



## **Formative Assessment**

**A. Tick (✓) the correct option :**

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

**B. Fill in the blanks :**

- Ans.**

  1. **Butterfly** (Butterfly/Bear) is a herbivore.
  2. **Herbivores** (Herbivores/Omnivores) only eat plants.
  3. Carrot and **turnip** (turnip/potato) are roots.
  4. Eggs of **chicken** (goat/chicken) are eaten by human beings.
  5. Spinach is a **leafy** (leafy/flower) vegetable.

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

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

**D. Match the following:**

<b>Ans.</b>	<b>Column A</b>	<b>Column B</b>
1.	Tiger	(ii) Carnivore
2.	Goat	(iii) Herbiore
3.	Vulture	(iv) Scavenger
4.	Human beings	(v) Omnivores
5.	Egg	(i) Chicken

## Summative Assessment

## A. Very Short Answer Questions :

**Ans.** 1. We need food for nourishment and for living. It also provides many materials needed by body for maintenance and growth.



**B. Short Answer Questions :**

**Ans.**

1. Cereals are the food grains produced by crops like wheat, barley, millet, maize, rice, etc. Wheat is used for making chapatis, breads and cakes. Barley is used for making chapatis, breads, beverages, etc. Rice is used for preparing idlis, dosas, and the like.
2. Given below are some tips that may help to prevent wastage of food.

- a. Food should not be allowed to get spoiled or eaten away by animals like rats, squirrels, etc., and should be stored properly.
- b. We must eat only that much quantity of food which is required by our body. Overeating can lead to obesity.
- c. We should eat food which is easily available in the region and is seasonal.
3. Human beings that eat both plants and animals are called omnivores. Land animals like bears, foxes, dogs are omnivores.
4. Honeybees collect nectar (sweet juices) from flowers, convert it into honey and store it in their hive.
5. No because different living being live in different areas so they need different food for survive there.

### C. Long Answer Questions :

**Ans.** 1. The various categories in to which food from plants is divided is as following :

- a. **Cereals** : Cereals are the food grains produced by crops. Eg : wheat, barley, maize.
- b. **Vegetables** : Vegetables are the parts of plants such as roots, stem leaves, flowers which are eaten as food. Eg : turnips, carrots, radish.
- c. **Fruits** : We get fruits from plants some are fleshy and some contain fibers. Eg : banana, apples, lemon, amla.
- d. **Pulses** : Pulses contains proteins. Eg : rajma, chana, urad.
- e. **Oil** : Most of the oils are obtained by crushing the seeds or the dried fruits of plants. Eg : coconut, mustard, soyabean.
- f. **Spices** : Spices are substances derived from plants that add flavour of our food. Eg : jeera, haldi, adrak.
- g. **Beverages** : Any drink other than water is called a beverage. Eg : Tea and coffee.
- h. **Sugar** : Sugar is obtained from sugar cane and sugar beet Eg : sugar.

2. Meals that we take comes to us by take various sources. Like plants and animals. Different types of food gives different vitamins, proteins, minerals.

**Food from plants** : Many plants or plant parts are eaten as food/meal like cereals, vegetables, fruits, pulses, oil spices, beverages, sugar.

**(Vegetables)** : Vegetables are the parts of plants such as roots, stems, leaves, flowers which are eaten as food.

**Food from Animals** : Animals also provide a variety of food. Early human used to eat uncooked meat lets see what else we get from animals. like milk, honey meat, fish.

**(Meat)** : The main sources of meat are sheep, goat, pig, hen etc. early humans used to eat raw meat but now meat is cooked before eating.

3. In our daily life we eat a lot of things. But not all the things can be eaten in

same ways. According to our choice we can eat the same thing in two or more totally different ways. For example, potato. Potato is eaten in almost every part of our country. We can eat potato either by boiling, or by frying or by making curry from it. We can mix potato with different vegetables according to our interest. Similarly, egg is one of the most popular food item. It can also be eaten in different ways such as in the form of omelets, or boiled egg or poached eggs or half boiled etc. In the same way, both rice and wheat is used in different parts in different ways.

4. (a) If the number of Insects grow crop of field is destroyed.  
(b) Yes the farmer increase the number of tomato plants without increasing the size of the term.
5. No, Every one around us not get enough food to eat because India is the second most populous country in the world. Due to its large population, our country is facing food problem. Peoples who have not enough money, can't purchase good and enough food.

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.**
1. He/she can't work and play for the whole day Because He/She not take a balanced diet like milk fruit green vegetables, sugar, egg, etc.
  2. All green plants convert solar energy into chemical energy of food all living things depend on plants directly and indirectly so plants are known as producers.



## Components of Food

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### Formative Assessment

**A Tick (✓) the correct option :**

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

**B. Write True or False :**

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

### Summative Assessment:

**A. Very Short Answer Questions :**

- Ans.** 1. Potato      2. Micro minerals, macro minerals  
3. Rickets      4. Carbohydrates, fats, proteins, Vitamins, minerals.  
5. Starch

**B. Short Answer Questions :**

- Ans.**
1. Glucose is an instant source of energy for the cells because it is the main source carbohydrate. Carbohydrate gives energy for work.
  2. Our diet contains excess of proteins and carbohydrates leads to health problems it's called over eating and it's leads to a condition called obesity this is a condition in which the body tends to gain weight and become fat and leads to problems of the heart.
  3. Paleness of nails and face, low haemoglobin, fatigue and loss of weight.

4. Carbohydrates, proteins, fat, vitamins, minerals.
5. Protein-energy malnutrition is a disease caused due to the shortage of proteins and carbohydrates in the diet of children. This disease is called marasmus.

**C. Long Answer Questions :**

- Ans.** 1. (a) The dietary fibres are formed of cellulose. Since we cannot digest cellulose, they do not provide us any nutrients. They simply add bulk to our food and help get rid of undigested food. Therefore, dietary fibres are said to form food roughage.

Sources : We get dietary fibres from vegetables, whole grains, pulses and fresh fruits.

(b) Importance of roughage in our diet :

- Roughage helps in the retention of water and easy digestion of food.
- It helps in easy and regular movement of bowel and thus prevents from constipation.
- It also reduces excess of acidity in the stomach.

2. (a)	Minerals	Functions	Food Sources
Calcium	Keeps bones and teeth healthy, helps in clotting of blood	Milk and Milk products, Beans, Whole gram, Cereals, Green leafy vegetables, Meat and Fish	
Iron	Formation of haemoglobin	Liver, Red meat, Green leafy vegetables like Spinach and Broccoli, Cereals and Pulses	
Iodine	Production of thyroxine hormone by thyroid gland	Iodised salt, Seafood, Fish and Onion	
Phosphorus	Helps in the formation of bones and teeth	Milk, Bajra, Ragi, Nuts, Green vegetables, Fish and Meat	
Sodium and Potassium	Maintains body's water balance; conduction of nerve impulse and muscle contraction.	Salt, Green leafy vegetables, Citrus fruits	
Fluorine	Keeps bones and teeth healthy	Milk and Seafood	

- (b) If our diet has insufficient amount of calcium our bones and teeth will be weak and insufficient amount of Iodine thyroxine hormone cannot produce by thyroid gland.

3. **Causes of Obesity in Children :** Obesity in children has become a common problem these days. This is due to excessive intake of junk food like pizzas, potato wafers, noodles, ice cream and soft drinks. Instead of

playing outdoor games, playing games on computer and watching T.V. for long hours and some other causes of obesity.

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.** 1. Doctors recommend refined oil instead of animal fats, like desighee because desi ghee contains more amount of carbohydrates, fat, instead of refined oil more fat is cause heart problem.  
2. Animal protein sources like fish, meat, eggs contain higher protein than plant protein sources like pulses cereals, beans etc.  
3. Our body never does suffer from fat deficiency because we need fat in a maximum quantity and we get excess amount of it from our food. Moreover our body stores fat in itself at various places for further use.



## Separation of Mixtures

3

### Formative Assessment

**A. Tick (✓) the correct option :**

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

**B. Complete the following :**

- Ans.** 1. Mist is a **liquid-gas** mixture.  
2. The constituents of a **mixture** can be separated by physical means.  
3. Sugar candy is made by **sugar**.  
4. An alloy is a **solid-solid** mixture.

**C. Match the columns :**

**Ans.**

**Column A**

- |                          |   |
|--------------------------|---|
| 1. A fizzy drink         | (i) A gaseous mixture                     |
| 2. Air                   | (ii) A solid-gas mixture                  |
| 3. Smoke                 | (iii) A homogeneous solid-liquid mixture  |
| 4. A glucose solution    | (iv) A heterogeneous solid-liquid mixture |
| 5. A chalk-water mixture | (v) A gas- liquid mixture                 |

**Column B**

**D. What are the following called?**

- Ans.** 1. Residue                  2. Homogenous  
3. Suspension                  4. Heterogeneous mixture

### Summative Assessment

**A. Very short Answer Questions :**

- Ans.** 1. **Winnowing** : Winnowing is a method used to separate lighter components of a mixture from the heavier ones by wind or by blowing air. Particles are separated from heavier ones by winnowing.

2. **Homogeneous** :

- Steel (iron + carbon + manganese), brass (copper + zinc), and stainless steel (steel + chromium + nickel)
- A solution of spirit in water

**Heterogeneous** :

- Sand + salt

- Rice + stone
  - Chalk + sugar
  - Salt + pepper
  - Salad
  - Oil + water
3. Churning.
  4. Sieving is a method used to separate the components of a mixture which are of different sizes and the mesh (usually fitted into a frame) is called a sieve.
  5. When a solution is not capable of dissolving any more solute at a given temperature it is called a **saturated solution**.

**B. Short Answer Questions :**

- Ans.** 1. **Magnetic Separation :** If you move a magnet through a mixture of iron fillings and sand, the iron particles cling to the magnet. Iron is attracted by a magnet. Sand is not attracted by a magnet and so the particles of sulphur are left behind. A method in which a magnet is used to separate the components of a mixture, is called magnetic separation.
2. Sugar is soluble in water and the solution of sugar in water is immiscible with oil that is immiscible liquid.

**Separate :** Separate this mixture by using a separating funnel. Oil is left behind in the separating funnel and the solution of sugar in water is collected in a beaker.

3. Sea water contains salt. So we can call it a salt solution. Sea water is collected in shallow pits dug on the seashore. The heat of the sun makes the water evaporate. When enough water has evaporated, the solution becomes concentrated. After some time the salt begins to crystallise.
4. Heat some water in a vessel and dissolve some sugar in it. Go on adding sugar and dissolving it by stirring and heating until no more sugar dissolves. Filter the hot solution into a jar. Tie a string to a pencil and place the pencil on the rim of the jar.

Now the string hangs in the solution. Leave the set-up untouched for two days. You will find that colourless crystals of sugar have appeared around the string.

**C. Long Answer Questions :**

- Ans.** 1. **Distillation :** In distillation, a liquid is boiled, and the vapours are condensed and collected separately. When the liquid is mixed with solids, the solids do not vaporise. Thus, a liquid can be separated from a solid mixed with it. The process is used for separating a solid-liquid mixture—homogeneous (e.g., a solution of salt in water) or heterogeneous (e.g., a sand-water mixture).
- Often distillation is done by setting up an apparatus as shown in given figure. A solution of salt 'or sugar' is taken in the flask. The flask is heated gently so that the liquid boils. In no time, water starts collecting in the test

tube. The water thus collected does not have the taste of salt 'or sugar'. It is pure and is called distilled water. On distillation for some time, all the water is distilled out and a white residue of the salt 'or sugar' is left in the flask.

In the same way distilled water is prepared for laboratory and medicinal purposes.

2. Take a mixture of salt and sand in a beaker. Add some water to the mixture and shake it for some time. Warm it from time to time so that all the salt dissolves in the water. Heating and shaking help dissolution. Filter, and wash the residue 4-5 times with hot water. Evaporate the filtrate to dryness. You will obtain a white solid, which is salt. The residue on the filter paper is sand, which can be dried in the sun.

**D. Higher Order Thinking Skills (HOTD) Questions :**

- Ans.**
1. Sugar, salt, oil, milk, rice
  2. In water treatment plants, water is allowed to stand undisturbed in large water tanks so as to let the impurities settle down on the surface.



## Fibre to Fabric

4

### Formative Assessment

**A. Answer the following questions orally :**

- Ans.**
1. Cotton, Jute, Nylon
  2. Warm climate, soil Black soil
  3. During that time, people had no idea of cutting and stitching clothes. They used to cover various parts of the body according to their needs by the fabrics.

**B. Tick (✓) the correct Answer :**

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

**C. Fill in the blanks :**

- Ans.**
1. Cotton is a **natural** fibre.
  2. Fabric is made from **fibres**.
  3. After harvesting cotton is sent for **ginning**.
  4. **Silk** is an animal fibre.
  5. Cotton crop is grown in **black clayey** soil.

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

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

**E. Match the following :**

**Ans.**

**Column A**

1. Cotton
2. Jute
3. Silk
4. Separating of cotton fibre from seeds
5. Spinning
6. Handlooms

**Column B**

- (i) Animal fibre
- (ii) Combing
- (iii) Charkha
- (iv) Bolls
- (v) Weaving
- (vi) Cheapest plant fibre

**F. Tick the odd-one out giving reason :**

**Ans.**

1. Cotton, **Silk**, Jute, Coir
2. **Jute**, Gunny bags, Door mat, Kurta
3. Wool, Sheep, Highly porous fibre, **Synthetic fibre**
4. Cotton, **Mango**, Leaf, Seeds
5. Ginning, **Retting**, Spinning, Sliver

**Summative Assessment**

**A. Define the following terms :**

**Ans.**

1. **Ginning** : The process of removing cotton seeds from cotton pods is called ginning. Ginning can be done by hand and also by machines.
2. **Warp** : During the weaving process the shuttle carries the yarn back and forth across the yarn placed lengthwise (in the warp). The shuttle yarn is called weft.  
In simple weaving, the weft yarn goes alternatively over and under a single lengthwise yarn (or warp).
3. **Weaving** : The process of arranging two sets of yarn together (at right angle to each other) to make a fabric is called weaving.
4. **Uses Of Cotton** : Cotton is mostly used for making cloth of various kinds, towels, curtains etc.

**B. Short Answer Questions :**

**Ans.**

1. In the hot weather conditions synthetic clothes are not suitable.
2. Wool and silk fibres are obtained from animals. Wool is obtained from the hair of sheep, rabbits, yaks and camels. Silk fibre is drawn from the cocoon of the silkworm.
3. The places where cloth is woven are called looms. Weaving can be done on handlooms or powerlooms.
4. Today, besides all these natural fibres, we have man-made or synthetic fibres to make clothes. These fibres are not obtained from plant or animal sources. Fibres that are made by man from different chemicals in the industries are called man-made or synthetic fibres. Some of the common synthetic fibres are nylon, terylene, polyester and acrylic.
5. Natural fibres are blended with synthetic fibres to obtain more superior and useful fibres. These are called mixed fibres. Some well-known mixed fibres are terrycot (terylene + cotton), terrysilk (terylene + silk) and terrywool (terylene + wool).
6. Yes, jute is a biodegradable fibre.
7. We wear woollen clothes in cold weather to keep us warm.
8. Gunny bags and carpets are the two items made from jute.
9. Cotton fabrics were used for the first time by Indians and Egyptians. So the birth place of cotton is considered to be Indian region as it was grown in the Ganges valley.

**C. Long Answer Questions :**

**Ans.**

1. 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.

2. Today, besides all these natural fibres, we have man-made or synthetic fibres to make clothes. These fibres are not obtained from plant or animal sources. Fibres that are made by man from different chemicals in the industries are called man-made or synthetic fibres. Some of the common synthetic fibres are nylon, terylene, polyester and acrylic.

3. **(a)** The process of arranging two sets of yarn together (at right angle to each other) to make a fabric is called weaving.

Weaving can be done on handlooms or powerlooms.

The big reels of yarn are called bobbins. These bobbins are used for weaving the cloth.

In the looms, the yarn is placed lengthwise on the frames. Another yarn is attached to the shuttle of the machine.

During the weaving process the shuttle carries the yarn back and forth across the yarn placed lengthwise (in the warp). The shuttle yarn is called weft.

In simple weaving, the weft yarn goes alternatively over and under a single lengthwise yarn (or warp).

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

**(c)** 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. The real breakthrough in making proper clothing came when needle was invented. Gradually, designing, fabricating, cutting, stitching became specialized professions of the world.  
The development of clothing, their fabrication to suit individual needs and requirements have become one of the greatest money spinning industry nowadays.
5. Jute is a long, soft, shiny plant fibre that can be spun into coarse, strong threads. It is produced from the skin of the jute plant's stem. It is the second most important plant fibre after cotton.  
Jute is one of the cheapest natural fibres and is second only to cotton in the amount produced and variety of uses. Jute fibres are of-white to brown in colour, and 1 to 4 metres long.  
The fabric made from jute is popularly known as burlap. Jute fabrics are also called hessian cloth and jute sacks are called gunny bags.

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.**
1. The fibres that are obtained from plants and animals are called natural fibres. Cotton, jute and linen fibres are obtained from plants. Wool and silk fibres are obtained from animals. Wool is obtained from the hair of sheep, rabbits, yaks and camels. Silk fibre is drawn from the cocoon of the silkworm.
  2. Cotton clothes are very light and good absorbent.



## Kinds of Materials

5

### Formative Assessment

**A. Tick (✓) the correct option :**

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

**B. Fill in the blanks:**

- Ans.**
1. Silver **has** (has/doesn't have) a lustre.
  2. Glass is a **bad** (good/bad) conductor of heat.
  3. Objects made of **Iron** (iron/wood) are attracted by a magnet.
  4. Salt is **soluble** (soluble/insoluble) in water.
  5. Plastic is a **bad** (bad/good) conductor of heat.

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

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

### Summative Assessment

**A. Very Short Answer Questions :**

- Ans.**
1. Arranging same types of things together is called grouping.
  2. The process of sorting out and grouping things according to some basis or

criteria is called classification.

3. Gold and silver are the two examples of materials having lustre.
4. Some materials conduct electricity. These materials are called conductors like iron, copper etc.
5. Wood is one example of insulator.

**B. Short Answer Questions :**

- Ans.** 1. Arranging some types of things together is called grouping. Grouping makes it easier for us to find things when we need them. If all textbooks had been kept at the same place, it would have been very easy to find the maths textbook. Similarly, it would be easy to find a particular pant if all clothes are kept together. Also, grouping things would make the room look much attractive.
2. The substances which conduct electricity are called good conductors of electricity or simply conductors whereas substances which do not conduct electricity are called bad conductors of electricity or insulators. For example, metals are good conductors of electricity; air, wood and plastic are insulators.
3. Glass window pane and jar wood chair and table metal utensils and needle.
4. Some types of materials float on water whereas others sink. This property is called flotation. Generally, materials such as leaves, wood, and feathers float on water whereas rocks and metals sink.
5. Aerogel, a new material developed by NASA, created by Steve Kistler in 1931, is a material with very interesting properties. All known as from smoke, it consists of 99.8% air. It is the best known insulator and can support 2000 times its own weight. The brick shown in the picture is kept aerogel.

**C. Long Answer Questions :**

- Ans.** 1. Surface of materials can be rough or smooth. Certain materials have bumps or ridges on their surface, which can be felt by touching them. Such materials are said to be rough. Examples of rough materials are rocks, sandpaper and bark of a tree. Smooth materials lack these bumps. A glass sheet, flower petals, and surface of an apple are examples of smooth surfaces.
2. Materials that do not allow light to pass through them are called opaque materials. Some examples of opaque materials are wood, metal, sheet, leaf, stone and cardboard.  
Materials that allow light to pass through them are called transparent materials. Some examples of transparent materials are water, glass, acrylic sheet, and cellophane paper.
3. Substances which conduct heat are thermal conductors. If you observe the utensils kept in your kitchen, you will find that though most of them are made of metals, their handles are made of wood or plastic. Why aren't

the handles made of metal as well? This is because metals get heated whereas materials such as wood and plastic do not. It would be difficult to handle metal utensils after cooking if the handles were made of metal.

4. Materials such as, metals that are attracted to magnet are called magnetic materials. This property is called magnetism. Objects made of iron are attracted to a magnet. In addition to iron, cobalt and nickel are also attracted to a magnet.
5. A thing that occupies space and has mass is called matter. Matter can be of a fixed shape and size or may not be so. All substances are made up of matter. Matter exists in three categories, which differ in the arrangement of particles they are made of.

**Solid state :** Solids such as, table, chair have the following characteristics.

- (i) The particles are closely packed.
- (ii) They have a definite shape and volume.
- (iii) They cannot be compressed.

**Liquid state :** Liquids such as, water, milk have the following characteristics.

- (i) The particles are not as closely packed as those of solids.
- (ii) They have a definite volume but no definite shape. They take the shape of the container they are poured in.
- (iii) They can only be compressed to a small extent.

**Gaseous state :** Gases such as, oxygen, carbon dioxide have the following characteristics.

- (i) The particles are loosely packed.
- (ii) They do not have a definite shape or volume.
- (iii) They are highly compressible.

#### D. Higher Order Thinking Skills (HOTS) Questions :

**Ans.**

1. Because sweater is made up of wool and thick woolen clothes keep us warm during winter. They prevent to release our body heat.
2. Wires are used to pass them electricity. Plastic is a good insulator of electricity. To prevent a shock metal wires are enclosed-inside a plastic covering.



## Changes Around Us

6

### Formative Assessment

#### A. Answer the following questions orally :

**Ans.** 1. The natural changes :

- a. plants convert in big trees after some years
- b. changes of seasons.
- c. seeds develop a plant
- d. Growth of a child.
- e. Earth quakes.

Five man made changes.

- a. cotton convert in cotton fibres.
- b. vegetable convert in food.
- c. wheat convert in chapatti
- d. formation of roads on mountains

- e. formation of houses.

2. (a) Heated — when we heated any material it became spread. (Increase).  
(b) Cooled — when any material is cool it became decrease in science.

3. • Burning of paper.  
• Food formation.

**B. Tick (✓) the correct Answer :**

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

**C. Fill in the blanks:**

**Ans.**

1. An essential difference to an object's size, shape and nature is called a **change**.
2. The undesirable changes are **harmful** to man.
3. An irreversible change brings a **permanent** change in substance.
4. The burning of a candle or matchstick is a **chemical** change.
5. The homogeneous mixture of a solute and solvent is called a **solution**.

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

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

**E. Match the following:**

- Ans.**

1. Milk changes to curd	(i) Slow change
2. Temporary change	(ii) Irreversible change
3. Change of season	(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 :**

**Ans.** 1. Burning of paper, Ageing of man, Cooking of food, Boiling of water  
2. Changes of seasons, Freezing of water, Hammering of metals, Beating of heat  
3. Forest fire, Eruption of volcanoes, Floods, Formation of curd

## **Summative Assessment**

### A. Define the following terms :

**A.** Define the following terms:

**Ans.**

1. The change which can be reversed by reversing the condition or removing the cause is called a reversible change.
2. The change which cannot be reversed even by changing the conditions or by removing the cause is called an irreversible change.
3. A change in which only the physical properties of a substance get changed and no new substance is formed is called a physical change.
4. An irreversible change in which the composition and chemical properties of the reacting substances get change and which cannot be reversed by reversing the conditions is called a chemical change.

**B. Short Answer Questions :**

- b. When conditions are reversed, the substance/object gets back to its original state.
  - b. Substance or object cannot be reversed back to its original form/state even when conditions are reversed.
  - c. Examples : Stretching of a rubber band, melting and freezing, dissolution of sugar in water, glowing of an electric bulb.
  - c. Examples : Burning of coal, conversion of milk into curd and cheese, growth of plant etc.
2. **Periodic or non-periodic :** The periodic changes include the rotation of the Earth on its axis and revolution round the Sun. The rotation of the hands of a watch is also a periodic change.
- 3. Ageing of living beings, growth of plants, ripening of fruits etc are some biological changes that are irreversible.
  - 4. Following are the few examples of physical change where the original form cannot be regained by us :
    - (i) Breaking of a wooden stick
    - (ii) Dissolution of sugar in water
    - (iii) Dissolution of washing soda in water
    - (iv) Breaking of glass tumbler
    - (v) Dissolving salt in water etc.
5. The energy released during chemical reaction has been used by human beings for different purposes such as the cooking of food at homes using LPG (liquefied petroleum gas), running of vehicles like cars and buses to flying of aeroplanes and the generation of electricity in power plants. The only source of energy for all these chemical reactions involves the burning of a fuel such as coal, petrol or diesel. However, the excessive need of energy required by human beings has resulted in undesirable changes in the surroundings in the form of pollution, acid rain and green house effect. To let the environment remain conducive to man, human beings have to restrict the overuse of energy.
- 6. (i) Some chemical changes such as photosynthesis or taking a photograph are possible only when sunlight is available. The chemical change on the film in camera occurs only when light falls on it. These changes are called photochemical changes.
  - (ii) Some substances such as water, on passing of electric current, undergo a chemical change. These changes are called electrochemical changes. When electric current passes through water, it brings about a chemical change by breaking water molecules to produce hydrogen and oxygen gas
7. (i) The homogeneous mixture of two or more substances is called a solution. In a solution of water and sugar, water is called the solvent, the substance in which the other substance is added. The sugar which is added to the water is called the solute. The formation of a solution is

- only a physical change as the dissolved solute can be recovered by evaporating the water and sugar solution.
- (ii) If we keep on adding sugar to a tumbler of water, a stage comes when no more sugar will be soluble in it. At this stage, the solution is called a saturated solution. The maximum amount of a solute that can be dissolved in 100 millilitres of the solvent at room temperature is called the solubility of that substance.
8. The solubility of solutes depend on the temperature. Generally, solubility increases with an increase in the temperature as the inter-molecular spaces between the molecules of the solvent increase on heating. Therefore, more solute can be dissolved in the solvent when it is heated. The solubility of sugar and other solutes in water increases with an increase in temperature. The solubility of sugar in water is more than the solubility of salt in water. This is, because, every solute has its own solubility.
9. (i) Solid-solid solutions Mixture of soil and sand  
(ii) Solid-liquid solutions Mixture of salt and water  
(iii) Liquid-liquid solutions Mixture of milk and water  
(iv) Gas-liquid solutions Mixture of oxygen and water  
(v) Gas-gas solutions Mixture of carbon-dioxide and oxygen

### C. Long Answer Questions :

#### Ans. 1. Reversible Change

The change which can be reversed by reversing the condition or removing the cause is called a reversible change.

Some reversible changes are,

Conversion of ice into water by heating and that of water into ice on cooling.

Glowing of an electric bulb

Stretching of a rubber band

Ploughing a field

Irreversible Change

The change which cannot be reversed even by changing the conditions or by removing the cause is called an irreversible change.

**Burning of paper, wood etc.** : Paper when burnt gives ash and smoke. We cannot obtain paper back from the ash and the smoke. Therefore, this change is irreversible.

**Ageing of living beings** : We cannot make an old man, a child by any method. Therefore, ageing of living things is an irreversible change.

**Change of milk into curd** : You cannot get milk back from curd. So it is an irreversible change.

**Growth of plants** : A tree cannot be reversed back into a plant or seed. Therefore, growth of a plant is an irreversible change.

**Rusting of iron** : You cannot get back iron from the rusted-iron by a

simple process. That is why rusting of iron is an irreversible change.

2. Do yourself
3. To study a chemical change :

**Procedure :** Take a china dish with little sugar.

Keep the China dish on a wire gauze and heat it using a spirit lamp.

Hold a glass sheet over the china dish.

When it is heated to its full, observe the changes that occur in the sugar.

The sugar, upon heating, in a China dish with glass cover, first turns brown and starts melting. The glass sheet over China dish becomes foggy.

If you continue heating, the sugar mass turns black forming charcoal.

It is not necessary that substances undergoing both these changes must be different. A substance can undergo both physical and chemical change under different conditions.

For example, breaking a matchstick into two smaller pieces is a physical change but burning a matchstick is a chemical change because, after burning, you are left with a black residue which is different from the matchstick. You cannot burn it like matchstick again.

4. The solubility of solutes depend on the temperature. Generally, solubility increases with an increase in the temperature as the inter-molecular spaces between the molecules of the solvent increase on heating. Therefore, more solute can be dissolved in the solvent when it is heated. The solubility of sugar and other solutes in water increases with an increase in temperature. The solubility of sugar in water is more than the solubility of salt in water. This is, because, every solute has its own solubility.

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.**
1. Whether the growth of our body is irreversible change because this change can't be reversed. Body of living things grow. After grow it can't convert in last position.
  2. Yes chemical changes or taking place.  
(i) Burning of paper : This is irreversible chemical change.  
(ii) Burning of candle : This is reversible chemical change.



## Things Around Us

7

### Formative Assessment

**A. Tick (✓) the correct option :**

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

**B. Complete the following :**

- Ans.**
1. The structural unit of an organism is the cell.
  2. A group of tissues which work together to perform one or more functions is called organ.
  3. We throw out waste from our bodies in the form of faeces, urine and sweat.

4. A stimulus is something which produces a response or reaction in a living being.
5. All living beings respond to external stimuli.

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

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

## **Summative Assessment**

**A. Very Short Answer Questions :**

- Ans.**
1. Touch-me-not plant
  2. When we touch the tip of a touch-me-not plant then all the leaves will close.
  3. No, all the organisms are not made of only one cell.
  4. **Cell** : Smallest unit of structure and function in all living beings.
  5. Cells are organised into special groups which perform special functions. These groups of cells which are similar and perform a particular function are called tissues.

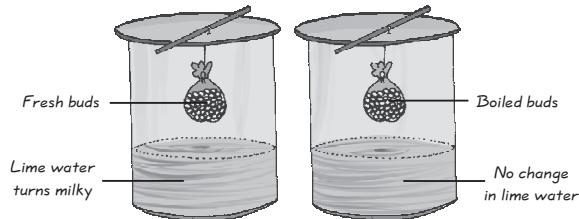
**B. Short Answer Questions :**

- Ans.**
1. Shape, mass and occupy space are the those characteristics which living and non-living things have in common.
  2. Reproduction, growth, movement, excretion and respiration are the five characteristics of a living being.
  3. Fish breathe by taking in water. They breathe through gills.
  4. A group of organs which co-operate with each other to perform a particular function is called an organ system.
  5. The process of getting rid of wastes by the living organisms, is called excretion.

**C. Long Answer Questions :**

- Ans.**
1. Growth is a feature differentiating the living from the non-living. Some non-living things such as, crystals formed from a solution also seem to grow. But this growth is different. A sugar crystal hanging in a solution grows because more sugar is added on to it from the outside. Human body on the other hand, grow because the cells inside the body multiply and grow inside the body. In non-living things growth occurs from outside, while in living beings growth occurs from inside.
  2. Life of all living beings start from a single cell. In many plants, this cell grows and multiplies inside a seed until the seedling comes out, and the new plant grows. In many animals (like birds and snakes), the single cell grows and multiplies inside the egg until the baby hatches out of the shell. The baby then grows into the adult. In some other animals, the baby grows inside the mother's body, is born, and grows into the adult. However it happens, a small organism grows into an adult organism. Then it reproduces, or produces its young ones. Then it grows old, and lastly it dies. We can conclude that all organisms follow a life cycle of birth, growth, reproduction, ageing and death.

3. The energy is stored in the food. All living beings use food to produce energy in their bodies. For this process they need oxygen, which they get from the air or water surrounding them. Oxygen combines with food inside their bodies to release energy. This is a type of chemical change in which carbon dioxide and water vapour are produced. The carbon dioxide and water vapour are wastes, which the body gives out. This process of taking in air (or water), allowing oxygen combine with food, and giving out carbon dioxide and water vapour is called respiration.
  4. Whether plants really respire, to know this do this activity. Put a handful of Lantana buds or any other small flower, like drumstick in a piece of muslin. Tie up the piece of cloth to make a bag and suspend the in a vessel containing lime water. Moisten the cloth and make sure that the bag does not touch the lime water.  
Suspend a bag of boiled buds in another vessel containing lime water. Cover both vessels. After some time, the lime water in the vessel with fresh buds will turn milky because the buds respire and give out carbon dioxide. The lime water in the vessel with the boiled buds will not turn milky. You could use small developing fruit or germinating seeds instead of buds.
- will turn milky because the buds respire and give out carbon dioxide. The lime water in the vessel with the boiled buds will not turn milky. You could use small developing fruit or germinating seeds instead of buds.
5. All living things show growth. You were born a little baby and now you are nearly 5 feet tall. You will still increase for a few more years. Then your growth will stop. This is true of all animals. They grow to the adult size and then stop growing. But plants, on the other hand, grow all their lives. They start as little seedlings and then keep growing.
  6. Plants throw out gases through the stomata (pores) in their leaves. They also store wastes in cells. Some of these wastes are useful to human beings. For example, the rubber we extract from rubber trees is a plant waste called latex. Gum obtained from Acacia trees is also a waste product. So is the resin extracted from coniferous trees.



#### **D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.**
1. Oxygen is that gas which is a by product of photosynthesis in plants by essential for human beings.
  2. Whales are not included in fish group. Actually they are mammals. Like other mammals they breathe in oxygen with the help of their nostrils.



## **Plants : Forms and Functions**

**8**

### **Formative Assessment**

#### **A. Answer the following questions orally :**

- Ans.**
1. Trees, shrubs and herbs are the three groups in which the most of the

plants can be classified.

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. Tap root is a main root from which a number of branch roots arise. In a fibrous root a number of similar sized roots arise in a cluster below the stem and spread out in the soil.

**B. Tick (✓) the correct Answer :**

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

**C. Fill in the blanks :**

- Ans.** 1. A plant can be divided into two main parts **root system** and **shoot system**.  
2. **Root** is the main organ of support in a plant.  
3. The stalk by which the leaf lamina is attached to the main stem is called **petiole**.  
4. **Root** provides anchorage to the plant.  
5. Leaves prepare their food by a process called **photosynthesis** and remove water by a process called transpiration.

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

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

**E. Match the following :**

1. Anther	(i)	Mango
2. Herb	(ii)	Leaf
3. Ovule	(iii)	Stamen
4. Tap root	(iv)	Ovary
5. Stomata	(v)	Mustard

## Summative Assessment

**A. Define the following terms :**

- Ans.** 1. **The shoot system of a plant :** An above-ground part of the plant (above the soil), called the shoot system. The shoot system consists of stem, branches, leaves, flowers and fruits.  
2. **Transpiration :** Roots absorb more water than is necessary for their survival. The excess water is allowed to escape through the small pores (stomata) found on the surface of leaves. The water is given out in the form of water vapour. This process is called transpiration. Transpiration helps in cooling of plant. This process also helps in absorption of water through roots.  
3. **Stomata :** The tiny pores on leaf surface that help in the exchange of gases during respiration.  
4. **Stamens :** 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.

5. **Primary roots :** In plants like mustard and pea, there is a main root from which a number of branch roots arise. The main root is called the tap root and the branch roots are called the lateral roots.

**B. Short Answer Questions :**

- Ans.** 1. Functions of the Roots

- (i) **Support and anchor :** Roots give support to the plants. They anchor the plant firmly in the ground. They hold the soil and prevent it from being washed away easily.
- (ii) **Absorption :** Besides the above mentioned function, roots often have some additional functions too. They absorb water and minerals through root hairs.
- (iii) **Conduction :** They conduct water and minerals absorbed from the soil to the stem.
- (iv) **Prevent soil erosion :** Roots bind the soil particles and thus prevent the soil from soil erosion by wind or water.
- (v) **Storage of food :** Roots store food in certain plants.

2. Do yourself.

3. The stem conducts water and minerals from the roots to other parts of plant. It also distributes the prepared food to the various parts of the plant.
4. The arrangement of veins in the leaf blade is called venation. Leaf venation may be either reticulate or parallel.

In reticulate venation, veins are arranged in a net-like pattern on both sides of the midrib. This is seen in leaves of plants like pea, petunia, gram, rose and mango.

In parallel venation, veins run parallel to one another. This is seen in leaves of plants like grasses, banana and palms.

5. Do yourself

**C. Long Answer Questions :**

- Ans.** 1. A leaf consists of two main parts the petiole and the leaf blade or lamina. The flat green portion of the leaf is called the leaf blade or lamina. It is attached to the stem by a narrow, short stalk called the petiole.

If you observe the lamina carefully, you will find that a network of lines is present. The petiole continues in the lamina as a thick vein in the middle. This vein is called the midrib. The midrib branches out as veins to form a network. The veins perform two functions :

- (i) Transport water and food.
  - (ii) Provide support to the leaf.
- The arrangement of veins in the leaf blade is called venation. Leaf venation may be either reticulate or parallel.

2. 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 conduct 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

3. There are several varieties of plants which have different heights, type of stems and branching patterns. Based on these, plants can be grouped into four categories trees, shrubs, herbs and creepers.

**Trees :** Plants that are tall and have thick, hard, brown stems are called trees. Their stems branch out and spread above the ground, for example, guava tree, neem tree and mango tree.

**Shrubs :** Plants with hard stems which branch near the surface of the soil are called shrubs. For example, lemon and rose are shrubs.

**Herbs :** Plants with soft green stems are called herbs. They are generally short in height and have no branches, for example, basil and coriander.

#### D. Higher Order Thinking Skills (HOTS) Questions :

- Ans.**
1. Flowers are so brightly colored to attract the insects for the process of pollination.
  2. Honey bee is sucking the juice of flower for making honey.



# Animals : Forms and Function

9

## Formative Assessment

### A. Tick (✓) the correct option :

- Ans. 1. (ii)    2. (iii)    3. (iv)    4. (iii)    5. (iii)

### B. Fill in the blanks :

- Ans. 1. A bony framework is absent in a **snail** (fish/snail).  
2. The spine is made up of bones called **vertebrae** (vertebrae/backbone).  
3. Our skeleton is made up of **206/260** (206/260) bones.  
4. The **cage** (skull/rib cage) protects the heart.  
5. The **skull** (skull/backbone) protects the brain.  
6. The backbone protects the **spinal** (lungs/spinal cord).  
7. Movement is brought about by the contraction and relaxation of **muscles** (bones/muscles).  
8. Knee joint is an example of a **ball-and-socket** (hinge/ball-and-socket) joint.

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

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

## Summative Assessment

### A. Very Short Answer Questions :

- Ans. 1. Five organ systems of our body are :  
(i) Digestive system    (ii) Circulator system    (iii) Nervous system  
(iv) Muscular system    (v) Skeletal system  
2. Most birds can fly easily. The following characteristics help them to fly.  
(i) Their bones are hollow, which makes them lightweight.  
(ii) They have streamlined shape, which makes it easier for them to fly through air.  
(iii) They have strong chest muscles, which help them in flapping their wings during flight.  
(iv) They have wings, which are equipped with feathers.  
3. The human skeleton consists of the following parts: skull, rib cage, backbone, and limbs. Unlike most limbed vertebrates, human beings use.  
4. All the movements are brought about by joints and muscles. Joints are places where two or more bones meet.  
5. Some fish such as sharks and rays have no bones inside their bodies. Their skeleton is entirely made of cartilage. There are called liquid skeleton.

### B. Short Answer Questions :

- Ans. 1. **Invertebrates:** These animals do not have a backbone. Insects, spider, and jellyfish are examples of invertebrates.  
**Vertebrates:** These animals have a backbone. Human beings, birds, and snakes are examples of vertebrates.
2. For movement snails use a muscular organ called the foot. The foot

produces a slimy substance called mucous. The snail actually slides on a layer of mucous. The mucous reduces the friction between the ground and the foot by offering a smoother surface to slide on. The muscular foot produces a series of wavelike movements that force the snail's body forward. A trail of mucous is left behind when the snail crawls. Sticky mucous also enables the snail to crawl on a variety of surfaces.

3. Muscles bring about movement by contracting (shortening) and relaxing (lengthening). Joints cannot bring about movement without the help of muscles. One end of a muscle is attached to a movable bone, whereas the other end is attached to a fixed bone. When the muscle contracts, it pulls the movable bone. Since muscles are only capable of pulling, they work in pairs.
4. Vertebrates are the animals which have a back bone. Human beings, birds and snakes are examples of vertebrates.
5. Joints at the elbow and the knee are examples of hinge joints.

### C. Long Answer Questions :

- Ans.**
1. An earthworm's body is made up of various parts called segments. It moves by lengthening and shortening these segments. Its movement can be compared with that of a spring. The segments also have tiny, hair-like bristles, which help the earthworm to grip the surface and move its body forward.
  2. They are able to run very fast and can move across a variety of surfaces. Their feet are equipped with small claws that help them climb walls. Cockroaches walk in a very interesting manner, moving three legs at a time.  
Cockroaches are thought to be fastest land insects. When they are running very fast, they rear up on their two back legs and run like we do!
  3. In our body, bones are arranged in an organized manner and form the skeleton. The human skeleton is made-up of 206 bones. Besides helping in movement, it is responsible for the following functions.
    1. It protects the soft internal organs.
    2. It provides shape and support to the body.
    3. Bones are filled with a substance called marrow, which produces blood cells.
  4. **Freely movable joints:** These joints can move quite freely and allow a variety of movements. Examples include knee and elbow joints.  
**Slightly movable joints :** These joints allow very little movement. Examples include the joints between most vertebrae.  
**Fixed joints :** These joints do not allow any movement. The joints between the bones of our skull are examples of fixed joints.
  5. (i) **Pivot joint :** In this joint the rounded surface of one bone fits into a ring formed by the other, such that one bone is able to rotate over the other. This type of joint is found between the first two vertebrae of

the backbone.

- (ii) **Ball-and-socket joint** : In this joint the ball-like surface of one bone fits into a hollow in the other. A ball-and-socket joint allows maximum movement in all directions. Joints at the hip and the shoulder are examples of this type of joint.
- (iii) **Hinge joint** : This joint provides movement similar to the hinges of a door. Joints at the elbow and the knee are examples of this type of joint.
- (iv) **Gliding joint** : This joint allows bones to glide over each other, providing little movement in all directions. Examples include joints between the bones of the ankle (tarsals).

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.** 1. Cockroaches are able to climb walls because their feet are equipped with small claws that help them climb walls.  
2. Wrestlers develop strong muscles so that they can stay long in the fights.



## Motion and Measurement of Distances 10

### Formative Assessment

**A. Answer the following questions orally :**

- Ans.** 1. People need the modes of transport to move from one place to another.  
2. Hand span is not a proper unit of measurement of length because hand spans of different people will be of different size.  
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 introduce 51 units.  
4. All periodic motions are repetitive but all repetitive motions are not periodic.

**B. Tick (✓) the correct Answer :**

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

### Summative Assessment

**A. 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.
  - a. To measure quantities accurately
  - b. 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.

#### B. Short Answer Questions :

- 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 :
    - (i) You may need to know how tall you are to choose clothes of your size from the market.
    - (ii) One needs to know the height of bridges from the road to allow the traffic to pass through them.
    - (iii) You need to know the length and breadth of a room to make a bed of an appropriate size which will fit into it.
    - (iv) One needs to know the length and width of doors or windows to determine the cloths required to make curtains.
  3. 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.

4. **Rectilinear motion** : Rectilinear motion is a translational motion in a straight line.  
**Curvilinear motion** : Curvilinear motion is a translational motion along a curved path.
5. 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.

### C. Long Answer Questions :

- 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 patter'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.

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.** 1. Measuring take is easy to round according to body.

2. Measurements are important in our life to know the distance between various objects or places and know the quantity of things that we purchase from market.



## Electric Current

11

### Formative Assessment

**A. Tick (✓) the correct option :**

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

**B. Give one (or two) word (s) for the following :**

- Ans.** 1. copper      2. switch  
3. source of electric current      4. Dry cell  
5. Closed circuit

**C. Fill in the blanks :**

- Ans.** 1. A dry cell contains dry or semisolid **materials**.  
2. Electric current flows only if there is an **unbroken** path.  
3. Electric current flows in a **particular** direction.  
4. An electric switch is a device that is used to open or **close** an electric circuit.  
5. An electric torch has one or more dry cells inside, which act as **the 'source'**.

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

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

### Summative Assessments

**A. Very Short Answer Questions :**

- Ans.** 1. A device or an appliance that is used to produce electric current is called a source of electric current.  
2. A dry cell is a very convenient source of electric current. It contains dry or

semis solid materials.

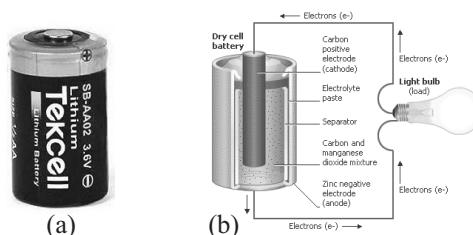
3. A circuit which has a 'broken path' through which an electric current can not flow is called an open circuit.
4. A circuit which has an 'unbroken path' through which an electric current can flow is called a closed circuit.
5. No, all materials do not allow electric current to flow through them.

#### B. Short Answer Questions :

- Ans.**
1. A dry cell is a very convenient source of electric current. It has made it possible to invent so many wonderful electrical devices.
  2. There are three main conditions required for an electric current to flow.
    - (i) A device used to produce an electric current such as batteries, cells, or plug points.
    - (ii) A wire made of a metal such as aluminium, silver, or copper, which will allow electric current to flow through easily.
    - (iii) A loop of the wire running through from one terminal of the source, through various various appliances, back to the other terminal of the source.
  3. The 'path' made for electric current to flow is known as the electric circuit or, simply, circuit.
  4. A material that does not allow the electric current to flow through it is called an insulator or a bad conductor of electricity such as the plastic pen and the rubber band in figures (a) and (c), respectively.
  5. A person gets an electric shock if an electric current flows through his or her body.

#### C. Long Answer Questions :

1. Look at a simple dry cell and see what is inside it.



(a) A dry cell and (b) inside of a dry cell

- 2.



(a) Open circuit- the bulb does not glow and (b) Closed circuit the bulb lights up

3. An electric torch has one or more dry cells inside, which act as the 'source'. These cells are connected through a switch to a small bulb. When the switch is pushed to the 'on' position, the circuit is complete and the bulb glows. When the switch is pushed to the 'off' position, the circuit is incomplete (broken). Now the current can not flow through the circuit, and the light goes out.
4. Precaution to avoid getting an electric shock :
  - (i) Do not put a metal object into any electrical appliances.
  - (ii) Do not put your finger into a plug socket. You might get a nasty shock.
  - (iii) Do not plug in or take out the cords of any electrical device with wet hands.
  - (iv) Do not pull a wire from the plug point. Do not take out the wire when the switch is on.
  - (v) Do not touch a hanging wire on the road.



*Electric torch*

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.**
1. Insulators are used in places where we do not want an electric current to flow. Insulators are used to cover the electric wire.
  2. We are usually advised to wear rubber shoes slippers when we touch an electrical appliance because rubber is an insulator which prevent the flow of electricity through our body into the earth.



## Magnet and Its Properties

12

### Formative Assessment

**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. Tick (✓) the correct Answer :**

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

**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. True

**E. Match the following :**

<b>Ans.</b>	<b>Column A</b>	<b>Column B</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

## **Summative Assessment**

**A. Define the following terms :**

- Ans.**
1. **Magnetic substance** : The materials that are 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.

**B. Short Answer Questions :**

- 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. By the property of repletion we identify the two iron bars of equal size as an ordinary iron bar.
  3. 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.

4. 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. 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.

### C. Long Answer Questions :

- 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.

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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.

#### D. Higher Order Thinking Skills (HOTS) Questions :

**Ans.** 1. Do yourself

2. The magnetic effect of the electromagnet creates a space between the train and the rail.



## Water

13

### Formative Assessment

A. Tick (✓) the correct option :

- Ans. 1. (c)      2. (d)      3. (a)

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

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

C. Fill in the blanks :

- Ans. 1. A human body has **75%** water by weight.  
2. Excretion of water from the human body occurs in the form of **sweat** and **urine**.  
3. The major sources of water are **rainwater, surface water** and **ground water**.  
4. **Water table** is the level of water under the ground.  
5. Excessive rainfall causes **flood**.

### Summative Assessment

A. Very Short Answer Questions :

- Ans. 1. The major sources of water are : rainwater, surface water and groundwater.  
2. **Water table** : The level of water under the ground is called water table.  
3. Well water, tube wells, hand pumps are forms which we use from groundwater.  
4. Drought and flood.  
5. Drought occur when no rainfall for a long period, it leads to serious hydrological in balance.

B. Short Answer Questions :

- Ans. 1. Due to scarcity of water, the soil dries up completely, becomes hard and begins to crack and gradually becomes infertile. While rapidly running water takes a way the top layer of the soil. It leads to soil erosion and sedimentation deposition problem down stream.  
2. Heavy and continuous rain for a long period of time can lead to a major calamity. When there is continuous rain and the soil and vegetation cannot absorb all the water, then water runs off the land. It cannot be carried in river channels or retained in natural lakes and ponds, reservoirs and dams. The water then may spread over a large area. This condition is called flood.  
3. We know that about 75% of the earth's surface is covered with water. About 2% of water exists in ice from. Which we can not drink. About

97.4% is present in oceans and seas and is saline. Which we can not drink. Only 0.6% of water is fresh water, of which 1.98% is present in ice caps and glaciers, 0.61% is groundwater and only 0.01% is available for consumption So we need to conserve it.

4. The water level in ponds and wells, etc, in drought affected areas goes down and some of them may even dry up and the water life is completely lost. While in floods, many water animals are carried away by the strong water current and are deprived of their habitat.
5. Water is necessary for us in the following ways:
  - Water maintains the body temperature. In summer, we sweat a lot which has a cooling effect.
  - Blood, consisting of water and blood cells, absorbs digested food and also helps in transportation of oxygen and carbon dioxide in the body.
  - Digestion of food in the body takes place with the help of water.
  - Water helps in excretion of wastes from the body in the form of sweat and urine.

Therefore, person should drink 3-4 litres of water daily to make up for this loss.

### C. Long Answer Questions :

- Ans.**
1. About 30% of plant body weight is water. Water is necessary for plants in the following ways:
    - Water is very important for the germination of seeds.
    - Water helps in transportation of minerals among different parts of the plant body.
    - A large amount of water is needed by plants during photosynthesis.
  2. Some other uses of water are:
    - A large amount of water is required in many industries such as chemical industries, steel mills, paper mills, petroleum refineries, fertilizer and rayon industries.
    - The largest amount of water is used for irrigation.
    - Water is also used for producing electricity, i.e., hydroelectricity, in which the energy of falling water (hydropower) is used to produce electricity.
    - Water is used for extinguishing fire, sanitation and cleaning streets.
    - Water acts as a coolant in power generation from fossil fuels and nuclear fuels, and also in car radiators.
    - Ships, boats and sailboats are used for transporting humans and goods from one place to another.
    - Some people in Kerala and Kashmir live in boats. These boats are called houseboats.
    - Water is needed for many sport activities and recreation such as swimming, river rafting, boating and water skiing.
  3. If there is no rainfall for a long period, it leads to serious hydrological

imbalance. Drought refers to a period (a year or more), in which there is an unusual scarcity of rain.

Major water crisis can have the following effects:

- The water table in drought-affected areas goes down, so, groundwater become scarce.
- The soil dries up completely, becomes hard and begins to crack and gradually becomes infertile.
- The water level in ponds and wells, etc., in drought- affected areas also goes down and some of them may even dry up and the water life is completely lost.
- During drought, farmers, who depend on agriculture for their livelihood, are mostly badly, affected. they suffer loss of crops, i.e. their source of income.
- Drought leads to shortage of food, increase in poverty, reduced health and poor quality of life.
- Many people as well as living beings die of dehydration and thirst.

4. Flood can have the following effects:

- Rapidly running water takes away the top layer of the soil. It leads to soil erosion and sedimentation deposition problem downstream.
- It leads to acute shortage of food, safe drinking water, etc.
- If water rushes in to godown and fields, it destroys the stored food material and crop.
- Heavy rains and sudden flow of water carry away people, their houses, other belongings and domestic animals and can cause death by drowning.
- Many water animals are carried away by the strong water current and are deprived of their habitat.
- During heavy rains there are increased chances of the outbreak of epidemics, various kinds of infectious diseases, malaria, diarrhoea, etc.
- Collapse of houses, buildings, bridges, banks and other structures leads to a lot of financial losses.
- Floods for a long period of time delay traffic, disturb the drainage system and often break hydroelectric power.

5. **RAINWATER HARVESTING**

One of the ways of conserving water is to collect rainwater and store it for future use. This is called rainwater harvesting. The motto behind rainwater harvesting is “collect water where it falls.”

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

The following methods can be used to collect rainwater in such places:

1. **Rooftop rainwater harvesting:** It is a old method in which rainwater is collected from the rooftop and allowed to go into a storage pit

through pipes. Water from the roof may contain soil and should be cleaned before use. Rainwater can be directed through pipes from the rooftops to the storage pipe in the ground. From here it goes into the soil to recharge or refill the ground water.

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

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.**
1. Do yourself
  2. We know that the water vapour in the atmosphere condense to form clouds and fall as rain. Rain forms a part of the water cycle. Rainwater is the purest form of water.



## Light and Shadows

14

### Formative Assessment

**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 may 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. Tick (✓) the correct Answer :**

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

**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. The outer bright rim of the Sun observed during annular solar eclipse is called **diamond ring**.

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

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

## **Summative Assessment**

### **A. 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.

### **C. 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. Yes, the flame of gas stove limit light. We can say this by the fact that we can see a thing when it falls on a it. As the light from the gas stove reflects and help us to show an object, it is proved that the flame of a gas stove emit light.
  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  $600^{\circ}\text{C}$  to  $800^{\circ}\text{C}$ .

### **C. Answer the following questions :**

- Ans.**
1. To make a transparent sheet translucent, you just need to roughen up the surface (e.g., with sandpaper) so that light is scattered, rather than being transmitted uniformly. To make a translucent sheet transparent. You need to polish the surface smooth. Have you ever tried putting a drop of cooking oil on to a piece by tracing paper? The oil spreads and fills in some of the surface irregularities, creating a surface which goes some way to making the sheet transparent more.
  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.

3. A video camera facing the Sun is connected to a television set to watch the solar eclipse in the 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.
4. We know that a shadow is formed when an opaque object comes in the path of light. A shadow is always dark in colour. So if we use a coloured light is used in place of white light the formation of the shadow will remain the same. Similarly the shape and size of the shadow has nothing to do with the colour of the light. It depends upon the distance of large source of the light from the object. If a source of light is far away from the object the shadow will be beiger than the object. Singularly, the nearer the source of light, the shorter the size of the shadow would be.
5. 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.

#### D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Yes

2. The word 'Ambulance' written backwards on the front of an ambulance so that the people, riding on the vachinles which is ahead the ambulance, can read the word 'Ambulance' in the mirror of vehicles and give the way to pass the ambulance.



# Air Around Us

15

## Formative Assessment

**A. Tick (✓) the correct option :**

**Ans.** 1. (c) 2. (c) 3. (c)

**B. Fill in the blanks :**

**Ans.**

1. Water, when poured into a glass, displaces **air** from the latter.
2. The earth is surrounded by a thick blanket of **atmosphere**.
3. Air is a gaseous **of some gases**.
4. Nitrogen is neither combustible nor a **supporter** of combustion.
5. A diver carries **oxygen cylinder** for respiration.
6. The **water vapour** present in air helps in the formation of clouds.

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

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

## **Summative Assessment**

## A. Very Short Answer Questions :

**Ans.** 1. Air bubbles come out when soil is added to water because soil contains air in it

2. In the absence of air in the soil, plants would not grow as their roots would not get oxygen. And the absence of plants would bring all life on earth to an end.

3. Two component of air and their proportions are :

4. Carbon dioxide is released in the air during burning and respiration. The burning of fuels like coal (carbon), diesel, petrol, wood and kerosene, results in the formation of carbon dioxide.

5. Carbon dioxide is formed when carbon is burnt in air.

**B. Short Answer Questions :**

**Ans.** 1. To see that water contains dissolved air, heat some water very slowly on a burner. You will see air bubbles being formed.

Allow some cold water to stay undisturbed in a glass for a couple of hours on a hot day. You will observe air bubbles sticking to the walls of the glass. This happens because the solubility of air decreases with increasing temperature. So the warmer water releases some of the air dissolved in it.

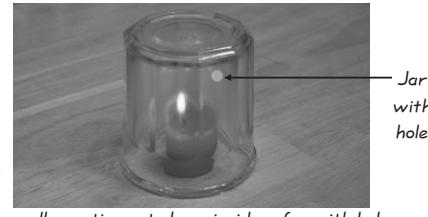
2. (i) Put a inverted glass over a burning candle. The candle will burn for

only and a short while. This is because the amount of air so, of oxygen in the glass is limited. The burning stops as soon as the oxygen is used.



*A Candle cannot burn without oxygen*

(ii) Again do the activity with glasses of different sizes. The bigger the glass, the longer will the candle burn because the more will be the amount of oxygen available of burning.



*A candle continues to burn inside a jar with holes.*

(iii) Make holes in a plastic jar and invert it over a burning candle. The candle will continue to burn till the end. This is because it continues to get oxygen through the holes.

3. The mucus and hair in your nostrils trap the dust particles and soot present in the air when you inhale it. On the other hand, when you inhale through your mouth, the dust particles and soot enter your lungs and respiratory tract.
4. **THE USES OF AIR :** Water and air are the most useful natural resources. We know that we cannot live for more than a few minutes without breathing. We have already discussed the various uses of water, and how it is necessary for our life. Here, let us discuss some of the important uses of air.
  - (i) **Respiration :** The oxygen of the air takes part in respiration in animals and plants alike.
  - (ii) **Photosynthesis :** The carbon dioxide of the air helps plants to make their food by the process of photosynthesis.
  - (iii) **Regulating temperature :** The air absorbs a lot of the heat of the sun during the day. Had it not done so, the earth would have become too hot to sustain life. It also traps the heat radiated by the earth at night. This prevents the nights from becoming too cold.
  - (iv) **Compressed air :** Compressed air is used for inflating tubes. It is also used in sprayers.
  - (v) **Hearing :** We can hear one another only because there is air between us. When we speak, the air vibrates. These vibrations make our eardrums vibrate and so we can hear each other.

### C. Long Answer Questions :

- Ans.** 1. Invert an empty glass tumbler and push it right into a bucket containing water. No water will enter the tumbler. Now slightly tilt the tumbler. You will find bubbles coming out of the tumbler and water entering it. You see the bubbles because the tumbler was filled with air. When you

tilted the tumbler, the air inside it found its way out forming bubbles. No water could enter the tumbler when the tumbler was in an inverted position. This is because air is lighter than water. So, air remained on top and water remained at the bottom.

2. **Displacement of Air by Water and Vice versa :** We know that water is heavier than air, it goes to the bottom when filled into a tumbler. And a volume of air equal to that of the water goes out of the tumbler. We then say that water has displaced air from the tumbler.

Air, the displaced matter, goes upwards. Such displacement is known as upward displacement.

Fill a bottle with water. Close its mouth with your thumb and invert it into a bucket of water. Remove your thumb and hold the bottle with its mouth under the water. Introduce one end of a bent drinking straw into the bottle and blow from the other end. You will find bubbles rising up the liquid and collecting in the upper part of the bottle. The level of water in the bottle falls as air collects in the bottle. Finally the bottle will be full of air and the level of water in the bottle will become the same as that in the bucket. In this case air has displaced water from the bottle. This is the downward displacement of water.

3. We burn fuel in the industry, laboratory, kitchen, motor vehicles, railway engines, etc. A large amount of the oxygen of the air is being used every moment for burning and respiration. The product is carbon dioxide, which is thrown into the atmosphere. Also, every living organism—plant or animal respires all the time. Again, big amounts of oxygen are used and large amounts of carbon dioxide are given out. Thus, it looks that the proportion of oxygen should decrease and that of carbon dioxide should increase in the air. But this is not so. During the process of photosynthesis, plants use up carbon dioxide and give out oxygen into the air. Thus, the balance of oxygen and carbon dioxide is maintained. (plants produce more oxygen than they use. This makes up for the oxygen used up in burning and by animals.) This is a good example of the interdependence of animals and plants.

**D. Higher Order Thinking Skills (HOTS) Questions :**

- Ans.** 1. No, life would not be possible without air.  
2. If there is too much water vapour in the air, it will be very difficult to breath in.



## Waste Management

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### Formative Assessment

**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. Tick (✓) the correct answer :**

- Ans.** 1. (b)      2. (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 **carbon dioxide**.  
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

## **Summative Assessment**

**A. 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.

**B. Short Answer Questions :**

- 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, everyday, 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.

### C. Long Answer Questions :

- 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 waste it can cause serious pollution and environmental harm.

- (i) They are highly inflammable, for example, oil products.
- (ii) 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.
- (iii) They are toxic and could cause damage or be fatal to living organisms (for example, pesticides and heavy metals)
- (iv) They are highly infectious.
- (v) They are carcinogenic, i.e. they cause cancer.
- (vi) 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 husbandry, 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.