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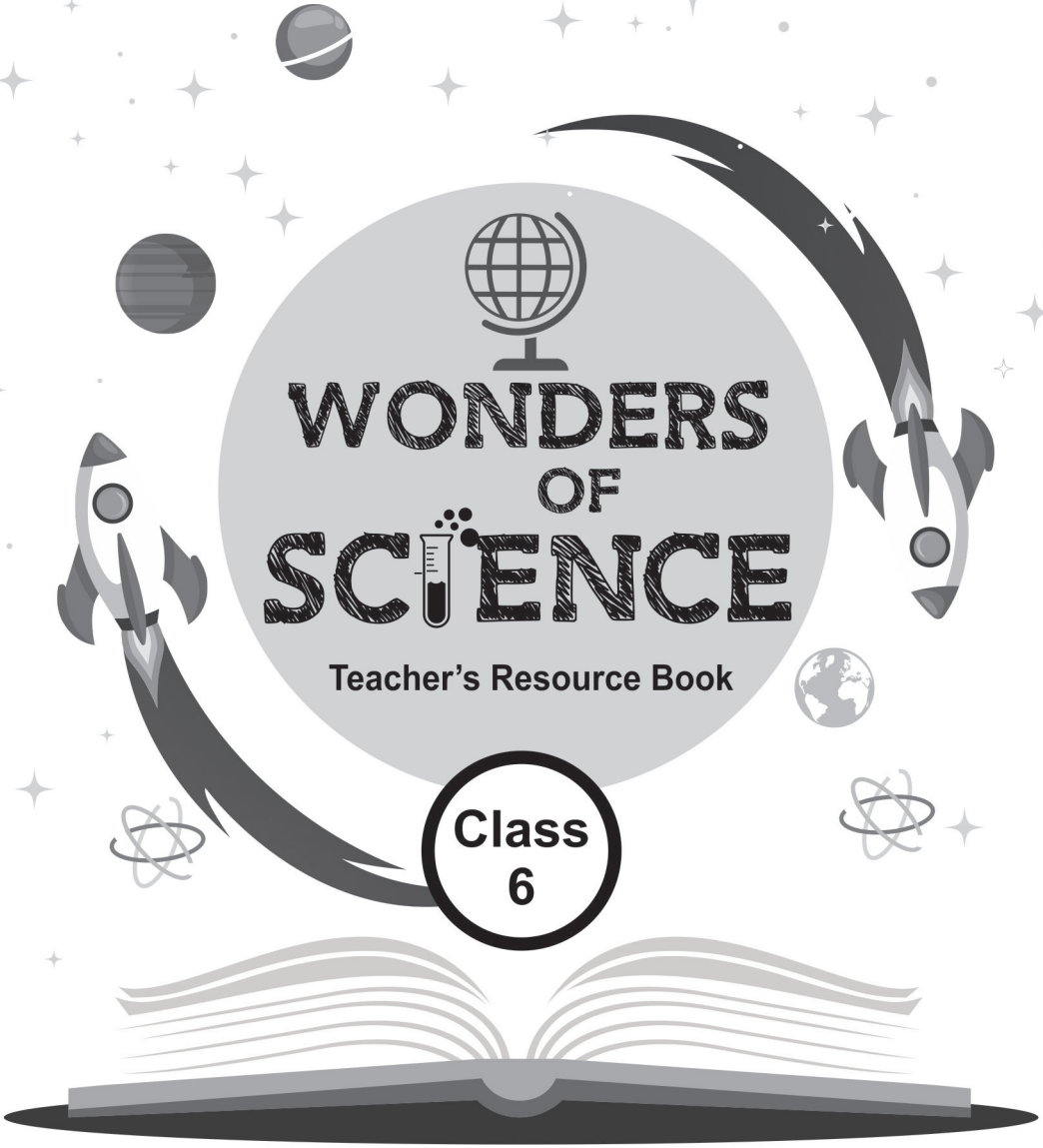


WONDERS OF SCIENCE

Teacher's Resource Book

Class 6

Wonders of Science-6

Unit 1 : The World of the Living

1. Things Around Us

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (b) protoplasm, **2.** (d) fins, **3.** (d) phototropism **4.** (a) 18 years, **5.** (a) Cells.

B. Fill in the blanks :

1. cells, **2.** plant, **3.** space, **4.** density, **5.** cell division.

C. State whether the following statements are true or false :

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

D. Answer the following questions briefly :

1. Cell is the basic structural and functional unit of life.

2. The process by which living things produce the same type of living things or their own kind is known as reproduction.

3. A living organism develops certain characteristics which help it to live and survive in its environment. This is called adaptation.

4. The two general properties of matter are :
(i) It has mass.
(ii) It has volume.

5. Living things move from place to place to find food and shelter.

6. Plants make their own food but animals can't make their own food.

E. Answer the following questions :

1. Living things can move while non-living things cannot.

2. All living beings react to changes around them. For example, when we touch a hot cup, we immediately withdraw our hand. This is how we react to the change in our environment.

3. The process in which wastes are removed from the body of animals is called excretion.

Yes, excretion takes place in plants also.

4. Difference in nutrition of plants and animals are as follows :

Plants	Animals
Plants make their own food using sunlight by the process of photosynthesis. It is a holophytic type of nutrition.	Animals do not make their own food. They depend on the food made by plants and plant eaters. It is a holozoic type of nutrition.

5. Difference in locomotion of plants and animals are as follows :

Plants	Animals
Plants do not move in the same way as animals do. Only their parts move. They can move or bend their parts in response to light, water, gravity and touch.	Animals move from place to place to find food and shelter. They move in many ways. **For example,** fish swim and kangaroo hop.

Activity Time

I. Science Puzzle

There is a magic box given here. Find out names of living and non-living things in it.

Non-living things : TABLE, BOOK, GUN, BOTTLE, CAR.

Living things : SUNFLOWER, OX, LION, DUCK.

T	A	B	C	R	S	T	U	X	Z	E	T	S	R
A	M	J	I	L	B	O	O	K	P	S	U	U	A
B	T	D	R	Z	U	X	Y	C	T	D	F	N	G
L	R	U	P	S	B	O	M	T	N	B	T	F	S
E	G	C	F	R	A	S	N	O	F	O	M	L	N
T	R	K	S	I	J	A	L	K	N	T	G	O	T
P	I	L	A	R	H	J	O	N	O	T	R	W	S
F	T	A	B	P	C	K	P	O	Q	L	U	E	V
X	V	P	E	B	C	L	K	I	F	E	G	R	R
I	J	L	P	N	O	M	H	L	G	F	U	T	S
L	E	K	B	A	C	D	R	G	O	P	N	S	D
D	G	B	F	A	R	Q	S	T	U	C	A	R	V

2. Environment

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (d) producers, **2.** (c) omnivores, **3.** (a) 70%, **4.** (b) air.

B. Fill in the blanks :

1. chlorophyll, **2.** scavenger, **3.** sunlight, **4.** Cacti, fleshy, **5.** Air.

C. Match the following :

Column A	Column B
1. Green plants	(i) Herbivores
2. Rabbits	(ii) Autotrophs
3. Mushrooms	(iii) Carnivores
4. Wolves	(iv) Omnivores
5. Bears	(v) Decomposers

D. Answer the following questions briefly :

1. Abiotic environment includes air, water, soil and the climate.

2. Sunlight is the immediate source of energy for most living organisms.

3. Five climate factors are air, water, soil, sunlight and temperature.

4. Air is the important source of oxygen on the earth.

5. Some organisms such as mice and rabbits that eat plants are called herbivores.

6. Bacteria and mushroom are two examples of decomposers.

7. Organisms are linked through food chain within an ecosystem.

E. Answer the following questions :

1. The main constituents of air are oxygen, nitrogen and carbon dioxide.

2. The process by which green plants make their own food in the presence of sunlight, is called photosynthesis.

3. Organisms that consume both plants and animals are called omnivores. Examples are Human, bear and crow.

4. Sunlight is the primary source of energy for most living things. Plants make their own food in the presence of sunlight. Some animals feed on plants and hence gain energy stored in them. This way energy from sunlight is passed from one living thing to another.

5. A food chain shows how groups of organisms within an ecosystem get their food and energy.

On the other hand, when a number of food chains come together and overlap, they form a food web.

F. 1. The environment on the earth is made up of two components or factors: Biotic and Abiotic. The biotic components are all the living things in an ecosystem. They are the animals, the plants and the microorganisms. Biotic components also include the waste from living things and dead organisms. Even the harshest corners of our planet have biotic components. Earth is teaming with biotic beings.

Types of Biotic Factors

Biotic factors are grouped into three major groups, which define their role in the flow of energy which all living things in the ecosystem need to survive. These groups are **producers** or *autotrophs*, **consumers** or *heterotrophs*, and **decomposers** or *detritivores*.

Producers : also known as autotrophs, from the Greek words "*auto*" for "*self*" and "*troph*" for "*food*" – are organisms that make their own food using inorganic materials and energy sources.Producers are extremely important: without them, no life could exist at all!

Consumers, also called "heterotrophs," are organisms that eat other living organisms in order to obtain energy. Their name comes from the Greek "*hetero*" for "*other*" and "*troph*" for "*food*."Herbivores who eat plants, carnivores who eat animals, and omnivores who eat both plants and animals, are all heterotrophs.

Decomposers, or "detritovores", are organisms that use organic compounds from producers and consumers as their source of energy. They are important to ecosystems because they break down materials from other living things into simpler forms, which can then be used again by other organisms.

2. Soil is the link between the air, water, rocks, and organisms, and is responsible for many different functions in the natural world or ecosystem. These soil functions include: air quality and composition, temperature regulation, carbon and nutrient cycling, water cycling and quality, natural "waste" (decomposition) treatment and recycling, and habitat for most living things and their food. Life could not survive without these soil functions.

Soils are the environment in which seeds grow. They provide heat, nutrients, and water that are available for use to nurture plants to maturity. These plants form together with other plants and organisms to create ecosystems. Ecosystems depend on the soil, and soils can help determine where ecosystems are located. These plants then provide valuable habitat and food sources for animals, bacteria, and other things.

3. The importance of plants to humans and life on Earth in general is immense. Life, as we know it, would not be possible without plants. The importance of plants is as follows:

(i) Plants supply food to nearly all terrestrial organisms, including humans. We eat either plants or other organisms that eat plants.

(ii) Plants maintain the atmosphere. They produce oxygen and absorb carbon dioxide during photosynthesis. Oxygen is essential for cellular respiration for all aerobic organisms. It also maintains the ozone layer that helps protect Earth's life from damaging ultra-violet radiation. Removal of carbon dioxide from the atmosphere reduces the greenhouse effect and global warming.

(iii) Plants recycle matter in biogeochemical cycles. For example, through transpiration, plants move enormous amounts of water from the soil to the atmosphere. Plants such as peas host bacteria that fix nitrogen. This makes nitrogen available to all plants, which pass it on to consumers.

(iv) Plants provide many products for human use, such as firewood, timber, fibers, medicines, dyes, pesticides, oils, and rubber.

(v) Plants create habitats for many organisms. A single tree may provide food and shelter to many species of insects, worms, small mammals, birds, and reptiles

4. Food Chain Hierarchy

The food chain describes who eats whom in the wild. Every living thing, from one-celled algae to giant blue whales, needs food to survive. Each food chain is a possible pathway that energy and nutrients can follow through the ecosystem.

For example, grass produces its own food from sunlight. A rabbit eats the grass. A fox eats the rabbit. When the fox dies, bacteria break down its body, returning it to the soil where it provides nutrients for plants like grass.

Of course, many different animals eat grass, and rabbits can eat other plants besides grass. Foxes, in turn, can eat many types of animals and plants. Each of these living things can be a part of multiple food chains. All of the interconnected and overlapping food chains in an ecosystem make up a food web.

Activity Time

I. Science Puzzle

Certain words are hidden in the grid given alongside. Search them going up, down or diagonally forward or backward. One is done for you.

B	I	O	T	I	C	I	Q	O	O
N	Q	L	R	T	B	E	R	X	H
V	I	P	S	G	N	V	T	Y	G
T	R	H	L	O	A	O	Z	G	J
P	Y	A	Z	R	Q	N	J	E	I
F	O	O	D	C	H	A	I	N	L
G	H	J	S	T	M	E	A	S	T
L	U	S	O	I	L	C	B	L	M
O	S	C	A	V	E	N	G	E	R
B	A	W	A	T	E	R	L	Z	Q

3. Habitat and Adaptation

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (b) ponds, **2.** (b) *Hydrilla*, **3.** (d) Gills, **4.** (d) Broad, rough leaves.

B. Fill in the blanks :

1. it inhabits or it dwells, **2.** fleshy, **3.** respiratory, **4.** cold, windy, **5.** Fins.

C. State whether the following sentences are true or false :

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

D. Match the following :

Column A	Column B
1. *Capparis*	(i) Xerophyte
2. *Hydrilla*	(ii) Lakes
3. Pine	(iii) Hydrophyte
4. Terrestrial habitat	(iv) Cone-shaped top
5. Aquatic habitat	(v) Land

E. Answer the following questions briefly :

1. The place where an organism lives, or the place where one would find a particular organism is known as its habitat.

2. The three main types of habitats are :

(i) Aquatic habitat

(ii) Terrestrial habitat

(iii) Aerial or Arboreal habitat

3. The plants which are adapted to grow in dry habitats and drought conditions are called xerophytes.

4. Pine trees or conifers grow abundantly in mountainous regions.

5. The animals living in cold regions have thick skin or fur to keep them warm.

F. Answer the following questions :

1. The special characteristics that enable animals and plants to be successful in a particular environment are called adaptation.

The fish has a streamlined body to move in water. Fins help it to move while gills help it to breathe. Air bladders help it to maintain its depth in water.

2. The roots of xerophytes are either partly developed as in *Hydrilla* or absent as in *Ceratophyllum*. Their leaves are thin, long and ribbon shaped as in *Vallisneria* or finely dissected as in *Ceratophyllum*. Their stem is long, slender, spongy and flexible.

3. Xerophytes have the following adaptation features :

(i) They are annuals & complete their life cycle in very short period to avoid dry conditions.

(ii) Their stems, leaves and roots are fleshy for accumulation of water.

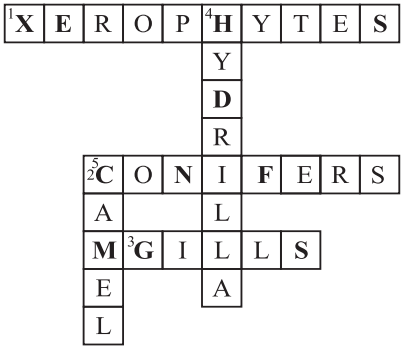
(iii) Many of these plants have spines instead of leaves to avoid water loss.

4. In fishes, fins act as paddles and control the direction of movement. Gills work as respiratory organs and help in gaseous exchange in water.

5. The pine trees have pointed leaves because mountainous regions are cold and windy throughout the year. This adaptation does not allow snow to settle on them.

Activity Time

I. Science Puzzle



4. Structure and Functions of Living Organisms

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (b) Xylem, **2.** (d) radish, **3.** (c) *Bryophyllum*, **4.** (d) 206, **5.** (b) creepers.

B. Fill in the blanks :

1. chlorophyll, **2.** photosynthesis, **3.** spines, **4.** ligaments, **5.** joint.

C. State whether the following statements are true or false :

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

D. Match the following :

Column A	Column B
1. Coriander	(i) Herb
2. Balsam	(ii) Shrub
3. Radish	(iii) A green pigment present in leaves
4. Potato	(iv) Modified root
5. Chlorophyll	(v) Modified stem

E. Answer the following questions briefly :

1. There are two main systems in plants :
(i) Root system, (ii) Shoot system.

2. The stomata regulates water loss through the leaves of the plant.

3. Animals move from place to place in search of food and shelter.

4. The protective function of the backbone is to protect the spinal cord (It is the message 'cable' between the brain and other body parts).

5. The place where two bones meet is called a joint.

F. Answer the following questions :

1. A tap root system consists of one major root from which various minor branches arise while a fibrous root system consists of numerous similar fine roots, all growing from the base of the plant stem.

2. A leaf has two main parts : (a) a blade or *lamina* and (b) a stalk or a *petiole*. The stalk connects the leaf to the stem while the blade is the thin part of the leaf.

3. Pollination is necessary in a flower because it leads to the formation of fruit and seeds which create other plants.
Pollination is brought about by wind, insects, and birds.

4. Fish has a streamlined body which allows it to glide through water easily. It offers little or no resistance to water.

5. The skeletal system has five important functions :
(i) It provides shape.
(ii) It allows movement.
(iii) It protects organs.
(iv) It produces blood cells.
(v) It stores certain materials.

Unit-2 : Materials

5. Cloth and Cloth Materials

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)
1. (c) shearing, **2.** (a) Angora, **3.** (c) Nylon, **4.** (a) Jute

B. Fill in the blanks :

1. boll, **2.** Nylon, rayon, **3.** smooth, **4.** Linen.

C. State whether the following statements are true or false :

1. T, **2.** F, **3.** F, **4.** F.

D. Complete the given analogies :

1. Ginning, **2.** Angora, **3.** Sheep, **4.** Linen.

E. Answer the following questions briefly :

1. Nylon is used to make ropes.

2. The cloth material used by modern man are cotton, wool, silk and synthetic.

3. Cotton and jute are two plant fibres. Jute is obtained from the bark of the jute plant stem.

4. Cotton cloth is preferred because it is comfortable to wear and ideal for summer season.

F. Answer the following questions :

1. The basic necessity of cotton plant is plenty of water and sunshine for its proper growth.

2. The sources of wool are the coat of a sheep, camel and yak. After cleaning and oiling, the fibres are twisted together to make yarn which can then be woven into garments.

3. Silk is made by rearing silkworm moths. Their eggs are placed in incubators, which hatch into tiny black silkworms, the caterpillars of the moths. These silkworms are kept in special containers and fed on mulberry leaves for about four weeks.

At the end of this time, they spin their cocoons and start to turn into moths. Then they are killed and each cocoon is unwound as a long thread between 900 and 1300 metres. These threads are wound together to obtain silk.

4. Synthetic fibres are man made fibres. These are obtained artificially from chemicals in the industries.

Activity Time

I. Read the following carefully and complete the given blank boxes :

1.

L	I	**N**	E	N

2.

S	**I**	L	**K**

3.

C	**O**	T	**T**	O	N

6. Classification of Objects

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (a) Water, **2.** (c) nitrogen, **3.** (b) iron, **4.** (d) glass, **5.** (a) the ball is lighter than water.

B. Fill in the blanks :

1. lemon juice, sugar; **2.** conductors, **3.** transparent, **4.** quartz, **5.** Density.

C. State whether the following statements are true or false :

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

D. Match the following :

Column A	Column B
1. Common salt	(ii) Solid
2. Carbon dioxide	(i) Gas
3. Vinegar	(iii) Transparent
4. Air	(iv) Opaque
5. Wood	(v) Liquid

E. Answer the following questions briefly :

1. The difference between magnetic and non magnetic materials is that while the former are attracted by a magnet while the latter are not.

2. Silver and copper are two good conductors of heat and electricity.

3. Materials that do not allow electricity to flow freely through them are called insulators. For example, rubber and glass.

4. Substances that transmit light but not its detail are called translucent. For example, Frosted-glass and waxed paper.

5. Alcohol and vinegar are two soluble liquids while kerosene and coconut oil are two insoluble liquids.

6. The measurement of the amount of mass in a given volume of an object is called its density.

F. Answer the following questions :

1. The process of grouping objects based on some known criteria is called classification.

On the basis of following properties, different kinds of matter are classified in various groups :

(i) Solubility in water (ii) Conduction of heat
(iii) Conduction of electricity (iv) Transparency
(v) Response to magnet (vi) Lustre
(vii) Hardness (viii) Sinking and floating

2. (a) Electrical conductivity is the ability of an object to allow electric current to pass through it.

(b) The lustre of a mineral describes the way it reflects light from its surface.

(c) When light strikes a substance and passes through it, the substance is called transparent and the process is called transparency.

(d) The ability of a thing to resist being scratched is known as its hardness.

3. The density of water is 1 gm/cm^3. If any object has density more than this, it would sink in water whereas any object with density less than it would float on water.

Activity Time

I. Write names of four non-magnetic materials in the given space :

1. Aluminium, **2.** Silicon, **3.** Wood, **4.** Plastic.

7. Changes Around Us

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (a) Burning of candle, **2.** (d) Chemical, **3.** (c) exothermic change, **4.** (c) Chemical, **5.** (c) natural change.

B. Fill in the blanks :

1. reversible, irreversible; **2.** desirable, undesirable; **3.** chemical; **4.** physical, chemical; **5.** undesirable change.

C. State whether the following statements are true or false :

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

D. Match the following :

Column A	**Column B**
1. Making curd from milk	(i) Chemical change
2. Changes of seasons	(ii) Physical change
3. Pendulum of a clock	(iii) Desirable change
4. Rusting of iron	(iv) Periodic change
5. Melting of ice	(v) Natural change

E. Classify the following changes in as many ways as you can :

1. Physical change
2. Periodic change
3. Chemical change
4. Chemical change
5. Non-periodic change
6. Chemical change
7. Physical change; undesirable change
8. Chemical change

F. Give two examples each of :

1. Melting of wax and melting of ice

2. Germination of seed and souring of milk

3. Burning of matchstick and drying of clothes
4. Feeling cool on our hands and the tongue feeling cool.

G. Answer the following questions briefly :

1. Change which takes place over a longer duration of time is called a slow change.
2. Burning of matchstick is the example of a fast change.
3. A change in which a new substance is formed and we cannot get back the original substance is called chemical change.
4. If we put a small amount of glucose on our tongue, it dissolves and the tongue feels cool. Here, the energy is absorbed.
5. Blowing of wind is an example of natural change.

H. Answer the following questions :

1. Pulling of rubber string is reversible change because it can be reversed by reversing the conditions that brought about the change in the first place itself.
2. The differences between reversible and irreversible changes are :

	Reversible Changes	**Irreversible Changes**
(i)	A change which can be reversed is called a reversible change.	A change which cannot be reversed is called irreversible change.
(ii)	Such changes can be reversed by reversing the conditions.	Such changes cannot be reversed.

3. Four examples of physical change are :
   (i) Breaking of chalk or glass tumbler.
   (ii) Dissolving of common salt in water.
   (iii) Melting of ice.
   (iv) Changing of state of camphor or naphthalene from solid to gas at room temperature.
4. Four examples of chemical change are :
   (i) Burning of candle.
   (ii) Rusting of iron.
   (iii) Germination of a seed.
   (iv) Formation of water from hydrogen and oxygen.
5. Two examples of a change involving interaction between two materials are :
   (i) Sharpening of a pencil with a sharpener.
   (ii) Burning of matchstick by striking the side of a matchbox.

I. Answer the following questions in detail :

1. Changes which occur again and again after a fixed interval of time and whose occurrence can be predicted are called periodic changes. For example, phases of moon.

Changes which do not repeat themselves at regular intervals of time are called non-periodic changes. For example, train accidents.

2. The differences between physical and chemical changes are :

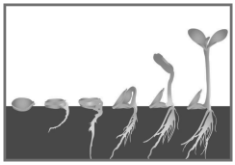
S.No	Physical Changes	Chemical Changes
(i)	No change in the composition of substance.	Change in composition of substance.
(ii)	No new substance is formed.	New substance is formed.
(iii)	The change is temporary.	The change is permanent.
(iv)	It can be reversed in many cases by simple physical change.	It cannot be reversed by simple physical methods.
(v)	No change in the characteristic properties of the substance.	Change in the characteristic properties of the substance.

3. When spirit or petrol is put on the palm of our hand, we feel cool because the spirit absorbs the heat from the hands by evaporation. Due to loss of heat, our hand feels cool.

4. A chemical change is irreversible because it results in a new substance with completely new and different characteristic properties. The original substance cannot be obtained by any means.

Activity Time

J. Write below each whether it is a physical change or chemical change :



Chemical Change

Physical Change

Physical Change

Unit-3 : Food

8. Sources of Food

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (d) All of these, **2.** (c) roots, **3.** (a) stem, **4.** (c) plants, **5.** (d) scavengers.

B. Fill in the blanks :

1. producers, **2.** cereal, **3.** plants, **4.** dead, **5.** Shark liver oil, cod liver oil.

C. Answer the following questions briefly :

1. Food is necessary for life as it gives energy for movement and warmth and helps the body to grow and stay healthy.

2. Plants and animals are the main sources of food.

3. The birds from which we obtain eggs are known as 'poultry'.

4. Herbivores are those animals which eat plant parts like leaves, fruits, roots, etc. For example, rabbit and deer.

5. The thick and sweet liquid made by bees from the nectar of flower is called honey.

D. Rearrange the following to form a food item. Mention whether each is obtained from a plant or an animal :

	Food items	**Sources**
1. TEMA	MEAT	Animal
2. OTATOP	POTATO	Plant
3. SEAP	PEAS	Plant
4. GEGS	EGGS	Animal
5. LIKM	MILK	Animal

E. Answer the following questions :

1. Three functions of food are as follows :

(i) It provides us energy.

(ii) It helps in the growth and repair of body parts.

(iii) It protects the body against diseases.

2. Omnivores are those animals that feed on both plants and animals while carnivores are those animals that feed on the flesh of other animals.

3. Plantation agriculture is practiced for food purposes. The crops under plantation agriculture include tea, coffee, oranges, coconuts, etc.

4. The main source of food for people living in coastal areas is fish.

The main natural source of vitamin A and D are shark liver oil and cod liver oil.

5. BMR or Basal Metabolic Rate is a measure of the calories the body needs to maintain its function when we are at rest.

F. Answer the following questions in detail :

1. The main plant sources of food for human beings are as follows :

(i) cereal crops (ii) root crops

(iii) stem crops (iv) leaves

(v) flowers (vi) fruits.

2. On the basis of feeding habits, animals are classified into following categories :

(i) Those animals which eat plant parts like leaves, fruits are called herbivores. They are also known as primary consumers.

(ii) Those animals feed on the flesh of other animals, are called carnivores. They are also known as secondary consumers.

(iii) Those animals which feed on both plants and animals are called omnivores.

(iv) Those animals which eat dead/decaying animals are called scavangers.

3. The food we eat should be cooked properly because over cooking of vegetables destroys many vitamins while eating uncooked or half cooked food may transmit disease causing organisms or worms.

4. Maintenance of food quality means all activities from production of food to its consumption should be hygienic. The quality of food can be maintained in the following ways :

(i) Storage : Perishable food material, such as milk, vegetables, boiled rice etc., should be kept in the refrigerator.

(ii) Handling : Food handlers should wash their hands before handling food.

(iii) Cleanliness of Cooking and Eating Place : Proper sanitation of cooking and eating places is necessary for maintaining quality of food.

(iv) Cooking : Over-cooking of vegetables destroys many vitamins so it should be avoided.

Activity Time

J. Puzzle

Here is a magic box. Find out any five plant products in it :
(i) CARROT, (ii) WHEAT, (iii) PEA, (iv) SPINACH, (v) METHI.

M	E	T	H	I	P	R	R	Q	T
A	S	S	C	I	N	A	C	H	J
P	U	P	A	O	A	T	C	E	K
L	J	I	R	F	W	H	E	A	T
U	L	N	R	G	F	G	H	R	C
M	M	A	O	H	I	R	R	M	B
S	A	C	T	E	L	O	P	E	A
Q	S	H	S	G	R	T	S	U	E

9. Components of Food

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)
1. (b) iodine, **2.** (c) Vitamin C, **3.** (a) sodium chloride (salt), **4.** (d) fat.

B. Fill in the blanks :

1. malnutrition, **2.** fat, **3.** Beri-beri, **4.** Calcium and phosphorus, **5.** iron

C. State whether the following statements are true or false :

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

D. Match the following :

Column A	Column B
1. Anaemia	(i) Vitamin B
2. Scurvy	(ii) Iron
3. Beri-beri	(iii) Iodine
4. Rickets	(iv) Vitamin C
5. Goitre	(v) Vitamin D

E. Answer the following questions briefly :

1. Food components that serve different purposes in our body are called nutrients.

Six basic nutrients are proteins, carbohydrates, fats, vitamins, minerals and water.

2. Proteins are an essential component for growth and repair of body parts. Lean meat is one of the main source of protein.

3. Disease caused by deficiency of any nutrient is called deficiency disease.

4. Minerals help to maintain the normal functioning of the body.

5. The function of roughage is to add bulk to the diet. As it cannot be digested by our body, it adds bulk to the faeces. It aids in the digestion process and healthy functioning of the bowel system.

6. A balanced diet is a proportional combination of carbohydrates, fats, proteins, vitamins, minerals and water.

F. Answer the following questions :

1. Carbohydrates are essential for the body as they are the major source of energy required by it. They provide about 72% of its total energy requirements. The sources of carbohydrates are vegetables, cereals, fruits, etc.

2. In addition to providing energy, fats support and cushion vital organs, protecting them from injury and insulate the body against loss of heat.

The sources of fats are nuts, butter, vegetable oils, fatty meats, cheese, etc.

3. We cannot digest fibre yet it important for us because it adds bulk to the faeces, helps in the digestion process and healthy functioning of the bowel system.

4. Calcium and phosphorus are important as they are essential for building bones and teeth. Deficiency of any one of them may lead to soft bones, poor skeletal growth and rickets.

5. Shivam is suffering from scurvy. He can be cured by having a balanced diet with plenty of fresh fruits and lightly cooked food.

G. Answer the following questions in detail :

1. The main components of food are :

Carbohydrates, proteins, fats, vitamins, minerals, roughage and water.

Carbohydrates are the major source of energy required by the body. They provide about 72% of its total energy requirements. The main sources are fruits, vegetales, grains and their prodcuts.

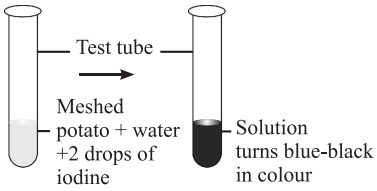
2. Vitamins regulate growth and the normal functioning of the body. There are a number of vitamins which the body needs. Vitamins and their sources are as follows :

Vitamins	Sources	Importance in the Body
A	Carrot, mango, liver, fish-liver oil, butter.	Good for eyes, hair and skin.
B complex	Yeast, meat, fish, milk, green vegetables.	Proper functioning of muscles and nerves, growth.
C	Citrus fruits like lemon, orange and amla.	Teeth and gums remain healthy for resistance against diseases.
D	Cod-liver oil, milk, butter, exposure to sunlight.	Bones and teeth become strong.

3.

Minerals	Sources	Importance
Calcium and phosphorus compounds	Whole grain, cereals, meat, milk, green leafy vegetables, table salts	Strong bones and teeth, blood and other tissues.

4.



Appearance of blue-black colour shows the presence of starch

The presence of starch in any material is tested by iodine test. Place a small quantity of mashed potato in a test tube. Add some amount of water in it and shake well to form a solution. Add a drop of weak idoine solution in it. The solution turns blue-black. This confirms the presence of starch in a potato.

Activity Time

K. Science Puzzle

Rearrange the following words into meaningful words :

1. A N A E M I A
2. V I T A M I N
3. M I N E R A L
4. F A T S
5. P R O T E I N

10. Separation of Substances

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (d) tea leaves from tea, **2.** (c) magnet, **3.** (c) separating funnel, **4.** (d) sublimation, **5.** (b) condensation.

B. Fill in the blanks :

1. Winnowing, **2.** sublimation, **3.** decantation, **4.** filtration, **5.** sublimation, **6.** Alum.

C. State whether the following statements are true and false :

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

D. Match the following :

Column A	Column B
1. Crystallization	(v) Cooling a hot saturated solution
2. Centrifugation	(i) Separation of sand from water
3. Decantation	(iii) Separates cream from milk
4. Sublimation	(iv) Process to separate mixtures
5. Evaporation	(ii) Changing of a solid into vapours

E. Answer the following questions briefly :

1. We need to separate substances from a mixture to remove undesirable components, to separate useful substances, to remove a harmful component or to know the ratio of the component.

2. Three magnetic substances are iron, nickel and cobalt.

3. The process of settling of heavy solids at the bottom is called sedimentation.

4. Evaporation method is used to separate solids dissolved in a liquid.

5. The three components of air are nitrogen, oxygen and carbon dioxide.

F. Answer the following questions :

1. A pure substance has :

(i) same properties throughout its bulk;

(ii) fixed melting and boiling points; and

(iii) definite density.

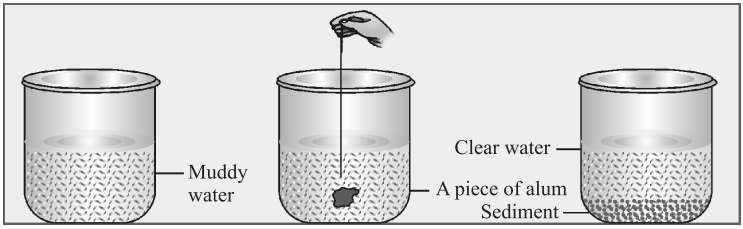
2. Homogenous mixtures are the ones that are well mixed and their constituents are distributed uniformly while heterogeneous mixtures are the ones that do not have a uniform composition throughout.

3. The process of improving the settling property of solid particles by addition of special chemicals, such as alum, is called as coagulation.

A coagulating agent is a chemical which is addd to a solution so as to improve the settling property of solid particles. Its example is alum.

4. Centrifugation is the method for separating the suspended particles of a substance in a solution.

5.



Loading of suspended clay particles with alum

Sometime canal water is dirty enough or muddy. In such a case, some chemicals such as alum is added to the water. The dissolved particles of alum load the fine clay particles which become heavier and settle down. The clear water is separated by decantation.

G. Answer the following questions in detail :

1. A pure substance has its own set of properties. These properties will be different for different substances. On the other hand, a mixture comprises of two or more substances in any ratio which do not react with each other.

2. The three main purposes of separating the constituents of mixture are as follows :

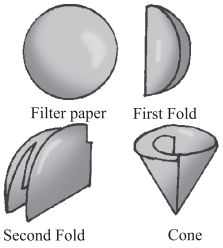
(i) To Remove Undesirable Components : In case of river and canal water, its undesirable constituents, such as minute dust particles and germs need to be removed to get clean water.

(ii) To Get Pure Substance : In the pharmaceutical industry, it is very important to remove all harmful impurities from the substances so that they can be used for manufacturing medicines. In the laboratory, it is very important to remove all impurities from different chemicals.

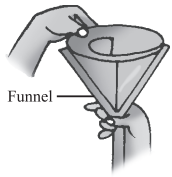
(iii) To know the Ratio of the Component : Sometimes it becomes necessary to know the ratio of the components in a mixture.

3. One method of separating insoluble solids from liquids is filtration. The process is as follows :

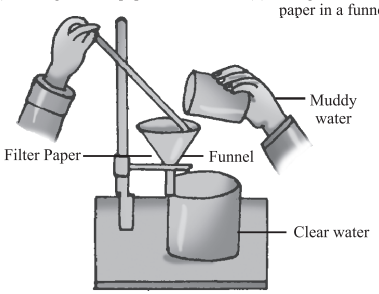
This method is used for separating insoluble solids from liquids by using a filter paper. The solid which remains back on the filter paper is called the residue and the clear liquid obtained is called filtrate.



(a) Folding of filter paper



(b) Fitting the folded filter paper in a funnel

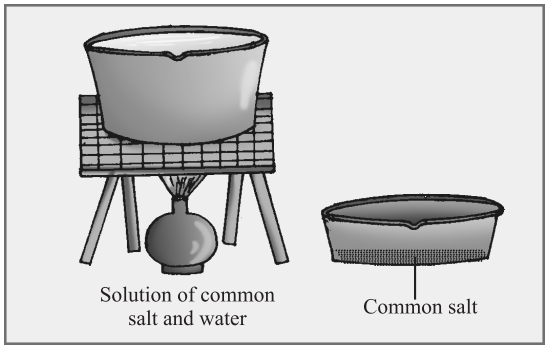


(c) Filtration

In this method, muddy water is made to fall through a cone of filter paper, into a beaker. The water passes through the cone and into the beaker while the solid impurities are held back on the filter paper.

4. **Two methods of separating soluble solids from liquids are as follwos :**

   (i) Evaporation : The process of separating the solute from a solvent on heating is called evaporation. It is used to separate solids dissolved in a liquid. Common salt dissolved in water is separated by this method. The water slowly evaporates while common salt is left behind in the container.



Preparation of salt by the evaporation of water

(ii) Centrifugation : Centrifugation is the method for separating the suspended particles of a substance in a solution. It is the process by which we can remove fine insoluble solids from a liquid-solid mixture in a machine called centrifuge which rotates at a high speed. Due to high speed of the machine, the solids are pushed towards the wall of the machine while the liquid remains at the centre. This way the mixture is separated.

5. The process of fractional distillation is used to separate two liquids which are miscible (soluble) and boil at different temperatures. For example, alcohol boils at 80°C and water boils at 100°C. When a mixture of alcohol and water is heated, alcohol boils first and distils at 80°C while water is left behind.

Activity Time

J. Science Puzzle

In the given grid, some methods of separation of substances are hidden. Find out their names :

WASHING, WINNOWING, SUBLIMATION, SIEVING, LOADING

W	L	M	N	S	O	P	R	Q	T	W
A	J	B	L	B	M	S	N	T	L	I
S	U	B	L	I	M	A	T	I	O	N
H	F	G	A	O	S	R	P	Q	A	N
I	J	I	L	R	K	M	L	J	D	O
N	K	S	I	E	V	I	N	G	I	W
G	I	R	G	A	M	J	K	A	N	I
L	P	O	T	F	T	N	L	R	G	N
S	T	J	R	J	S	O	B	Z	V	G

Unit-4 : Moving Things, People and Ideas

11. Motion and Measurement of Distances

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (a) Mass, **2.** (c) periodic, **3.** (a) linear, **4.** (c) rectilinear motion, **5.** (a) SI unit.

B. Fill in the blanks :

1. velocity, **2.** rotatory, **3.** repetitive motion **4.** length, mass, time; **5.** 9,460,000,000,000,000

C. State whether the following statements are true or false :

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

D. Write down SI units used for the following measurements :

1. m, **2.** mg, **3.** mm, **4.** km, **5.** kg.

E. Answer the following questions briefly :

1. Weighing machine is used to measure the weight of vegetables.

2. Two examples of rectilinear motion are motion of a cyclist on a straight plane road and the motion of a falling stone.

3. Velocity is defined as speed in any particular direction.

4. Three types of motion are :

(i) Translatory motion

(ii) Random motion

(iii) Circular motion

5. Ria's speed $= \frac{\text{Total distance travelled}}{\text{Time taken}} = \frac{240\text{ m}}{60\text{ s}} = 4\text{ m/s}$

6. SI units or the International System of Units which are used all over the world as standard measure.

F. Answer the following questions in detail :

1. The movement of an object along a straight line is called rectilinear motion or linear motion while the movement of an object along a curved path is called curvilinear motion.

2. Speed is the distance an object moves in a certain amount of time. The speed of an object can be measured by dividing the distance it has travelled by the time it took to travel that distance or Speed $= \frac{\text{Distance}}{\text{Time}}$.

3. The to and fro movement of an object about its mean position is called oscillatory motion while the to and fro movement of some part of a body about a mean position while other parts remain stationary is called vibratory motion.

4. We need to measure things so that we get an idea of the distance we need to travel, the speed at which to travel, the quantity of the things we need and the time we need to spend.

5. To measure the thickness of wire turns, we wrap it very closely around a pencil ten times. Divide the length so obtained by 10 to get the thickness of the wire.

For example, if length of 10 turns = 2.0 cm

then thickness of wire $= \frac{2}{3}$ cm, $= 0.2$ cm $= 2$ mm.

Unit 5 : How Things Work

12. Electricity and Circuits

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (d) All of these, **2.** (d) Water, **3.** (c) Glass, **4.** (b) nitrogen.

B. Fill in the blanks :

1. secondary,
2. Argon, nitrogen;
3. path, circuit;
4. made;
5. two.

C. State whether the following statements are true or false :

1. T, **2.** T, **3.** T, **4.** T, **5.** T.

D. Match the following :

Column A	Column B
1. Human body	(i) Alternating current
2. A.C.	(ii) Conductor
3. Argon	(iii) Insulator
4. Plastic	(iv) Direct Current
5. D.C.	(v) Light bulb

E. Answer the following questions briefly :

1. Electricity is a form of energy that powers electric trains, vacuum cleaners, radios, television sets, etc.

2. A continuous path consisting of conducting wires and other resistances, such as a bulb, between the terminals of a battery or cell, along with an electric current flow, is called a circuit.

3. Aluminium, copper and silver metals can be used to make a wire for current flow.

4. Switches are simple devices that open and close gaps in a circuit.

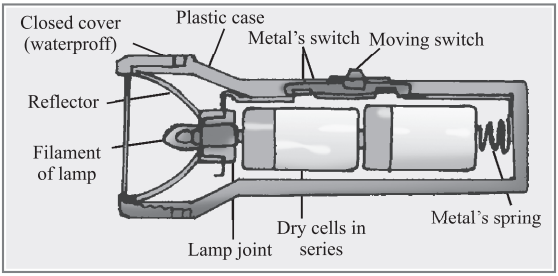
5. Fuse is an emergency switch. Inside each fuse is a thin strip of metal through which current flows. If the current becomes too high, the strip of metal melts and breaks the flow of electricity.

F. Answer the following questions in detail :

1. Opposition to the flow of electricity is called resistance. The unit of resistance in Ohm.

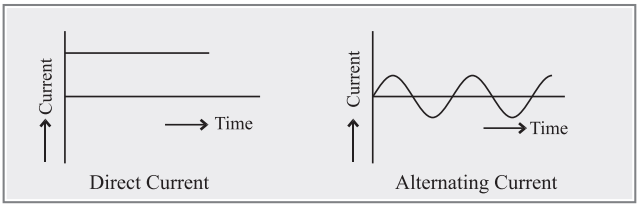
2. Dry cell consists mainly of two components :

(i) Negative terminal (ii) Positive terminal



Chemical action in a dry cell battery leaves the carbon rod positively charged and the zinc case negatively charged creating a difference in the electrical potential (voltage) which results in a flow of electricity. The arrows show the conventional direction of the current.

Working of the Dry Cell : When the carbon plate (+) and zinc container (–) are connected to an external circuit, a current flows from carbon to zinc on the circuit.



Graphical representation of DC and AC

3. The current in the dry cells and batteries is direct current or simply D.C. In direct current, a steady current flows in one direction.

The electric current which moves back and forth, reversing its direction regularly, is called alternating current or simply A.C.

4. Materials which allow an electric current to pass through them are called conductors, such as metals, acids, tap water, etc.

Materials which do not allow electric current to pass through them are called insulators, such as rubber, plastic, glass.

5. Light Bulb : The light bulb is made of a metal base which contains a glass support through which two pieces of metal wires pass. These wires are joined together at the top with a tiny spiral of tungsten wire, called the filament and at the bottom the two contacts which are connected to the electrical power source. The inner structure is covered with a thin, airtight glass dome which is filled with an inert gas like argon and nitrogen, which prevents the filament from burning up.

Electric bulb

Working : As electric current passes into the bulb, the tungsten filament glows white hot thus giving us the necessary artificial light. In case there is a sudden increase in the current allowed to flow into the bulb, the filament might break and the bulb might get fused.

Activity Time

I. Science Puzzle

Given below are a few jumbled words. Arrange them into meaningful words :

1. E L E C T R I C I T Y

2. C I R C U I T

3. C O N D U C T O R

4. I N S U L A T O R

13. Magnets

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (c) iron, **2.** (d) Wood, **3.** (c) the south pole.

B. Fill in the blanks :

1. natural, **2.** strongest, **3.** repel, **4.** navigation.

C. State whether the following statements are true or false :

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

D. Match the following :

Column A	Column B
1. Natural magnet	(i) rubber
2. Permanent magnet	(ii) iron
3. Magnetic material	(iii) lodestone
4. Non-magnetic material	(iv) alnico

E. Answer the following questions :

1. Lodestone is the world's first natural magnet.

2. In a magnet, like poles repel while unlike poles attract each other.

3. If a metal is magnetized, then its magnetism can be destroyed by demagnetization.

4. Alnico is a strong permanent magnet.

5. We can make a magnet with the help of electricity.

F. Answer the following questions in detail :

1. Materials that are attracted to a magnet are called magnetic materials. For example, Iron, nickel, cobalt, etc.

Other materials that are not attracted to a magnet are called non-magnetic materials.

For example, Plastic, rubber, glass.

2. When a paper-clip or a pin is attached to a magnet, it itself becomes a magnet. We can see this by arranging pins and paper-clip on a magnet. Each pin and a paper clip becomes a magnet and attract others. This type of magnetism is called induced magnetism.

3. Properties of a magnet are as follows :

(i) Attractive property and poles of magnet.

(ii) Directive property.

(iii) Like poles repel and unlike poles attract each other.

(iv) Magnetic poles always exist in opposite pairs.

4. (a) Permanent magnets are the ones that retain their magnetism for a long time. For example, steel.

Temporary magnets lose their magnetism as soon as the cause producing it is removed. **For example,** iron nail.

Activity Time

I. Write four different magnetic materials and four non-magnetic materials in the space given below :

S. No.	Magnetic materials	Non-magnetic materials
1.	Iron	Plastic
2.	Nickel	Rubber
3.	Cobalt	Glass
4.	Alnico	Silver

Unit-6 : Natural Phenomena

14. Rain, Thunder and Lightning

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (d) humidity, **2.** (b) vaporization, **3.** (d) water cycle,

4. (b) Thunderstorm.

B. Fill in the blanks :

1. evaporation, **2.** water, **3.** droplets, **4.** 0°C, **5.** blinding flash, thunderclaps.

C. State whether the following statements are true or false :

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

D. Match the following :

Column A	Column B
1. Liquid state	(i) Below 0°C
2. Solid state	(ii) Above 100°C
3. Gaseous state	(iii) Below 0°C and 100°C

E. Answer the following questions briefly :

1. The rain undergoes three processes : evaporation, condensation and precipitation.
2. When the heat of the sun causes water on the earth's surface to change into a gas, this process is called evaporation.
3. The process of changing of water vapour into liquid form is called condensation.
4. The process of changing of ice or solid state of water into liquid water upon heating is called melting in which the solid absorbs heat energy.

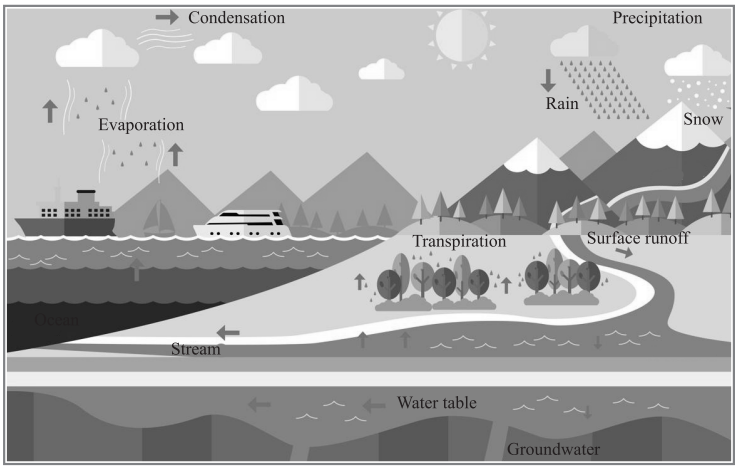
   The opposite change or the change of liquid water into a solid (ice) is called freezing. It occurs when a substance loses heat energy.
5. The process of circulation of water continually between the atmosphere and the surface of the earth is known as water cycle.

F. Answer the following questions in detail :

1. When the temperature stays below the melting point of the water that makes up the snow, the fallen snow slowly disappears. This process is called sublimation. For example, melting of dry ice.
2. Lightning is simply a large spark of electricity, a current flowing between a cloud and the surface of the earth, between clouds or within a cloud.
3. The falling of liquid water down to earth in the form of rain, snow, hail, steet etc., is called precipitation.

   The change of a substance from liquid to gas is called vaporization.
4. Everyday, the heat of the sun causes water on the earth's surface to change into gas. When water evaporates, it goes into air as water vapour.

   Air can hold only a certain amount of water vapour. As warm air, loaded with water vapour rises, it cools. Some of the water vapour changes back into liquid. Clouds are made up of billions of tiny light water droplets so they can float in the air. Sooner or later, this water falls to the earth as rain, sleet, hail or snow. Thus, the process of circulation of water continually between the atmosphere and the surface of the earth, is known as water cycle.



The water cycle is made up of the processes of evaporation, condensation and precipitation.

5. Lightning is caused by the build up of a negative electric charge at the bottom of the thundercloud. It means that the molecules there have extra electrons compared to the surface of the earth. As the charge builds up, a point is reached at which the air can no longer block the passage of electricity. Then there is an enormous flash of electric energy between the cloud and the surface of the earth. It is lightning.

Lightning

Thunderstorm is a storm caused by heavy rain or hail alongwith thunder and lightning. Thunderstorms develop from large clouds known as cumulonimbus clouds. These clouds form when there is a rapid upward rush of warm air from very hot areas on the ground and a rapid downward movement of cool air around the warm air.

Cumulonimbus cloud

As the air cools, its vapour condenses first into a white fluffy cloud and eventually cumulonimbus cloud. The water droplets turn to ice crystals which grow until they are big enough to fall. As they fall, they

melt into raindrops which are met by upward current of air. Only largest raindrops are heavy enough to force their way. As a result, the rain in thunderstorm always falls in large drops.

Activity Time

I. Science Puzzle

Here are some jumbled words for you. Arrange them into meaningful words :

1. E V A P O R A T I O N

2. L I G H T N I N G

3. T H U N D E R S T O R M

4. P R E C I P I T A T I O N

5. C L O U D

15. Light

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (b) the greatest in vacuum, **2.** (b) pin-hole camera, **3.** (d) inverted.

B. Fill in the blanks :

1. straight, **2.** 3,00,000, **3.** irregular, **4.** new moon day, **5.** full moon night.

C. State whether the following statements are true or false :

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

D. Match the following :

Column A	Column B
1. Transparent object	(ii) Glass
2. Natural source of light	(i) Sun
3. Translucent object	(v) Waxed paper
4. Artificial source of light	(iii) Candle
5. Opaque object	(iv) Wood

E. Answer the following questions briefly :

1. The sun and other objects that give off their own light are called luminous objects. For example, star, a torch.

2. Sometimes, light can pass through or be transmitted by the matter, it strikes. If the light is transmitted readily, the substance is said to be transparent. Object seen through transparent substances are very clear. For example, glass, water.

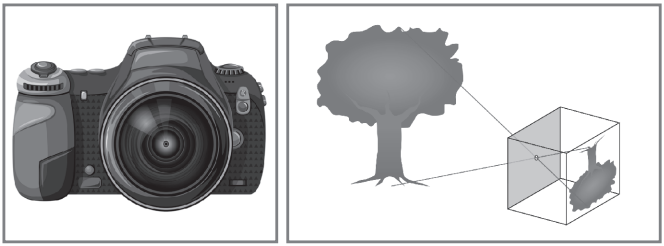
3. When light strikes a surface, whether smooth or rough, it can bounce back. This bouncing back of light is called reflection.

There are two types of reflection :

(i) In mirror there is little scattering of reflected light, the image formed is clearly defined. This type of reflection is called regular reflection.

(ii) When we look in a pool of water, our image is not clearly defined. This is called irregular reflection.

(iii)



Left; Rays or light are shown passing through the lens forming an image on the film at the back of the camera.

4. A pin-hole camera is based on rectilinear propagation of light. It has a tiny pin-hole to let the light through. The hole has to be small for a sharp image. It consists of a light-proof cardboard box.The face with the pin-hole in its center is covered with a black paper.

A greased or tracing paper is pasted on the opposite face of the box. It acts as a translucent screen.The object is placed infront of the hole of the pin-hole camera. Light travels in straight line and an inverted image of the object can be clearly seen on the tracing paper.

5. When the sun, the earth and the moon are in a straight line with the earth in between, the shadow of the earth falls on the moon and this is known as lunar eclipse.

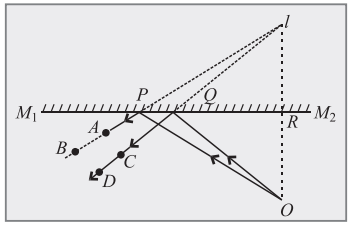
F. Answer the following questions :

1.

Certain objects can be heated until they glow, or give off light. Incandescent objects in our home produce light in this way. For example, inside a glass bulb, there is a thin wire filament made of the metal tungsten which can be heated to over 2000°C without melting.

An incandescent bulb produces light as electricity flows through the thin tungsten filament inside.

2. A mirror with a perfectly flat surface is called a plane mirror. Images formed by plane mirror appear to be behind the mirror.



Formation of image by a plane mirror

To understand the formation of an image, a plane mirror is placed perpendicular on a white paper. A pin is fixed infront of the paper.

The diagram shows only two rays marked as OP and OQ which enter the eye after reflection from the mirror. The reflected rays AB and CD appear to come from the point I behind the mirror I is called the image of the point O. The image appears to be inside the mirror, is called a virtual image. The image obtained on the screen, is called real image.

3. When an opaque subject is lighted, some areas, located behind the object don't receive light and form the shadow of the object. The length of the shadow formed by sunlight changes with time because the angle between the source (sun) the object and the ground, changes.

4. Differences between Images and Shadows :

S.No.	Images	Shadows
1.	An image is formed when the light is reflected from a mirror or any other shining object.	A shadow is formed when an object blocks light from striking some surface.
2.	The image is of the same size as the object.	The shadow changes according to the angle between the source of light, the object and the ground.
3.	The image is a erect but laterally inverted.	The shadow though erect, is not laterally inverted.
4.	The image gives all the details including colours of the object.	The shadow gives only a dark representation of the object.

G. Answer the following questions in detail :

1. Luminous objects can produce incandescent light, fluorescent light and neon light.

(i) Incandescent Light : Certain objects can be heated until they glow, or give off light. **For example,** inside a glass bulb, there is a thin wire filament made of the metal tungsten which can be heated to over 2000°C without melting.

An incandescent bulb produces light as electricity flows through the thin tungsten filament inside.

(ii) Fluorescent Light : Some lamps produce light when they are cool and hot. Instead of being used to build up heat, electrons are used to bombed molecules of a gas kept at a low pressure in a tub. Fluorescent light is a cool light that uses much less electricity than incandescent light.

This picture of a house is made by passing electricity through tubes filled with different gases under pressure. Neon gas produces red light. Mercury vapour produces greenish blue light.

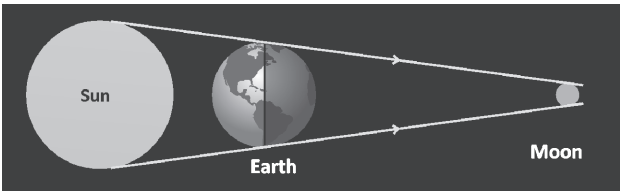
(iii) Neon Light : Neon lights produce light when electricity passes through tubes filled with neon gas under pressure.

2. Sometimes, light can pass through or be transmitted by the matter it strikes. If the light is transmitted readily, the substance is said to be transparent.

Substance that allow some light to pass through itself are said to be translucent.

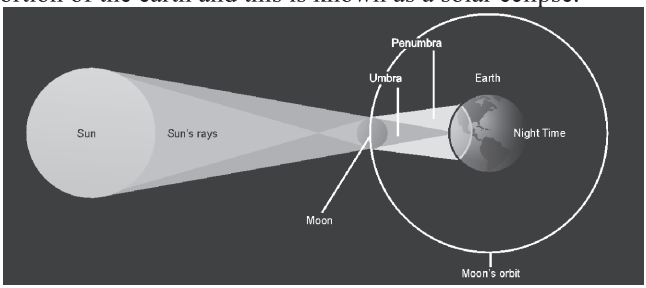
If we hold a block of wood or a piece of paper up to a light, all the light is blocked. The light, in this case, is not transmitted but absorbed. These substances are said to be opaque.

3. (a) Lunar Eclipse : When the sun, the eart and the moon are in a straight line with the earth in between the shadow of the earth falls on the moon and this is known as a lunar eclipse.



Lunar eclipse

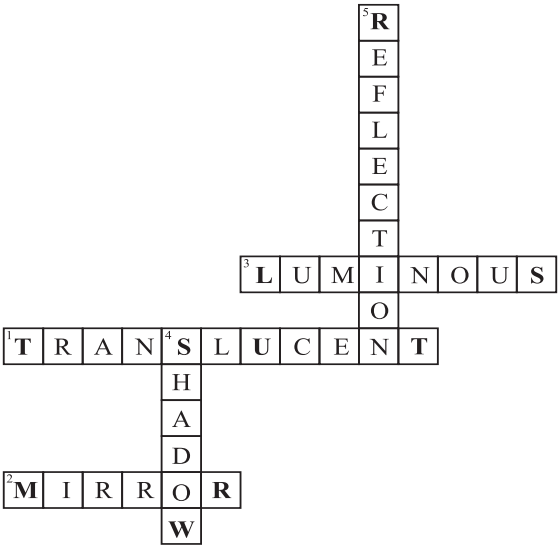
(b) Solar Eclipse : As the earth revolves around the sun, sometimes the sun, the moon and the earth come in a straight line with the moon in between. In this case the shadow of the moon falls. On a portion of the earth and this is known as a solar eclipse.



Solar eclipse

Activity Time

I. Science Puzzle



Unit-7 : Natural Resources

16. Water

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (b) 70%, **2.** (c) 2.5%, **3.** (a) Distilled water, **4.** (a) Rain, **5.** (a) dam.

B. Fill in the blanks :

1. rivers, streams; **2.** Floods; **3.** various; **4.** snow, floods; **5.** Purification.

C. State whether the following statements are true or false :

1. T, **2.** T, **3.** T, **4.** T, **5.** T.

D. Match the following :

Column A	Column B
1. Living natural resources	(i) Distilled water
2. Non-living natural resources	(ii) 37°C
3. Temperature of human body	(iii) Soil
4. Pure but tasteless water	(iv) Plants

E. Explain the following terms :

1. Our environment provides us with a variety of things necessary for our survival. These are called natural resources which include air, water, soil, minerals along with the climate and solar energy.

2. Photosynthesis is the process through which plants manufacture their own food. In this process, plants use water to manufacture carbohydrates which are essential for energy supply throughout the plant.

3. The water, which is suitable for human consumption without causing adverse health effects is called potable water.

4. Rainwater harvesting essentially means collecting rainwater on the roofs of buildings and storing it underground for later use.

5. A barrage is low-head diversion dam, consisting of a number of large gates which can be opened or closed to control the amount of water passing through.

F. Answer the following questions briefly :

1. Four uses of water are as follows :

(i) Water is most essential component of life and is vital for survival.

(ii) In agriculture.

(iii) In drinking and household needs.

(iv) In industry and commerce.

2. The purest form of water is rainwater.

3. 65% of our body is water.

4. We need about 8 litres of water daily.

5. Rainwater harvesting is the process by which we cllect rainwater for later use.

G. Answer the following questions in detail :

1. Following factors are responsible for availability of water on the earth :
   - **(i) Rivers and Streams :** These are a source of fresh water which often needs to be treated to be safe for drinking.
   - **(ii) Surface Water :** Surface water comprises water from rain and is found in large water bodies, *e.g.* rivers, lakes, oceans, seas.
   - **(iii) Ground Water :** Some rainwater seeps through the soil and gets collected above the layer of impervious rocks. This forms a large water body under the ground and is called groundwater.

     This water is safe for drinking.
2. Water is very important for animals. They need fresh water for their bodies to function. They gain water not only through the drinking but also from the food they eat. Water is essential for different functions of the body, such as regulation of temperature, nutrient uptake, removing wastes, body weight and health.
3. Rainwater harvesting is an effective measure to conserve water. It essentially means collecting rainwater on the roofs of buildings and storing it under ground for later use. This method not only arrests groundwater depletion but also raises the declining water table and can help augment water supply. This water can be used for laundry purpose and watering the plants.

   The importance of rainwater harvesting is as follows :
   - (i) Prevents groundwater from being depleted.
   - (ii) It is environment friendly.
   - (iii) It improves the quality of groundwater through dilution of fluoride, nitrates and salinity.
4. **Methods of Rainwater Harvesting**

   There are two ways of rainwater harvesting :
   - **(i) Surface Runoff Harvesting :** In urban area, rainwater flows away as surface runoff. This runoff water could be collected and used for recharging aquifers by adopting appropriate methods.
   - **(ii) Rooftop Rainwater Harvesting :** It is a system of collecting rainwater where it falls. In rooftop harvesting the roof becomes the catchment and the rainwater is collected from the roof of the house/building. It can either be stored in a tank or diverted to artificial recharge system.

Activity Time

J. Unjumble the words below to form a sentence that will help people understand why we should conserve water.

The water is a vital resource for the environment and the planet will not survive without it, so we must conserve water for future generations.

17. Air

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (b) air, **2.** (a) Oxygen, **3.** (c) *Hydrilla*, **4.** (d) lungs.

B. Fill in the blanks :

1. atmosphere, **2.** Nitrogen, **3.** oxygen, **4.** oxygen, **5.** Carbon dioxide.

C. State whether the following statements are true or false :

1. F, **2.** F, **3.** F, **4.** T.

D. Answer the following questions :

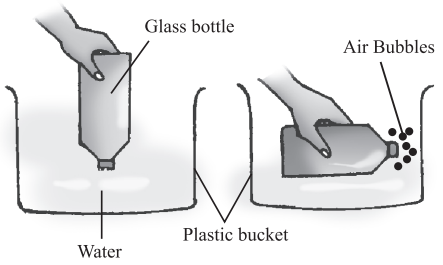
1. Air contains about 78% nitrogen, 21% oxygen and 0.3% carbon dioxide and traces of other gases.

(i) Nitrogen : This is the most abundant gas in air. It neither burns nor helps in burning, therefore it is called an inactive or inert gas. It is used in packaging foods like chips.

(ii) Oxygen : Most of the living beings require oxygen present in air for respiration. It also supports burning. An adequate supply of oxygen is necessary to burn fuels.

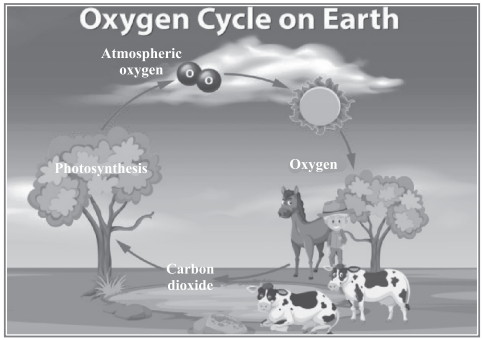
(iii) Carbon dioxide : Even though carbon dioxide constitutes only 0.03% of the air, it is an important gas. Plants require it to carry out the process of photosynthesis. It does not help in burning, hence it is used to put off or extinguish fire. It is dissolved in water to make soft drinks.

2.



Fill a plastic bucket half with water. Introduce an inverted glass bottle into the water. The water does not enter the bottle. It is so because the bottle is already filled with air. Now tilt the bottle slightly. Bubbles of

air escape from the mouth of the bottle through water. As the air escapes, water enters the bottle. This shows that air occupies space.

3. 

Oxygen cycle

Nothing can burn without oxygen. To show this first, light the candle and cover it with a glass jar. Rest the jar on plasticine so that water can get under the rim. Mark the level of water in the jar. As the candle burns, oxygen is used up and water rises to take its place. Soon the candle goes out as all the oxygen has gone.

4. During rainy season after a heavy rainfall, earthworms are seen in large numbers crawling on the ground because the rainwater enters their dwelling place and displace air from there. In absence of air, the earthworms feel suffocated and come out on the ground.

5. The air we breathe is a mixture of many gases. It is comprised of nitrogen (78%), oxygen (21%), argon (0.9%) and other gases, such as hydrogen, helium, neon and carbon dioxide in minute percentage.

Air is vital for us as well as plants and animals. We cannot survive without it. For plants, air helps in germination, seed dispersal and photosynthesis. All animals need air to grow and remain alive.

Activity Time

G. Science Puzzle

Given below are a few jumbled words. Arrange them into meaningful words :

1. O X Y G E N
2. N I T R O G E N
3. C A R B O N D I O X I D E
4. O Z O N E
5. U L T R A V I O L E T R A Y S

18. Waste Management

Assess Yourself

A. Choose the correct option : (*Multiple Choice Questions*)

1. (b) Paper, **2.** (a) Aluminium foils, **3.** (a) recycling.

B. Fill in the blanks :

1. waste, **2.** hazardous, **3.** composting, **4.** Reuse.

C. State whether the following statements are true or false :

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

D. Answer the following questions briefly :

1. Any material which is not needed by the producer or processor is waste.

2. Dead plants, animals and their products decompose and get mixed up in the soil. They degrade with the passage of time and do not accumulate in the environment. Such wastes are called biodegradable wastes. For example, Stale or leftover food, fruits, leaves, etc.

3. Those substances which do not decompose by natural process with the passage of time, are called non-biodegradable waste. For example, metal cans, empty tubes of toothpaste, plastic and polythene bags, etc.

4. One of the disadvantage of overflowing waste is air pollution which causes respiratory diseases and other adverse health effects.

5. Two advantages of recycling are as follows :

(i) It not only helps to get rid of wastes but also creates useful materials.

(ii) It is not only environment friendly but also energy saving.

E. Answer the following questions in detail :

1. The differences between biodegradable and non-biodegradable wastes are as follows :

Biodegradable Wastes	Non-biodegradable Wastes
Dead plants, animals and their products decompose and get mixed in soil. They degrade with the passage of time. For example, Vegetable peels, state or left over food, fruits, leaves.	These substance are not decompose by natural process. For example, metal cans, glass bottles, empty tubes of toothpaste.

2. Burying wastes oozes poison out of them to soil and water chemicals in them react to produce heat and fume. A number of dump fires have burnt underground for years.

3. In landfilling method, all garbage is packed into the smallest possible volume and the garbage is covered at least once in a day with a layer of soil. If built and used properly, sanitary landfills work well.
   But they cannot handle more than a portion of the solid waste our large country produces.
4. The method of converting biodegradable waste into a useful product is called composting. This is done by the microorganisms living in the soil.
   Compost is a valuable soil material.
   We can make use of vegetable wastes, vegetables and fruits peels, coffee and tea remains, etc. with the help of redworms-a kind of earthworm.

Activity Time

H. Science Puzzle

Rearrange the following words into meaningful words :

1. R E C Y C L I N G
2. B U R N I N G
3. R E U S E
4. W A S T E
5. C O M P O S T

Half-Yearly Model Test Paper

A. Choose the correct option : (*Multiple Choice Questions*)

1. (d) phototropism, **2.** (d) Gills, **3.** (c) Nylon, **4.** (c) natural change, **5.** (a) sodium chloride (salt).

B. Fill in the blanks :

1. Air, **2.** spines, **3.** quartz, **4.** dead, **5.** sublimation.

C. State whether the following statements are true or false :

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

D. Answer the following questions briefly :

1. The special characteristics that enable animals and plants to be successful in a particular environment is known as adaptation.
2. The measurement of the amount of mass in a given volume of an object is called its density.
3. We get egg from the birds like hen, duck, geese, etc.
4. Plantation agriculture is practiced for food purposes. The crops under plantation agriculture include tea, coffee, oranges, coconut, etc.

5. The process of settling of heavy solids at the bottom is called sedimentation.

E. Answer the following questions :

1. The process by which green plants make their own food in the presence of sunlight, is called photosynthesis.

2. The cotton plant requires plenty of water and sunshine for its proper growth.

3. We cannot digest roughage, so it adds bulk to the faeces. The main function of the roughage is to add bulk to the diet. It also helps in the proper working of digestion process and bowel system.

4.

Minerals	Sources	Importance
Calcium and phosphorus compounds	whole grain, cereals meat, milk, green leafy vegetables, table salts	strong bones and teeth, blood and other tissues

5. A pure substance has a own set of properties. These properties will be different for different substances while the impure substance is a mixture of two or more substances in any ratio which do not react with each other.

Annual Model Test Paper

A. Choose the correct option : (*Multiple Choice Questions*)

1. (c) Periodic **2.** (d) Wood, **3.** (b) Thunderstorm, **4.** (a) dam, **5.** (a) recycling.

B. Fill in the blanks :

1. path, circuit, **2.** droplets, **3.** irregular, **4.** oxygen, **5.** Reuse.

C. State whether the following statements are true or false :

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

D. Match the following :

Column A	Column B
1. Human body	(i) Alternating Current
2. A.C.	(ii) Conductor
3. Argon	(iii) Insulator
4. Plastic	(iv) Direct Current
5. D.C.	(v) Light Bulb

E. Answer the following questions briefly :

1. A continuous path consisting of conducting wires and other resistances, such as a bulb, between the terminals of a battery or cell, along with an electric current flow, is called a circuit.

2. A mirror with perfectly flat surface is called a plane mirror. Images formed by plane mirror appear to be behind the mirror.

3. There are two ways of rainwater harvesting :
   (i) Surface runoff harvesting
   (ii) Rooftop rainwater harvesting.
4. During rainy season, after a heavy rainfall, earthworms are seen in large numbers crawling on the ground because the rainwater enters their dwelling place and displace air from there. In absence of air, earthworm feel suffocated and come out on the ground.
5. The method of converting biodegradable waste into a useful product is called composting.

   We can make use of vegetable waste, peeling of vegetables and fruit with the help of redworms.

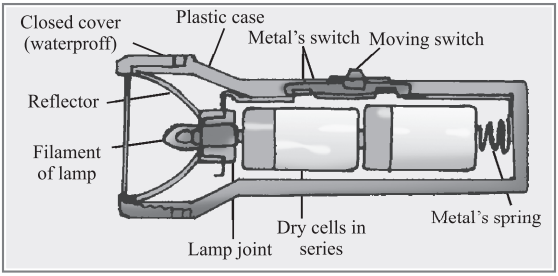
F. Answer the following questions :

1. The movement of an object along a straight line is called rectilinear motion or linear motion while the movement of an object along a curved path is called curvilinear motion.
2. When a paper-clip or a pin is attached to a magnet, it itself becomes a magnet. We can see this by arranging pins and paper-clip on a magnet. Each pin and a paper clip becomes a magnet and attract others. This type of magnetism is called induced magnetism.
3. A pin-hole camera is based on rectilinear propagation of light. It has a tiny pin-hole to let the light through. The hole has to be small for a sharp image. It consists of a light-proof cardboard box.The face with the pin-hole in its center is covered with a black paper.

   A greased or tracing paper is pasted on the opposite face of the box. It acts as a translucent screen.The object is placed infront of the hole of the pin-hole camera. Light travels in straight line and an inverted image of the object can be clearly seen on the tracing paper.
4. When an opaque subject is lighted, some areas, located behind the object don't receive light and form the shadow of the object. The length of the shadow formed by sunlight changes with time because the angle between the source (sun) the object and the ground, changes.
5. One of the disadvantage of overflowing waste is air pollution which causes respiratory diseases and other adverse health effects.

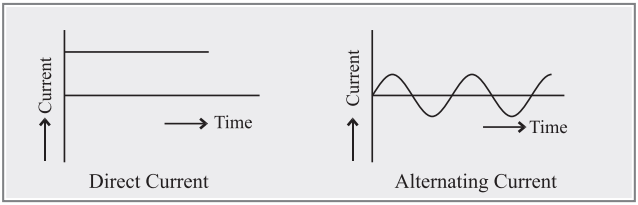
G. Answer the following questions in detail :

1. Opposition to the flow of electricity is called resistance. The unit of resistance in Ohm.
2. Dry cell consists mainly of two components :
   (i) Negative terminal
   (ii) Positive terminal



Chemical action in a dry cell battery leaves the carbon rod positively charged and the zinc case negatively charged creating a difference in the electrical potential (voltage) which results in a flow of electricity. The arrows show the conventional direction of the current.

Working of the Dry Cell : When the carbon plate (+) and zinc container (–) are connected to an external circuit, a current flows from carbon to zinc on the circuit.



Graphical representation of DC and AC

3. The current in the dry cells and batteries is direct current or simply D.C. In direct current, a steady current flows in one direction.

   The electric current which moves back and forth, reversing its direction regularly, is called alternating current or simply A.C.

4. Materials which allow an electric current to pass through them are called conductors, such as metals, acids, tap water, etc.

   Materials which do not allow electric current to pass through them are called insulators, such as rubber, plastic, glass.

5. **Light Bulb :** The light bulb is made of a metal base which contains a glass support through which two pieces of metal wires pass. These wires are joined together at the top with a tiny spiral of tungsten wire, called the filament and at the bottom the two contacts which are connected to the electrical power source. The inner structure is covered with a thin, airtight glass dome which is filled with an inert gas like argon and nitrogen, which prevents the filament from burning up.

Electric bulb

Working : As electric current passes into the bulb, the tungsten filament glows white hot

thus giving us the necessary artificial light. In case there is a sudden increase in the current allowed to flow into the bulb, the filament might break and the bulb might get fused.

H. Science Puzzle :