

# Science Booster 6

## 1

## Sources of Food

### ANSWERS

#### CHECK POINT 1

1. Ingredients 2. Cereals 3. Coconut 4. Protein

#### CHECK POINT 2

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

#### PRACTICE TIME

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

B. 1. autotrophs 2. honeybees; nectar 3. cereals 4. leafy

C. 1. We need food to get energy and to remain alive and active.

2. Tulsi, Neem

3. Fishes, Oysters, Crabs, Lobsters, Prawns, and some algae

4. Dried and cured leaves of tea plant; Dried seeds of coffee plant

5. A house sparrow is called omnivorous because it feeds on insects as well as seeds.

6. Radish, Carrot, Onion, Tomato and Turnip.

D. 1. Spices are food ingredients which add flavour and aroma to our food. They have little or no nutritional value but make the food tasty. They may be dry seeds, buds, fruits or bark of a plant. For example, cumin, turmeric, etc.

2. Food products such as meat, eggs, milk and milk products such as cheese, curd and honey are obtained from animals.

3. (a) Herbivores like horses and cows have broad and flat hind teeth to grind their food such as grass, black gram, etc.

(b) Nut and grain-eater herbivores like rabbits and squirrels have sharp front teeth to gnaw their food.

4. The animals which eat both plants and flesh of other animals are called omnivores. We are omnivores.
  5. (a) Food gives energy to body to carry out all life activities such as respiration, excretion, etc.  
(b) It keeps us healthy and gives strength to fight diseases.
- E. 1.** Materials required to prepare food are called its ingredients. For example, to prepare potato curry, potato, onion, tomato, oil or ghee and spices are its ingredients.
- (a) Ingredients for omelette: Egg, onion, tomato, oil or ghee and salt.
  - (b) Ingredients for dal: Dal, salt, turmeric powder, chillies, onion, tomato, oil or ghee and spices.
  - (c) Ingredients for *biryani*: Rice, vegetables like tomato, potato, etc., oil or ghee, salt, spices and meat (if nonveg *biryani*)
2. The two categories of food based on their sources are  
(a) Food obtained from plants (b) Food obtained from animals  
Food obtained from plants: Rice, Wheat, Radish, Potato.  
Food obtained from animals: Meat, Eggs, Milk, Fishes
  3. The groups of animals on the basis of their food habits are  
(a) Herbivores: They are plant-eating animals. Examples: Horse, Deer, etc.  
(b) Carnivores: They are flesh-eating animals. Examples: Lion, Tiger, etc.  
(c) Omnivores: They are plant and flesh-eating animals.  
Examples: Bear, Crow, etc.
  4. (a) Honey is important for health because it contains sugar, minerals and some enzymes. It is easy to digest and has antibacterial and medicinal properties.  
(b) Scavengers are important for cleaning the earth because they eat the flesh of dead animals.  
(c) People living in coastal areas thrive on fishes and sea foods such as oyster, crab, lobster, prawn and some algae. These foods are rich source of iodine and proteins.
- F. 1.** Pasteurisation.
2. Sprouts are considered more nutritious because they are rich source of proteins and vitamin B complex.
  3. Spices add flavour and aroma to our food and make it tasty. They also have medicinal properties.
- G. 1. APPLE 2. ENERGY 3. BRINJAL 4. SCAVENGERS 5. CARROT 6. NEEM 7. ROOT 8. CLOVE 9. TOMATO 10. LETTUCE**

# 2

## Components of Food

### ANSWERS

#### CHECK POINT 1

1. (F) 2. (T) 3. (F) 4. (T)

#### CHECK POINT 2

1. (a) K; Calcium (b) Vitamin C (c) micro- 2. (a) Starch (b) Iodine (c) Blue-black (d) Rice and potato

#### CHECK POINT 3

1. Vitamins and minerals 2. Protein 3. Scurvy 4. Anaemia

#### PRACTICE TIME

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

B. 1. (F) 2. (T) 3. (F) 4. (F) 5. (T)

C. 1. Vegetables, whole grains, pulses and fresh fruits.

2. Sodium, Potassium

3. Rickets (in children), Osteoporosis (in adults)

4. Vitamins and minerals 5. Cellulose

D. 1. Glucose is the simplest sugar which is burned or oxidised to get energy by the cells. So, it is called instant source of energy.

2. Excess of proteins and carbohydrates are converted into fats and stored in the body. This will make us obese.

3. (a) Deficiency of iron which takes part in the formation of haemoglobin.

(b) Deficiency of vitamins B<sub>6</sub>, B<sub>9</sub> and B<sub>12</sub> which help in the formation and maturation of RBCs.

4. (a) Proteins form muscles, skin, hair and nails of the body.

(b) They form antibodies.

5. Marasmus is a disease of children in which their body suffers the shortage of proteins and carbohydrates. Such children are very thin and weak. Their growth stops and tissues are slowly destroyed.

- E. 1.** (a) Roughage is dietary fibres that are formed of cellulose. We get it from vegetables, fresh fruits, whole grains, etc.
- (b) Roughage adds bulk to the food, and helps in easy and regular movement of bowel to get rid of undigested food.
- 2.** (a) Iron, calcium, phosphorus, sulphur, potassium, chlorine, sodium, magnesium and iodine are major minerals of our diet.
- (b) The insufficient amount of calcium in diet hampers the health of bones and teeth. Its deficiency causes rickets in children in which their bones and teeth are poorly developed, and in adults, it causes osteoporosis which makes their bones weak and fragile.
- The deficiency of iodine causes goitre in which thyroid gland enlarges and affects the production of thyroxine hormone.
- 3.** (a) Taking diet which has shortage of one or more nutrients is called malnutrition.
- (b) If the children do not get sufficient amount of mother's milk during the early years, they suffer from protein malnutrition.
- (c) A child suffering from kwashiorkor has stunted growth, large pot-like belly, swollen face, thin legs, mental retardation, and cracked and scaly skin.
- 4.** Obesity in children has become a common problem due to excessive taking of junk food like pizzas, chocolates, soft drinks, etc. by them. Instead of involving in any physical activity, playing games on computer and watching TV for long hours is another cause of obesity in children.
- 5.** (a) Undernutrition refers to a condition in which body gets less amount of nutrients than required from a diet even if it is balanced, whereas malnutrition is taking an unbalanced diet lacking one or more nutrients.
- (b) Saturated fats are obtained from animals. These are butter, ghee, milk cream, meat, egg-yolk, cheese, etc. while unsaturated fats are obtained from plants, e.g., mustard oil, groundnut oil, coconut oil, etc.
- F. 1.** Animal fats like *desi ghee* contain cholesterol which, if present in excess in blood, gets deposited on the walls of blood vessels making them narrower. In this condition, the heart has to work hard to push the blood through narrow blood vessels which leads to heart attack.
- 2.** Animal proteins are better than plant proteins because they contain higher proportion of essential amino acids than the plant proteins.
- 3.** This is because green vegetables, fruits and milk provide all the vitamins and minerals which protect the body from infections and diseases, and help in the growth and normal functioning of the body.
- 4.** Our body never suffers from fat deficiency because excess of proteins and carbohydrates in the body changes into fats and store in the body.
- 5.** People living on mountains are prone to goitre because water on mountains lacks sufficient amount of minerals including iodine. The deficiency of iodine leads to goitre.

**G. 1. OBESITY 2. RICKETS, ROUGHAGE 3. VITAMINS  
4. CARBOHYDRATES 5. RICE 6. OIL 7. CALCIUM 8. MINERALS  
9. EGG 10. GOITRE 11. PROTEIN 12. FATS**

**ANSWERS****CHECK POINT 1**

1. Clothes protect us from cold, heat, rain, etc.
2. Fabrics is cloth material made by weaving or knitting threads together.
3. Fibre is a very thin strand of any material.
4. Natural fibres, man-made fibres.

**CHECK POINT 2**

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

**CHECK POINT 3**

1. cocoon 2. sericulture 3. heat 4. Ganga 5. linen

**PRACTICE TIME**

- A. 1. (b) 2. (b) 3. (d) 4. (d) 5. (a) 6. (b) 7. (d)**
- B. 1. Natural fibres; man-made fibres 2. cotton bolls 3. spinning 4. flax 5. looms**
- C. 1. The rearing of silkworm to produce silk is called sericulture. 2. Ginning**  
**3. Removing hair from sheep is called shearing.**  
**4. Wool traps the air between its fibres which does not allow the heat to escape from our body.**  
**5. Black soil and alluvial soil are suitable for growing cotton plants.**
- D. 1. Fibres obtained from plants and animals are called natural fibres. Jute, wool, silk, cotton, etc. are examples of these fibres.**  
**2. Man-made or synthetic fibres are those fibres which are manufactured from chemicals in factories. Nylon, rayon, acrylic, etc. are few examples of man-made fibres.**  
**3. Man-made fibres have following properties:**
- They are very strong.
  - They are easy to clean.

- They dry quickly and need little ironing as they do not wrinkle easily.
4. Natural fibres are obtained from plants and animals. For example, jute is obtained from the stem of jute plant, wool from the hair of sheep, silk from cocoon of silkworm, cotton from cotton fruits and linen from flax plant.
  5. Silk is a strong and shiny fibre. It is a good absorbent of heat.
- E.**
1. Cotton is obtained from the fruits of cotton plants called cotton bolls. The fibres with seeds are picked from dried cotton bolls by hand. Thereafter, they are taken to a ginning plant where the fibres are separated from the seeds by using cotton gins. The fibres thus obtained are cleaned by machines to remove impurities.
  2. In ancient times, the Early man used leaves of trees or skin and fur of animals to cover its body. Gradually, it learnt to weave grass and twigs to make baskets and mats. It also learnt that some plant materials such as cotton or jute fibres could be spun into yarns or threads. It used this yarn to weave the cloth.
  3. Jute is obtained from the stem of jute plant. The jute plants are harvested at the flowering stage. Their stems are cut and kept under water for some days. Gradually, the stems start rotting. Thereafter, these stems are taken out of water and fibres are separated by hand. These fibres are washed off in water and dried in the sun.  
Jute fibres are used for making ropes, carpets, mats, etc.
4. (a) Jute is one of the cheapest natural fibres. It is very strong, so it is used as a strong packing material like gunny bags, etc.
  - (b) Wool is warm to wear and is a good absorbent of heat. Woollen cloths like sweaters, blankets, shawls, mufflers, scarves, etc. trap the air between its fibres and do not allow to escape the heat from our body. Therefore, they are used during winter season to keep us warm.
  - (c) In olden days, people simply draped the fabrics to cover their bodies because stitching was not known at that time.
- F.**
1. Jute is one of the cheapest natural fibres. It is very strong, so it is used as a strong packing material like gunny bags, etc.
  2. Cotton clothes are good absorbents of sweat and keep our body cool so they are preferred to wear in summer.
  3. A piece of paper and a cotton cloth are made of cellulose.
  4. A large part of West Bengal has well-drained fertile soil. It has warm and humid climate, the best suited to grow jute plants. Hence, it is the main jute producing state of India.
- G.**
1. YARN 2. GINNING 3. FIBRES 4. SPINNING 5. GOLDEN
  6. LINEN 7. SERICULTURE 8. TAKLI 9. CHARKHA

# 4

## Kinds of Materials

### ANSWERS

#### CHECK POINT 1

1. The grouping of things on the basis of some criteria is called classification.
2. Nail, Hammer, Pressure Cooker
3. The basis to identify an object is its material and shape.

#### CHECK POINT 2

1. Lusture is the shining property of an object. For example, all metals.
2. The roughness and smoothness of a material of an object is called its texture. For example, sandpaper has rough surface, while glazed paper has smooth surface.
3. The property of a hard or a soft material is called hardness.

#### CHECK POINT 3

1. Transparent materials: They allow light to pass through them.  
Examples: Glass, water, etc.
2. Translucent materials: They allow light to pass partially through them.  
Examples: Butter paper, etc.
3. Opaque materials: They do not allow light to pass through them.  
Examples: Wood, rubber, etc.

#### PRACTICE TIME

**A.** 1. (a) 2. (d) 3. (c) 4. (c) 5. (c)

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

- C.** 1. Objects which have shiny surfaces are called lustrous objects, e.g., gold, silver, copper, etc.
2. Wood and rubber are nonlustrous objects.
  3. Materials which can be compressed are said to be soft, e.g., eraser, sponge, etc.
  4. Materials which cannot be compressed are said to be hard, e.g., metal spoon, glass, etc.



5. The property of dissolving a substance in water is called solubility.
- D. 1.** In order to choose a material to make an object, the following objectives should be kept in mind:
- The purpose for which the object is to be used.
  - The properties of the material.
2. The cooking utensils should have the property of heat conduction but wood does not have such property. Also, if wooden pot would be heated, it would catch fire. Hence, utensils are not made of wood.
3. We cannot use rubber to make electric wires because rubber is a bad conductor of electricity.
4. Commonly, the following properties are used to group the objects:
- Appearance (lustrous or nonlustrous)
  - Texture (rough or smooth)
  - Solubility (soluble or insoluble in water)
  - Ability to float or sink in water
  - Transparency (transparent, translucent or opaque)
5. Transparency is the property of a material of an object which tells whether we can see through the object or not. On the basis of this property, objects are categorised as transparent, translucent and opaque objects.
- E. 1.** The process of grouping things on the basis of some criteria is known as classification.
- Classification of objects is necessary because:
- it makes it convenient to locate objects, and
  - it makes it easier to study the properties of objects. If we know the properties of one member of a group, it can give an idea about the properties of other members belonging to the same group.
2. To group objects on the basis of their solubility in water, perform the following activity.
- Materials Required: Sugar, chalk powder, baking powder, talcum powder, vinegar, mustard oil, corn flour, milk, wax, turmeric powder, coconut oil, lemon juice and honey
- Procedure: Add small amounts of each one of these to a glass tumbler of half-filled water. Stir well. Identify the soluble or insoluble materials in water.
- Observation: Group the materials and write them in the given table.
- Conclusion: Some materials are soluble in water while some are insoluble.
3. To understand transparency of objects, perform the following activity.
- Materials Required: A table, a book, a butter paper and a piece of glass
- Procedure: Hold the book upright on the table and place your hand behind the

book. Ask your friend if he is able to see your hand behind the book. Repeat the same with the butter paper and the glass piece.

Observation: Record your friend's observations in the table given below:

Object	Observation	Transparent/opaque
Book	Not able to see the hand	Opaque
Butter paper		
Glass piece		

4. (a) Lustrous objects have shiny surfaces. They are generally made up of metals like, gold, silver, copper, aluminium, etc.

Nonlustrous objects do not have shiny surfaces. They are commonly made up of nonmetals like wood, rubber, etc.

(b) The objects which can be attracted by a magnet are called magnetic objects. They are made up of iron, nickel, cobalt, etc.

The objects which cannot be attracted by a magnet are called nonmagnetic objects. These objects are made of other kind of metals and nonmetals.

(c) • Objects through which we are able to see very clearly are called transparent objects.

• Objects through which we are able to see, but not clearly are called translucent objects.

• Objects through which we are not able to see at all are called opaque objects.

F. 1. To play hide and seek, we hide behind an opaque object like a pole or a car, and not behind a transparent object like a glass window because it will make us visible through itself.

2. (a) On the basis of texture because some of them are rough and some are smooth.

(b) On the basis of solubility because sugar, salt and biscuit are soluble in water while others are not.

G. 1. NITROGEN 2. INSULATOR 3. SOFT 4. TRANSLUCENT 5. HARD  
6. SOLUBLE 7. OPAQUE 8. TRANSPARENT 9. INSOLUBLE

# 5

## Separation of Substances

### ANSWERS

#### CHECK POINT 1

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

#### CHECK POINT 2

1. residue 2. Evaporation 3. solution 4. filtration, evaporation

#### PRACTICE TIME

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

- B. 1. (F) 2. (T) 3. (F) 4. (T) 5. (F)

- C. 1. Winnowing is the method of separating husk from grains with the help of wind.

2. Filtration

3. Sugar

4. A solution in which no more solute can be dissolved at a given temperature is called a saturated solution.

5. In a filtration process, the substance that flows through the filter paper is called filtrate.

- D. 1. (a) The process used to separate grains from stalks with the help of machines, animals or manually is called threshing.

(b) The method of separating a mixture into its components by hand is called handpicking.

2. Sea water is trapped in shallow pits and is left in the sun for long to evaporate, leaving the salts behind. This mixture of salts is then purified to obtain common salt.

3. Impurities and bran are separated from flour by using the method of sieving. This is done because these impurities contaminate our food and may harm our health.

4. The components of a mixture are separated for the following reasons:

- To obtain two different but useful components of mixture.
- To remove harmful components or impurities of a mixture.

- To remove useless components of a mixture.
5. (a) The process of setting down of sediment (insoluble heavier substance) in a mixture is called sedimentation.
  - (b) The process of pouring out of liquid without disturbing the sediment is called decantation.
  - (c) The process of changing water vapour back into liquid water is known as condensation.
6. Filtration is a suitable method to separate sand from water because when a mixture of sand and water is allowed to pass through a filter paper, only water passes through it and sand does not, so components are separated.

7. Sediment	Residue
1. The substance that settles at the bottom of a liquid is called sediment.	1. The substance that remains in the filter paper is called residue.
2. It is heavier than the liquid.	2. It may be heavier or lighter than the liquid.
3. It is separated using decantation method.	3. It is collected by filtration method.

8. The method of handpicking is used to separate only those mixtures in which the components:
    - are mixed in small quantities.
    - can be easily picked by hand.
    - have different sizes, shapes or colours.
- E. 1.** We will separate the components of a mixture of sand and common salt by using the method of filtration and evaporation as follows:
- Take a beaker and pour a little amount of given sample into it. Now, add a plenty of water and stir well using a glass rod. Thereafter, filter this mixture using a filter paper. Here, salt dissolved in water passes through filter paper and sand is separated as residue. Now, heat the filtrate collected in another beaker till all the water evaporates. Common salt is left in the beaker.
2. **Winnowing** is the method of separating husk from grains with the help of wind. In this process, the mixture of grains and husk obtained after threshing is taken in a winnowing basket. The farmer stands on a raised platform and holds the basket at his shoulder height. He then tilts the basket allowing the mixture to fall down slowly, shaking it continuously. The lighter husk particles get carried away by wind, whereas the heavier grains fall down vertically on the ground forming a heap. Thus, husk and grains are separated.
  3. **Sieving** is a method of separating a mixture of various sized particles by passing them through a suitable sieve.

Pebbles are separated from chalk powder by using a larger sieve at a construction site to prepare a uniform mixture of sand, cement and water which is used to construct a wall with the setting of bricks.

4. To separate a mixture of chalk powder and water

**Materials Required:** A filter paper, a funnel, two beakers, an iron stand, a glass rod, chalk powder and water

**Procedure:** Take a filter paper and place it in a funnel after making its cone. Pour the mixture containing chalk powder and water over the filter paper using a glass rod.

**Observation:** Clear water gets collected in the beaker kept below the funnel and chalk powder remains in the filter paper.

5. To separate a mixture of cooking oil (mustard oil) and water by using a separating funnel

**Materials Required:** A mixture of mustard oil and water, a separating funnel, an iron stand and two beakers

**Procedure:** Pour the mixture containing mustard oil and water into a separating funnel. Allow it to stand for some time. Note your observations. Now, place a beaker below the separating funnel and open the stopcock. Allow the water to flow through it. When all the water flows through it, close the stopcock.

**Observation:** Mustard oil and water form two separate layers. Water forms the lower layer and mustard oil forms the upper layer. On opening the stopcock, water flows through it and gets collected in the beaker and mustard oil remains in the separating funnel, which can be collected in a separate beaker.

6. (a) Tea granules are separated as they are useless component of the mixture.  
(b) Small stones and husk are harmful components so they are separated from *dal* or rice before cooking.  
(c) Pebbles are separated from sand to prepare a uniform mixture of sand, cement and water which is used to construct a wall with the setting of bricks.  
(d) Handpicking is applicable when the components are mixed in small quantities and can be easily picked up. Thus, farmer is not able to apply this method for a large amount of crop.  
(e) Water can dissolve many substances in different states, i.e., solid, liquid and gas, therefore, it is called a universal solvent.
7. (a) Evaporation is the process of changing of water into water vapour, whereas condensation is the process of changing water vapour into water.  
(b) In the process of threshing, grains are separated from stalks while in winnowing, husk is separated from grains with the help of wind.

Threshing is done manually by using human power or by using animal

power like bullocks or with the help of machines. Winnowing is carried out manually or with the help of machines.

- (c) The process of settling down of sediment in a mixture is called sedimentation. The process of pouring out of liquid without disturbing the sediment is called decantation. Decantation is done after sedimentation.

- F. 1.** She cannot dissolve more sugar at a given temperature but she could be able to mix more amount of sugar by increasing the temperature.
- 2.** No, as salt and sugar both are soluble in water so no residue is left on filter paper when the solution of their mixture is filtered.
- H. 1. THRESHING 2. RESIDUE 3. EVAPORATION 4. SATURATED**
- 5. CONDENSATION 6. FILTRATE 7. SOLUTION**

# 6

## Changes Around Us

### ANSWERS

#### CHECK POINT 1

1. (T) 2. (F) 3. (F) 4. (T)

#### CHECK POINT 2

1. ice 2. substance 3. irreversible 4. chemical

#### PRACTICE TIME

A. 1. (c) 2. (d) 3. (c) 4. (a) 5. (c)

B. 1. Chemical 2. Physical 3. Physical; chemical 4. irreversible 5. reversible

C. 1. Reversible change

2. Physical change

3. No, bursting an inflated balloon is a physical change but it is not reversible.

4. Ash and some gases are formed on burning wood 5. No

D. 1. A change which can be done or reversed is called a reversible change, e.g., paper folding activity to make a boat, cap, etc.

2. A change which cannot be undone or reversed is called an irreversible change, e.g., mixing of cement with water, causes a permanent change which cannot be turned back into cement.

3. A change in which no new material or substance is formed is called a physical change. Freezing of water into ice is an example of physical change.

4. A change in which a new material is formed is called a chemical change. Burning of paper is an example of chemical change.

5. Burning of candle shows following changes:

- On getting heated, the wax under the wick melts and flows down. Also, the length of candle gets reduced. The molten wax changes back into solid wax which is a physical change.
- Molten wax burns to produce carbon dioxide gas and water vapour. Since new substances are formed, it is a chemical change.

Thus, when a candle burns, both physical and chemical changes take place together.

6. When lemon juice is mixed with baking powder, a gas is evolved with hissing sound. It is a chemical change because a new substance (gas) is formed but lemon juice and baking powder cannot be get back.
7. The process of steaming of *Idli* batter to get *idlies* is an irreversible change because a new substance is formed after baking and it cannot be get back into raw materials.

8. Changes	Types
1. Making a paper aeroplane	Reversible
2. Inflating a balloon	Reversible
3. Melting of butter	Reversible
4. Growth of plant	Irreversible
5. Blooming of flower	Irreversible
6. Burning of candle	Irreversible

- E. 1. To show that mixing of vinegar and baking powder is a chemical change

**Materials Required:** A beaker, vinegar, baking soda and a spatula

**Procedure:** Take 5 mL of vinegar in a beaker. Add a spatulaful of baking powder to it.

**Observation:** A hissing sound is produced and a gas is evolved.

**Conclusion:** Since a gas is evolved (i.e., a new substance is formed), the mixing of vinegar with baking soda is a chemical change. Also, we cannot get back vinegar and baking soda once they are mixed.

2. Burning of a substance is an irreversible change. For example, when we burn paper, coal or wood, smoke and ash are formed. Here, we cannot change smoke and ash back to either paper, coal or wood. Thus, it is clear that when a substance burns, it changes into ash and some gases.
3. (a) inflating a balloon — It is a reversible or physical change but other three are irreversible or chemical changes.  
(b) frying of potatoes — It is an irreversible change but remaining are reversible changes.
4. Chemical changes are irreversible changes. To show this fact, let us perform an activity.

**Procedure:** Light an incense stick with a matchstick.

**Observation:** On lighting an incense stick, smoke, ash and smell are produced. Also, the size of the incense stick becomes small.

**Conclusion:** New substances are formed on burning an incense stick. We cannot get back the original incense stick from smoke, ash and smell. Hence, burning of an incense stick is a chemical change.

- F. 1. Yes, moulding of clay into different shapes is reversible but baking of clay is an irreversible change because backed clay cannot be changed into soft earth to mould into different shapes.



- 2.** We can classify the changing of milk into curd in many ways as it is an irreversible change, a desirable change, a permanent change, a chemical change, etc.
- G. 1.** Reversible **2.** Heating **3.** Mixing **4.** Physical **5.** Melting **6.** Burning  
**7.** Chemical **8.** Desirable

## ANSWERS

CHECK POINT 1

1. cells 2. multicellular 3. internal 4. locomotion 5. leaves

CHECK POINT 2

1. Energy from the sun and carbon dioxide 2. Autotrophs 3. Carbon dioxide  
4. Gum

CHECK POINT 3

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

PRACTICE TIME

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

B. 1. cell 2. lifespan 3. stimulus 4. excretory 5. stomata

C. 1. From sun 2. Food 3. Carbon dioxide 4. gum, resin and latex

5. By forming seeds or spores and from plant parts such as root, stem and leaf.

D. 1. Only plants can make their food themselves. Therefore, they are called autotrophs. They use energy from the sun, water and carbon dioxide to make their food.

2. Animals move from one place to another by changing their position while plants do not change their position, but some of their parts move in the direction of stimulus.

3. Unicellular organisms are made of single cell such as *Amoeba*, yeast, etc., whereas multicellular organisms are made of many cells. For example, man.

4. Faeces, carbon dioxide, urine and sweat are excretory wastes produced in animals.

5. Respiration is the breakdown of food by using oxygen in the cells for getting energy and releasing carbon dioxide and water as waste while breathing is taking in fresh air to get oxygen and giving out used air to expel carbon dioxide formed during respiration.

- E. 1.** This is because carbon dioxide is used in the process of photosynthesis.
- 2.** All living things respond to stimuli which are changes in light, temperature, touch, moisture, etc., in the environment. For example,
- We shiver on a cold day or sweat on a hot day due to change in the temperature of surroundings.
  - Lotus flowers open in the morning and close by sunset because of change in the amount of light in the environment.
- 3.** The process of taking in fresh air and giving out used air is called breathing. Organisms breathe to get oxygen from the air which is used to burn the food for getting energy.
- 4.** To demonstrate growth in nonliving things

**Materials Required:** Sugar, a beaker and water

**Procedure:** Make a saturated solution of sugar by mixing excess of sugar in water. Stir well and pour it into a beaker. Fill the beaker up to three-fourths and hang a small crystal of sugar in the solution with the help of a thread. Leave it undisturbed for a few hours.

**Observation:** After a few hours, the crystal has increased in size.

**Conclusion:** This shows that growth is external because crystal has increased in size due to deposition of sugar from the solution.

- 5.** Plants do not change their position, but some of their parts move in the direction of stimulus. For example,
- Shoot grows towards light.
  - Roots grow towards water in the soil.
  - Sunflower turns its head in the direction of the sun.
  - Touch-me-not plant folds its leaves when touched.
  - When a bud opens into a flower, its petals move outwards.

**F. 1.** Oxygen

- 2.** The car is not a living thing because it does not burn fuel on its own to get energy. It moves by some external force.
- 3.** A crystal is not a living thing because it grows in size due to deposition of matter on it when kept in a saturated solution. Thus, its growth is external.

**G. 1.** AUTOTROPHS **2.** UREA **3.** RESPONSE **4.** HETEROTROPHS

- 5.** STIMULUS **6.** LOCOMOTION **7.** CELL

# 8

## Habitat of the Living Things

### ANSWERS

#### CHECK POINT 1

1. physical 2. biotic 3. sun 4. decomposers 5. primary

#### CHECK POINT 2

1. Habitat 2. Seas 3. Halophytes 4. Canopy

#### CHECK POINT 3

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

#### PRACTICE TIME

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

**B.** 1. drip tips 2. Lungs 3. seashores 4. conical 5. succulents

**C.** 1. Animals of desert habitat have padded soles.

2. Gills are the respiratory organs of fishes.

3. It is because deciduous trees can tolerate the severe cold during winter by shedding their leaves.

4. The green and succulent stems of desert plants carry out photosynthesis and store water.

5. Polar bears are found in tundra habitat.

6. The thick layer of fat found under the skin of a polar bear is called blubber.

7. It is called camouflaging.

**D.** 1. Carnivorous animals have long and strong canines to tear the flesh of their prey.

2. (a) Camels have large padded soles which help them walk on loose sand without sinking.

(b) Their long legs keep the body away from hot sand.

3. Bats, hedgehogs, fishes, amphibians and reptiles go on hibernation.

4. • The trees of tropical rainforests have large leaves with drip tips which allow raindrops to drop off and save them from rotting.

- Some trees develop buttress roots for getting extra stability.
5. Herbs and shrubs do not grow well in dense tropical forest because the leaves of tall evergreen trees form a dense canopy which prevents sunlight to reach to forest floor.
- E. 1.** (a) Grasslands are hot and partly dry areas with the annual rainfall from 50 cm to 90 cm. Here, grasses are the main plants with a few trees and shrubs.
- (b) The animals which live in grasslands are Zebras, Giraffes, Deer, Buffaloes, Elephants, Lions, Tigers, Hyenas and Foxes.
  - (c) The stripes on the body of a tiger help it hide and not get spotted in dry grass while hunting.
2. (a) Whales have **lungs** to breathe.
  - (b) The place where an organism lives in nature is called its **habitat**.
  - (c) Animals living on trees are called **arboreal** animals.
  - (d) Cone-shaped trees grow in **mountain** habitat.
3. (a) Aquatic;    1. Streamlined body  
                    2. Blowholes to breathe
  - (b) Cacti; 1. Leaves modified into spines  
                    2. Green succulent stem
  - (c) Pinus, Fir, Spruce.
4. (a) In desert plants, leaves are modified into spines to reduce water loss from them through transpiration.
  - (b) Fish does not survive outside water because it is adapted to take in oxygen dissolved in water.
  - (c) Trees in mountain habitat are cone-shaped to help snow slide off easily.
5. A. spines; water loss    B. Pinus; snowfall and water loss
- F. 1.** The streamlined shape of the fish body reduces friction due to water and helps it swim easily.
2. Cactus grows in deserts where water is scanty. To prevent water loss due to transpiration from their surface, leaves are modified into spines and to carry out the function of leaves, stem becomes green.
  3. Some insects are green and leaf-like to protect themselves from their enemies by blending with their surroundings.
  4. The sunlight in rainforests does not reach up to forest floor. Hence, small plants like bushes and herbs do not grow here. Therefore, it is easy to walk through a rainforest.
  5. Camels are adapted to store water by drinking its large quantity at a time. Also, the breakdown of fat stored in their humps provides them with sufficient amount of water.

**ANSWERS****CHECK POINT 1**

1. B 2. (F) 3. (T) 4. (T)

**CHECK POINT 2****1. Characteristics of Roots**

- Roots are nongreen underground parts of a plant.
- They develop from the radicle of the seed.
- They grow towards soil and water.
- They grow away from sunlight.
- They do not have nodes and internodes.
- They have many lateral branches called secondary and tertiary roots.

2. Maize and wheat.

3. Radish, turnip, beetroot and carrot.

4. The rope-like roots which grow from the horizontal branches of banyan and rubber trees are called prop roots. They support the heavy branches of these trees.

**CHECK POINT 3**

1. Stem 2. Bulb 3. Eyes 4. Stem tendrils

**CHECK POINT 4**

1. midrib 2. lamina 3. pedicel 4. pollination

**PRACTICE TIME**

A. 1. (c) 2. (b) 3. (a) 4. (b) 5. (a) 6. (b)

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

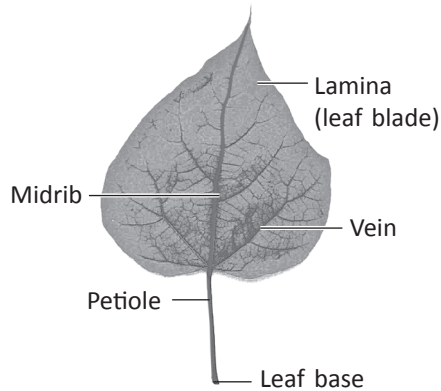
C. 1. Underground stem

2. Pea; Grapevine

3. Pea

4. Spines prevent the loss of water due to transpiration and also protect the plant from grazing animals.
  5. Corolla
- D. 1.** Herbs are small plants with soft green stem, less than a metre high. For example, balsam, sweet pea, etc.  
Shrubs are medium-sized woody plants, about 1–3 metres high. For example, rose, lemon, etc.
2. A tap root has primary root which is long and thick; branches into secondary and tertiary roots and grows vertically downwards in the soil. For example, mango, carrot, etc.  
In fibrous root, primary root is short-lived and is replaced by a cluster of fibre-like roots. For example, maize, wheat, grass, etc.
  3. The fusion of male gamete with the female gamete is called fertilisation.
  4. Pollen grains are male reproductive structures of plant that contain male gametes. They are formed in anthers of flowers.
  5. Potato, ginger, zimikand, etc.
  6. Stem.
- E. 1.** (a) Stem of some plants such as cactus becomes green and makes food for the plant.  
(b) Stem of potato, ginger, turmeric, etc. modifies and stores food for the plant to grow in next season.  
(c) Some branches of weak stem of grapevine and passion flower change into thread-like structures called stem tendrils. They support the plant to stand erect.  
(d) Stem of rose, lemon, *Bougainvillea*, etc. bear thorns to protect the plant from grazing animals.
2. The leaves of cacti change into spines to prevent the water loss. To carry out the function of leaves and to store water, the stem becomes green and fleshy.
  3. The transfer of pollen grains from the anther to the stigma is called pollination. It is of two types:
    - Self pollination: When the pollen grains from the anther of a flower are transferred to the stigma of the same flower or to the stigma of another flower on the same plant, it is called self-pollination.
    - Cross pollination: When the pollen grains from the anther of the flower of one plant are transferred to the stigma of the flower of another plant of the same type through different agencies such as wind, water, insects, etc., it is called cross-pollination.
  4. A plant gives rise to fruit after fertilisation when petals, sepals and stamen fall off and ovary grows into a fruit.
  5. A leaf has following parts:

- **Leaf base:** A leaf is attached to the stem with its leaf base.
- **Petiole:** It is the stalk of the leaf. It connects the leaf blade with the leaf base.
- **Lamina or leaf blade:** It is the green, flat and expanded part of the leaf.
- **Midrib and Veins:** Midrib is the extension of petiole into the lamina. It divides into many lateral branches called veins.
- **Stomata:** These are tiny pores on the surfaces of leaves which can be seen only under a microscope.



- F. 1.** Potato is a modified underground stem. The food formed by green leaves of potato plant is transported to the underground stem and is stored there in the form of starch.
- 2.** The plant that has fibrous roots is a monocot plant, whereas the one which has tap root is a dicot plant.
- G. 1.** POLLINATION; POLLEN **2.** TUBER **3.** LAMINA **4.** PETAL  
**5.** PEDICEL **6.** NODE **7.** ROSE



## ANSWERS

CHECK POINT 1

1. unicellular
2. tissue
3. organ
4. organ system

CHECK POINT 2

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

CHECK POINT 3

1. Bone marrow
2. Vertebrae
3. Femur
4. Cranium
5. Humerus

CHECK POINT 4

1. patella
2. ball and socket
3. hinge
4. levers
5. contraction; relaxation
6. triceps

PRACTICE TIME

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

**B.** 1. cockroach 2. crawling 3. skeletal 4. friction 5. biceps; triceps

**C.** 1. Setae 2. Lower jaw 3. 206 4. To protect heart and lungs 5. Thumb joint

**D.** 1. Movement is the change in the position of body parts, whereas locomotion is the change in the position of whole body. For example, opening and closing of eyelids is the movement of body part while movement of an animal as a whole from one place to another is locomotion.

2. The two pairs of wings – forewings and hindwings help cockroach in flying. The hindwings move up and down by the action of flight muscles attached to them.

3. The five regions of vertebral column are Neck region, Chest region, Belly region, Hip region and Tail region.

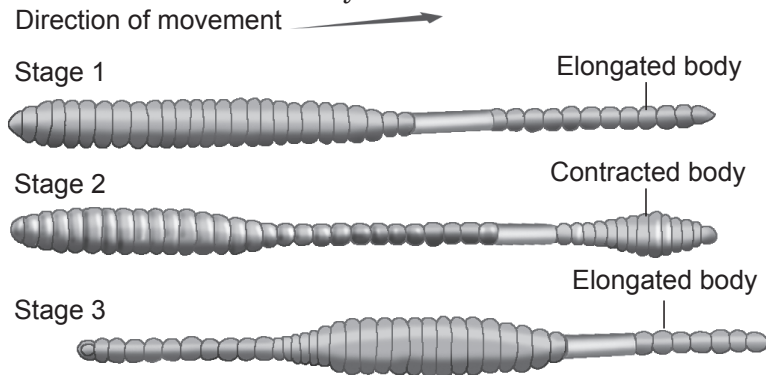
4. Bone marrow is a soft, jelly-like tissue found in some bones of the body. It produces RBCs and WBCs.

5. Ball and socket joint is a freely movable joint in which the end of one bone is rounded as a ball that fits into the socket of other bone. The head of bone is freely movable in all directions.

The examples are the joints between humerus and shoulder bone and between

femur and hip bone.

- E. 1.** (a) Skeletal system gives shape and support to the body.  
(b) It protects the inner delicate organs of the body such as brain, eyes, lungs, heart, etc.  
(c) It provides attachment to muscles and helps in the movement of body parts such as arms, legs, etc.  
(d) Some of the bones of the body form RBCs and WBCs in their bone marrow.  
(e) Bones store minerals like calcium and magnesium.
- 2.** The place in the body where two or more bones meet is called joint. On the basis of movement, joints are of 3 types:  
(a) Immovable or fixed joints such as joints between skull bones.  
(b) Partially movable joints which allow partial movement of bones such as joint between two vertebrae and joints between ribs and breastbone.  
(c) Freely movable joints in which one bone moves freely on the other. These are shoulder joints, hip joints, knee joints, elbow joints, joints between ankle bones and between wrist bones.
- 3.** Birds fly by downstroke and upstroke of wings. During downstroke, the wings move downwards and forwards that push the air downwards and backwards. This lifts the bird upwards and forwards.  
During upstroke, the wings move upwards and body moves downwards.
- 4.** An earthworm moves by crawling caused by the alternate contraction and relaxation of muscles of its body wall.



Crawling in earthworm by alternate contraction and relaxation of body muscles

- 5.** (a) Cartilage is found mainly at joints to protect the ends of bones from friction.  
(b) The backbone is formed of many small ring-shaped bony pieces to make it flexible due to which we are able to bend our body in all the possible directions.  
(c) Animals move from place-to-place in search of food, shelter, mate and self-defence.

(d) The bristle-like setae provide grip to the earthworm on the surface while crawling.

- F. 1.** Some long bones have red bone marrow to produce red blood cells.
- 2.** If we would not have freely movable joints, we have not been able to move our body parts and even to locomote.
  - 3.** The bones in birds are hollow to make their body lightweight.
  - 4.** The streamlined body of birds and fishes reduces the friction and helps in making the way through air and water respectively.

## ANSWERS

CHECK POINT 1

1. Unit 2. Foot 3. Metre 4. Temperature

CHECK POINT 2

1. Cubit 2. Fundamental quantity 3. K (kelvin) 4. s 5. metric system

CHECK POINT 3

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

PRACTICE TIME

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

**B.** 1. angular 2. fundamental 3. multiples 4. rectilinear 5. oscillatory 6. periodic

**C.** 1. Measurement is the comparison of an unknown quantity with some known fixed quantity of the same kind.

2. The length between the tip of the middle finger and the elbow of one's arm is known as a cubit.

3. Multiples of kilogram are quintal and metric tonne while its submultiples are hectogram, decagram and gram.

4. When an object changes its position with respect to a fixed point with time, it is said to be in motion.

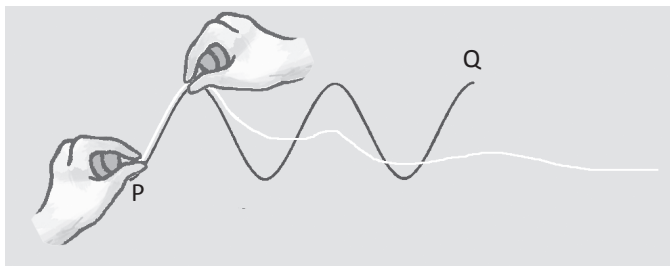
5. In a hilly area, a moving bus has curvilinear motion.

**D.** 1. In 1790, a committee of French Academy devised a decimal system of units for measurement which is called the metric system of units. In this system, the length is measured in centimetre, mass in gram and time in second (CGS).

2. Quantities which do not depend on other quantities are called fundamental quantities. The seven fundamental quantities are: mass, length, time, electric current, temperature, luminous intensity and amount of substance.

3. In CGS system, length is measured in centimetre, mass is measured in gram while in MKS, they are measured in metre and kilogram respectively. However, time is measured in second in both the systems.

4. An object in a to-and-fro motion about a fixed point is said to be in oscillatory motion. For example, motion of a pendulum of a clock, motion of a swing, etc.
  5. Some examples of multiple motions are:
    - (i) A moving car has translatory motion as a whole, but its wheels show rotatory motion.
    - (ii) A rolling ball has rotatory as well as translatory motions.
    - (iii) The earth has rotatory motion on its axis and revolutionary motion around the sun.
    - (iv) A drill machine while using has rectilinear as well as rotatory motions.
- E. 1.** The units of seven fundamental quantities and their derived units are called SI units. The SI unit of length is metre (m), of mass is kilogram (kg), of time is second (s) and that of temperature is kelvin (K).
2. To measure the length of a curved line, say PQ, by using a thread, tie a knot at its one end. Place this knot at one end of the curved line (P). Carefully, move the thread along the length of the curved line, holding the thread at small distances between your thumb and first finger. Continue until you reach the other end of the curved line (Q). Put a mark on the thread using a pen, where it touches the end point. Now, stretch the thread along a metre scale. The length of the thread between the knot and the pen mark is equal to the length of the curved line.



Measuring the length of a curved line by using a thread

3. If a body moves on the whole from one place to another, so that all its body parts move the same distance in a given time, it is said to be in a translatory motion. Translatory motion is of two types:
  - Rectilinear motion: When an object, on a whole, moves along a straight path, it is said to be in rectilinear motion, e.g, a car moving on a straight road shows rectilinear motion.
  - Curvilinear motion: When an object, on a whole, moves along a curved path, it is said to be in curvilinear motion, e.g., a car moving on a curved road shows curvilinear motion.
4. A ball rolling on an inclined surface has multiple motions. When the ball moves down, it shows translatory (rectilinear) motion. At the same time, it is rolling about its centre-point (say, axis) which shows that it is in rotatory motion too.

5. The motions which repeat after a fixed interval of time are called periodic motions. For example, the earth completes its one rotation in 24 hours and one revolution in 365.25 days and the pendulum of a clock completes one oscillation in 1 second.

Some motions which repeat themselves but not after a fixed interval of time are called nonperiodic motions. For example, beating of a drum or the heart beat of a sick person.

- F.**
1. Multiples are larger units while submultiples are smaller units of a standard unit. Multiples are used for larger measurements and submultiples are used for smaller measurements.
  2. If the earth had only rotatory motion, then there would have been only days and nights on the earth. The season change and weather change caused due to revolutionary motion of the earth would not have been possible on it.
  3. If a drill machine had only rotatory motion, it would rotate at the same place and would not be useful to make a hole in the articles like furniture, walls, pipes, etc.

**ANSWERS****CHECK POINT 1**

1. (F) 2. (T) 3. (F) 4. (T)

**CHECK POINT 2**

1. Dark 2. Size 3. Shadow 4. Lunar

**CHECK POINT 3**

1. Reflection 2. Incident ray 3. Spherical mirror  
4. Rectilinear propagation of light

**PRACTICE TIME**

**A.** 1. (b) 2. (c) 3. (a) 4. (b)

**B.** 1. man-made 2. Transparent 3. Opaque 4. image

**C.** 1. The property of light to travel in a straight line is called rectilinear propagation of light.

2. The sun, stars and some light-emitting organisms such as glow worm, firefly, etc. are natural luminous objects.

3. The substances which allow light to pass through them partially are called translucent substances. Butter paper, greased paper, honey and ground glass are some examples of translucent substances.

4. A shadow is a dark region formed when light is blocked by an opaque object.

5. A mirror is a smooth polished surface which reflects the light.

**D.** 1. Characteristics of light are

- Light is a form of energy which sensitises our eyes and enables us to see the objects around us.
- It travels in a straight line.
- It is the fastest travelling energy. It travels with a speed of 3,00,000 kilometres per second in vacuum.

- Sunlight, as perceived by us, is actually made up of seven different colours, combined together.
2. We can categorise objects into three different types based on the passing of light through them:
    - The substances which do not allow light to pass through them are called opaque substances, e.g., rubber, stone, brick, etc.
    - The substances which allow light to pass through them are called transparent substances, e.g., water, glass and air are some examples of transparent substances.
    - The substances which allow light to pass through them partially are called translucent substances, e.g., butter paper, greased paper, honey, etc.
  3. An eclipse is the shadow of a celestial body formed on some other celestial body, i.e., earth or moon. It is a natural phenomenon. It is of two types – solar eclipse and lunar eclipse.
  4. The phenomenon of bouncing back of light after striking a shiny and opaque surface is called reflection of light.
  5. Colour of an object depends on the colour of light that the object reflects. Shadow of an object is the dark region where no light reaches and gets back. Hence, a shadow is colourless.
  6. Differences between a shadow and an image are:
    - A shadow does not show the details of the object, whereas an image shows more or less exact details of the object.
    - A shadow is formed due to the blocking of light by an opaque object while the image is formed due to reflection of light from an opaque, smooth and shiny surface.
    - A shadow is always dark while the image shows true colours of the object.

**E. 1.** Light travels in a straight line. It can be proved by performing the following activity:

**Materials Required:** An aluminium tube of about 30 cm length, a candle, a table and a matchbox

**Procedure:** Light the candle and place it on the table. See the candle through the tube. Now, give a small bend to the tube. Place it in between the candle and one of your eyes, keeping the other eye closed.

**Observation:** The candle is visible through the straight tube but it is not visible through the bent tube.

**Conclusion:** This is because light travels in a straight line.

## 2. Characteristics of a Shadow

- A shadow is formed only when the light is blocked by an opaque object.
- A shadow is only a dark region which does not show any colours or the details of the object.



- A shadow may or may not resemble the actual shape of the object.
  - The size of a shadow depends on the position of the source of light with respect to the object.
  - The shadow of an object is formed only on another opaque object or surface called the screen.
3. A pinhole camera is the simplest type of camera in which the image of an object is obtained through a very small hole called pinhole. This is called so because this hole is made with the help of a pin. It works on the principle of rectilinear propagation of light. The image formed by it is real and inverted. Its size depends on the distance of screen and that of the object from the pinhole.
  4. **Solar eclipse:** When the moon comes in between the sun and the earth, the shadow of the moon falls on the earth. When the people from the shadowed part of the earth try to see the sun, the view of the sun is partially or completely blocked for some time. This phenomenon is known as solar eclipse.  
**Lunar eclipse:** When the earth comes in between the sun and the moon, the shadow of the earth falls on the moon and the view of the moon gets partially or completely blocked for some time. This phenomenon is known as lunar eclipse.
- F. 1.** Birds, kites and aeroplanes flying high in the sky do not cast their shadows because the screen (earth's surface) is far away from them. So umbra is not formed on the earth's surface and penumbra is too faint to be visible.
2. The moon is a nonluminous body but it appears bright as it reflects the light of the sun falling on it.
  3. The earth when viewed from space, shines as a bright, blue ball due to the light of the sun falling on it. It gives out the same light that it receives from the sun.

## ANSWERS

CHECK POINT 1

1. (T) 2. (F) 3. (T) 4. (F)

CHECK POINT 2

1. charge 2. ammeter 3. circuit 4. positive; negative 5. makes; breaks

CHECK POINT 3

1. Electric switch 2. Open circuit 3. Conductor 4. Rubber

PRACTICE TIME

- A. 1. (d) 2. (b) 3. (a) 4. (d)

- B. 1. electricity 2. zinc 3. filament 4. cell or battery 5. insulating

- C. 1. We get electricity from power generation plants (e.g., thermal power plant). Whenever there is power failure, we get electricity from generators and inverters.

2. Different types of cells are dry cells, button cells, solar cells, etc.

3. Bulb, compact fluorescent lamps (CFLs) and fluorescent tubes are some common light-giving electric devices.

4. The combination of two or more cells is called a battery.

5. The function of an electric switch is to make or break the flow of electric current in a circuit without disturbing its connections.

- D. 1. An electric circuit is a closed path along which electric current flows. An electric circuit consists of:

- A source of electricity (a cell or a battery)
- A device that uses electric current (generally a bulb)
- Connecting wires
- On-Off switch or key to make or break the circuit

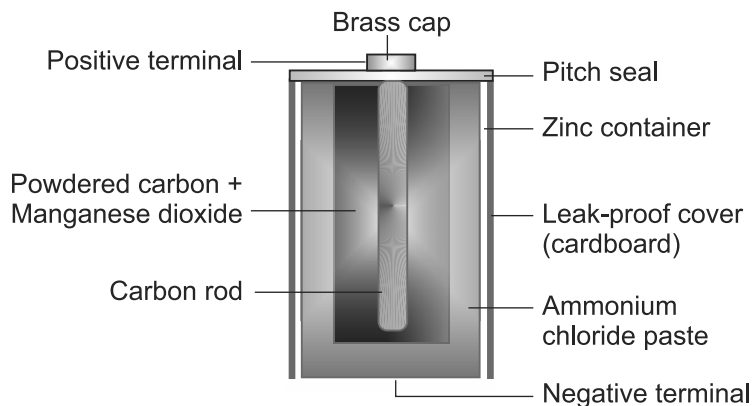
2. An electric cell is a device which provides continuous flow of electricity in a circuit. It is used in torches, alarm bells, wall clocks, TV and AC remote controls, wristwatches, etc., to provide energy.

3. Working of a dry cell:

When a dry cell is connected to a device and the device is switched on, chemical reactions take place inside the cell and produce electric current for the working of the device.

4. The two terminals of a bulb are connected to the positive and negative terminals of the cell separately.
5. All metals (such as gold, silver, copper, iron, aluminium), salt solutions, moist air, impure water, graphite and even the human body are good conductors of electricity. Metals are used for making electric wires, and parts of switches, plugs, sockets, electrical devices, etc.

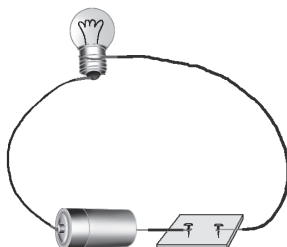
**E. 1. Structure of a dry cell**



A dry cell consists of a carbon rod placed in the centre of the cell. It is surrounded by the powdered mixture of manganese dioxide and carbon. The powder is filled in a small muslin bag and the muslin bag is placed inside a zinc container. The space around the muslin bag is filled with moist paste of ammonium chloride and gelatin. The zinc container is placed in a leak-proof cover made of cardboard and the top is sealed with pitch. The zinc container acts as the negative terminal of the cell and the carbon rod as the positive terminal. Usually, a brass cap is mounted on the carbon rod.

2. (a) Filament, it is made of tungsten.  
(b) The bulb is filled with an inert gaseous mixture of argon (80%) and nitrogen (20%).
3. The electrical conductivity of the given material can be tested by following method:

Connect a bulb, a dry cell and two nails with the help of connecting wires and place them on the table. Fix the two nails on the cardboard at a gap of 2 cm between them. Now, keep the object whose material is to be tested on the nails such that it touches both the nails at the same time.



If the bulb glows, it shows that the object is a good conductor of electricity, and if the bulb does not glow, it shows that the object is an insulator.

4. (a) Thermocol – it is an insulator while others are good conductors of electricity.  
 (b) Iron nail – it is a good conductor of electricity while others are insulators.  
 (c) Hydropower plant – others are different types of cells.
5. (a)
  - Insulators like rubber and plastics are used to cover the electric wires, handles of electrical tools, electrical appliances, etc., so that they do not give an electric shock to the user.
  - Electricians use rubber gloves while working to safeguard themselves against electric shocks.
  - In factories, the workers who operate electrical machines are provided with thick footmats of insulating material to stand upon and work safely.
- (b) We should strictly follow these precautions while using an electrical appliance:
  - Never play with sockets or electric wires.
  - Never touch an electric switch, plug or device with wet hands.
  - Wear dry rubber slippers or stand on a dry wooden or plastic base while using electrical appliances.
  - Never switch 'ON' or 'OFF' a geyser while barefoot, especially, if the floor of the bathroom is wet.
  - In case of a short circuit or a spark in a switch, put it off immediately with the help of a plastic or a wooden stick.
  - In case of a fire in electric wires, never use water to extinguish it, instead first switch off the mains, then use dry sand to extinguish the fire.

**F. 1.** Both impure water as well as human body are good conductors of electricity. It may be a chance of getting an electric shock if we touch an electric switch, plug or device with wet hands. Hence, it is advised never touch them with wet hands.

**2.** An electric bulb is filled with inert gaseous mixture which contains argon (80%) and nitrogen (20%) to save the bulb filament from burning out and to minimise the blackening of the glass.

**3.** Over the time, when all the chemicals present inside the cell are used up, the cell stops providing electric current and is called dead.

**4.** If connecting wire of a circuit breaks down, the flow of electric current will stop and also the device will stop working.

**G. 1. ARGON 2. SILVER 3. CANDLE, CARBON ROD 4. BULB 5. CELL  
 6. TUNGSTEN 7. WOOD**

**ANSWERS****CHECK POINT 1**

1. magnetite, lodestone 2. magnetic 3. magnet 4. magnesia

**CHECK POINT 2**

1. (T) 2. (T) 3. (F) 4. (T)

**CHECK POINT 3**

1. Directive property 2. North pole 3. Magnetic compass 4. Keepers

**PRACTICE TIME**

**A. 1.** (d) **2.** (d) **3.** (c) **4.** (a) **5.** (d)

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

- C. 1.** A magnet is a substance that has the property of attracting objects made of iron, nickel, cobalt and their alloys.
- 2.** Materials such as iron, nickel, cobalt and their alloys are attracted by the magnet. Such materials are called magnetic materials.
- 3.** Materials such as wood, plastic, rubber, paper, brass, cotton, glass, copper, aluminium, stainless steel, etc. are not attracted by the magnet. They are called nonmagnetic materials.
- 4.** A freely suspended magnet rests in the north-south direction.
- 5.** When like poles of two magnets are brought close to each other, the two magnets repel each other.
- 6.** When a magnet loses its power, it is called demagnetised.
- D. 1.** Magnets made from the pieces of iron are known as artificial magnets. Artificial magnets are made in rectangular, cylindrical, dumb bell shape horseshoe shape, ring shape and in needle shape.
- 2.** The poles of a magnet always exist in a pair. If we break a magnet into two parts, each part will behave like a magnet, i.e., it will again have a north pole and a south pole.

3. When the magnetic compass is placed on a horizontal surface and the needle is allowed to come to rest, the needle aligns itself along north-south direction. The north pole of needle points towards the north and the south pole points towards the south. So the directions can be located easily with the help of a magnetic compass.
4. Precautions to be taken while handling magnets are:
  - Never hit or beat a magnet with anything.
  - Do not throw a magnet or let it fall on the floor.
  - Do not heat a magnet.
5. A magnet loses its power when it is dropped frequently or hammered or brought in contact with other magnets repeatedly or heated to a certain temperature.
6. The attractive property of a magnet is used to separate magnetic materials from nonmagnetic materials such as removing iron pieces from junk, adulteration of iron dust from tea leaves, etc.

**E. 1.** An iron bar can be magnetised by following procedure:

Lay an iron bar on a table. Hold a bar magnet vertically at one end of the iron bar, so that one of the poles of the magnet (say N-pole) touches the iron bar. Rub the magnet along the length of the iron bar, till you reach its other end. Lift the magnet from the other end vertically and bring it back in the direction, so that the same pole touches the iron bar again.

Repeat the process for at least 40–50 times, until the iron bar gets magnetised.

Now, test it for magnetic property by bringing small iron pins near it.

**2.** Repulsion is the sure test of magnetism. It can be proved by performing the following activity:

Suspend a bar magnet and bring any end of the object to be tested close to both the poles of the suspended magnet one-by-one.

If the end of the object is attracted by both the poles, then it is simply a magnetic substance and if the end of the object is repelled by one of the poles of the suspended magnet, then it is a magnet.

3. A magnetic compass consists of a small and lightweight magnetic needle pivoted at its mid-point so that it can freely rotate in a horizontal plane. The needle is enclosed in a flat circular aluminium box with a glass plate at the top. At the base of the box, the four main directions the north (N), south (S), east (E) and west (W) and four subdirections, north-east (N-E), north-west (N-W), south-east (S-E) and south-west (S-W) are marked. Generally, the north pole of the magnetic needle is painted red and the south pole blue or black.

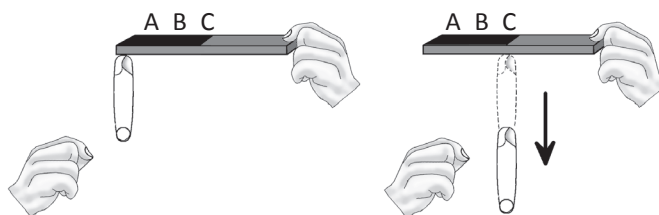
**Uses:** A magnetic compass is used by sailors, navigators, pilots, soldiers, mountaineers, etc. to find the directions. It is also used by students in performing scientific experiments.



4. The power of a magnet is concentrated at its poles. It can be shown by the following activity:

Hold a magnet in one hand and a safety pin in the other hand. Bring both things close to each other. See that one of the poles of the magnet picks up the pin. Remove the safety pin from this pole and try to stick it to point A, slightly away from the pole, as shown in the figure. Similarly, try to stick the pin at point B of the magnet. The safety pin again goes back to the nearest pole.

Now, remove the safety pin from the pole and try to stick it to the centre of the bar magnet at point C. The magnet does not hold the safety pin at its centre. This shows that the power of a magnet is the maximum at its poles and the minimum or negligible at its centre.



5. The magnetic behaviour of the earth is due to the movement of magnetic materials (iron and nickel) found in the molten state in the earth's core.
- F. 1. We can use a magnet to find out the missed needle easily because needle is a magnetic material.
2. When magnets are dropped frequently or hammered, they lose their magnetism because these activities disturb the alignment of atoms of magnet in their magnetic domains in which they are grouped.
3. To find the direction at a place, we can use the directive property of magnet as follows:

Tie one end of a thread in the middle of a bar magnet and suspend it from a wooden stand. Allow the magnet to come to rest. In the meanwhile, mark the directions on a piece of paper and place it on the base of the stand, with its centre just below the magnet. Disturb the direction of the magnet and allow it to come to rest.

Note the direction in which the magnet aligns itself after coming to rest.

The magnet always rests in the same direction, i.e., north-south direction.

The direction left-hand side to north-south direction is always west. In this way, we can find the direction by using a bar magnet.

## ANSWERS

CHECK POINT 1

1. three-fourths
2. nutrients
3. electricity
4. lotus; water chestnut
5. temperature

CHECK POINT 2

1. temperatures
2. condenses
3. landslides
4. Dehydration
5. Rainwater harvesting

PRACTICE TIME

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

B. 1. (F) 2. (F) 3. (T) 4. (T) 5. (F)

- C. 1. Evaporation is the process of converting water into water vapour.  
 2. Conversion of water vapour into water on cooling is called condensation.  
 3. Water vapour enters the air through the following three processes:  
 (a) Transpiration (b) Evaporation (c) Respiration  
 4. The water vapour that evaporates from waterbodies mixes with the air and after rising up higher, condenses into tiny droplets of water which form clouds.  
 5. The two waterborne diseases are—Cholera and Typhoid.
- D. 1. (a) Drought is an extended period of months or years when a region does not receive any rainfall. It can cause a lot of damage and harm to life.  
 (b) When it rains heavily, the rainwater it may cause the water level of lakes, ponds and rivers to rise, leading to a condition called flood.  
 2. The three states of water are solid, liquid and gas.
  - The solid state of water is ice. On heating, it changes into liquid state.
  - On heating, the water in liquid state changes into water vapour.
  - On cooling, the water vapour changes back into water.
  - On freezing, the liquid water changes into ice.





(Ice)

(Water)

(Water vapour)

3. Rainwater is the purest form of water, whereas sea water contains a lot of salts. Therefore, sea water is saline.
  4. Rainwater harvesting is the method of collection and storage of rainwater from rooftops or from land surface for future use. It is an appropriate method of increasing the availability of water.
  5. We shall conserve water because the population of the world is increasing day-by-day and so is the demand for water. We cannot use water from all the sources directly. So, we must use water wisely and avoid its wastage.
- E. 1.** The continuous circulation of water from the earth's surface to the air and from the air back to the earth's surface is called water cycle.

Water as water vapour enters the air from seas, oceans and other waterbodies, plants and animals through evaporation, transpiration and respiration respectively. This water vapour rises up higher and higher and condenses into tiny droplets of water and forms clouds in the sky. In the clouds, tiny droplets join together to form larger drops which fall down on the earth in the form of rain. The rainwater fills back the rivers, lakes and ponds, and also seeps under the ground.

In this way, the water cycle is completed.

**2.** Uses of water can be classified as:

- Domestic use: We use water for drinking, cooking, washing, bathing, flushing the lavatory, brushing teeth, sweeping the floor, filling the swimming pools, etc.
- Agricultural use: Plants also need water. Water is required for germination of seeds, transporting nutrients to various parts, completing the process of photosynthesis, etc.
- Industrial use: In industries like paper, chemicals, food, etc., water is mainly used as a solvent, for washing, cooling and disposal of waste.
- Other uses: Water helps in
  - ◆ maintaining the body temperature, digesting food, excreting waste materials from the living body.
  - ◆ providing habitat for aquatic animals and plants.
  - ◆ generating electricity in hydroelectric power plants.
  - ◆ extinguishing fire.
  - ◆ giving medium for the transport of ships, boats, etc.

**3.** Following are the effects of flood:

- Great damage to crops, animals and human life.
- Landslides.
- People and animals may drown in flood water and die.
- Shortage of food crops as the entire harvest can get destroyed.

- Spread of waterborne diseases like cholera and typhoid due to unhygienic conditions.
  - Scarcity of drinking water as the water gets contaminated.
4. A drought results in
- Decrease in the crop yield.
  - Lack of water which may cause death of livestock.
  - Water shortage which may cause death of people living in drought-hit area.
  - Scarcity of food and fodder which may lead to malnutrition.
  - Dehydration and other related diseases.
  - Migration of people from drought-affected areas which may put civic and economic pressure on nondrought areas.
5. Water can be conserved by following ways:
- Use minimum amount of water for bathing. Use a bucket instead of a shower.
  - Never drain the water when there may be another use for it, for example, washing vegetables, watering plants, etc.
  - Do not let water run while brushing, shaving or washing your hands or face.
  - Repair the leaky taps.
  - Avoid flushing the toilets unnecessarily.
  - Turn off the taps immediately after use.
  - Adopt rainwater harvesting.
6. The two methods of rainwater harvesting are:
- Recharging Groundwater: In this method, the rainwater is allowed to go into the ground directly. This can be stored underground for later use.
  - Storing Rainwater in Tanks (Rooftop Rainwater Harvesting): In this method, the rainwater collected on the rooftops is stored in a tank with the help of pipes.
7. Different sources of water are as follows:
- Rainwater: It is the main source of water which is obtained from the rain. It is the purest form of water.
- Surface water: It is the water found in rivers, lakes, seas and oceans on the surface of the earth. These waterbodies are filled with water of rains and melting of snow.
- Underground water: A part of rainwater which seeps under the ground and infiltrates at the level of hard rock present there is called underground water. It is free from impurities.
8. (a) Seawater is saline, so it cannot be used directly for drinking and agricultural purposes.

- (b) The storage tank must have a tight cover to prevent the contamination of water and also to prevent breeding of mosquitoes.
  - (c) Rainwater harvesting should be encouraged because it is a good method of increasing the availability of water for future use.
  - (d) Proper balance of water is important for the growth of plant because if soil has excess water, the roots of the plant rot and the plant droops or wilts as it cannot get enough oxygen from the soil. On the other hand, if soil is deficient in water, the nutrients needed for the proper growth of plant cannot be absorbed by it.
  - (e) Due to insufficient availability of water in the soil, plants do not get required amount of nutrients from the soil. Hence, they do not grow well.
- F. 1.** Rainwater is considered as the purest form of naturally occurring water. Therefore, it can be used for the purposes like growth of plants, drinking by animals, etc.
- 2.** Water stored in puddles on roads and playgrounds gets heated when the sun shines and evaporates, so the puddles dry up very soon.
  - 3.** Water cycle is a continuous process which keeps the amount of water constant on the earth's surface. The amount of water that evaporates from various waterbodies on the surface of earth comes back in the form of rain or snow.
- G. 1. SWEATING 2. NUTRIENTS 3. ELECTRICITY 4. RAINWATER**  
**5. TYPHOID 6. OCEAN 7. WHALE 8. RIVERS**

**ANSWERS****CHECK POINT 1**

1. atmosphere
2. water vapour
3. Nitrogen; oxygen
4. dust
5. breathing; burning

**CHECK POINT 2**

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

**PRACTICE TIME**

**A. 1. (b) 2. (c) 3. (b) 4. (a) 5. (d) 6. (b) 7. (b) 8. (d) 9. (d)**

**B. 1. air 2. noble 3. gills 4. burning 5. more**

**C. 1. Nitrogen 2. Oxygen 3. Photosynthesis 4. Wind 5. Carbon dioxide**

**D. 1. The composition of the air is as follows:**

Nitrogen–78%, Oxygen – 21%, Carbon dioxide – 0.03%, Noble gases – 0.95% and small amounts of water vapour, smoke and dust particles.

**2. The three uses of air are:**

(a) Moving air helps to rotate the blades of windmills.

(b) Air helps to separate husk from grains by winnowing.

(c) Air helps aeroplanes, helicopters, gliders and yacht to move and birds to fly.

**3. Aquatic animals use air (oxygen) dissolved in water for breathing.**

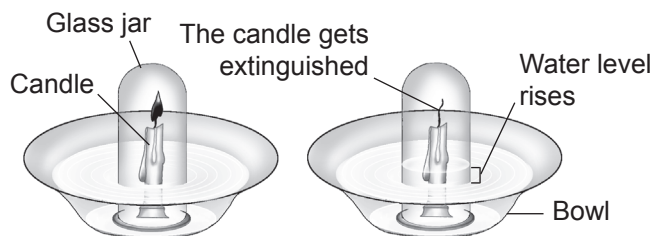
**4. As carbon dioxide gas is essential for the process of photosynthesis, it is important for plants.**

**5. The thick layer of air surrounding the earth is called atmosphere.**

**E. 1. Oxygen gas is required for burning. It can be shown by following activity:**

Take a bowl and fix a small candle in its centre. Pour some water into the bowl. Note the level of water. Light the candle. Invert a glass jar over it.

The candle keeps burning for some time and then gets extinguished. Also, there is a rise in the water level in the glass jar.



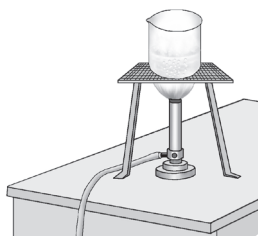
This shows that oxygen gas present in the air helps in burning. The space which was occupied by oxygen is now taken up by water.

2. 'Soil contains air' can be shown by following activity:

Take a beaker and put some soil in it. Add some water to the beaker.

The water poured on soil goes into the spaces between the soil particles and pushes the air out of the soil particles in the form of bubbles. This shows that air is present in soil.

3. 'Air is dissolved in water' can be shown by the following activity:



Pour some water into a beaker and heat it.

On heating the water, some bubbles are seen on the inner surface of the beaker. These bubbles come from the air dissolved in water. This activity shows that air is dissolved in water.

4. Air is present all around us. This fact can be shown by following activity:

Dip a glass upside down into the water. Now, tilt the glass a little and see if the water enters the glass.

When the glass was dipped into water without tilting it, no bubbles were seen. This is because the air was occupying the space in the glass. On tilting the glass, the air escapes in the form of bubbles and water fills the empty space that was occupied by air.

This shows that the glass was not empty. It was filled with air. Hence, air is present all around us.

5. (a) Oxygen

(b) Oxygen is used by living organisms in respiration.

(c) No, the candle will extinguish after some time due to unavailability of oxygen.

- (d) Yes, water level inside the jar will rise up to fill the space created due to burning of oxygen.
  - (e) Carbon dioxide
- 6.** (a) Availability of oxygen decreases as we go higher and higher. Therefore, mountaineers carry oxygen cylinders with them to get sufficient supply of it.
- (b) Nitrogen is a nonreactive gas and it prevents food from oxidising, i.e., from spoiling. Hence, it is used in packaging of food.
- (c) Carbon dioxide does not support combustion. It is heavier than oxygen and able to disconnect the contact between oxygen and burning substance. Hence, it is used in fire extinguishers.
- (d) Smoke produced in the furnaces of factories contains a large number of tiny particles and poisonous gases which are harmful to us. Therefore, factories have tall chimneys to keep the smoke away from us.
- (e) Nasal cavities have hair and mucus that filter the air when we breathe. Thus, harmful particles and microorganisms are prevented from entering our body. Due to this, we should never breathe from our mouth.
- (f) Earthworms and other insects use air present in soil. Earthworms move in and out of the soil making space for air to pass through the soil. The excreta of earthworms provides nutrients to the soil for plants to grow. Therefore, they are called 'friends of farmers'.
- F. 1.** A diver carries with him a cylinder filled with oxygen because the diver has no such organ (like gills) which can be used to take oxygen dissolved in water.
- 2.** Oxygen is produced by green plants as a by-product during photosynthesis. Due to this reason, we do not run out of oxygen.
- 3.** Snakes and other animals living in the soil, come out of their burrows in rainy season because their burrows get filled with water and they do not get air to breathe.

## ANSWERS

CHECK POINT 1

1. Waste 2. biodegradable 3. nonbiodegradable 4. faster 5. nonbiodegradable

CHECK POINT 2

1. Nonbiodegradable 2. Composting 3. Biodegradable 4. Waste 5. Landfilling

CHECK POINT 3

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

PRACTICE TIME

- A. 1. (d) 2. (d) 3. (d) 4. (b) 5. (b) 6. (c) 7. (a)

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

- C. 1. Recyclable waste is disposed off in blue bins and compostable waste in green bins.

2. Municipal solid waste 3. Nonbiodegradable waste

4. Glass, metals, plastics, paints and pesticides.

5. The recycling of paper will check the felling of trees.

- D. 1. The 4Rs include Reduce, Reuse, Recycle and Recover.

(a) Reduce means generating as less waste as possible.

(b) Reuse means using objects that can be used again and again.

(c) Recycle means the articles that cannot be reused should be sent for recycling.

(d) Recover means when reuse and recycling of waste is not possible, it should be converted into some other kind of resource.

2. The waste which is decomposed by microorganisms is called biodegradable waste such as peels of fruits and vegetables, leftover food items, etc. Such waste is not harmful to the environment.

The waste which is not decomposed by microorganisms is called nonbiodegradable waste such as plastic, glass, metals, etc. If left untreated, it accumulates and becomes hazardous to the environment.

3. When compost is prepared using special type of earthworms called red worms, it is called vermicomposting. It differs from composting in which instead of redworms, microorganisms decay the waste.
  4. Recycle means sending the articles that cannot be reused to the recycling unit for manufacturing new products while reuse means using such type of objects that we can use again and again.
  5. Plastic bags are nonbiodegradable. When they are thrown carelessly, they clog the soil and affect its fertility. They choke the food pipe of stray animals when swallowed along with leftover food from garbage and cause their death. The food stored in recycled polythene bag gets contaminated with poisonous dyes used in their making.
- E. 1.** The use of plastic can be minimised by following ways:
- Using jute or cloth bags instead of polythene bags for buying fruits, vegetables, groceries, etc.
  - Reusing the polythene bags whenever possible.
  - Not throwing garbage in polythene bags.
  - Reusing plastic bottles and containers for various other purposes such as storing pulses, grains, etc., growing plants, making decorative articles, etc.
- 2.** It is the process in which microorganisms decay the organic matter under controlled conditions and convert it into manure.

**Preparation of vermicompost:** Vermicompost can be prepared as follows:

Dig a pit of about 1 m × 1 m × 1 m in a corner in a garden. Line the pit with net or chicken mesh at the bottom and spread 1 to 2 cm thick layer of sand. Now, spread some wastes of vegetables and fruits, used tea leaves, kitchen wastes, dry leaves, garden wastes, animal dung, husk, newspapers, cardboards, etc. Once filled, cover the pit with sand. Sprinkle some water to make the material wet. Introduce redworms in the pit and cover the pit loosely with gunny bag or old sheet of cloth or a layer of grass. Leave the pit undisturbed for about a month but keep the contents moist.

After a month, the waste turns into brown-black matter. This brown-black matter is vermicompost and can be used as a manure.

3. Each one of us can play an important role in reducing waste generation by
  - Creating as less waste as possible.
  - Reusing as many things as possible.
  - Keeping separate garbage bins for biodegradable and nonbiodegradable items at homes, offices, schools, etc.
  - Ensuring that the garbage generated in your locality is thrown in the community bins.
  - Never littering the public places.
  - Disposing off the excreta of pets properly.
  - Setting up a central compost pit for composting biodegradable waste in the locality.



4. The practice of 4R principle will help in the conservation of resources as well as in minimising the generation of waste.  
It will save the environment from the hazards of waste accumulation and provide better chances for the management of waste.
  5. Nonbiodegradable wastes are more hazardous because if left untreated, they increase over a period of time and pollute the environment. Accumulation of waste causes serious problems to the environment and public health. It pollutes air, water and soil leading to many diseases.
  6. We should avoid use of polythene bags because
    - Polythene bags are nonbiodegradable. If they are thrown as waste and left untreated, they clog the soil and reduce its fertility.
    - They cause health problems if used for storing food items as their poisonous dyes spoil the food.
    - If garbage is thrown in polythene bags, it does not undergo any change.
    - Polythene bags if thrown carelessly on roads, they get into drains and choke them.
    - On burning, polythene bags release toxic gases.
  7. Rural people use items made of natural things like natural fibres, straw, wood and leaves. They use earthenware; their houses are made from mud. They take medicines derived from plants. All these are biodegradable. On the other hand, urban people have modern lifestyle that includes use of a variety of man-made nonbiodegradable goods that create lot of waste.
  8. The waste should be segregated into compostable and recyclable wastes before disposing off. This will help to treat the waste appropriately.
  9. (a) Open dumping attracts flies, rats and worms.  
(b) It produces foul smell and spoils the aesthetic look of the area.  
(c) The leftover food and worms in openly dumped waste attract birds that may hid an aircraft.  
(d) It pollutes air, water and soil.  
(e) It causes many airborne and waterborne diseases.
- F. 1.** Polythene bag is a nonbiodegradable material, therefore, the waste wrapped in the polythene bag does not come in contact with microorganisms and hence it does not get decomposed.
- 2.** Landfills generate foul smell and spoil aesthetic look of the area around. The leftover food and worms in landfill attract rodents and birds. A bird may hit an aircraft causing it to crash. Therefore, landfills need to be placed away from habitation.
- G. 1. GARBAGE 2. COMPOSTING 3. LANDFILL 4. OPEN DUMPING**
- 5. NONTOXIC**