating the liquid in a machine is called centrifugation. In this method, heavier particles settle down and lighter particles remain on top. Cream is separated from milk by centrifugation. As cream is lighter, it separates and floats at the top of the milk.
 6. **Stomata :** the tiny pores on leaf surface that help in the exchange of gases during respiration.
 7. **Herbs :** Plants with soft green stems are called herbs. They are generally short in height and have no branches, for example, basil and coriander.
 8. **Limbs :** There are two pairs of limbs : (a) a pair of forelimbs or arms and (b) a pair of hind limbs or legs. The bones of the arms are joined to the spine by the shoulder girdle and the collar bone. Our upper arm has only one bone called humerus. In our lower arm there are two bones called radius and ulna. The bones of legs are joined to the spine by hip girdle. Our upper leg has one bone called femur or thigh bone. It is the longest bone in our body. Our lower leg has two bones called tibia and fibula.

C. Differentiate between the following :

- Ans.**
1. **Threshing :** Threshing is the process of separating grains from the stalks after the harvesting of the crop.
Winnowing : Winnowing is the process of separating the grain from the chaff.

2. **Mass :** Mass is the amount of substance that something contains.
Volume : It is the amount of space occupied by a material.
3. Living things grow, reproduce, need food, excrete, respire etc and are made up of cells.
While non-living things do not show these characteristics and are made up of molecules.
4. Skeletal system is made up of bones. It provides the shape of our body.
The muscular system consists of muscles. These muscles help in movement.

D. Give reasons for the following :

Ans. Do yourself

E. Answer the following questions in short :

- Ans.**
1. 'A balanced diet is one which contains all the nutrients in proper amount according to age and work we do.'
 2. In the hot weather conditions synthetic clothes are not suitable.
 3. Mixtures can be either homogeneous or heterogeneous. A homogeneous mixture is a type of mixture in which the composition is uniform. In it the components are not easily visible. For example, air is a homogeneous mixture of different gases such as nitrogen, oxygen, carbon dioxide etc.
A heterogeneous mixture, on the other hand, is a mixture in which the components are easily visible. For example, the mixtures of sand and water or sand and iron filings.
 4. The maximum amount of a solute that can be dissolved in 100 millilitres of the solvent at the room temperature is called the solubility of that substance.
 5. Photosynthesis : Leaves prepare food of the plant. They use carbon dioxide, water and chlorophyll in the presence of sunlight to make sugar and starch. This process is called photosynthesis.
 6. An earthworm has a long cylindrical body made up of many rings or segments joined end to end. It has a liquid skeleton. On the under-surface of the body, a number of minute bristles are present that help the earthworm to get a firm grip on the ground. Muscles attached to these bristles help to contract the body.

F. Answer the following questions in detail : 16

- Ans.**
1. Some portion of the food we eat cannot be digested by the body. This part is mainly cellulose. It is a carbohydrate present in plant foods such as fruits and vegetables. It is called roughage. It forms an important part of our diet because of the following reasons.
It adds bulk to our food. Since it is not digested, it passes down the entire digestive tract from the mouth to the anus. The muscles of the digestive tract need this bulk to push against like squeezing toothpaste out of a tube. It prevents constipation and ensures proper bowel movement. Many doctors believe that a high-fibre diet reduces the risk of heart diseases and

bowel cancer.

2. The act of passing a liquid through a filter or a piece of equipment in order to remove particular undissolved substances is known as filtration. The insoluble solids which cannot be separated by decantation are passed through a sieve or strainer or filter paper in filtration. The strainer or sieve used is the filter, the clear liquid obtained is called the filtrate and the insoluble solid which gets separated is called the residue. Muddy water can be cleaned by filtering it by placing folded filter paper in a funnel and pouring the muddy water through it while stirring it. The clear solution collects in the container and the mud remains on the filter paper. The water filters we use in our households contain special types of filters which separate all possible insoluble impurities from the water and make it potable.

3. Cotton was known to the ancient people for long. Cotton was being used in India around 1800 BC. The Greek historian Herodotus (500 BC) introduced cotton to the Europeans.

In India, cotton is cultivated in the northern, central and western parts such as Maharashtra, Gujarat, Punjab, Haryana, Rajasthan, Tamil Nadu, and Madhya Pradesh.

Uses Of Cotton

Cotton is mostly used for making cloth of various kinds, towels, curtains etc.

The blends of cotton with man-made fibres such as viscose and polyester are used as dress materials.

Cleaned and sterilised cotton is used as absorbent in hospitals. Bandage is also made of cotton thread.

The dispersed cotton is used as filler in mattresses, pillows and quilts.

Cotton cloth or strands of spun cotton yarn are used in mops for cleaning floor.

4. When we can see easily through some material, then the material is said to be transparent and this property is called transparency.

Conversely, when you cannot see through some material, then the material is said to be opaque and this property is called opacity.

(a) Solids : On the basis of the above phenomenon, matter can be classified as transparent or opaque.

Solids are generally opaque. For example, metals, wood, stones, etc., are opaque in nature. However, some solids such as glass, diamonds and certain kinds of plastics are transparent.

(b) Liquids : Most of the pure liquids are transparent in nature. For example, water, alcohol, petrol, etc., are transparent in nature.

(c) Gases : All gases, oxygen, nitrogen, carbon dioxide, etc., and even the coloured gases, such as chlorine and nitrogen dioxide are transparent in nature.

However, there are other kind of materials through which things are

partially visible. Such materials which allow the light to pass through them partially are called translucent materials.

However, there are other kind of materials through which things are partially visible. Such materials which allow the light to pass through them partially are called translucent materials.

Examples of translucent materials :

Ground glass, oiled paper, butter paper, deep water, muddy water, fog, mist, dust laden air are the examples of translucent materials.

- | | |
|----------------------|---------------------|
| 5. Reversible change | Irreversible change |
|----------------------|---------------------|
1. A reversible change is a temporary change.
 1. An irreversible change is a permanent change.
 2. When conditions are reversed, the substance/ object gets back to its original state.
 2. Substance or object cannot be reversed back to its original form/state even when conditions are reversed.
 3. Examples : Stretching of a rubber band, melting and freezing, dissolution of sugar in water, glowing of an electric bulb.
 3. Examples : Burning of coal, conversion of milk into curd and cheese, growth of plant etc.
 6. All living and non-living things are made up of matter. You have already read that matter occupies space and has mass. Thus, all living and non-living things have mass and occupy space. Another common feature between living and non-living things is that they are made up of structural units. A non-living thing like a chalk can be broken into smaller and smaller particles until you get the smallest piece of chalk. You have read that a molecule is the smallest unit of matter. So a molecule is the structural unit of chalk. Thus, molecules are the structural units of non-living things. The structural unit of a living thing is the cell. Cells vary in size and shape. There are different kinds of cells in the body of a living thing. Cells can be seen under a microscope.
 7. Flowers vary in shape, size and colour. But most flowers have the same basic structure, as seen in the figure given below.

A flower, in general, shows four sets of parts arranged in rings or whorls sepals, petals, stamens and pistil (or carpel).

The outermost whorl consists of small, green, leaf-like structures called sepals. Sepals protect the flower in its bud stage (young, unopened condition of a flower).

The inner whorl consists of the petals. These are the most prominent part of a flower and are usually brightly coloured. Large brightly coloured petals can be easily seen in flowers of china-rose and gulmohar.

Petals conducts two important functions :

- (i) They attract pollinators.
- (ii) They make a flower look beautiful.

If we remove the sepals and petals, we can see the next whorl which is that of stamens. These are the male reproductive parts of a flower. Each

stamen consists of two parts.

- (i) a thin long stalk called filament, and
- (ii) a knob-like structure at the tip of the filament called anther. The anther produces male gametes in large numbers.

The innermost part of a flower is called the pistil or carpel. It is the female reproductive part of a flower.

Each pistil consists of three parts-ovary, style and stigma. Ovary is the swollen portion at the base of the pistil. The ovary extends above as a thin long structure called style. The style ends in a knob-like structure at the tip called stigma. The stigma receives the male gametes.

The ovary contains many bead-like structures. These are called ovules. These ovules contain the female gametes. Ovary and ovules finally develop into fruits and seeds respectively. In most plants, all the four whorls are present in a flower. Such flowers are called complete flowers.

Examples : petunia, pea, mustard, hibiscus and gulmohar

In some flowers, one or more whorl is missing. Such flowers are called incomplete flowers.

Examples : date palm and mulberry

8. The birds generally fly. They show two different kinds of flight, (a) gliding and (b) flapping

(a) Gliding : While gliding, the bird has its wings and tail spread out. In this type of flight the bird uses air currents for going up and down.

(b) Flapping : The other type of flight of a bird is called flapping. It is an active flight, the bird beats the air with its strong wings. The flight feathers attached to the wings are of great help. Birds also have streamlined bodies, feathers and hollow bones, which make them well suited for flying.

i. The bones of the hind limbs of the birds are typical for walking as well as perching. Their shoulder bones are strong.

ii. The breast bones are modified to hold massive flight muscles which are used to move the wings up and down.

Unit 4 : Moving Things People and Ideas

Motion and Measurement of Distances

9

Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

Ans. 1. People need the modes of transport to move from one place to another.

- Hand span is not a proper unit of measurement of length because hand spans of different people will be of different size.
- The standard units people of different countries developed over the years were accurate enough. However, one problem still remained. They were not uniform. To solve this problem scientists introduced 51 units.
- All periodic motions are repetitive but all repetitive motions are not periodic.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

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

C. Fill in the blanks :

- Ans.** 1. The distance between any two points placed apart from each other is called **length**.
2. The standard unit of distance is **metre**.
3. The motion of a body in straight line is described as **rectilinear** motion.
4. A cyclist going around a curve shows **circular** motion.
5. The hands of a watch show **rotatory** motion.

D. Write True or False for the following statements :

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

E. Match the following :

- Ans.**
- | | | |
|------------------------|---|---------------|
| 1. length | → | (i) ampere |
| 2. mass | → | (ii) mole |
| 3. time | → | (iii) candela |
| 4. temperature | → | (iv) metre |
| 5. electric current | → | (v) second |
| 6. amount of substance | → | (vi) kilogram |
| 7. luminous intensity | → | (vii) kelvin |

F. Tick (✓) the odd-one out giving reason :

- Ans.** 1. Cycle, Car, Bus, Television
2. String length, Hand Span, Footstep, Metre
3. Centremetre, Metre, Kilometre, Hand span
4. Length, Mass, Time, Area
5. Circular motion, Rotational motion, Periodic motion, Rest

Section 2 : Summative Assessment (CCE Pattern)

G. Define the following terms :

- Ans.** 1. The position of rest : There are many objects around us which are movable like chairs, tables, beds, televisions, light bulbs, clocks, scooters, cars, etc. However, the movable objects which do not change their position with time and remain at the same place with respect to stationary objects are said to be at rest.

2. Curvilinear motion : Curvilinear motion is a translational motion along a curved path.
3. Standard unit of measurement : A standard unit is a standard or fixed measure of a physical quantity, such as length or time. We need standard units for two major reasons.
 1. To measure quantities accurately
 2. To convey these measurement to other people in such a way that they understand us, or for the sake of uniformity.
4. Periodic motion : Periodic motion is a motion which repeats itself after a fixed interval of time.
5. Vibratory motion : Vibratory motion is that in which a body moves to and fro about its mean position.

H. Answer the following questions in short :

- Ans.**
1. It is important to know the distance between various objects or places. It helps us in determining which mode of transport we should use to go from one place to another.
 The knowledge of the distance between various objects or that between two points of an object also helps us in determining the size of various objects around us. Sometimes we need to know the length and breadth of objects.
 The knowledge of the distance between various places helps us in determining the time taken to travel to these places.
 2. In daily life, there are many occasions when one needs to know the length of something or the distance between any two points.
 For example :
 1. you may need to know how tall you are to choose clothes of your size from the market.
 2. one needs to know the height of bridges from the road to allow the traffic to pass through them.
 3. you need to know the length and breadth of a room to make a bed of an appropriate size which will fit into it.
 4. one needs to know the length and width of doors or windows to determine the cloths required to make curtains.
 3. In our daily life, we might have to measure these quantities :
1. length 2. mass 3. time 4. temperature
 4. In all the measurements used previously, footsteps, hand spans and arm's lengths are used as units of measurements of length. However, length measurements using hand spans, arm's lengths, footsteps, sticks and thread strings are crude methods of measurement of length and give inconsistent results because hand spans, arm's lengths, footsteps, sticks and thread strings of different people will be of different size.
 5. To overcome inconsistency in the measurement of lengths, one must use some standard objects to measure the length of all objects at different

places. In other words, the same unit must be used to measure length everywhere. Such a unit is called a standard unit of measurement of length. The first internationally accepted standard of length was prepared using a bar of a platinum-iridium alloy called the standard metre. This standard metre is kept at the International Bureau of Weights and Measures near Paris, France.

6. To know the distance between two objects we have to measure that distance. Measurement is the scientific method to determine the value of a quantity.
7. The reading of the scale at one end = 5.6 cm
 The reading of the scale at other end = 57.2 cm
 The length of the box = 57.2 - 5.6 cm
 = 51.6 cm
8. Rectilinear motion : Rectilinear motion is a translational motion in a straight line.
 Curvilinear motion : Curvilinear motion is a translational motion along a curved path.
9. A moving fan shows the rotatory motion. Rotatory motion is that in which a body moves about a fixed axis without changing its position. A moving wheel of a bicycle shows a circular motion. It also changes its position.
10. Oscillatory motion is that in which a body moves to and fro about its mean position. Periodic motion is that which repeats itself after regular intervals of time. In an oscillatory motion a body has completed an oscillation at a fixed time period. This oscillation repeats at a fixed time period. This oscillation repeats itself after regular intervals of time. In this way we can say that all oscillatory motions are periodic motions.

I. Answer the following questions in detail :

- Ans.** 1. In ancient times, when no means of transport were available, people travelled mainly on foot and carried luggage on their back.
 After domestication of animals, human beings started using animals such as horses, camels and elephants for transportation and in carrying goods from one place to another.
 The invention of the wheel brought about many changes. Carts pulled by animals were used to travel from one place to another. The wheel is still the basis of all our vehicles like bicycles, scooters, cars and motor bikes.
 The invention of steam engine introduced a new source of power. It led to the development of trains and automobiles. Motorised ships were used as means of transport on water. These inventions greatly reduced the time taken to travel from one place to another.
 Today, electric trains, aeroplanes, supersonic jets and high speed automobiles have further reduced the time taken to travel from one place to another. Space ships are used for transportation to outer space.

2. Do yourself.
3. One metre is a useful standard unit for measuring things like cloth or rope. If you want to measure the length of your pencil box or your handspan, you will need a smaller unit. This is the centimetre. There are one hundred centimetres in one metre.

1 km	=	1000 m
or 1000 m	=	1 km
1 m	=	100 cm
or 100 cm	=	1 m
1 cm	=	10 mm
or 10 mm	=	1 cm
1000 mm	=	1 m

Length is the distance between two given points. This can be width, depth, thickness or height. We have seen that any measurement of length means the comparison of the unknown length with the known length such as 1 metre. For measuring long distances, we use the unit kilometre (km).

4. Following are the various types of motions :
 - (i) **Translatory motion** : Translatory motion is that in which all the particles of a body move through the same distance in the same time. Examples : moving truck or train, a ball rolling on the ground etc.
 - (ii) **Rotatory motion** : Rotatory motion is that in which a body moves about a fixed axis without changing its position. Examples : A patten's wheel, a spinning top etc.
 - (iii) **Oscillatory motion** : Oscillatory motion is that in which a body moves to and fro about its mean position. Examples : motion of a swing, pendulum of a clock.
 - (iv) **Periodic motion** : Periodic motion is that which repeats itself after regular intervals of time. Examples : motion of pendulum, heartbeat etc.
 - (v) **Repetitive motion** : Repetitive motion is that which occurs again and again. Examples : movement of lips while speaking etc.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Unit 5 : How Things Work

Electric Current and Circuits 10

Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

Ans. 1. Our body is a good conductor of electricity. A person gets an electric

shock if an electric current flows through his or her body. It can cause internal burns and can even be fatal. We need to take care to protect ourselves from dangerous and painful electric shocks.

2. The two terminals of an electric cell should never be joined without connecting them through electric switch and an electric device such as toy, alarm clock or an electric bulb. If done so, the chemicals in the electric cell get used up quickly and the electric cell stops working.
3. Toaster, iron, geysers, Heater and television are the five appliances used at home that work with electricity.
4. A bulb is fused when its filament is broken. This will stop the flow of the current in the circuit and the bulb will not glow.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

- Ans.** 1. (a) 2. (d) 3. (b) 4. (d) 5. (a)

C. Fill in the blanks :

- Ans.** 1. In an electric bulb, electric current flows through the **filament**, which gets heated up and starts glowing.
2. **Electric wires** allow electric current to flow through them.
 3. Electric wires are covered with **plastic**.
 4. Switch is used for **making** and **breaking** electric current.
 5. Electric current flows through a **closed** loop.

D. Write True or False for the following statements :

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

E. Tick (✓) the odd-one out giving reason :

- Ans.** 1. Silver, Graphite, Quartz, Brass, Gold
2. Dry Cell, Zinc Container, Zinc Oxide, Carbon rod
 3. Battery of Cells, Switch, Flash light bulb, Thread
 4. Solar Cell, Dry Cell, Storage Cell, Hydropower Plant, Electrolytic cell
 5. Rubber Metals, Alloys, Graphite, Wet Clothes

F. Define the following terms :

- Ans.** 1. Electrical Circuit : An electric circuit is a complete path of flow of electric current.
2. Non Conductors : The materials that do not allow electric current to pass through them are called non-conductors wood, plastic, rubber etc are the examples of non-conductors.
 3. Insulators : The materials that do not allow electric current to pass through them are called insulators. Wood, cotton, wool, plastic, rubber, mica, bakelite, ebonite, distilled water and glass are some insulators.
 4. Electric switch : Electric switch is a simple device that is used for making and breaking the electric circuit.

5. Dry Cell : A dry cell used in torches, toys, etc. consists of a zinc container, having a moist paste or ammonium chloride. It has a carbon rod fitted with a metal cap and wrapped in a muslin cloth bag, kept in its centre. The muslin cloth bag contains a mixture of powdered coke, graphite, zinc chloride and manganese dioxide.
6. Open Circuit : Do yourself.

G. Answer the following questions in short :

- Ans.**
1. Electric current is a form of energy, i.e., electrical energy, which gets converted into heat and light energy when it flows through an electric bulb or any other electrical appliance.
 2. Electric circuit is the combination of a battery, connecting wires and the device to be operated, for example, a bulb. They are connected in a manner to provide a complete path for the flow of charges from one terminal of the battery to the other, through the device.
 3. The materials that allow electric current to pass through them are called conductors. All metals, carbon (in the form of graphite), salt solutions and impure water are some conductors of electricity.
 4. The materials that do not allow electric current to pass through them are called insulators. Wood, cotton, wool, plastic, rubber, mica, bakelite, ebonite, distilled water and glass are some insulators.
 5. Electric circuit is the combination of a battery, connecting wires and the device to be operated, for example, a bulb. They are connected in a manner to provide a complete path for the flow of charges from one terminal of the battery to the other, through the device. An electric circuit is a combination of electric components including a battery connected in a manner to form a closed path for the flow of electric current through them.
 6. In a closed electric circuit, the electric current passes from the positive terminal of the electric cell to the negative terminal of the electric cell.

H. Answer the following questions in detail ?

- Ans.**
1. A torch usually has more than one electric cell. When more than one electric cell have to be used, they are joined to the electric circuit in such a way that the positive terminal of one electric cell is connected to the negative terminal of the other electric cell. The electric circuit in a torch with two electric cells is shown.
 2. To make a torch at home.
Material required : A torch bulb, an electric cell and a piece of electric wire.
Procedure : Remove the plastic covering a little at the ends of the wire.
Join one end of the electric wire around the base of the electric bulb using the tape and leave the other end free.
Fix the tip of the base of the torch bulb with the positive terminal of the electric cell with the help of a tape.

Now bring the tip of the free end of the electric wire in contact with the negative terminal of the electric cell.

Observe what happens.

You will find that the torch bulb starts glowing. Your torch is now ready.

Now remove the free end of the electric wire from the negative terminal of the electric cell.

Observe what happens.

You will notice that the torch bulb does not remain lighted.

3. Figure

4. When a complete electric circuit is connected across a battery, there is a flow of charges which constitute the movement of current from the positive terminal of the battery towards its negative terminal. In an electric circuit, the direction of the flow of current is always taken from the positive terminal to the negative terminal of the battery through the circuit. Conventionally, the direction of the flow of current is opposite to the direction of the flow of negatively charged electrons. Only when current passes through the filament of the bulb, it glows.

5. It is not possible to manually hold electric wires in contact with the electric cell when you need light and remove it when you do not need it. Therefore, a device called electric switch is used for making and breaking an electric circuit. Electric switches are used at home to switch on or off electric bulb, tube light, fan and other electrical equipment.

The stopping and starting of flow of electric current in an electric circuit is controlled by an electric switch.

6. Electrical appliances like a toaster, an iron press and geysers are very useful to us. Our body is a good conductor of electricity. A person gets an electric shock if an electric current flows through his or her body. It can cause internal burns and can even be fatal. We need to take care to protect ourselves from dangerous and painful electric shocks. Some preventive measures to avoid electric shock are as follows :

- (a) Replace the light bulb only when it is switched off and cool.
- (b) Never touch electrical switches or gadgets when body is wet.
- (c) Don't try to repair or install electrical wiring or appliances.
- (d) Do not touch electric poles and transformers on the road. Do not touch a hanging wire on the road.
- (e) Never fly kites near overhead power lines.
- (f) Never join the electric wire with bare hands.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Magnet and Its Properties

11

Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans. 1. Due to the magnetic force the ludo coins not fall from magnetic ludo, even if the board is inverted.
2. Plastic is non-magnetic because it is not affected by a magnet.
3. The magnetic strength is maximum at the poles of magnet. This is the reason that the iron filings not spread uniformly around a bar magnet.
4. A magnet can be demagnetized by hammering or excessive heating. So we should not heat or hammer a magnet.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

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

C. Fill in the blanks :

- Ans. 1. The materials, not affected by the presence of a magnet are called **non-magnetic**.
2. The line passing through the centre of two poles of a bar magnet is **axial line**.
3. **Magnetic compass needle** is used to map the hypothetical magnetic lines of force.
4. The natural magnets are made up of the ore of **iron**.
5. The opposite poles of two magnets **attracts** each other.
6. Magnetic force is **non-contact** force.
7. The poles of a magnet are **inseparable**.
8. Magnetic north pole is near geographical **north pole**.

D. Write True or False for the following statements :

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

E. Match the following :

- | Column A | Column B |
|------------|----------------------------|
| 1. S-S | (i) Attraction |
| 2. Compass | (ii) Non-magnetic material |
| 3. Poles | (iii) Repulsion |
| 4. S-N | (iv) Exist in pairs |
| 5. Paper | (v) Finding direction |

F. Tick the odd-one out giving reason :

- Ans.**
1. Refrigerator, Pin stand, Magnetic ludo, Wax Candle
 2. Wood, Rubber, Plastic, Iron
 3. Magnetic needle, Horse shoe magnet, U-shaped magnet, Bar magnet, Piece of wood
 4. Alpines, Paper, Eraser, Compact disc
 5. Magnesia, Magnes, Ironsmith, Greece

Section 2 : Summative Assessment (CCE Pattern)

G. Define the following terms :

- Ans.**
1. Magnetic substance : The materials that affected by the presence of a magnet are called magnetic materials, e.g. iron, steel, cobalt and nickel.
 2. Demagnetisation of a magnet : The loss in the strength of a magnetic field is demagnetisation.
 3. Ceramic magnets : Do yourself.
 4. The poles of a magnet : In every magnet, there are two regions where its magnetic strength is maximum. These two regions or points of every magnet where its magnetic strength is maximum are called poles of a magnet.
 5. Magnetic compass : It is a device based on the directive property of the magnet. It consists of a magnetized needle pivoted at a point where it is free to rotate. The one end of the needle is marked with some colour (usually red) to identify the north and stands for its north pole. It always points in north direction while the other end in south direction, provided there is no magnet or magnetic material in its close vicinity. These compasses are in use for past hundreds of years by sailors. They are also used by soldiers on ground or pilots in aircrafts to determine or confirm their direction.

H. Answer the following questions in short :

- Ans.**
1. The Chinese called the naturally found magnet as the leading stone because it could attract the small pieces of iron towards it.
 2. (i) The materials that affected by the presence of a magnet are called magnetic materials, e.g. iron, steel, cobalt and nickel; whereas the substances that are not affected by a magnet are called non-magnetic materials, e.g. aluminium, copper, silver, gold etc.
(ii) Magnet : Magnet is a material that attracts any other magnetic material.
Magnetic Material : The materials that affected by the presence of a magnet are called magnetic materials, e.g., iron, cobalt etc.
 3. It is important to note here that the two poles of a magnet exist in pairs. The two poles of magnet cannot be separated. These poles are shifted more towards the centre of the magnet than to the terminal edges of the magnet which cannot be separated even if a magnet is cut to the smallest

size of a particle, therefore, the two poles of a magnet are inseparable. The magnetic strength of each pole, even after efforts to separate them by cutting the magnets into two, remains unaffected.

4. A magnet attracts all the ferromagnetic materials whether a magnet or not but an ordinary iron bar does not show this property. In this way we can identify the two iron bars of equal size as a magnet or as an ordinary iron bar.
5. A magnet with its property of attracting magnetic materials and always directing itself in geographical north and south directions, when suspended freely, it is said to possess both the attractive and directive properties. The directive properties are used in magnetic compass, and the attractive properties are used in metallurgy, electromagnetic cranes and removal of iron from garbage.
- 6.
7. A straight line that passes through the centre of the two poles of a magnet is called the axial line. It represents the north-south direction. The line that divides the magnet into two perpendiculars to the axial line is called an equatorial line of the magnet. A magnet has minimum magnetic strength at its equatorial line. The magnetic strength of a magnet is expressed in terms of the magnetic field. The magnetic field of a bar magnet on the axial line is twice the magnetic field on the equatorial line at the same distance.
8. Weber proposed a molecular theory to explain the magnetism. This theory of magnetism explains the difference between a piece of iron and a natural magnet. According to this theory, every magnetic substance whether it is a magnet or not has magnetic particles with their respective north and south poles. If these magnetic particles are aligned in a particular direction i.e., have their north and south poles in a specific direction, the material acts as a magnet; and if they are randomly placed, when their north and south poles cancel each other's magnetism, the substance simply acts as a magnetic material.
9. In a space around the magnet, the magnetic field is studied by mapping the hypothetical magnetic lines of force. These lines are mapped using a magnetic compass needle starting from north pole of the magnet to south pole of the magnet. When the needle is placed in the magnetic field, it experiences a force that continues to change as the needle is moved from north pole to south pole. The magnetic lines of force appear as close continuous curves. These curves, moving from north to south, contract longitudinally and dilate laterally without intersecting each other. After mapping the magnetic lines of force in, you have learnt that the unlike poles of a magnet attract each other and the like poles repel each other.
10. Hold a bar magnet above a compass, with its south pole over the north

pole of the magnetic needle. Now rotate the bar magnet a bit. You will see that the needle of the compass comes to rest parallel to the bar magnet, with its north pole facing the south pole of the magnet. This, as you know, is because opposite poles attract each other. Now, you also know that the needle of a compass or any freely suspended magnet always aligns along the geographical N-S direction. This means that there must be an 'invisible magnet' inside the Earth.

Certain complex phenomena inside the Earth produce a magnetic effect, which makes the Earth behave like a huge bar magnet, with poles at its ends. The north pole of this imaginary magnet points approximately towards the geographical south pole, and its south pole points approximately towards the geographical north pole.

I. Answer the following questions in detail :

- Ans.**
1. Any material that can attract ferromagnetic metals, i.e., iron, nickel and cobalt, is a magnetic material. The rest of the materials are not affected by a magnet. In presence of ferromagnetic materials, a magnet exerts a force called 'magnetic force' to attract them. The magnetic force is a non-contact force, therefore, you see a magnet attracting iron nails from a distance. The materials that are affected by the presence of a magnet are called magnetic materials, e.g. iron, steel, cobalt and nickel; whereas the substances that are not affected by a magnet are called non-magnetic materials, e.g. aluminium, copper, silver, gold etc. Magnets, whether natural or artificial, are called differently on the basis of their shapes. These are bar magnets or horse-shoe magnets or circular magnets. The bar magnets are rectangular or rod like with their ends, called poles, in the opposite direction whereas the horse-shoe magnets are curved with both of their ends facing the same direction. Magnets have their maximum magnetic force at their poles than in the centre.
 2. Do yourself.
 3. To observe that a freely suspended magnet comes to rest in a particular direction only.

Procedure : Tie a bar magnet with a string from the centre and freely suspend it from a wooden stand as shown in the figure given below. Find out the direction in which it comes to the rest position.

A bar magnet will come to rest in the geographical north-south direction.

Now rotate the bar magnet to the east-west direction and leave it. Does it again come to rest in the north-south direction? Yes it does.

A freely suspended magnet on the Earth always aligns itself in geographical north-south directions.

4. Each magnet has two poles. The Earth also has two poles. The two geographical poles of the Earth are called its North Pole and South Pole. Likewise, the two poles of a magnet are called its North Pole and South Pole. To know why magnetic poles are also known as the North Pole and

South Pole, let us carry out an activity.

To observe that a freely suspended magnet comes to rest in a particular direction only.

Procedure : Tie a bar magnet with a string from the centre and freely suspend it from a wooden stand as shown in the figure given below. Find out the direction in which it comes to the rest position.

A bar magnet will come to rest in the geographical north-south direction.

Now rotate the bar magnet to the east-west direction and leave it. Does it again come to rest in the north-south direction? Yes it does.

A freely suspended magnet on the Earth always aligns itself in geographical north-south directions. The names of a magnet's poles are assigned accordingly. The tip of the magnet that points to the magnetic north is called its North Pole or north seeking pole with the tip of the magnet that points towards the magnetic south is called its South Pole or south seeking pole.

It is important to note here that the two poles of a magnet exist in pairs. The two poles of magnet cannot be separated. These poles are shifted more towards the centre of the magnet than to the terminal edges of the magnet which cannot be separated even if a magnet is cut to the smallest size of a particle, therefore, the two poles of a magnet are inseparable. The magnetic strength of each pole, even after efforts to separate them by cutting the magnets into two, remains unaffected.

The two poles maintain their magnetic strength despite their separation as each part of its piece has its own respective poles after separation. A magnet with its property of attracting magnetic materials and always directing itself in geographical north and south directions, when suspended freely, it is said to possess both the attractive and directive properties. The directive properties are used in magnetic compass, and the attractive properties are used in metallurgy, electromagnetic cranes and removal of iron from garbage.

5. USES OF MAGNETS

1. Motors, generators and loudspeakers have powerful magnets.
2. In scrap-yards, magnets are used to separate iron and steel from a junk of waste materials.
3. Data, sound and images are stored on special surfaces coated with magnetic material in computer hard disks, floppies and audio and video tapes.
4. Information is stored on magnetic strips in credit cards, ATM cards and airline tickets.
6. A magnet can be demagnetized by making it lose its magnetic field. Either it is done intentionally or it happens unknowingly, but in either case, the orientation of the molecular magnets in a magnet is disturbed. A magnet can easily be demagnetized by :

Heating a magnet above a particular temperature
Hammering the magnet that will disturb the molecular orientation
Leaving the poles of a magnet free which causes slow self-demagnetization.

The three factors reveal that it is important to handle the magnets carefully before they lose their magnetism. In laboratory, where small magnets are used, the magnets are placed in pairs with opposite poles along sides. These opposite poles are then covered with thin plates of soft iron, called 'keepers'. These keepers help maintain the continuous chain of the molecular magnets in both the magnets which prevent them both from undergoing any demagnetization.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Unit 6 : Natural Phenomena

Rain, Thunder and Lightning 12

Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. When there is less or no rain at all in a particular area for a long time period, it is called drought. Not only the lack of rain causes droughts but hot dry winds, very high temperature and evaporation of moisture from the ground can result in the conditions of droughts.
 2. In a flat plate the level of water is less in the comparison of a bucket. So in the plate the rate the evaporation is high because water in the plate heated up quickly. This is the reason that water from a flat plate disappears quickly but not from a bucket full of water when both are kept in bright sunlight.
 3. Steam can only be seen at the boiling point of the water. The boiling point of the water is 100°C . When water is heated at this point then steam can be seen. This is the reason that steam can only be seen during initial stages e.g. heating.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

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

C. Fill in the blanks :

- Ans.** 1. **Vapour** is water in the gaseous state.

2. Condensation is caused due to **cooling** of vapour.
3. The constant circulation of water from the Earth to the atmosphere and back again is known as the **water cycle**.
4. Salty water is said to be **saline**.
5. A lightning conductor consists of a metal **rod** ending in **spikes** at the **top**.

D. Write True or False for the following statements :

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

Section 2 : Summative Assessment (CCE Pattern)

E. Define the following terms :

- Ans.**
1. Condensation : The changing of water vapour into water on cooling.
 2. Evaporation : The changing of water into water vapour on heating.
 3. Freezing : The changing of water into ice on cooling.
 4. Water-cycle : Water constantly circulates between the Earth and air. This is called the water cycle.
 5. Lightning : The electric discharge that can occur between two clouds, or between a cloud and a tall building or a tree, results in thunder and lightning.

F. Answer the following questions in short :

- Ans.**
1. Ice, liquid water and water vapour (or steam) are the three states of water.
 2. In nature, water exists in the solid states as snow on high mountains. Most of water on the Earth exists in the liquid form in rivers, lakes, seas and oceans. In the gaseous state, water exists as water vapour in the air
 3. How can you change :
 - (a) water to ice Through freezing
 - (b) ice to water Through melting or heating
 - (c) water vapour to water Through condensation
 4. You must have noticed, how water disappears from wet clothes as they dry up in the sun and from wet roads, rooftops, potholes, etc. This water changes to water vapour due to heat. The same process is used to separate salt from sea water. The sea vapours so formed become a part of the air and disappear. This evaporation of water is faster in sunlight. It is slow during the night or in the shades but it does take place. During the daytime, air surrounding us gets heated. This warm air provides heat for the evaporation of water during the night or in the shade.
 5. Do yourself.
 6. Water from the ocean and surface of the Earth goes into air as vapour; returns as rain, hail or snow and finally goes back to the oceans. The circulation of water in this manner is known as the water cycle, and this circulation of water between the oceans and land is a continuous process.
 7. The process of condensation plays an important role in bringing water back to the surface of the Earth. As we go higher from the Earth, it gets cooler. When the air moves up, it becomes cooler. At sufficient heights,

the air becomes so cool that the water vapour present in it condenses to form tiny drops of water called droplets.

G. Answer the following questions in detail :

Ans. 1. These water vapours in air form clouds. The process of condensation plays an important role in bringing water back to the surface of the Earth. As we go higher from the Earth, it gets cooler. When the air moves up, it becomes cooler. At sufficient heights, the air becomes so cool that the water vapour present in it condenses to form tiny drops of water called droplets. It is these tiny droplets that remain floating in air and appear to us as clouds and this is how clouds are formed. These clouds lead to rain as many droplets of water come together to form larger drops. These drops of water become so heavy that they begin to fall and it is called rain. In cold regions, this rain falls as hail or snow. This process of water drops coming back on the earth in the form of rain, hail or snow is called precipitation.

Thus, water in the form of vapour goes into air by evaporation and transpiration, forms clouds, and then comes back to the ground as rain, hail or snow.

2. Have you ever tasted sea water? It is very salty, and, therefore, not potable (i.e. it cannot be used by us for drinking purposes). Where do these salts come from?

Sea water evaporates continuously and then falls down as rain. Rainwater dissolves salts as it falls on land and flows down. The salts are brought to the sea by rivers. Thus, the sea continuously receives salts, making sea water salty. Salty water is said to be saline.

3. You must have seen the flash of lightning and heard the roll of thunder during a thunderstorm. You may have noticed that lightning is seen first, and then the thunder is heard after a few seconds. However, you may be surprised to know that they occur together in the clouds. You will read in the next chapter that light travels at an incredibly high speed of 300000 kilometres per second. The speed of sound is only about 340 metres per second. Therefore, we can see the flash of lightning much before we can hear the thunder.

4. A scientist called Benjamin Franklin conducted an experiment to find this out. He flew a silk kite into the clouds during a thunderstorm. He tied a metal key to the thread of the kite. He got an electric shock when he touched the key. You have read in an earlier chapter that an electric current can give an electric shock. Therefore, Benjamin Franklin concluded that electricity got generated in the clouds during a thunderstorm. It flowed down the wet thread to the metal key. That is why the key gave an electric shock when touched.

5. When two clouds in which electricity has been generated come near each other, very heavy current flows from one cloud to another for a very short

time, through the air. Such a momentary flow of electricity through air is called an electrical discharge. At home you can see the discharge in a electric gas lighter. Normally a discharge is accompanied by heat, light and sound. We can see this discharge in the clouds in the form of lightning and thunder.

6. When two clouds in which electricity has been generated come near each other, very heavy current flows from one cloud to another for a very short time, through the air. Such a momentary flow of electricity through air is called an electrical discharge. At home you can see the discharge in a electric gas lighter. Normally a discharge is accompanied by heat, light and sound. We can see this discharge in the clouds in the form of lightning and thunder.
7. Sometimes a discharge may occur between a cloud and a tall building or a tree. It is so powerful that the building or tree can get burnt and destroyed. To prevent tall buildings from getting damaged in this way, a device called a lightning conductor is fixed on them. It consists of a metal rod ending in spikes at the top. The lower end of the rod is attached to a copper plate buried deep in the Earth. When lightning strikes the building, it flows down harmlessly to the Earth through the metal rod, and no damage is done to the building.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Formative Assessment-3

A. Answer the following questions orally :

- Ans.**
1. When there is less or no rain at all in a particular area for a long time period, it is called drought. Not only the lack of rain causes droughts but hot dry winds, very high temperature and evaporation of moisture from the ground can result in the conditions of droughts.
 2. Our body is a good conductor of electricity. A person gets an electric shock if an electric current flows through his or her body. It can cause internal burns and can even be fatal. We need to take care to protect ourselves from dangerous and painful electric shocks.
 3. The standard units people of different countries developed over the years were accurate enough. However, one problem still remained. They were not uniform. To solve this problem scientists introduced SI units.
 4. Plastic is non-magnetic because it is not affected by a magnet.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct Answer :

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

C. Fill in the blanks :

- Ans.** 1. Magnetic force is **non-contact** force.
2. The hands of a watch show **rotatory** motion.
3. Condensation is caused due to **cooling** of vapour.
4. Electric current flows through a **closed** loop.

D. Write True or False for the following statements : 2

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

E. Match the following :

- Ans.** 1. Gaseous state of water → (i) Fast vaporization
2. Boiling → (ii) 0°C
3. Evaporation → (iii) Transpiration
4. Melting point of ice → (iv) Steam
5. Loss of water from plants → (v) Rain
6. Water falling from clouds → (vi) Slow vaporization

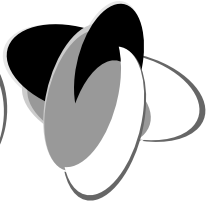
F. Tick the odd-one out giving reason :

- Ans.** 1. Dry ✓ cell, Zinc container, Zinc oxide, Carbon rod
2. Solar cell, Dry cell, Storage cell, Hydropower ✓ plant, Electrolytic cell
3. Silver, Graphite, Quartz, Brass, Gold
4. Rubber, Metals, Alloys, Graphite, Wet ✓ clothes
5. Battery of cells, Switch, Flashlight bulb, Thread ✓



Light and Shadows

13



Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.** 1. We need to classify the objects into different categories to recognise them easily.
2. Opaque objects form very dark shadows because an opaque object does not allow light to pass through it.
3. A shadow is a dark outline of the object. The shape of the shadow may or many not match with that of the object. It all depends on the position in which the object is held in the path of light. The details of the objects such as colour, texture etc. are not there in a shadow.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

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

C. Fill in the blanks :

- Ans.**
1. Dark outline formed on an **opaque** body is called shadow.
 2. **Light** is an energy which causes in us the sensation of vision.
 3. **Reflection** takes place from the smooth and polished surfaces.
 4. Ground glass is a **translucent** medium.
 5. Pinhole camera is based on the principle of **rectilinear** propagation of light.
 6. The outer bright rim of the Sun observed during annular solar eclipse is called **diamond ring**.
 7. The solar eclipse occurs when **moon** comes in between **sun** and **earth**.

D. Write True or False for the following statements :

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

E. Tick the odd-one out giving reason :

- Ans.**
1. Sun, Stars, Earth, Jugnu
 2. Wood, Iron sheet, Glass, Rocks
 3. Rock, Mirror, Iron plate, Plywood
 4. A source of light, An opaque object, A plane mirror, A screen
 5. Solar eclipse, Pinhole camera, Rectilinear propagation of light, Reflection from mirror

Section 2 : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.**
1. Luminous objects : The objects that emit their own light.
Non-luminous objects : The objects that do not emit, but only reflect the light.
 2. Shadow formation : The shadow is always a dark outline of any object, irrespective of the colour of the object or the colour of the light.
For the formation of shadow these must be present (i) a source of light (ii) an opaque body to obstruct light and (iii) an opaque screen to receive shadow.
 3. Working of a pinhole camera (through a figure only) : Figure
 4. Penumbra : The faintly, dark part of shadow where only the slight light manages to reach.
 5. Solar eclipse : The shadow of moon falling over the whole or only a part of the Earth.

G. Answer the following questions in short :

- Ans.**
1. The Sun and the Moon.
 2. Candles, oil lamps, bulb.
 3. Glow-worm or the Firefly.

4. Do yourself.
5. A non-luminous body can be made luminous by heating it. Take an iron wire and heat it on a gas flame. In about two minutes, the iron wire will get red hot and start emitting light. At this moment, the temperature of iron is between 600°C to 800°C.

- | | | |
|----------------|-----------------------------------|-----------|
| 6. Transparent | Translucent | Opaque |
| Reading glass | Wax paper skin
of a drum smoke | Stone |
| | | Wood |
| | | Milk |
| | | Leather |
| | | Blood |
| | | Dense fog |

$$\begin{aligned}
 7. \text{ Time} &= \frac{\text{Distance}}{\text{Speed}} \\
 &= \frac{40000 \text{ km}}{300000 \text{ km/s}} \\
 &= \frac{13}{60} \\
 &= .0022 \text{ sec}
 \end{aligned}$$

8. Do yourself

H. Answer the following questions in detail :

- Ans.**
1. Do yourself
 2. Pinhole camera is based on the principle that light travels in a straight line.

Construction

A pinhole camera consists of a cardboard or wooden box having a pinhole in its front face and a translucent ground glass/waxed paper screen at the back. The distance between the pinhole and the screen may be fixed or adjustable. The distance between the pinhole and the screen can be adjusted by moving the screen towards or away from the pinhole.

Working : When the pinhole of the camera is turned towards a bright object, a real, inverted image of the object is formed on the screen.

The nature has provided you a large number of pinhole cameras. You have to simply stand under a dense tree on a sunny day and watch the round patches of light on the ground. These round patches are the images of the Sun. The gaps between the leaves are the pinholes.

Advantages of a Pinhole Camera

A pinhole camera has the following advantages.

No focussing is required.

There is no lens in pinhole camera. Therefore, the image is free from spherical and chromatic aberrations.

Disadvantages of a Pinhole Camera

A pinhole camera has the following disadvantages.

The image formed does not give any details. Usually, the image is hazy.

Image is obtained on the screen. No permanent record of the image can be obtained.

Pinhole camera cannot be used for studying moving objects.

3. Do yourself

4. It is advisable not to view the solar eclipse directly with naked eyes as it is damaging to them. It can damage the eyes permanently. To watch a solar eclipse, proper visual aids or indirect methods of reflection have to be used properly. A video camera facing the Sun is connected to a television set to watch the solar eclipse in the television set or a small circular hole is cut into a cardboard sheet and placed perpendicular to the Sun to watch the image of the eclipse on the screen. The solar eclipse shows different phases as shown in the figure given below.

5. Conditions for the Formation of a Shadow

1. There must be a source of light.

2. There must be an opaque body to obstruct the light.

3. There must be an opaque screen to receive the shadow as it cannot be formed in air, which is transparent in nature.

6. Do yourself

7. When the moon happens to come in between the sun and the Earth, the shadow of the moon falls on a certain portion of the Earth where people fail to see the Sun completely or even partially. The place where the umbra of the moon falls, people fail to see the Sun completely. They are said to experience the total solar eclipse. The people in the penumbra region experience the partial solar eclipse.

The distance of the Sun from the Earth is large and variable. Moreover, the Sun is an extended source of light, therefore, the umbra of the moon formed on the Earth is small or even does not fall on the earth. When the umbra formed is so small that only a small tip of it reaches the Earth's surface, it is the people living only in that area that experience the solar eclipse, called annular solar eclipse. These people, instead of observing the Sun, will observe the corona, the outer bright rim of the Sun, called the diamond ring.

The solar eclipse always takes place on a new moon day when the dark side of the moon faces the Earth. However, it does not happen on every new moon day because the planes of the Earth's orbit and the moon's orbit around the Sun are tilted with respect to each other.

8. The lunar eclipse takes place on a full moon day when the bright side of the moon faces the Earth. However, the lunar eclipse does not take place on all the full moon days, because the planes of the Earth's orbit and the moon's orbit around the Sun are tilted with respect to each other. When the Earth comes in between the Sun and the moon, the shadow of the

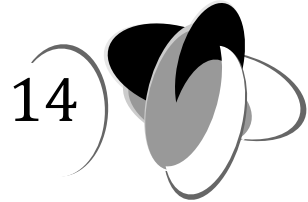
Earth falls on the moon and as the moon moves in its orbit, it passes through the different areas of the shadow. It represents the umbra of the Earth's shadow, i.e. the moon is fully covered by the Earth's shadow and the result is the total lunar eclipse, when the moon is not at all visible to people on the Earth. When the moon is partly in umbra and partly in penumbra, the result is the partial lunar eclipse. During partial lunar eclipse, the moon appears pale. Once out of the penumbra the moon is fully visible to us as before the eclipse.

Section III : Activities Assessment (CCE Pattern)

Do yourself



Unit 7 : Natural Resources



Water

14

Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
- Water exists in three physical states—solid, liquid and gas (under different conditions). Ordinarily, water is in liquid state but when it is kept in the freezer or a refrigerator, it freezes and forms ice. Ice is the solid state of water. When heated, water converts into water vapour called steam. So, steam is the gaseous state of water.
 - Plants absorb water through their roots and use a part of this to prepare their food and retain some of it in different parts of their body. The remaining part of this water is released by them into air as water vapours through the process called transpiration.
 - Drought is a natural disaster, resulting from the unusual scarcity of rain for a long period of time (a year or more).

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

- Ans.** 1. (b) 2. (d) 3. (a)

C. Fill in the blanks :

- Ans.**
- The human body is about **70%** water.
 - The **solid** state of water is ice.
 - Water is a good medium for the transportation of **people** and **goods**.
 - The two ways of rainwater harvesting are **Roof top** and **Road side**.
 - Lack of rain may cause **drought**.

D. Write True or False for the following statements :

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

E. Match the following :

Ans.

1. Groundwater	→	(i) Excess of rainfall
2. Drought	→	(ii) Saline water
3. Conservation of water	→	(iii) Water table
4. Floods	→	(iv) Rainwater harvesting
5. Oceans	→	(v) Scarcity of rains

Section 2 : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.**
1. Surface water : It is the water which is present on the surface of the Earth and is of three types on the basis of its purity : (a) Rainwater, (b) River and lake water, and (c) Sea Water.
 2. Drought : Drought is a natural disaster, resulting from the unusual scarcity of rain for a long period of time (a year or more).
 3. Flood : Flood is a natural disaster caused due to the accumulation of heavy rainwater for a long period of time.
 4. Famine : The condition, when there is a drought for a long time leading to scarcity of water and food.
 5. Cyclone : Do yourself

G. Answer the following questions in short :

- Ans.**
1. Plants absorb water through their roots and use a part of this to prepare their food and retain some of it in different parts of their body. The remaining part of this water is released by them into air as water vapours through the process called transpiration.
 2. Drought refers to a period (a year or more), in which, there is an unusual scarcity of rain. If there is no rainfall for a long period, it leads to serious hydrological imbalance.
 3. Rain is useful to use because :
 - (i) Rain is the main source of water.
 - (ii) Rain is essential for agriculture.
 - (iii) It provides the purest form of water.

H. Answer the following questions in detail :

- Ans.**
1. (a) Water (liquid form of water)
(b) Ice (solid form of water)
(c) Water vapour (gaseous form of water)
 2. Through heavy rains rapidly running water washes away the top layer of the soil. It leads to soil erosion and sedimentation and deposition problem down stream. Heavy rains and sudden rush of water carry away the animals living in soil, their houses (shelter) and other belongings.
 3. The rainwater that falls on concrete roads and buildings cannot seep into

the ground. This water flows into the drains from where it goes to rivers, lakes or ponds. A lot of effort will then be required to get this water back for use.

One way of increasing the availability of water near our homes or any workplace is to collect rainwater and store it. The process of collecting rainwater from roofs and street corners and storing it for further use is called rainwater harvesting. The basic idea behind rainwater harvesting is "Catch water where it falls."

There are two ways of rainwater harvesting :

1. Rooftop rainwater harvesting
2. Roadside rainwater harvesting

Section III : Activities Assessment (CCE Pattern)

Do yourself

Importance of Air

15

Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. Air is matter. It occupies space and has mass. It fills all the space available to it.
 2. Air contains 78% of nitrogen. It occupies almost four-fifths of the volume of dry air. Nitrogen is an inert gas but is required by plants and animals in the form of various compounds.
 3. Name the two process that
 - (a) Consume oxygen from the air : Respiration and Burning
 - (b) Put back carbon-dioxide in the air : Burning of fuels of Respiration

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

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

C. Fill in the blanks :

- Ans.**
1. **Dust particles** and **smoke** present in air are harmful.
 2. **Atmosphere** gets thinner with increase in altitude.
 3. **Air** is transparent and has no colour.
 4. **Oxygen** supports combustion.
 5. Air is not one substance but a **matter**.

D. Write True or False for the following statements :

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

E. Match the two columns :

- | Column A | Column B |
|--------------------|---------------------------|
| 1. Carbon dioxide | (a) Atmosphere |
| 2. Envelope of air | (b) Photosynthesis |
| 3. Water vapour | (c) Supports combustion |
| 4. Oxygen | (d) Controls burning |
| 5. Nitrogen | (e) Gaseous form of water |

F. Tick the odd-one out giving reason :

- Ans.** 1. Air, Oxygen, Nitrogen, Nitrogen dioxide, Water vapour.
2. Respiration, Burning, Combustion, Photosynthesis
3. Oxygen, Carbon dioxide, Photosynthesis, Chlorophyll, Wind energy
4. Birds, Human beings, Mammalian animals, Fish
5. Wind energy, Biogas, Parachutes, Electricity generation

Section 2 : Summative Assessment (CCE Pattern)

G. Define the following terms :

- Ans.** 1. Air is a mixture and is made up of nearly 78% nitrogen, 21% oxygen, 0.9% argon, 0.04% water vapour, 0.03% carbon dioxide and the remaining 0.03% are the inert gases. Some dust particles and smoke are also present.
2. Plants use carbon dioxide to prepare their own food. During photosynthesis, green leaves absorb carbon dioxide from the atmosphere and convert it into starch (carbohydrate) in the presence of sunlight using a green pigment, chlorophyll. Oxygen is produced (liberated) during the process.
3. During respiration, oxygen is inhaled by human beings and animals, and carbon dioxide is exhaled.
4. Plants use carbon dioxide to prepare their own food. During photosynthesis, green leaves absorb carbon dioxide from the atmosphere and convert it into starch (carbohydrate) in the presence of sunlight using a green pigment, chlorophyll. Oxygen is produced (liberated) during the process.
5. Wind (moving air) is used to generate electricity by moving windmills. The energy of moving wind is called wind energy.

H. Answer the following questions in short :

- Ans.** 1. Air is made up of nearly 78% nitrogen, 21% oxygen, 0.9% argon, 0.04% water vapour, 0.03% carbon dioxide and the remaining 0.03% are the other inert gases.

2. What components of air will you find more in the following places :
 - (a) coastal areas : water vapour
 - (b) industrial areas : dust and smoke
3. Do yourself
4. The Earth's atmosphere extends approximately upto 480 km. It is thickest upto a height of 16 km, where clouds are present.

I. Answer the following questions in detail :

- Ans.** 1. To observe that an empty glass tumbler is filled with air.

Procedure :

Take a transparent bowl and fill it with water.

Take the empty glass tumbler and push it open mouth into the bowl filled with water as shown below.

Does the water enter the glass tumbler?

You will notice that water does not enter the glass tumbler.

Now tilt the glass tumbler.

Does the water enter the glass tumbler now?

You will notice the bubbles of air come out and water gets filled up in the glass tumbler.

Actually, the glass tumbler was not empty. It was filled with air, even when it was turned upside down. That is why, when you pushed the glass tumbler in an inverted position, no air could escape and no water could enter the glass tumbler.

On tilting the glass tumbler, the air came out in the form of bubbles and water could enter the glass tumbler. Water filled up the space that was earlier occupied by air.

2. Do yourself
3. Do yourself
4. To show oxygen is used in burning.

Procedure : Fix a candle in the centre of a trough. Fill the trough with water more than half. Light the candle. Place a gas jar over the burning candle upside down as shown in the figure below. Observe and say what is happening? Does burning candle burn continuously or gets extinguished? It extinguishes after a while and at the same time, the level of water in gas jar rises. Can you explain why this happens? After putting the gas jar on the burning candle, the candle burns for a while, because there is some oxygen in the air, which helps burning. When all oxygen has been consumed in burning, the candle extinguishes.

Conclusion : Oxygen helps in burning.

5. Uses of Oxygen

Oxygen is essential for breathing.

All living things breathe oxygen. Oxygen is able to release energy contained in the food in the body of living organisms. Energy is required all the time by living organisms to carry out life process, therefore, they

breathe all the time.

Animals living on land breathe by lungs. They take oxygen from the air and return carbon dioxide during breathing.

Animals living in water, like fishes, have special organs called gills for breathing (exchange of gases) in water. Whales, which live in water, breathe through thin lungs. For this, they come to the surface of water to get the supply of fresh air.

Roots of plants take air present in the soil in between the particles of soil. The leaves have stomata which allow exchange of gases.

Some other uses of Oxygen

1. Oxygen is used in hospitals for artificial respiration.
2. Mountaineers, sea-divers and astronauts carry oxygen cylinders with them for respiration as at the higher altitude and underwater presence of oxygen is negligible.
3. It is used for welding purposes and for cutting of metal at very high temperatures.
4. Liquid oxygen is used in rockets for combustion of fuels.
5. Oxygen is needed for burning process.

Uses of Carbon Dioxide

1. It is used as a fire-extinguisher since it is heavier than air and does not burn.
2. Dry ice (solid carbon dioxide) is used as a refrigerant.
3. It is also used to prepare fizzy drinks like soda water etc.
4. Plants use carbon dioxide to prepare their own food. During photosynthesis, green leaves absorb carbon dioxide from the atmosphere and convert it into starch (carbohydrate) in the presence of sunlight using a green pigment, chlorophyll. Oxygen is produced (liberated) during the process.
6. Air acts as a medium of communication. You can hear each other's voice only because of the presence of air. Sound waves use air as a medium to travel.

Air helps birds to fly in the sky. The air pressure along with other forces lets birds fly in air.

Air helps in the movement of aeroplanes, parachutes, gliders, sailboats, etc.

Air is a habitat for many organisms like birds, bats and insects.

Air can be compressed easily. The compressed air is filled in tubes, balloons, tyres and pillows. The air-filled tyres make transport easy smooth.

Air evaporates sweat during summer and gives cooling effect to the body. We dry wet clothes out in the open. Moving air evaporates water and dries the clothes faster.

The brake system of automobiles and trains work in the presence of air.

Air helps in seed dispersal and pollination of flowers.

Moving air, i.e., wind is used to generate electricity by moving windmills. Windmills are used to draw water from tubewells and to run flour mills also.

Separation of grains from husk is done using air movement.

Air filters some heat and prevents the harmful radiations of the Sun from reaching the Earth.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Waster Management

16

Exercise

Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.**
1. Sulphur dioxide and Nitrogen oxides are two gaseous-sources of waste.
 2. Non-biodegradable wastes are those wastes which cannot be broken down by decomposers. These do not rot easily or take a very long time to rot.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

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

C. Fill in the blanks :

- Ans.**
1. The process of getting manure from biodegradable wastes by adding earthworms to the compost is called **vermicomposting**.
 2. The wastes which can be broken down to simple materials by the action of micro-organisms are called **biodegradable**.
 3. Gas produced from biodegradable wastes in sanitary landfill is **carbondioxide**.
 4. The rotting and conversion of some materials into manure is called **composting**.

D. Write True or False for the following statements :

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

E. Tick the odd-one out giving reason :

- Ans.**
1. Plastic, Glass, Paper, Paints
 2. Kitchen waste, Animal dung, Iron scrap, Paper waste

3. Old newspapers, Paper bags, Old books, Plastic toys
4. Kitchen waste, Fruit peels, Blue bins, Decaying fruits

Section 2 : Summative Assessment (CCE Pattern)

F. Define the following terms :

- Ans.**
1. Decomposers : The organisms which cause degradation of organic waste in the soil.
 2. Garbage : The waste part of fruits, vegetables and other organic matter.
 3. Decomposition : Decomposition is the process in which degradation of organic waste takes place with the help of decomposers.
 4. Sewage : The waste water from toilets, kitchens and bathrooms is known as sewage.
 5. Vermicomposting : The method of preparing compost with the help of earthworms is called Vermicomposting.

G. Answer the following questions in short :

- Ans.**
1. Waste can be classified as gaseous, solid or liquid according to their physical state.
 2. Our kitchens generate remains of fruits, vegetables and wastewater.
 3. The waste materials which can be decomposed in nature are biodegradable and those which cannot be decomposed are non-biodegradable.
 4. Decomposers are those organisms which cause degradation of organic waste in the soil. They play an important role in the process of waste management. They help in reducing the waste and protects our environment.
 5. Landfills are generally located in urban areas where a large amount of waste is generated and has to be dumped in a common place. Unlike an open dump, it is a pit that is dug in the ground. The garbage is dumped and the pit is covered, thus preventing the breeding of flies and rats. At the end of each day, a layer of soil is scattered on top of it and some mechanism, usually earth-moving equipment is used to compress the garbage, which now forms a cell. Thus, every day, garbage is dumped and becomes a cell. After the landfill is full, the area is covered with a thick layer of mud and the site can thereafter be developed as a parking lot or a park.

H. Answer the following questions in detail :

- Ans.**
1. Waste is categorised according to its physical state, its source, the means of disposal and its characteristics. Waste is also broadly categorised based on its physical state and ability to decompose. According to its physical state, waste can be grouped into solid, liquid and gas.
Waste is divided into four main groups according to its source :
 - (i) Waste generated by households
 - (ii) Waste generated by commercial activities

- (iii) Waste generated by hospitals.
- (iv) Waste generated by industrial activities.

We can also classify waste into two groups on the basis of its disposal.

These are :

- (i) Biodegradable waste
- (ii) Non-biodegradable waste

2. Here are a few examples of recycling of waste.

Old papers, newspapers and torn papers can be easily recycled to form fresh writing paper.

Old and rusted metals can be melted in big furnaces and shaped into new ones as per requirement.

Kitchen waste, sewage and wastewater can be used for generating energy. This waste is put in big digesters and burnt. As a result, a large amount of gas called gobar gas is produced. This can be taken to kitchens through pipelines and used for cooking. This can be used for lighting, power generation and running of electrical equipments.

Broken glass materials can be converted into new bottles.

We can also decompose the waste with the help of earthworms. The wastes are dumped in a large pit within the soil. Earthworms are added to these pits. The earthworms eat soil along with the waste materials and convert them into manure. The process is commonly called vermicomposting and the pit is called a compost pit.

Sewage water is treated in large tanks called septic tanks. In these tanks the heavy particles settle down first. Then alum is added which helps the fine particles to settle. The supernatant liquid is filtered and purified air is blown through it and chlorine tablets are added to kill the germs.

Especially designed sewage treatment plants are used for the recycling of waste. Here, sewage, is passed through filters and treated with bacteria. After that, water is treated with special chemicals and the result is clean pure drinking water.

- 3. If we do not dump the wastes it can cause serious pollution and environmental harm.
 - 1. They are highly inflammable, for example, oil products.
 - 2. They are extremely reactive, that is react spontaneously in contact with other materials and lead to generation of toxic gases, explosion, fire or heat, for example, cyanides, acids, bases and alkaline matter.
 - 3. They are toxic and could cause damage or be fatal to living organisms (for example, pesticides and heavy metals)
 - 4. They are highly infectious.
 - 5. They are carcinogenic, i.e. they cause cancer.
 - 6. They are ecotoxic, that is these substances accumulate and/or poison directly the ecosystems.

Hazardous waste can occur as residuals of a series of activities, for

example, agriculture, animal husbandary, forestry, and industries related to these primary activities like dairies, breweries, textiles, leather industries, pulp and paper industries. Energy production based on oil or coal and related activities, for example, mining and oil drilling; metallurgical industries and production of electronic equipment, glass, asbestos and cement; chemical industry and processing also produce hazardous wastes.

Households and service industries are also sources of hazardous waste, for example, lead-containing batteries, paints and solvents, chemicals from photo laboratories, research laboratories, hospitals, etc.

Some types of hazardous waste can be potentially dangerous over a period of time, whereas some become dangerous only in combination with other residual products, naturally occurring substances, or when exposed to special conditions like heat. Occasionally, waste which is not originally hazardous becomes very dangerous if sufficient amount of it is generated.

4. This is a common term for how the waste is handled, whether some of it is recycled, treated in some way another, or placed in a landfill.

Source Sorting

The purpose of source sorting is to keep waste components separate from each other at the source, or where the waste arises, so that one or more of them can be reutilised or recycled. Usually, cardboard and paper are sorted, but food waste, glass, metals, plastics, combustible and compostable matter can be sorted. Such sorting requires that the producers of waste are enabled to store waste components separately, and that special collection and transport systems for the various components exist. In developing countries, source sorting is still uncommon.

Central Sorting

Central sorting takes place by sorting out valuable components from mixed waste. In some industrialised countries, mechanised sorting plants exist, but these have only been tried out to a small degree in developing countries, at least as far as mixed domestic waste is concerned. Manual sorting, however, is quite common, and large amounts of valuable materials are sorted out for reuse.

Segregation

Certain things that are not needed around the house can be kept aside to be sold to the kabadiwala or the man who buys old items. These items are newspapers, used bottles, magazines, bags, old exercise books, oil-cans, etc. This is one form of segregation, which is done as a routine in all households in India. Certain items are not biodegradable but can be reused or recycled. In fact, it is believed that a large portion can be recycled, a part of it can be converted to compost, and only a smaller portion of it is real waste that has no use and has to be discarded.

Household waste should be separated daily into different bags for the different categories of waste such as wet and dry waste, which should be

disposed off separately. One should also keep a bin for toxic wastes such as medicines, batteries, dried paints, old bulbs, and dried shoe polish. Wet waste, which consists of leftover food, vegetable peels, etc., should be put in a compost pit and the compost could be used as manure in the garden. Dry waste consisting of cans, aluminium foils, plastics, metals, glass, and paper could be recycled. If we do not dispose off the waste in a more systematic manner, more than 1400 square kilometres of land, which is the size of the city of Delhi, would be required in the country by the year 2047 for waste disposal.

Production of Refuse Derived Fuel (RDF)

The highly combustible components that can be found in waste, i.e., cardboard, paper, textiles and wood are dried, grounded and briquetted for the production of Refuse Derived Fuel. A briquette is a small rectangular block of compressed material such as charcoal, sawdust or coal dust.

5. Garbage generated in households can be recycled and reused to minimise creation of waste at source and reduce the amount of waste thrown into the community dustbins.

Waste management can include a series of activities. A brief description of the various activities which waste management generally include is given here.

Storage

Storage of waste takes place at the spot where the waste is produced. Domestic refuse is normally stored continually in a container or sack until collected. The daily production is usually stored inside the house until it is carried outside for collection. There can be one unit per household or per several households or local communal collection points where garbage is emptied in a bin or container.

Industries and business places often have their own systems with relatively large storage units. Some factories dump large refuse heaps on the factory premises, without any form of regular collection. Containers are commonly used as storage units by many industries and are also found outside large market places.

Collection

Collection generally takes place by loading waste from the storage containers on to a vehicle, for example, a hand cart, a tractor with trailer, a lorry or special garbage truck. The garbage is usually collected and emptied by the crew of garbage collectors.

Wherever there is a systematic collection, small-scale industries and business are usually included. Major manufacturing industries that produce large amounts of waste usually run their own systems for collection and transport. Collection of sludge from waste water treatment plants also requires separate collection routines.

Waste Transfer and Transport

If the place of disposal is far away or if very small vehicles are used for

collection, it can be appropriate to load the garbage on to a larger transport vehicle. Transport, thereby, takes fewer vehicles and crew. Waste transfer can take place by the emptying of the garbage into a container for collection by a larger container car, or by the garbage being loaded directly from the collection vehicle on to the transport vehicle.

Section III : Activities Assessment (CCE Pattern)

Do yourself

Formative Assessment-4

A. Answer the following questions orally :

- Ans.**
1. Sulphur dioxide and Nitrogen oxides are two gaseous-sources of waste.
 2. Plants absorb water through their roots and use a part of this to prepare their food and retain some of it in different parts of their body. The remaining part of this water is released by them into air as water vapours through the process called transpiration.
 3. Air contains 78% of nitrogen. It occupies almost four-fifths of the volume of dry air. Nitrogen is an inert gas but is required by plants and animals in the form of various compounds.
 4. Opaque objects form very dark shadows because an opaque object does not allow light to pass through it.

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

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

C. Fill in the blanks :

- Ans.**
1. Loss of water from plant is called **transpiration**.
 2. Air is not one substance but a **matter**.
 3. Gas produced from biodegradable wastes in sanitary landfill is **carbon dioxide**.
 4. Pinhole camera is based on the principle of **rectilinear** propagation of light.

D. Write True or False for the following statements :

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

E. Match the following :

- | Column A | Column B |
|----------------------------|---------------------------|
| Ans. 1. Groundwater | (i) Excess of rainfall |
| 2. Drought | (ii) Saline water |
| 3. Conservation of water | (iii) Water table |
| 4. Floods | (iv) Rainwater harvesting |
| 5. Oceans | (v) Scarcity of rains |

F. Tick the odd-one out giving reason :

- Ans.** 1. Air, Oxygen, Nitrogen, Nitrogen dioxide, Water vapour

2. Respiration, Burning, Combustion, Photosynthesis
3. Oxygen, Carbon dioxide, Phosotsynthesis, Chlorophyll, Wind energy
4. Birds, Human beings, Mammalian animals, Fish
5. Wind energy, Biogas, Parachutes, Electricity generation

Summative Assessment-2

A. Name the following :

- Ans.** 1. Freezing 2. Motion 3. Drought
4. Gills 5. Non-biodegradable

B. Define the following terms :

- Ans.** 1. Lightning conductor : Ice, liquid water and water vapour (or steam) are the three states of water.
2. Oscillatory motion : Oscillatory motion is that in which a body moves to and fro about its mean position.
3. Electric circuit : Electric current is a form of energy, i.e., electrical energy, which gets converted into heat and light energy when it flows through an electric bulb or any other electrical appliance.
4. Magnet : A material that attracts any other magnetic material.
5. Reflection : The bouncing back of light in the same medium is called reflection.
6. Rainwater harvesting : One of the methods of conserving water is to collect rainwater and store it for later use. This is called rainwater harvesting.
7. Biodegradable waste : The waste which can be decomposed under natural conditions by microorganisms.
8. Atmosphere : The blanket of air around the Earth.

C. Differentiate between the following :

- Ans.** 1. Oscillatory motion : Oscillatory motion is a motion in which a body moves back and forth about its mean position.
Periodic motion : Periodic motion is a motion which repeats itself after a fixed interval of time.
2. Conductors : Conductors are materials which allow current to pass through them.
Insulators : Insulators are materials which do not allow current to pass through them.
3. Luminous objects : The objects that emit their own light.
Non-luminous objects : The objects that do not emit, but only reflect the light.
4. Drought : Absence of rain in particular region for a long time leading to severe shortage of water

Flood : A condition when ground becomes submerged under water, due to heavy rain and overflowing of river.

D. Give reasons for the following :

Ans. Do yourself

E. Answer the following questions in short :

Ans. 1. It is important to know the distance between various objects or places. It helps us in determining which mode of transport we should use to go from one place to another.

The knowledge of the distance between various objects or that between two points of an object also helps us in determining the size of various objects around us. Sometimes we need to know the length and breadth of objects.

The knowledge of the distance between various places helps us in determining the time taken to travel to these places.

2. Magnets produce electricity in power stations, and are used in appliances like motors, refrigerators, cassette players and recorders, computer discs etc.

3. The total amount of water on the Earth remains the same. But the demand for water is increasing day by day. It is due to the following reasons :

The number of people using water is increasing due to rising population.

More and more water is being used for producing food and goods in industries.

These are the main factors that lead to the shortage of water supply in many towns and cities. As a result, we see long queues of people waiting to collect water. It makes our life very difficult. Hence, it is very important that water is used carefully and we must not waste water.

4. Nitrogen gas is used to prepare fertilisers.

5. Landfills are generally located in urban areas where a large amount of waste is generated and has to be dumped in a common place. Unlike an open dump, it is a pit that is dug in the ground. The garbage is dumped and the pit is covered, thus preventing the breeding of flies and rats. At the end of each day, a layer of soil is scattered on top of it and some mechanism, usually earth-moving equipment is used to compress the garbage, which now forms a cell. Thus, every day, garbage is dumped and becomes a cell. After the landfill is full, the area is covered with a thick layer of mud and the site can thereafter be developed as a parking lot or a park.

F. Answer the following questions in detail :

Ans. 1. Following are the various types of motions :

(i) **Translatory motion** : Translatory motion is that in which all the particles of a body move through the same distance in the same time. Examples : moving truck or train, a ball rolling on the ground etc.

(ii) **Rotatory motion** : Rotatory motion is that in which a body moves about

a fixed axis without changing its position. Examples : A patten's wheel, a spinning top etc.

- (iii) **Oscillatory motion** : Oscillatory motion is that in which a body moves to and fro about its mean position. Examples : motion of a swing, pendulum of a clock.
- (iv) **Periodic motion** : Periodic motion is that which repeats itself after regular intervals of time. Examples : motion of pendulum, heartbeat etc.
- (v) **Repetitive motion** : Repetitive motion is that which occurs again and again. Examples : movement of lips while speaking etc.

2. To make a torch at home.

Material required : A torch bulb, an electric cell and a piece of electric wire.

Procedure : Remove the plastic covering a little at the ends of the wire. Join one end of the electric wire around the base of the electric bulb using the tape and leave the other end free.

Fix the tip of the base of the torch bulb with the positive terminal of the electric cell with the help of a tape.

Now bring the tip of the free end of the electric wire in contact with the negative terminal of the electric cell.

Observe what happens.

You will find that the torch bulb starts glowing. Your torch is now ready.

Now remove the free end of the electric wire from the negative terminal of the electric cell.

Observe what happens.

You will notice that the torch bulb does not remain lighted.

3. Each magnet has two poles. The Earth also has two poles. The two geographical poles of the Earth are called its North Pole and South Pole. Likewise, the two poles of a magnet are called its North Pole and South Pole. To know why magnetic poles are also known as the North Pole and South Pole, let us carry out an activity.

To observe that a freely suspended magnet comes to rest in a particular direction only.

Procedure : Tie a bar magnet with a string from the centre and freely suspend it from a wooden stand as shown in the figure given below. Find out the direction in which it comes to the rest position.

A bar magnet will come to rest in the geographical north-south direction.

Now rotate the bar magnet to the east-west direction and leave it. Does it again come to rest in the north-south direction? Yes it does.

A freely suspended magnet on the Earth always aligns itself in geographical north-south directions. The names of a magnet's poles are assigned accordingly. The tip of the magnet that points to the magnetic north is called its North Pole or north seeking pole with the tip of the magnet that points towards the magnetic south is called its South Pole or

south seeking pole.

It is important to note here that the two poles of a magnet exist in pairs. The two poles of magnet cannot be separated. These poles are shifted more towards the centre of the magnet than to the terminal edges of the magnet which cannot be separated even if a magnet is cut to the smallest size of a particle, therefore, the two poles of a magnet are inseparable. The magnetic strength of each pole, even after efforts to separate them by cutting the magnets into two, remains unaffected.

The two poles maintain their magnetic strength despite their separation as each part of its piece has its own respective poles after separation. A magnet with its property of attracting magnetic materials and always directing itself in geographical north and south directions, when suspended freely, it is said to possess both the attractive and directive properties. The directive properties are used in magnetic compass, and the attractive properties are used in metallurgy, electromagnetic cranes and removal of iron from garbage.

4. When two clouds in which electricity has been generated come near each other, very heavy current flows from one cloud to another for a very short time, through the air. Such a momentary flow of electricity through air is called an electrical discharge. At home you can see the discharge in a electric gas lighter. Normally a discharge is accompanied by heat, light and sound. We can see this discharge in the clouds in the form of lightning and thunder.
5. Conditions for the Formation of a Shadow
 1. There must be a source of light.
 2. There must be an opaque body to obstruct the light.
 3. There must be an opaque screen to receive the shadow as it cannot be formed in air, which is transparent in nature.
6. The rainwater that falls on concrete roads and buildings cannot seep into the ground. This water flows into the drains from where it goes to rivers, lakes or ponds. A lot of effort will then be required to get this water back for use.

One way of increasing the availability of water near our homes or any workplace is to collect rainwater and store it. The process of collecting rainwater from roofs and street corners and storing it for further use is called rainwater harvesting. The basic idea behind rainwater harvesting is "Catch water where it falls."

There are two ways of rainwater harvesting :

1. Rooftop rainwater harvesting
2. Roadside rainwater harvesting
7. Do yourself.