*Enhanced Edition
NEP 2020 Guidelines

FACTS of SCIENCE

Teacher Manual

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YBPL

Chapter - 1 — SOURCES OF FOOD

Page 6

Quiz Time

1. Chlorophyll 2. (d) To prepare food

Page 6

Quiz Time

1. Organisms that prepare their own food are called autotrophs. For example- plants. Organisms that depend on plant for food are called heterotrophs. For example- men.
2. Plants need chlorophyll to prepare food. Non-green plants do not have chlorophyll. So, they are considered to be consumers.

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Quiz Time

1. Milk 2. Proteins and Vitamins 3. Nectar

Exercises

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

B. 1. physical and mental 2. chlorophyll 3. stomata
4. physical and mental 5. stem 6. berries
7. milch 8. pisciculture

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

D. 1. T 2. T 3. F 4. T 5. T
6. T 7. T 8. F

E. 1. seeds 2. wheat 3. potato 4. meat
5. hen 6. zebra 7. elephant

F. 1. We should eat healthy food which includes natural food, fiber rich food, vitamin-rich food and protein rich food.
2. Yes, food provides energy to all living beings.
3. Sun is the only source of energy on the earth.
4. Sunlight, carbondioxide, water and minerals are required for photosynthesis.
5. Human beings and animals are two examples of heterotrophs.
6. Small plants are called herbs.
7. Milk giving animals are called milch animals. Examples- cows and buffaloes.
8. Birds are waived in poultry farms.
9. The duration between sowing and ripening of cereals is four months.

G. 1. All living organisms need food because
- food provides energy
- It protects us from diseases
- It helps our body to grow
- It replaces our worn-out tissues.

2. Food contains proteins that are needed to replace and repair worn-out tissues.
3. Green plants are the only source of food so they are called producers.
4. Rhizobium is nitrogen fixing bacteria. It fixes up atmospheric nitrogen and synthesis food.
5. Tea and coffee are the two main beverages. Tea is obtained from the leaves of tea plant and coffee is obtained from its seeds called coffee beans.
6. Food products prepared from milk are called dairy products. For example- cheese, curd etc.

7. To seperate good eggs from spoiled ones. Take a container filled with hot water. Put the eggs into the container. The eggs that will float are the spoiled ones and the eggs that will settle down are good eggs.
8. Two eatable fish found in freshwater are Rohu and Oori.
Two eatable fish found in seawater are Cod, Eel.

H. 1. The important functions of food are:
(i) It provides energy- Food provides energy to all living beings to carry on different life processes and other activities. We obtain this energy form food.
(ii) It protects us from diseases- Food contains the required nutrients such as vitamins and minerals that protect our body from various diseases and infection.
(iii) It helps our body to grow- Food helps our body to grow. It contains various substances needed for physical and mental development.
(iv) It replaces our worn-out tissues- Food also contains proteins that are needed to replace and repair worn-out tissues.

2. The process by which plants prepare their own food with the help of sunlight is called photosynthesis. During the process of photosynthesis plants convert solar energy into chemical energy and also release oxygen. They also use the energy to carry on their life process and store the rest amount of energy in the form of food in leaves, roots, stems, seeds and fruits. We eat these parts of the plants to get energy and other nutrients.

3.

Plant	**Consumable part**
Carrot	Root
Cauliflower	Flower
Spinach	Leaves
Apple	Fruits
Mustard	Seeds
Onion	Stem

4. We get oil from seeds of some plants like mustard, groundnut etc. Oils are used to cook raw materials. They are rich source of fat and minerals.
5. Milk is considered as nutritious food as it contains all the essential nutrients. Animals that give us milk are cow, buffalo, sheep, goat and camel.
6. Honey is produced by honeybees. Honeybees collect nectar from flowers and store it in their hives. The nectar collected in hives is obtained by man, which is called honey. Purity of honey can be checked by putting a spoon of honey in water, if it dissolves in it, it is fake. Pure honey will not dissolve in water, it will settle at the bottom of the container.
7. The rearing of fish on a large scale is called pisciculture.
The rearing of honeybees for commercial purpose is called apiculture.

Scientific Thinker

If one organism disappears from a food chain then number of organisms in the previous level will increase because there won't be anyone to consume them.

Hots

A. Plants make their own food with the process called photosynthesis. They are the producers of food. Human beings and animals directly or indirectly depend on plants. Hence they are the ultimate source of food on the earth.

B. 1. Organism A can eat plants or animals. So it is an omnivore. An example of omnivore is bear.
2. B is herbivore. An example of herbivore is cow.
3. C is a carnivore. An example of carnivore is lion.
4. D is a plant. Example- mango plant.
5. The process E is photosynthesis. It is the process by which plants prepare thier own food.

C. Spicy food can cause diarrhea, stomach-pain and vomiting due to overstimulation of the nervous system.

D. M is honey
Honeybees make honey.
N is milk
Cow, buffalloes and camel provide us milk.

Value based Questions

Do it yourself.

Chapter-2 — Food habits and Skills of Handling food

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Quiz Time

1. Goat, elephant
2. Frog, wolf
3. Beans, Jackals

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Quiz Time

1. (a) Duck meat curry (b) Thukpa (c) Dhokla (d) Idli sambhar
2. (a) Wheat (b) Rice (c) Rice (d) Jowar, Bajra, Wheat

Exercises

A. 1. (d) All of these 2. (c) Horse 3. (b) Saprophytes
4. (c) Tapeworm 5. (d) West Bengal 4. (b) Wheat

B. 1. Herbivores 2. Grinding 3. Herbivores 4. Omnivores
5. Omnivores 6. Scavengers 7. Parasites 8. South Indians

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

D. 1. (e) 2. (f) 3. (b)
4. (a) 5. (c) 6. (d)

E. 1. Carnivores have long, sharp teeth.
2. Organisms that eat both plants and animals are called omnivores. For example- Bear and Jackal.
3. Haryana is the largest producer of wheat and pulses.
4. The common food for people of west bengal is rice and fish.
5. Jawar, Bajra and wheat are the main crops of Maharashtra.
6. Oily and spicy food is tasty but harmful. They lead to obesity.
7. Pregnant women, young children, the elderly and people will suppressed immune system are at more risk from food poisoning.
8. Different ways of cooking food are- Heating, Boiling, frying, cooking, roasting, steaming and baking.

F. 1. No, different living things eat different kind of food. For example- cow eats grass and human being eat plant product and meat.

2.

Herbivores	Carnivores
• Organisms that eat plants and their products.	Organisms that eat flesh of other animals.
• Their teeth do a lot of grinding.	Their teeth do a lot of cutting.
• For example- cows, buffaloes	For example- lion, tiger.

3. Small organisms which derive food from the body of other organisms are called parasites. They live on or inside another organisms. For example- roundworm and tapeworm.
4. A sanguivore lives by ingesting fresh blood.
A frugivore is an organism that feeds on raw fruits.

5. Rice and wheat are the main crops of Eastern India. So, they are eaten the most.
6. We can consume food by-
   - keeping food items covered
   - keeping cereals and pulses in clean containers.
7. Improper cooking can destroy important nutrients. Vitamin-C gets destroyed due to overcooking.

G.
1. Based on their feeding habits, animals can be classified into different groups. These are
   (a) Herbivores- Organism that eat plants and plant product. Example- cow, buffaloes.
   (b) Carnivores- Organisms that feed on flesh of other organisms. Example- lion, tiger.
   (c) Omnivores- Organisms that feed on both plants and flesh of other animals are called omnivores. For emample- bear and jackals.
   (d) Saprophytes- Organisms that derive nutrition by feeding on dead and decaying organic matter. For example- Bacteria, mushroom.
   (e) Scavengers- Organisms that eat the flesh of dead animals. Example- Eagle, vulture.
   (f) Parasites- Organisms that derive food from the body of other organisms. Example- Roundworm, tapeworm.
2. Scavengers are the organisms that eat the flesh of dead bodies. They keep the enviornment clean by eating them otherwise Earth would become a big store of dead bodies.
3. Saprophytes feed on dead and decaying organic matter whereas parasites feed on living organisms. Parasites live on or inside the body of other organisms whereas saprophytes do not.
4. The northern region of India has fertile land. People grow variety of crops here. Wheat and rice are the main crops. People in Punjab and Haryana eat wheat and pulses.
5. People in different part of India eat different kind of food because their food habit depend on the availability of food, personal likes and dislikes and the production of food in that area. People living near the coastal areas eat fish whereas people living in plains eat meat.
6. Skills of handing the food are-
   – Care must be taken to keep food items covered are well protected from rodents. birds and insects.
   – Cereals and pulses should be stored in clean containers.
   – We should take as much as food as we can finish.
   – We should avoid over-eating.
   – We should not eat oily and spicy food in excess.
7. To preserve the nutritive value of food.
   We should take following measures.
   – Food should be cooked on low flame.
   – Diet must contain raw/fresh fruits and half-cooked vegetables.
   – Creals and pulses should be cooked in pressure cooker.
   – Avoid overcooking because it destroys important nutrients.
   – Vegetables should be washed properly before cutting or peeling.

Enrichment Learning

A. Omnivores Sanguivores Carnivores

B. Do it yourself

C. Do it yourself

Hots

Flat, broad teeth are used for grinding so animal x is a herbivore while animal y is a carnivore because sharp, pointed teeth are used for cutting.

Value Based Question

Do it yourself

Chapter-3 — Component of food

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Quiz Time

1. A nutrient is an organic or inorganic substance required for the survival of a living being.
2. Too much of fat deposition leads to obesity.

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Quiz Time

1. Milk and fish
2. Water- soluble vitamins – vitamin B complex, Vitamin C.
   Fat- soluble vitamins – vitamin A and vitamin D.
3. The term vitamins was coined by Polish born biochemist Casimir Funk in 1912. He is known as the father of Vitamin Theraphy.

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Quiz Time

1. About two-third of the body weight is water.
2. ORS is oral rehydration solution. It can be prepared by dissolving salt and sugar in water.
3. A diet which contains an adequate quantity of nutrients is called balanced diet.

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Quiz Time

1. Marasmus affects children under 5 years of age.
2. Deficiency of vitamin K causes Hemorrhage.

Exercise

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

B. 1. Nutrition 2. Corn or maize 3. Starch
4. Children and teenagers 5. Protein calorie Malnutrition 6. Skin disease
7. Night blindness 8. Minerals 9. Calcium

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

D. 1. The study of composition of food materials and the quantity of food material required by our body for growth, maintenance and survival is called nutrition.
2. Types of nutrients are–
   1. Carbohydrates 2. Proteins 3. Minerals
   4. Fats 5. Vitamins 6. Water
3. A growing child, a nursing mother or a sportsman need more corbohydrates.
4. The body stores fat to fulfil further requirement of energy. So, fats are called energy bank in our body.
5. Fruits and vegetable contain roughage.
6. Two-third of our body weight is water.
7. Diseases caused due to deficiency of nutrients are deficiency diseases.

E. 1. The diet containing all the essential nutrient in right proportion for the healthy functioning of body is called a balanced diet. We should take it to protect ourselves from deficiency diseases and keep ourselves healthy.
2. Important sources of fats are-

(i) Animal sources- milk, ghee
(ii) Plant sources- vegetables, nuts

3. The term which is used to indicate disease caused due to deficiency of vitaminosis is known as hypovitaminosis.
   The term used to indicate diseases caused due to excess of vitamins is called hypervitaminosis.
4. Source of-
   Vitamin C – Amla, lemon, orange Vitamin D – Milk, fish, cod-liver oil
   Vitamin K – Cabbage, tomatoes, egg-yolk
5. Disease caused due to deficiency of vitamin A is night blindness. It can be prevented by eating food rich in vitamin A such as green-leafy vegetables. D is Rickets. It can be prevented by taking food-rich in vitamin D such as milk, fish.
6. Some of the important minerals and thin sources are-
   Iron – flour, meat Calcium – milk, eggs, pulses
   Iodine – Iodised salt, fish, sea food Sodium – salt, cheeze
   Potassium – eggs, milk, cheese Magnesium – green vegetables, cheese
7. Roughage helps in-
   (i) retaining water in the body
   (ii) reducing excess of acidity
   (iii) proper massaging of gums
   (iv) preventing constipation

F 1. Nutrients are the elements of food that help our body in maintaining life process. Nutrients are also called the components of food. Some important types of nutrients are-
   Carbohydrates, Fats, Vitamins, Water, Minerals and Proteins.
2. (a) To test the presence of starch in food, take a small quantity of boiled rice. Put it into a place and crush it with a spoon. Now, add one drop of iodine solution to it. The colour changes into deep blue which shows that rice contains starch.
   (b) To test the presence of fat, take a small quantity of crushed food, put it on a piece of white paper and rub it. If the piece of paper turns translucent or oily, it means the food contains fat.
   (c) To test the presence of protein, add a few drops of concentrated nitric acid to crushed food. If the food sample turns yellow, it means the food sample contains protein.
   (c) To test the presence of sugar, take a quantity of food item in a beaker, crush it with a spoon. Pour one litre of water to the beaker. Add 2-3 drops of benedict's solution, heat it for 5-10 minutes of red precipitate is obtained, it means the sample of food contains sugar.
3. Carbohydrates are the large group of organic compounds made up of carbon, hydrogen and oxygen. Glucose, sugar and starch are examples of carbohydrates. It is the main-source of energy in our body.
   Carbohydrates are found in three forms-
   Sugar, starch and cellulose.
   – Sugar is the simplest form of carbohydrates. The main sources are glucose, sugarcane, honey.
   – Starch is a complex form of carbohydrates. Important sources are rice, wheat and maize.
   – Cellulose is also a complex form of carbohydrates. It is obtained from roughage.
4. Vitamins are important nutrients as they help the body to release energy from carbohydrates, fats and proteins. They help in eyes, bones, teeth and gum healthy. They protect us against diseases. Vitamins are called protective food.
   They can be categorised on the basis of solubility:
   Water soluble- Vitamin B complex and Vitamin C are water soluble.
   Fat soluble- Vitamin A, D, E and K are fat soluble.
5. Water helps our body in many ways-
   – It works as a means of transport for the nutrients.

– It mantains body temperature. – It mantains all size.
– It detoxifies the body.
– It also helps in absorption of food.

6. Kwashiorkor is a deficiency disease caused due to lack of protein and energy in the body. This disease is caused in children especially from famine- struck areas and places with poor food supply.
Symptoms of kwashiorkor
– The children become irritable – lease of growth
– lose of weight – bevated bully and thin legs
– discoloured hair and skin – mental retardation
Marasmus is cause due to low supply of protein or less nutritive food to infants. Specially infants who do not feed on thier mother's milk become the victim of this deficiency disease.
Symptoms of Marasmus
– Ribs become more prominent – wrinkled skin
– sunken eye – thin and weak limbs
– mental retaradation – low body weight
– growth is completely stopped.

7.

Minerals	Dificiency Diseases	Preventions
Calcium	Brittle bones, excessive bleeding stunted growth	Patient should take spinach, cabbage, meat, eggs etc.
Phosphorus	Bad bones and teeth	Patient should take cereals, pulses, nuts, egg yolk
Potassium	Muscle weekness	Patient should take eggs, milk, cheese and potatoes.
Iron	Anamia	Patients should take green leafy vegetables, flours, apple, eggs.
Iodine	Goitre	Patient should take iodised salt fish and seafood.

Scientific thinker

Do it yourself

Enrichment learning

A. ***a.*** r w ***b.*** p x ***c.*** s z *d.* q y

B. Do it youself

C. Do it yourself

Hots

A. In the polar region, green plants do not grow so explorers won't find any vegetation there. So, they must carry green leafy vegetables and fruits juices with them.

B. He is suffering from goitre. It is cause due to deficiency of iodine.

C. 1. fish 2. Protein 3. Vitamin D
4. Iodine 5. Iodised salt

Value Based Question

A. Marasmus

B. Do it yourself

Chapter-4 — SEPERATION OF SUBSTANCES

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Quiz Time

1. Pikle and jam are mixure made of different components.
2. Combine harvester is a machine that completes the stages of reaping, threshing and winnowing in a go.
3. Muddy water becomes clear by filtration method.

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Quiz Time

1. Crystals of alum and sugar are obtained in pure form after crystalliasation.
2. The process by which milk is agitated to seperate cream from milk is called churning.

Exercise

A. 1. d 2. d 3 a 4. b 5. c
6. a 7. a 8. b

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

C. 1. mixtures 2. filtration 3. sedimentation 4. separating funnel
5. alum 6. crystallisation 7. sublimation 8. homogeneous

D. 1. thresher 2. distillation 3. supernatant 4. evaporation
5. sublimation 6. solubility

E. 1. Air is a mixture of different gases.
2. Thresher is a machine used to complete the stages of reaping, threshing and winnowing in a go.
3. Evaporation.
4. Alum is used to increase the rate of sedimentation.
5. A centrifuge is used to separate blood cells from plasma cells.
6. Separating funnel is used to separate oil from water.
7. Solid carbon dioxide is called dry ice.
   It is used as a jake fog.
8. Solution of sugar in water is homogenous because sugar dissolves completely in water.

F. 1. Separation of substances is done to obtain useful things such as butter by churning milk and separating cotton fibres from its seeds. Sometimes we also need to remove unwanted things such as tea leaves from tea.
2. Threshing can be done in three ways-
   – one is the manual way in which laboures beat the stalk on the ground to get the grains out of the stalks.
   – The second way is to get the stalk crushed by the feet of the animals.
   – The third way is by using thresher. This is the most effective way.
3. Stalk are crushed by the feet of the animals. Animals are made of trample the stalks with their feet and separate the grains from the stalk.
4. Combine harvester is a thresher machine. It is designed to efficiently harvest a variety of grain crops. It follows reaping, threshing and winnowing into a single process.
5. Tea leaves are separated from the by using stainer.
   A sieve is used to separate undesirable substances such as wheat bran from flour.
6. Seiving removes unwanted seeds and soil particles from grains. The smaller components pass

through the pores of the seive whereas the larger components are left behind in it. In this way, impurities are removed from the grains.

7. Separation of objects that attract towards magnet using magnets is called magnetic separation. For example- separation of iron objects collected from garbage by using powerful magnet in the scrapyard. The non-magnetic components are left behind.
8. Alum increased the rate of sedimentation.
9. Fish in shallow ponds die during summer because the water in the ponds gets warm due to heat. As a result, the amount of dissolved oxygen in water decreases and the fish in that pond die.

G. 1. The process of seperating grains from husk is called winnowing. In this method, a property of density is used. Heavy things fall straight on the ground and the things which are lighter in weight fly off with direction of wind. Farmers stand at a higher and throw the mixture of grains and husk from a height in the direction of the wind. The grains being heavy drop vertically and forms a heap. The husk being light in weigtht is carried away by the wind at a distance.
2. Insoluble substance which are heavier than water, settle down at the bottom of the container. This process is called sedimentation. The clear liquid is gently poured off into another container without disturbing the sediments. This process is called decantation.
3. The process used for separating suspended impurities from a liquid by passing the mixture through a filtering device is called filteration.
   In this process, filters are the medium of separtion. The thickness of the holes by the filters depends upon the thickness of the solid matter to be filtered.
   The method of filtration is also used to get pure drinking water in our homes and in water porcessing and cleaning centres.
4. Certrifugation method is used to separte cream from milk. Centrifuge is also used to separate blood cells from plasms cells.
5. A solution is homogeneous mixture of two or move substance dissolved in another substance. There are two types of solution-
   (i) Saturated solution- A solution is said to be saturted when a solvent can dissolve no more of a solute at a particular temperature.
   (ii) Unsaturated solution- A solution is said to be unsatured when it is a capable of dissolving more of solute than than it already contains at the same temperature.
6. The substance which is present in smaller amount is called solute and the substance present in larger amount is called solvent.
   The mixture of solute and solvent is solution.
   Water is solvent and lemon is solute in a lemonade.
7. Solubility of a solid solute increase with rise in temperature.
   Solubility of gases in water decreases with rise in temperature.
8. Same as F9.

Scientific thinker

Do it yourself

Enrichment learning

Do it yourself

Hots

A. We should add ice after dissolving sugar. Because when temperature is high, solubility of solid solute (sugar) increases.

B. 1. Clay 2. Alum 3. Lodding 4. Decantation

Value Based Question

1. Mothballs evaporate and convert into gaseous form directly.
2. Sublimation.
3. Do it yourself.

Chapter-5 — FIBRE TO FABRIC

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Quiz Time

1. Cotton, jute, flax.
2. Climate : Cool
   Temperature : 16° C to 18° C in summer
   Rainfall : 510 mm to 760 mm
   Soil : clayey or loamy soil

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1. Polymerization
2. Rayon

Exercise

A. 1. (a) 2000 2. (b) fibres 3. (a) warm
4. (b) stems 5. (d) warm and humid 6. (c) wool
7. (d) absorbs water

B. 1. Skins and furs 2. James Hargreaves 3. Artificial
4. linen 5. sericulture 6. Dupont

C. 1. c 2. d 3. f
4. b 5. a 6. e

D. 1. Spinning 3. Flax 4. Cotton
4. Jute fibres 5. Jute 6. Weaving

E. 1. Silk 3. Gold 3. Sheep
4. Cotton 5. Kurta 6. Mink

F. 1. Fibre that are obtained from plants or animals are called natural fibres.
2. Plants fibres are composed of cellulose.
3. Black soil suits to cotton plants.
4. Jute is known as the golden fibre.
5. Cool climate is required for flax plants.
6. Hemp is grown in hot and dry condition.
7. Mink is obtained from the fur of rabbit.
8. Polyester is a synthetic fibre.

G 1. Clothes are used in each and every household. Apart from covering the body clothes are used for various purposes in homes. For example- towels, dusters, mats etc. Clothes play an important role whether it is the beauty of a person or decoration of a house.

2. Cotton is obtained from the hair surrounding the seeds of the plant of gossypium family.
First, cotton is collected and separated from the seeds in ginning factories. It is then packed into big bales and sent to textile mills where it is cleaned and spun into yarns. Finally, yarn is woven into cloth.

3. Geographical conditions required for jute plants are-

Climate : hot and humid
Temperature : Above 30ºC
Rainfall : Heavy
Soil : It grows well where annual floods renew the fertility of the soil.

4. To obtain silk from silkworms. Cocoons are put into hot water to remove the gunny coating and the fibres are thin reeled. The fibres obtained from silkworms are twisted together to make stronger thread. The thread is woven in beautiful textiles in mills.
5. Wool is first removed from sheep using hair clippers. After this, the wool is cleaned and the combed by a machine, separated and soun into fibre. This fibre is woven and knitted to make woollen clothes.
6. Nylon is made by condensation polymerisation of small organic molecules. The material to made is melted and spun into yarn. Nylon fibres are strong and elastic. They have excellent roughness. Nylon is also very lightweight.

H. 1. Early man did not know how to make clothes. He remained naked for long time. After the discovery of agriculture, he started using animal skin and furs to cover their bodies. Later, the technique of weaving was discovered by the Roman. The process of weaving consisted of interlacing one set of threads of yarn with another. The threads are stritched lengthwise in the weaving looms. The cross threads are woven into the warn to make a cloth. Later spinning and weaving machines were introduced.

2. Plant fibres are composed of cellulose in combination with other components such as legnin. Plant fibres are classified according to their source in plants.
   - Bast or stem fibres- derived from the fibrous bundles in the inner bark of plant stems.
   - Leaf fibres, which run lengthwise through the leaves of monocotyledonous plants.
   - Seed-hair fibres such as cotton.
3. The properties of wool are-
   - It is composed of amino acids.
   - It has excellent absorbency.
   - Its moisture regain is high.
   - They tend to be warmer than others.
   - They have poor resistance to alkalis but good resistance to acids.
   - They have good elasticity and resiliency.
4.

Animal fibres	Plant Fibres
Animal fibres are extracted from animals.	Plant fibres are extracted from plants.
They are made up of proteins.	They are made up of cellulose.
They have less strength.	They are stronger than animal fibres.
They do not undergo the process of harvesting for extracting the fibre.	They need to be harvested.
Examples - silk, mink	Example - cotton, jute.

5. a. Coir
   Source: Obtained from coconut covering.
   Uses: It is used for filling sofa seats, making from mattresses, rough carpet etc.
   b. Silk
   Source: Obtained from silkworm.
   Uses: It is used to make clothes such as sarees.
   c. Rayon
   Source: It is made from regenerated and purified cellulose.
   Uses: It is used for making textiles, tyre cord, carpet and surgical dressings.
   d. Polyster

Source: It is derived from coal, air, water and petroleum.
Uses: It is used for making air filters, ropes, films, fishing nets, bottles etc.

e. Nylon
Source: It is produced after synthesising polyamide synthetic fibres.
Uses: It is used in clothing, fish nets, air bags, tarpaulins, tents etc.

6. Cotton is soft and allows air to pass through it. This is not so in synthetic clothes such as nylon and rayon. Cotton clothes can absorb sweat but synthetic fibres cannot. Synthetic fibres catch fire easily and shrink when in contact with flame but cotton does not.

Enrichment Learning

A. Do it yourself
B. Do it yourself
C. Do it yourself
D. 1. Ginning 2. Coir 3. Twisting 4. Nylon 5. Yarn
6. Cotton 7. Jute 8. Fibre 9. Silk 10. Wool

Hots

A. Do it yourself.
B. Wool does not allow heat to pass through our body. It is a poor conductor of heat. It traps air to keep us warm.
C. Cotton and wool are naturally available fibres. So, they do not require spinneret. Spinneret is used to obtain long threads of nylon.
D. 1. Cotton 2. Ginning 3. Coir 4. Coconut 5. Coconut fiber
E. 1. Y 2. X

F. Value Based Question

Do it yourself

Chapter-6 — SORTING MATERIALS INTO GROUPS

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1. Red 2. Silver

Exercise

A. 1. d 2. c 3. b
4. d 5. c 6 a
B. 1. Colour, size and shape 2. Time, energy 3. Liquids, gases
4. Weight 5. Air 6. Dissolve
C. 1. Sand 2. Copper sulphate 3. Boat 4. Baby
D. 1. Classification 2. Lustrous 3. Opaque 4. transparent 5. Mass
E. 1. F 2. F 3. T 4. F 5. T
F. 1. Silver reflects almost 90% of the light falling on it.
2. Aluminium, Gold
3. Wood, plastic
4. yes
5. Yes
6. Yes, grouping a useful. It saves our time and energy.

7. Anything that occupies space and has weight is known as matter.
8. Coffee, tea, softwater.

G. 1. Do it yourself.
2. Things are grouped into various classes in view of their similarities and dissimilarities. Materials are sorted into groups based on their properties. It is done to save our time and energy.
3. We see many things around us everyday. We can group things of the world in terms of life as living and non-living. Each of the group can further be classified into sub groups. Example- human beings are living and a chair is a non-living thing.
4. Materials are classified as natural materials and man made material.
Natural materials are those material which you find in the nature. Example-wood, stone, clay etc.
Man-made materials are those materials which are made by man. They include grass, plastics, steel, paper etc.
5. Soluble Materials- Materials which dissolve completely in water. Example- salt, sugar and alcohol.
Insoluble substances- Substances that do not dissolve in water. Example- sand, sawdust, oil etc.
6. The property of material that allows light to pass through it, is called transparency. Eaxmple- A glass window.

H. 1. Classification means sorting and grouping of things in view of their similarities and dis-similirities.
On the basis of similarities, classification is as follows-
Colour- An object having the same colour is classified into one cluster. For example- red colour depicting danger.
Texture- Every object possess a different kind of texture. For example- The surface of the material like sand-paper and wood texture.
Shape- An object of the shape is classified into one group. For example- a tall and a globe have similar shape.
Lusture- Some objects are shiny like gold and silver while others are not shiny like a chair and a table.
2. Classification of things is useful because-
   - The utility of things can be understood in a better way.
   - The things that are not useful can be discarded and new things can be added.
   - It saves a lot of time and energy.
   - It saves us from confusion.
   - Classified things can be sub-classified also for further convenience.
3. Materials are the matter of substance of which objects are made from. Materials occupy space, have weight and have concrete bodies.
The properties of materials are as follows-
   - Materials look different from one another.
   - Materials can be soluble or insoluble.
   - Materials can be soft or hard.
   - Materials can be transparent, opaque or translucent.
   - Materials can float or sink.
4. Yes, materials occupy space.
Proof: Take a cup and fill it up with sugar upto the brim. If we add more sugar, it will drop outside around the cup which shows sugar has occupied entire space inside the cup.
5. Yes, materials have bodies and mass. We can weight a hard substance on a balance. We can weigh liquid in a measuring cylinder. We can weigh gases also. All solids have bodies that can be touched. We can also touch liquids. We can also feel gases.
6. Sugar, salt and washing powder dissolve in water completely so they are soluble. Chalk powder, iodine and sand do not dissolve in water completely, so they are insoluble.

Scientific thinker

Density = Mass/Volume

1. Density of A = $8/2 = 4\ g/cm^3$
2. Density of B = $0.5\ g/cm^3$
3. Density of C = $3\ g/cm^3$

Hence statement 2 is correct.

B. Do it yourself

C. 4. the density of the cookie packs.

Enrichment learning

A. Do it yourself

B. 1. Thermocoal 2. Solids 3. Insoluble 4. Hardness
5. Tactile 6. Cotton 7. Opaque 8. Lusturous

Hots

A. 1. A- oxygen B- Carbon dioxide C- Nitrogen
2. D is fish

B. 1. Ground glass - It is translucent.
2. Clear glass - It is transparent.
3. Wood - It is opaque.

C. Gold and silver are used to make jwellery because of their appearance. They are shiny.

D. Water has greater density than ice as water freezes and expands. Also water has less volume than ice.

Value Based Question

A. Do it yourself

B. 1. Sugar dissolved completely in water so it disappeared.
2. Do it yourself

Chapter-7 — MATTER: NATURE AND PROPERTIES

Page 71

Quiz Time

1. There are three forms of matter. Solid, liquid and gas.
2. State of matter can be transformed if there is a change in temperature, pressure or phase.

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1. Petrol, LPG
2. Gold
3. Wooden or plastic
4. Magnetic substance - Iron Non-magnetic - ball

Exercise

A. 1. a 2. a 3. d 4. b 5. c
6. b 7. c 8. b 9. b 10. c

B. 1. particles 2. shape and volume 3. shape

4. liquid 5. vapour 6. composed of parmanu
7. miscible 8. immiscible

C. 1. e 2. d 3. b 4. a 5. c

D. 1. oil 2. wood 3. lime juice 4. acrylics sheet

E. 1. miscible 2. ductility 3. volatile
4. gases 5. conductors

F. 1. Anything that occupies space and has mass is called matter.
There are three forms of matter.
(i) Solid (ii) liquid (iii) gas

2.

Solid	Liquid	Gas
The molecules are very tightly packed	The molecules are loosely packed.	The molecules are very loosely packed.
Solids cannot flow	Liquid can flow.	Gases can flow.
Solids have definite shape and volume.	Liquid only have definite volume.	Gases do not have definite shape of volume.
Example- table	Example- juice	Example- oxygen

3. Matter can either be soluble in water or insoluble in water. The property of a substance to dissolve in water is called solubility. For example- glycerine is soluble in water but kerosene oil is not.
4. On the basis of transparency matter can be transparent, translucent or opaque. Materials that allow the light to pass through them are called transparent. Materials which allow small amount of light to pass through them are called translucent.
Materials which do not allow light to pass through them at all are called opaque.
5. Malleability- The property of a substance to be beaten into thin sheets is called malleablility.
Ductility- The property of a substance to be drawn into wires is called ductility.
6. Woolen clothes trap the air in the empty spaces between particles of wool. It does not let the heat of the body escape out and hence, they keep us warm.
7. The property of a substance to produce heat and light on burning is called combustibility. For example- hydrogen, wood, petrol, wax etc.
8. The materials which are attracted towards magnet are called magnetic substances. The materials which are not attracted by a magnet are called non-magnetic substances.
9. Material that allow electricity to pass though them are called conductors. For example- silver, copper.
Material that do not allow electricity to pass through them are called insulators. For example- wood, plastic.

G. 1. Matter is composed of particles which are basically atoms and molecules. So, matter is particulate. We can explain it by the following experiment-
Take a crystal of potassium permanganate. Add it in one litre of water. The crystal will divides and colour the water. The water will become pink showing there are a large number of particles in a crystal of potasssium permanganate which divide themselves when added to water.
2. Same as F4.
3. a. Brittleness- The property of a substance to be broken into pieces is called brittleness. Glass is brittle.
b. Volatility- The property of a liquid to evaporate quickly when in contact with atmosphere, is called volatility.
c. Diffusion- Mixing of the particles of one material with the particles of another through natural movement is called diffusion.
4. Plastic handles protect us from burning. The reason is that these materials do not take up heat

easily and thus save the hands of the cook from being burnt.

5. The property of materials to allow heat to pass through them is called conduction of heat. Some materials allow heat to pass through them and are called conductors such as metals. Some materials do not allow heat to pass through them and are called insulators. For example- plastic and wood.
6. Materials can be good or bad conductors of electricity. Materials that allow electricity to pass through them are called conductors. Materials that do not allow electricity to pass through them are called insulators.
7. In case of an electric bulb, electric current reaches the filament inside the bulb and heats it. The filament gets white hot to emit light all around.

Scientific thinker

A. John Dalton was a school teacher, a meteorologist an expert on colour blindness, physicst and an english chemist.

He developed methods to calculate atomic weights and structures and formulated the law of partial pressures.

No, two atoms of the same chemical element are not identical. Two atoms of the same element can be different if their electrons are in different states.

Do it yourself.

B. Yes, matter is anything that has mass and occupies space. So, everything is actually made up of matter.

4. all of the above.

C. A.

1.	molecule	2.	oxygen	3.	Element	4.	Gold
5.	solid	6.	classification	7.	Dalton	8.	Cobalt

B.
1. Rubber or plastics are bad conductors of electricity. They protect us from getting electric shock. Therefore, electric wires are always covered by rubber or plastics.
2. Iron nails are more dense than ice therefore they sink in water and ice floats.
3. Oil is immiscible in liquids whereas glycerine is miscible.
4. Mercury expands on heating therefore it is used in thermometers.

Hots

A. Sponge though compressible is solid.
B. Starch is insoluble in water.
C. Diffusion
D. Particles of air have large intermolecular space so we can move our hand in air but solids do not intermoleculosr space.
E. 3.
F. The random motion of microscopic particles in a fluid after a continuous bombardment from molecules of surrounding motion, is called brownian motion.

Value Based Question

a. 1 g of gold can be streched to 2.4 km. This property is called ductility. The property of a substance to be drawn into wires is called ductivity.
b. Do it yourself.

Chapter-8 — CHANGE: LAW OF NATURE

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Quiz Time

1. Irreversible 2. Reversible 3. Irreversible 4. Irreversible 5. Reversible

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Quiz Time

1. Chemical change 2. Chemical change 3. Chemical change
4. Chemical change 5. Physical change

Exercise

A. 1. d 2. a 3. a 4. a 5. a 6. d 7. a

B. 1. e 2. d 3. f 4. c 5. a 6. b

C. (i) Permanent Change (ii) formation of biogas from animal dung
(iii) Evaporatioin (iv) Ignition of a matchstick

D. 1. Freezing milk
Evaporation of water
2. Cooking of food is a chemical change.
3. Chemical change is involved in burning of a fuel.
4. Contact, heat.
5. The property by which a substance breaks and dissolves in water is called solubility.

E. 1. A change in which a matter gets back to its original shape, state, size colour or form is called a reversible change. No, all changes cannot be reversed.
2. A change which cannot be reversed back is called irreversible change. For example- curding of milk.
3. All physical change are not reversible. For example- cutting of tree is a physical change but cannot be reversed.
4.

Physical change	Chemical change
Their change is temporary.	This change is permanent.
No new substance is formed.	New substance is formed.
These changes are reversible.	These changes are irreversible.
Example- melting of ice.	Example- curding of milk.

5. When the air is heated, it becomes light and it also expands.
6. When iron and sulphur are mixed, they do not react. On heating the mixture, a black substance is formed.

F. 1. Heating cause expansion in objects.
– Some objects burn when heated.
– Objects change their state when heated.
– Air becomes light when heated.
2. Characteristics of Reversible change
– A substance can return to its original state.
– The chemical properties of the substance do not change.
– Most physical changes are reversible changes.
Characteristics of Irreversible change
– A substance cannot return to its original state.
– The chemical properties of the substance change.
– All chemical changes are irreversible.
3. When a candle burns, both physical and chemical change occur. On heating, candle wax gets melted which is a physical change. The wax near flame burns and gives new substances like carbon dioxide, carbon root, water vapour heat and light which is a chemical change.

4. Solubility increase with temperature. The kinetic energy of molecules increases with increase in temperature. The solvent molecules break apart the solute molecules that are held together by intermoleculor attractions. The increased vibration of solute molecule cause them to dissolve move rapidly.
5. Solubility of substances increase when heated.
   Proof-
   If we add more sugar to a saturated solution when it is cooled, no more sugar will be added but if we add more sugar to a saturated solution after heating so the sugar will be dissolved.

Scientific Thinker
Do it yourself

Enrichment Learning
A. Do it yourself

B. 1. Composition 2. Temporary 3. Candle 4. Melting
   5. Reversible 6. Chemical 7. Physical 8. Contract

Hots
A. Mechanics fix tyres around the wheels of cars by heating it.

B. It is not a chemical change. It can be brought back by evaporation or distillation.

C. 1. Calcium Sulphate 2. water 3. It is an irreversible change.

D. 1. X- expansion Y- Contraction Z- Rusting
   2. Expansion and contration are reversible.

Value Based Question
1. Aerated drinks have a large amount of carbon dioxide dissolved under pressure in it.
2. Do it yourself.

Chapter-9 — THINGS AROUND US

Page 96
Quiz Time

1. Reproduction is the process of producing young ones of own kind.
2. Growth in living beings is irreversible.
3. Horse- 25-30 years Housefly - 7-8 days Rat - 2-3 years

Exercise

A. 1. a 2. d 3. c
   4. d 5. c 6. a

B. 1. microorganisms 2. cells 3. multicellular
   4. laying egg, young ones 5. tropism 6. sun

C. 1. c 2. e 3. d 4. a 5. b

D. 1. Sub-categories of consumers are-
   (i) Herbivores (ii) Carnivores (iii) Omnivores (iv) Scavengers
   2. Herbivores - cows, horse Carnivores - lion, tiger
   3. Autotrophs - plants, algae Heterotrophs - animals, human beings
   4. Leaves are green because they contain green pigment called chlorophyll.
   5. Plants take in carbondioxide and release oxygen during respiration while animals take in oxygen

and release CO_2.

6. Mimosa pudica
7. Bacteria
8. 12 months
9. Moving air is called wind.
10. 70-80% of our body weight is water.

E. 1.

Biotic components	**Abiotic components**
Biotic components are those that have life.	Abiotic components do not have life.
For example - plants and animals	For example - air and water.

2. Non-green plants do not have chlorophyll so they cannot make their ownfood. They depend on other plants and animals for their food.
3. Organisms which depends on plants and other organisms for food requirement are called consumers.
4. Microscope is used to see such organisms that cannot be seen with naked eyes.
5. The process by which living things utilize the oxygen to release energy stored in the food they eat is called respiration.
6. Animals excrete solid wastes in the form of faecus, liquid wastes in the form of urine or sweat, gaseus wastes in the form of carbon dioxide. Plants excrete in the form of gum, latex etc.
7. Equator and areas closer to it have high temperature due to direct sun rays and areas away from the equator are cold.

F. 1. Characteristics of living things are-

(i) Living things can grow.

(ii) Living things can reproduce.

(iii) Living things response to stimuli.

2. All the living and non-living things are made up of matter. Both of them have a basic structured unit. Basic structural unit of non-living things is molecule and that of living-thing is a cell.

3.

living things	**Non-living things**
Living things can grow.	Non-living things cannot grow.
They reproduce.	They do not reproduce.
They respond to stimuli.	They do not respond to stimuli.
They respire.	They do not respire.
Example- plants, animals	Example- chair, table.

4. Plants such as mimosa pudica immediately curls its leaves when touched. Shoot of plants grow towards sunlight while roots grow towards gravity showing response of plants to stimulates.
5. We take oxygen from the air for respiration and give out carbon dioxide. Plants take in carbon dioxide and give out oxygen for the animals. This way balance between CO_2 and O_2 is mantained in nature.
6. Sun is the ultimate source of energy. Most plants need sunlight for proper growth and for the process of photosynthesis. If there won't be sunlight then plant will not be able to prepare food. And we depend on plants for food. So, no sunlight means no plants and no plants means no life.

Scientific thinker

1. Friedrich Wohler
2. Urea
3. 9.3 g/L

Enrichment Learning

A. Do it yourself

B. 1. Carbondioxide, Oxygen 2. Stomata 3. lungs

C. 1. Sunflower 2. Response to stimuli 3. Mimosa Pudica

Hots

A. Plants are called nature's airconditioner because they purify the air by absorbing CO_2.

B. We are warm blooded because we can regulate air body temperature.

Value Based Question

Do it yourself

Chapter-10 — HABITAT OF THE LIVING

Page 103

Quiz Time

1. Biotic - Plants, animals Abiotic - Air, water
2. Plants are the only living beings that convert solar energy into the form of food. So, they are called producers.
3. Virus, fungi and bacteria.

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1. False
2. True
3. True

Page 106

Quiz Time

1. Hydrophytes are plants which only grow in or on water.
2. Duckweed, mosquito fern.
3. Yes, lotus plant has roots fixed in mud.

Page 107

1. Mesophytes have well developed roots because terrestrial plants have to take in water or other nutrients from the soil.
2. Mango tree, sunflower.
3. Plants that have thick leathery covering on the stem to prevent loss of water through evaporation are called succulent plants.

Page 109

Quiz Time

1. The body of aquatic animals is covered with scales which protect them from decaying.
2. Fins mantain the balance of aquatic animals bodies and help in movement through water.

Page 109

Quiz Time

1. Amphibians are the animals that live both on land and in water. Frog and toads are amphibians.

2. Insects get stuck in a frog's sticky tongue.
3. Xerocoles live in deserts. Camel, lappet faced vulture and fennex fox are xerocoles.
4. Padded feet of a camel help it to walk on sandy surface.

Page 110

Quiz Time

1. Mountain animals have strong limbs for running up the rocky and cold slopes of the mountains.
2. Bats.
3. Birds bills have evolved to perform feeding activities.

Exercise

A. 1. d 2. 3. c 4. a 5. d
6. d 7. a 8. c 9. d 10. d

B. 1. Biotic 2. Consumers 3. Stems 4. Leaves, reduced 5. facultative 6. hair

C. 1. e 2. d 3. f 4. a 5. b 6. c

D. 1. All the things present around an organism constitute the environment of that organism.
2. Plants are called producers because they can prepare their own food.
3. Earthworms, crabs and flies are some examples of decomposers.
4. The three types of habitats are
(i) Aquatic habitat (ii) Terrestrial habitat (iii) Desert habitat
5. Adaptation is an evalutionary process of a living species to live in its habitator habitates and capable to reproduce.
6. Watermeal and duckweed are free floating water plants.
7. Xerophytes are the plants that have adapted to live in dry or desert conditions.
8. Xerophytes have deep roots to be in reach of water.
9. Amphibians have webbed feet top swim in water.

E. 1. Biotic component interact with abiotic component. For example- Plants interact with air, water, sunlight and minerals to prepare their own food.
2. Habitat is the special environment of an organism in which it lives and grows. Habitat offers, food, shelter and suitable climate conditions.
3. On the basis of availabity of water and food plants and animals have developed their features accordingly.
4. Two adaptive features of hydrophytes are-
   a. The roots are less significant.
   b. The stems are long, slender and spongy.
5. Two adaptive features of mesophytes are-
   a. They have well-developed roots.
   b. The stems are avial, solid and well-branched.
6. Animals in deserts have special adaptation that allow them to survive under the extreme temperature. Some animals in desert are endangered such as lappet faced vulture.
7. Loss of water through evaporation is called transpiration.
8. Xerophytes do not have well droped branches and leaves to prevent loss of water.
9. Halophytes are the plants that are able to survive in or around land or water high in salt content. Their adaptive features are-
   – They have branched roots which come out only for the soil surface to allow air to enter the soil.
   – They have green, small and leathery leaves.

F. 1. Biotic components: All the living organisms in an ecosystem refer to biotic components. These

include, plants, animals, microorganism.
Abiotic components: All the non-living things with chemical and physical factors are abiotic components. For example- air, water and soil.

2. Habitat is the home of an organism where it can find food, shelter and favourable conditions for breeding. It is a special environment of an orgnism where it lives and grows.
3. Aquatic animals are called hydrocoles. We can group them into-
   (i) Free-floating water plants- Duckweed amd mosquito fern.
   (ii) Rooted with free floating leaves- lotus, traps.
   (iii) Submerged water plants - spatterdock, watershield
4. Adaptive features of desert animals are-
   – They have deep roots.
   – Leaves are highly reduced or absent.
   – They have thick leathery covering on stems.
   – They have fleshy stems.
   – The surface of the leaves is shining and glazed.
5. Adaptive features of a frog are-
   – They have streamlined body with enlarged tail.
   – They have very short neck
   – They have webbed feet
   – They have sticky tongue.
   – Their bones are light and spongy.
6. Animals that can live both on land and in water are called amphibians.
   Adaptive features of amphibians are-
   – They have streamlined body with enlarged tail.
   – There skin is smooth, dry and rich in mucus. It keeps them moist and helps in respiration.
   – They have very short neck which has no power of mobility.
   – Their feet are webbed that help them to swim in water.
   – They have very light bones that reduce their body weight.
7. Adaptive features of aerial animals are-
   – They have streamlined body that is meant for swift passage through air.
   – Their feathers are light, elastic and waterproof.
   – The bones are hollow which also contain air cavities. They make their body light and buyoancy during flight.
   – Forelimbs are modified into wings for flying in the air.

Scientific Thinker

Do it yourself

Enrichment Learning

A. 1. Arboreal 2. Gum 3. Tropism 4. Producers 5. Nocturnal
   6. Buoyancy 7. Stimuli 8. Latex 9. Xerophytes

B. Do it yourself

C. Do it yourself

Hots

A. Bacteria and fungi decompose dead and decaying matter into simpler nutrients. So, they are called decomposers.

B. No, all aquatic animals do not breathe oxygen dissolved in water. Some aquatic animals such as dolphins come to the surface to breathe oxygen present in air. Only these organisms that have gills can breathe oxygen dissolved in water.

C. 1. (i) Camel (ii) water
2. (i) fish (ii) gills
3. (i) desert (ii) water

D. 1. Grassland 2. Pond river 3. Desert 4. Mountains

Value Based Question

Do it yourself

Chapter-11 — PLANTS: FORM AND FUNCTION

Page 118

Quiz Time

1. Root and shoot
2. a. Tap root system b. fibrous root system
3. maize, sugarcane

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1. Ginger, potato
2. Tendrils help plants to grow upwards by coiling sorrounding enternal support.

Page 123

Quiz Time

1. a. Calyx: The whorl formed by sepal calyx.
   b. Corolla: All the petals together form the whorl called corolla.
2. Pollen grains
3. A seed in a plant is the part that is developed from ovules after fertilisation.

Exercise

A. 1. a 2. a 3. d
4. d 5. a 6. b

B. 1. Fibrous roots 2. Tendrils 3. Stamens 4. Nectar 5. Peel

C. 1. a 2. d 3. b 4. e 5. c

D. 1. Tendrils are wiry, coiled and leafless projection that help plant to grow upward by coiling surrounding external support.
2. Leaves of plants have green pigment called chlorophyll due to which they look green.
3. Loss of water through stomata is called transpiration.
4. Male reproductive organ- stamen female reproductive organ- Pistil
5. A flower that contains both male and female buds is called a bisexual flower.

E. 1.

Root system	**Shoot system**
The parts of the plant below the ground form root system.	The parts of the plant above the ground form shoot system.

2. The roots change their shape and get modified to absorb and transport water and minerals from the soil to different parts of the plants. They are also modified for support, food storage and respiration.
3. The underground stems look like roots. These roots are called Rhizomes. The word comes from a

Greek word meaning "mass of roots" Gingers, turmeric and potato are rhizomes.

4. Leaves grow from the nodes of a stem in the following arrangements:

   Alternate: In this pattern, only a single leaf comes out from a node, eg; mango, sunflower.

   Opposite: In this pattern two leaves come out from a node, e.g; catotropis, jamun etc.

   Whorl: In this pattern, three or more leaves come out from a node e.g; oleander.

5. Different parts of a plant are-

   (i) pedicel (ii) Calyx or Sepals (iii) Petals (iv) Stamens (v) Carpels

6.

Unisexual Flowers	**Bisexual Flowers**
The flower in which only of the essential whorls is found are called unisexual. For example- cotton, china rose.	The flower that contains both male and female bud is called bisexual. For example- pea, china rose, cotton etc.

F. 1. Roots have different parts that carry out some specific functions and form a system called root system. There are two types of root system.

   (i) Tap Root System (ii) Fibrous Root System

   The Tap Root System

   It is characterised by the presence of a dominant central root, from which other small-sized lateral roots emanate horizontally.

   The Fibrous Root System

   A fibrous root system has no large single taproot because the embryonic root dies back when the plant is still young. The roots grow downward and outward from the stem.

   Branching repeatedly to form a mass of fine roots.

2. They consist of small nodule like projections. These nodules contain Rhizobium bacteria. These bacteria fix atmospheric nitrogen in the soil and make nitrogen available for the plants. The plants have modulated roots called leguminous plants. For example: beans, groundnuts, peas etc.

3. The three stem modifications are-

   (i) Mechanical support

   Most of the climbers like gourd, money plant, grapevine etc have weak stems. Such plants have auxiliary buds which are modified into thin, wiry coile and leafless projections knows as tendrils.

   (ii) Food Preparation

   The stems of some plants also prepare food for the plants. For example- stem of a cactus plant. They carry out photosynthesis and prepare food for the plants.

   (iii) Storage of Food

   The stems of some underground. These stems store food and become swollen and fleshy.

4. Different functions of stem are-

   (i) It supports and hold leaves, flowers and fruits.

   (ii) It supports the leaves to provide water and mineral that can be converted into usable products by photosynthesis and thus transport it to the leaves and other parts.

   (iii) The xylem and phloem present in the vascular bundles of stems conduct water and minerals across the plant.

   (iv) Stems bear flowers and fruits in a position that facilitates the process of pollination, fertilisation and dispersion of seeds.

5. The uses of flowers are-

(i) They are used to prepare different types of perfumes.

(ii) They are used in aroma therapy for using many diseases.

(iii) They are used for decoration purpose at various occassions.

(iv) Dry flower buds such as clove and saffron are used as spices.

(v) Flowers contain nector which attract honeybees. Honeybees make honey from that nector.

6. The seed in a plant is the part that is developed from the ovules after ferilisation. They are enclosed in the fruit.

   Functions of a seed

   A seed is sown to obtain a plant of same kind. In this way, the species of a particular kind is preserved.

   Seeds also protect the embryo and provide nourishment for their growth and development.

Enrichment Learning

A. 1. Ovules 2. Internode 3. Tendrils 4. Shrub 5. Ginger
   6. Stirt Roots 7. Banyan 8. Trunk 9. Creeper 10. Carpels

B. Do it yourself

C. Do it yourself

Scientific Thinker

Do it yourself

Hots

A. Plants with coloured leaves can synthesis x food because they still have chlorophyll for example: cotton plant. The red pigment is more than green pigment but chlorophyll is there.

B. P – Flower
   Q – Fruits
   R – Roots
   S – Leaves
   T – Stem

C. 1. (i) Carpel (ii) Stamen
   2. (i) Pistil (ii) Style (iii) ovary (iv) ovules.
   3. (i) Anther (ii) Pollen grains
   4. After fertilisation ovules grow into seeds.

Value Based Question

Do it yourself

Chapter-12 — ANIMAL: FORM AND FUNCTION

Page 130

Quiz Time

1. Vertebrate – monkey, human beings.

   Invertebrate – earthworm, leech

2. Bones are made up of bone cells known as osteoblasts.

3. There are 12 pairs of ribs in air ribcage.

Page 134

Quiz Time

1. The joints that help in free movement of the body parts are called synovial joints.
2. Fish, aeroplanes, birds and ships have streamlined body that reduces air resistance.
3. Snails are grouped into garden snail and apple snail.

Exercise

A. 1. a 2. c 3. b 4. a 5. a
6. a 7. d 8. a 9. d 10. d

B. 1. cells 2. Vertebrates 3. upper jaw 4. reddish brown
5. 6. enzymes 7. neurons 8. wastes

C. 1. b 2. d 3. e 4. a 5. c

D. 1. Living beings can be unicellular or multicellular on the basis of number of cells, they are made up of.
2. Reptile, amphibians, birds, mammals and fish are all vertebrates.
3. Vertebrates have bilaterally symmetrical bodies and a brain enclosed by a skull.
4. Lower jaw is the movable part in the skull.
5. The movement of an organism from one place to another is called locomotion.
6. Types of joints on the basis of movement are-
   (i) Hinge joint (ii) Ball and socket joint (iii) Pivot joint
7. Main organs of digestive system are mouth, teeth, tongue, food pipe, stomach, small intestine and large intestine.
8. Main organs of respiration are nose, pharynx, larynx, trachea, bronchi and lungs.

E. 1. Organisation in multicellular organisms is as follows
   Cell ⟶ Tissues ⟶ organs ⟶ organ system ⟶ organisms
2. The main function of skeletal system is to give a shape to the body and support to the body. It also protects vital organs like brain, heart etc. It also helps in body movement.
3.

Exoskeleton	Endoskeleton
It is present inside the body of a living organism.	It exists on the outside or an organism.
It protects muscles and soft tissues	It protects internal organs.
Most invertibrates have exoskeleton.	All vertebrates like birds, fish, reptiles amphibians have endoskeleton.

4. Hinge Joint: In hinge joints, the slightly rounded end of one bone fits into the slightly hollow end of the other bone. In this, one bone moves while the other remains stationary, like hinges of a door.

   The elbow and knee are examples of a hinge joint.

   Fixed: Fixed joints are immovable. Example- upper jaw, skull etc.
5. Bone is very hard material. It is made up of living cells, calcium phosphate and collagen. Cartilage is more elastic and resistant than bone but not so hard.
6. Voluntary muscles are skeletal muscles that contact and relax under consious control. Involuntry muscles are the muscles that are not under conscious control. They contract and relax automatically. Hammering a nail is a voluntary movement while breathing is an involuntry movement.
7. The fish have a streamlined body that help them in making passage for swimming. They also have fins for locomotion which act as oars. The scales on the body of a bony fish act as a waterproof jacket which does not let their body decay.

8. To move, earthmorm first extends the front part of its body, keeping the rear part fixed to the ground. Next, it fixes the front part and shortens it, thus pulling the rearend forward. It carries out such expansion and contraction of muscles repeatedly to move forward.
9. Respiratory system brings oxygen into the bodies, which is needed for the cells to live and function properly, it also helps to get rid of carbon dioxide, which is a waste product of cellular function.

F.	1.	**Vertibrates**	**Invertibrates**
		well defined internal skeleton system.	Lack of internal skeletal system.
		Animals with backbone.	Animals without backbone.
		Complex and specialised organ system.	Simple organ system.
		Examples- Birds, fish, mammals, amphibians etc.	Example- hydra, amoeba, paramecium.

2. Same as E 2.
3.

Locomotion	**Movement**
Moving away from the original position of an organism is locomotion.	Movement can happen with or without moving away from an organism's original position.
It is voluntary.	It can either be voluntary or involuntary.
Locomotion takes place at organisms level.	Movement takes pace at biological level.
Locomotion does not necessary require energy when a free-floating organism is considered.	Movement requires energy.

4. The place where two or more bones join is called a joint.

   Fixed joints- The joints that are immovable are called fixed joints. For example- upper jaw, skull etc.

   Synovial joints- Joints that help in free movement of body parts are called synovial joints.

   Gliding joint- The joints that allow side to side as well as backward and forward movement are called gliding joints.
5. Birds have wings covered with feathers. The bones of birds are hollow having air cavities and this makes their body light in wright. The neck of a bird is highly mobile. All these features help a bird to fly.
6. Cockroach is a reddish brown coloured insect about 5-6 cm in length. Its body is elongated and flattened. The body is divided into head, thorax and abdomen. The head was a pair of compound eyes, a pair of long antennae and mouth parts. They use thier wings when they fly.
7. The circulatory system delivers nutrients and oxygen to all cells in the body. It consist of the heat and the blood vessels running through the entire body. The arteries carry blood away from the heat, the veins carry it back to the heart.

Enrichment Learning

A. Do it yourself

B. Do it yourself

C. 1. Locomotion 2. Tendons 3. Cartilage 4. Ligament
   5. Cranium 6. Joints 7. Movement

Hots

A. If the backbone had one long bone instead of many vertebrae, living beings wouldn't have walked or bend.

B. P - Earthworms
Q - Fish
R - Earthworm
S - Snakes

C. 1. (i) Ribs (ii) Breastbone (iii) Ribcage
2. (i) Heart (ii) Lungs (iii) Liver

D. Wichelm Roentgen discovered X-Rays in 1895. X-Ray are a form of electromagnetic radiation similar to radio waves, visible light and gamma rays.

E. Do it yourself.

Value Based Question

Do it yourself

Chapter-13 — MOTION AND MEASURING DISTANCES

Page 143

Quiz Time

1. 'Metre' is the standard unit of length.
2. The distance between the tip of the middle finger and the elbow is called cubit.
3. (a) pencil (b) metre

Page 146

Let's Do it

1. Odometer and speedometer
2. Rotatory motion

Exercise

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

B. 1. Sledge 2. NPL 3. CGS and FPS 4. Estimation 5. Periodic

C. 1. b 2. e 3. d 4. a 5. c

D. 1. People need different modes of transport to go from one place to another.
2. Wheel less cart is called sledge.
3. The quantities that can be measured directly or indirectly are called physical quantities. For example- length, mass, time etc.
4. Arms, foot.
5. Measurement is reffered to as comparison of a quantity to be measured with a reference standard.
6. The reference standard of measurement is called unit.
7. Standard unit is the one which is acceptable throughout the world.

E. 1. (a) Handspan: It is the distance between the tip of the thumb and the tip of the little finger of a fully stretched hand.
(b) Cubit: It is the distance between the tip of the middle finger and the elbow.
(c) Fathom: It is the length of the outstretched arms.

2. In ancient time people used their footstep, arm length, hand span, ropes etc., to measure lengths. But all these units were not satisfactory because length of arm, foot and hand span varied from person to person. Therefore, a standard unit for measuring length was required.
3. A standard unit means a unit that is acceptable throughout the world. CGS (centimtre, gram, second), FPS (foot, pound, second) are common acceptable units used in the British system.
4. Motion: Continuous change of position of a body with respect to another body. Example car moving on a road.

   Rest: No change of position with respect to other body. Example: a car standing in a parking.
5. The motion of a body alongwith all its body particles through the same distane in the same time is called translatory motion.

   Translatory motion are of two types-

   (a) Rectilinear motion- Movement of a body along a straight line is called rectilinear motion.

   For example- a boy running on a straight line.

   (b) Curvilinear motion- Movement of a body along a curved line is called curvilinear motion. For example- a car moving on a curved road.
6. Rectilinear motion- same as 5 (a)
   Curvilinear motion- same as 5 (b)
7. 3240 m

   3000 m + 240 m

   3 km + 240 m

   3 km + 240/1000 km

   3 km + 0.24 km

   3.24 km

F. 1. In ancient time, people used to move on foot because they had no means of transport. With passage of time, animals were domesticated. These animals carried men and goods from one place to another. Later, they made wheel less cart called sledge. They used to carry their belongings. Later on, the invention of wheel proved to be a revolution in the field of motion. People started using wheel-carts. New means of transport were also discovered with the help of wheel.

2. Elastic tapes do not give correct measurement of a distance. They are stretchable so that length change each time due to stretching. Problems we may face while measuring distance with it are-
   - Measurement would also vary if different persons measure the same distance.
   - The length of elastic tape varies and depends upon the force by which it is stretched.

3. Oscillatory Motion- To and fro movement of a body about its means position is called oscillatory motion. For example- movement of a pendulum, motion of a swing.

4.

Periodic Motion	**Non-Periodic Motion**
Motion of a body that repeats itself after regular invertals is called periodic motion.	Motion of a body repeat itself but not at regular interval is called non-periodic motion.
For example, movement of the middle of a swing machine.	For example, motion of tides in the sea.

5.

Uniform Motion	**Non-Uniform Motion**
Motion of a body that covers equal distances in equal interval of time is called uniform motion.	If a body covers equal distance in unequal distance in equal interval of time, the motion of the body is called non- uniform motion.

For example; if a train covers 60 km in one hour and again covers 60 km in one hour.	For example; if a train covers 60 km in 1 hour, again it covers 60 km in 2 hours.

Scientific Thinker

Do it yourself

Enrichment Learning

A. Do it yourself.

B. 1. Curvilinear 2. Random 3. 4. Divider
4. Divider 5. Vibratory 6. Periodic 7. Fathom

Hots

A. Reading of the scale at one end = 2.0 cm
Reading of scale at other end is 32.4 cm
Length of the book = 32.4 - 0.2 = 32.2 cm.

B. Rotatory and Translatory.

C. The tree is moving with respect to the sun because it is rooted in the Earth and the Sun is continuously moving.

D. Do it yourself.

Value Based Question

Do it yourself

Chapter-14 — ELECTRIC CURRENT AND CIRCUITS

Page 152

1. There are two types of electic chrges-
   (i) Positive charge (ii) Negative charge
2. The filament in an electric bulb is made up of tungsten.
3. Filling a bulb with an inert gas will not burn the tungsten filament.

Page 150

Quiz Time

1. 

2. A device that is used to open or close circuit is called an electric switch.
3. Conductors- Silver, copper, aluminium.
   Insulator- Wood, plastic, rubber

Exercise

A. 1. c 2. c 3. d
4. c 5. c 6. d

B. 1. electricity 2. static 3. repel
4. positive, negative 5. half- cells.

C. 1. e 2. a 3. b 4. c 5. d

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

E. 1. Benjamin Franklin was the first one to prove lighting is an electic phenomenon.

2. Energy derived as a result of movement of electrically charge particles is called electric energy.

3. The charges that travel along wires is electricity and the electicity that passes through the wires is called current electricity.

4. Voltaic cell and Dry cell.

5. A cell contains electricity in a stored form or in the form of chemicals stored inside.

6. An electric swith opens or closes a circuit.

7. Water is a poor conductor.

F. 1. Static electricity is the electricity produced by rubbing one material upon another while current electricity is due to the charges travelling along wires.

2. Cells and batteries are the sources of electric current.

3. Basic conditions required for an electric current to flow are-

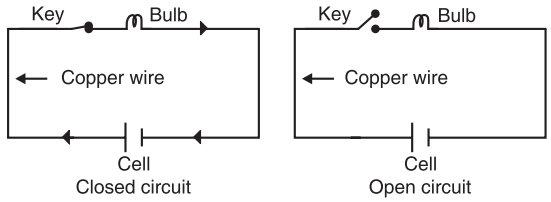
– a device used to produce an electric current such as cells, batteries or plug points acting as a source.

– A wire made of metal such as copper or silver which will allow electric current to flow easily.

– An unbroken loop running from one terminal of the source through various appliances back to the other terminal of the source.

4. Filling a bulb with an inert gas such as argon or nitrogen will not burn the tugsten filament.

5. A diagram which shows the arrangement of various components in an electric circuit with the help of their symbols, is called a circuit diagram.



6. An electric switch is a device which is used to open or close an electic circuit.

7.

Conductors	**Insulators**
Materials that allow electicity to pass through them are called conductors.	Materials that do not allow electricity to pass through them are called insulators.
For example- copper, silver, aluminium	For example- plastic, rubber etc.

8. Water is a poor conductor because it does not allow the charge to flow but it displaces the charge.

G. 1. • The construction of voltaic cell is as following-

• The cathode is an electrode where reduction occurs.

• The anode is an elctrode where oxidation occurs.

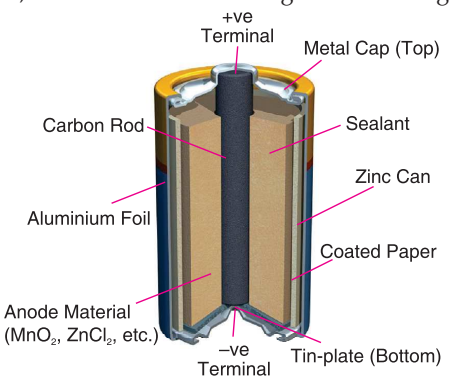
• A salt bridge is a chamber of electrolytes necessary to complete the circuit in voltaic cell.

• The oxidation and reduction reactions are separated into compartments called half-cell.

• The external circuit is used to conduct the flow of electrons between the electodes of the voltaic cell and usually include a load.

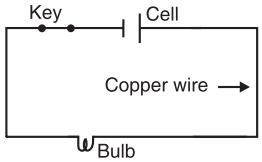
2. Construction and working- The dry cell consists of a zinc container having a paste of ammonium chloride. In the centre, a carbon rod is fitted with a metal cap and wrapped in a muslin cloth bag kept in its centre, which contains a mixture of powedered coke, grphic, zinc chloride and

manganese dioxide. The cell is completely sealed from the top. When the two terminals are connected with the bulb, the current starts flowing and the bulb glows.



Dry Cell

3. A complete set up in which the electric current can flow along a closed loop is known as an active circuit.



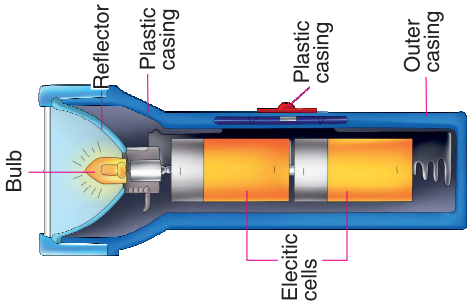
4. An electic bulb is a device which produces light when electricity is passed through its terminals.

   The bulb has two thick contact wires in the centre with a thin wire attached between them. The thin wire is made of tungsten and is called filament.

   One of the thick wires is connected to the metal case at the base of the bulb and the other is connected to the metal tip at the centre of the base. Then two form the terminal.

   When electricity is passed through the terminal of the bulb, the filament gets heated up and produces light.

5. A torch is powered by one or more cells. There is also a circuit inside the torch through which current is passed.



   A torch also consists of a switch and a small bulb. The switch of the torch allows current to pass through the circuit when needed. When the current passes through the circuit the bulb glows.

6. Three uses of conductor:
   - Copper wire is used in electric wire to conduct electricity.
   - Semi-metals like silicon are used in phones and computers.

• Metal pots transfer heat from the stove to the food inside them to cook it.

Three uses of insulators:

• Insultors are used to cover electric wires or appliances to avoid electric shock.

• The handles of electric tools are also made up of insulators.

• Rubber gloves are used by elctricians while working with electric appliances.

7. Electricity can be very dangerous. If we do not handle electrical device carefully. We should never play with electrical wires and sockets. Electricity from cells is safe and you can experiment with it, but we have to be careful not to connect two terminals of a cell directly through a wire.

Scientific Thinker

A. All of the above

B. 1. Do it yourself

2. (a) Magnetic effect of electric current.

Enrichment Learning

A. Do it yourself

B. Do it yourself

C. 1. Insulator 2. Solar cell 3. 4. Zinc 5. Switch

6. Battery 7. 8. Filament 9. Silver 10. Oil

Hots

A. If the wire is deteched, the circuit will break and current will not flow.

B. Rubber gloves do not allow electricity to pass through them so they protect electricians from getting electic shock.

C. 1. A. Insulator B. Conductor

2. A. Rubber B. Copper

3. Outer parts are made up of A while inner parts are made up of B.

D. 1. P — Bulb Q — Cell

2. R is filament

3. Q

E. A charger can reverse the electron flow and restore the initial excess of electrons in anode and creates a charged battery.

Chapter-15 — MAGNET

Page 162

1. Two poles of a magnet are north and south pole.

2. Magnet was discovered near the city of Magnesia.

Page 163

1. Bar magnet is more active at its pole.

2. Iron, nickel and cobalt.

Exercise

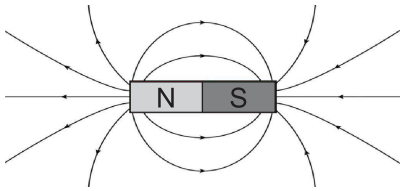
A. 1. b 2. c 3. d 4. d

5. b 6. b 7. a

B. 1. South and north 2. repel, attract 3. north-south
4. greater 5. attract 6. magnetic property

C. 1. An object which attract iron or repel other magnet is called a magnet.
2. Iron, nickel and cobalt are three magnetic materials.
3. The magnetic compass is an instrument used in finding direction.
4. Alnico and soft iron are used to make temporary magnets.
5. Two methods used to make artificial magnet are-
   (i) Single- Touch method
   (ii) Double- Touch method.

D. 1. A magnet create an invisible are of magnetism all around which is called a magnetic field.



2. Spread some nails on a table, now bind a thread in the middle of the bar magnet and move it over the iron nails. You will observe that more nails are attracted to the pole revolving their location. In this way, we can locate the pole of a magnet.
3. When a bar magnet is suspended freely, it always comes to rest in north-south direction. This is how we can locate directions using a bar magnet.
4. In double touch method, two bar magnets are used. Their opposite poles are brought together in the middle of the bar which has to be magnetised. Now, move from the middle in opposite direction to each other. Both magnets are then lifted together and again brought in the middle of the bar. This is repeated for 30-40 times to make a stronger magnet.

   In the single-touch method the magnet is rubbed over the iron bar in the same direction. In double-touch method iron bar is magnetised by simultaneously stroking it with two opposite poles of two bar magnets.
5. Ways to take care of a magnet are-
   — Magnet should be kept in magnet keeper.
   — Avoid both north and south sides from touching.

E. 1. Activity

Aim: To show the poles of a magnet repel and unlike poles attract each other.

Materials required: Two bar magnets and a wooden table.

Method: Firstly, Identify the north and south pole of both the magnets. Place slips marked 'N' and 'S' in both the magnet. Now place one magnet on the table horizontally. Take the other magnet and bring its north pole near to the south pole of the other magnet. You will observe that both magnets repel each other. Now, bring the south pole of the magnet near the north pole of the other magnet. Now will observe that both the poles attract each other.

2. Some important properties of a magnet are-

Magnets attract objects of iron, cobalt and nickel.

The force of attraction of a magnet is greater at its pole than in the middle.

Like poles of two magnets repel each other.

Opposite poles of two magnets attract each other.

3. Natural magnets are naturally occuring magnets. A lodestone is natural magnet.

   Artificial magnets are made by humans. They can be permanent or temporary. Permanent magnet are the ones that retain their property for a longer period of time while temporary magnets retain their property as long as magnetising force is available.

4. Activity

   Aim: To show a bar magnet always take norh-south direction.

   Materials required: A bar magnet, a magnetic compass and a thread.

   Method- Suspend a bar magnet horizontally with the help of a thread. Turn the direction of the pole of the magnet and leave it. When the magnet comes to rest, you will notice that it takes north-south direction.

A. See note

B. 1. Do it yourself
   2. (d)
   3. (a)
   4. Do it yourself

Enrichment Learning

Do it yourself

Hots

A. Circular magnets have north poles on the top and south pole at the bottom. We can find this by using a magnetic compass.

B. A freely suspended magnet rests in north south direction. We can locate west using this property of a magnet.

D. Do it yourself.

E. He can use a magnet to find the needle.

F. Yes, because Earth itself behaves like a big magnet.

G. Yes, like a solenoid.

Value Based Question

Do it yourself

Chapter-16 — RAIN, THUNDER AND LIGHTNING

Page 170

1. Three physical states of water are-
   (i) Water vapour (gaseous state) (ii) Ice (solid state) (iii) Water (liquid state)
2. Temperature at which a solid melts is called its melting point.

Page 172

1. The continuous circulation of water on the Earth is called water cycle.
2. Rate of evaporation may be affected by-

— When it is a windy day, rate of evaporation becomes faster.
— At high temperature, evaporation becomes faster.
— Hot and dry air also increases the rate of evaporation.
— The large the exposed area, faster the rate of evaporation.

Page 173

1. Sparkle of light caused due to the transfer of charges from one cloud to another or to the Earth is called lightning.
2. Lightning conductor is the device used to protect buildings from lightning.

Exercise

A. 1. d 2. a 3. b 4. c
5. a 6. a 7. b 8. b

B. 1. water 2. temperature 3. upwards 4. atmosphere
5. evaporation 6. top 7. antennae

C. (i) T (ii) T (iii) T (iv) T
(v) T (vi) T (vii) T

D. 1. The temperature at which liquid boils is called boiling point of the liquid.
2. The temperature at which liquids start freezing is called freezing point of that liquid.
3. Water can be converted into water vapour by boiling.
4. Water held underground in the soil is called groundwater.
5. Condensation is the change of water form its gaseous from into liquid form.
6. Rain, snow, sleet and hail are the forms of precipitation.
7. Franklin proved that lightning is a form of electricity.

E. 1. Activity

Aim: To show the process of condensation.

Material required: A glass and a ice cubes.

Method: Keep a few ice cubes in a glass and keep it on a table. After a few minutes, you will observe tiny water droplet on the outer surface of the glass, it is condensed and turns into tiny water droplets.

2. When the temperature is considerably below freezing point, the water vapour may condense into liquid and come to the Earth in the form of water droplets called rain. This process is called precipitation.
3. Cloud is actual mass of tiny water droplets or ice crystal floating in the atmosphere. It is formed due to condensation of water vapour at very high altitude in free air.
4. The maximum amount of water vapour that air can hold is called saturation point.
5. The continuous circulation of water on the Earth is known as water cycle. The water present on the surface of the Earth evaporate and moves upward. At high altitude, it condenses and turns into clouds. Finally it returns to the Earth as rain, snow or hail. Most of the rainwater makes its way back to the oceans through various streams and some trapped deep into the Earth's crust.
6. Water cycle is affected by these factors:
   — When it is a windy day, rate of evaporation becomes faster.
   — At high temperature, evaporation becomes faster.
   — Hot and dry air also increases the rate of evaporation.

— The large the exposed area, faster the rate of evaportion.

7. The lightning conductor is made up of a pointed conductor and good quality wire. The metallic rod is placed at the highest point of the building and a wire is connected with it properly. The other end of the wire is earthed in the ground. When the charge is discharged from the clouds and it comes near the building, the lightning conductor attracts all the charge and the building is protected.

F. 1. The three states of water are-
Solid, liquid and gas.

— The solid form of water occurs in the form of snow, frost and ice. Mountain peaks are generally covered with snow.

— Water is the liquid state. It is present in liquid form in ocean, seas, rivers, lakes etc.

— Water vapour is the gaseous state of water- small amount of water vapour is present in the atmosphere.

2. Three states of matter can be interchanged:

— Ice can be converted into water: This can be done by the process called melting.

— Water can be converted into water vapour by the process called boiling.

— Water can be converted into ice by freezing.

3. Same as E 6

4. The sun heats up the water of rivers, lakes and oceans and the water starts turning into water vapour due to evaporation. The water vapour mixes up with air. The water vapour bring lighter rises up in th air. As the temperature at very high altitude is low, the water vapour condenses at a certain height. About one kilometre or more above the sea level, it forms cloud. When the temperature is below freezing point, the water vapour may condense into liquid and come to the Earth in the form of water droplets called rain.

5. Same as E 3

6. Sparkle of light caused due to the transfer of charges from one cloud to another or to the Earth is called lightning.

A cloud sound caused due to release of energy during the process of transferring charges between clouds is called thunder.

7. Same as E 7

8. To avoid the effect of lightning, we should keep following points in our mind:

— Avoid using phones.

— Do not adjust television antennae.

— Do not stand near a tall tree or metallic pole.

— Remove the cord of antennae from the television.

Scientific Thinker

A. (c) The clothers will dry faster because it is a windy day due to which rate of evaporation increases.

B. (c)

Enrichment Learning

Do it yourself

Hots

A. The water kept in earthen pots seeps into the small pores in the pots and evaporates from the surface of the pot. The heat required for evaporation is taken from water inside pot, thus cooling the water

inside.

B. Hair dryer dries our hair quickly because rate of evaporation increase due to the air.

C. (c)

D. Water cycle.

E. Reservoirs are made by the damming of rivers for hydropower production, irrigation and flood protection.

F. No, it will not be effective because it will not be connected to the Earth so the charge will not pass through the Earth.

Value Based Question

Do it yourself

Chapter-17 — LIGHT

Page-179

1. Luminous- bulb, torch
   Non-luminous- table, chair
2. A group of light rays moving in an organised manner is called a beam of light.

Page- 181

1. a. straight b. black c. vary
2. Solar eclipse occur when the sun, the moon and the earth come in a straight line.

Exercise

A. 1. b 2. a 3. a 4. b 5. b

B. 1. transparent 2. opaque 3. lateral inversion
   4. reflected objects 5. rough

C. 1. d 2. a 3. e 4. b 5. c

D. 1. Bulb, torch

2. Material that allow only a small amount of light to pass through them are called translucent materials.

3. When light falls on the non-luminous object, they bounce it back. This is called reflection of light.

4. Solar eclipse and lunar eclipse.

5. The objects which causes reflection of light are called reflected objects. For example: mirror and polished metal sheets.

E. 1. Light is a form of energy. When it falls on an object, it bounces back in the different directions. When it enters our eyes, we are able to see the objects.

2.

Transparent	Opaque
Materials which allow all the light to pass through them are called transparent materials.	Materials which do not allow light to pass through them at all are called opaque.
For example- glass, water etc.	For example- book, wood etc.

3. Transparent material such as glass is used in making window panes and doors. Glass is also used in spectacles and binoculars.

4. The condition for shadow formation are-

a. Source of light

b. An obaque material

c. A screen or a surface on which shadow will be formed.

5. During a solar eclipse, the dark side of the moon faces the earth. Therefore, a solare eclipse will always take place on a new moon day.

6. The phenomenon of seeming left-right reversal is called lateral inversion.

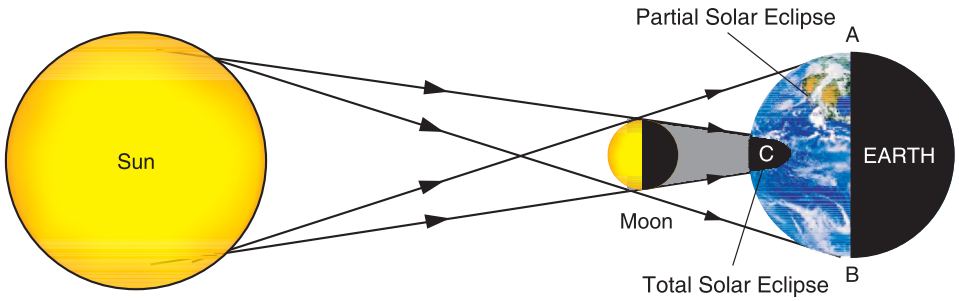
F. 1. Experiment

Aim: To show light travels in a straight line.

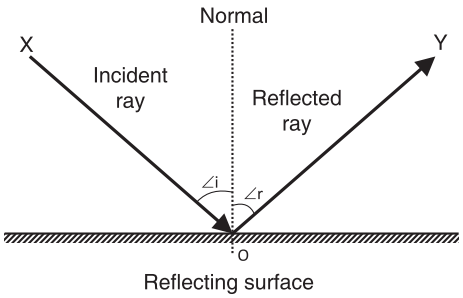
Material required: Three squares of cardboard about 20 cm of sides, a candle.

Method: Make small holes the centre of each square. Now, place these cardboard squares on flat wooden surfaces in a straight line so that you could see through the holes of all the three cordboards. Now, place a lighted candle such that the flame of candle could be seen through holes. Now, displace one of the cardboard slightly so that the holes are no longer in a straight line. The flame of the candle will not be visible now. This activity shows that light travels in a straight line.

2.



3.



Incident Ray: A ray of light which strikes the surface is called incident ray. XO is the incident ray in the diagram shown.

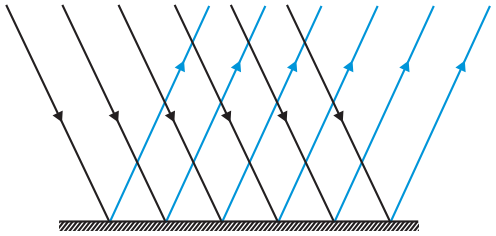
Reflected Ray: A ray of light which bounces off the surface is called reflected ray. Here OY is the reflected ray.

Normal: A dotted line perpendicular to the reflecting surface is called normal.

4. When a light coming from a source falls on the objects in front of a mirror, the image in a mirror is reflected by the mirror to the eye, creating the illusion of counting from a corresponding series points behind the mirror. A plane mirror forms an image equal to the six of the object and

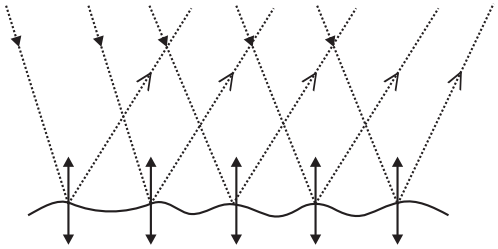
laterally inverted.

5. Image formed by a plane mirror is-
   (i) Laterally inverted
   (ii) is formd behind the mirror
   (iii) of equal size that of the object
   (iv) Image formed is same distance apart from the mirror as the object is.
6. Regular Relection: If the beam of light falls on a smooth surface, the entire beam is reflected in only one direction. This is called regular reflection.



Regular Reflection

Irregular Reflection: When beam of light falls on an uneven surfaces, they get reflected to different direction. This is called irregular reflection.



Irregular Reflection

7. Do it yourself

Scientific Thinker

1. The speed of the car and the speed of the image of the car will be the same because in a plane mirror image is formed behind the mirror at the same distance as the object is in front of the mirror.
2. (a) 2 m/s

Enrichment Learning

A. Do it youself
B. Do it yourself
C. Do it yourself

Hots

1. Reflection
2. Image
3. Opaque
4. Shadow
5. Luminous

Hots

A. Colour of the shadow is always black, no matter what colour light falls on it.

B. 1. (i) Q (ii) P (iii) R

2. P - wood Q - glass R - smoked glass

C. 1. Shadow 2. Sun 3. Ground 4. Shadow formation

Value Based Question

Do it youself

Chapter-18 — WATER AND AIR AROUND US

Page 190

Quiz Time

1. Three-fourth of earth's surface is covered with water.
2. The earth is called a blue planet becaue three-fourth of earth's surface is covered with water.
3. Source of surface water are- Rivers, lakes, ponds, oceans.

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1. Nitrogen
2. Oxygen
3. respiratory diseases
4. Breathing and release of energy

   Glucose + Oxygen — water + carbondioxide + energy

Exercise

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

6. b 7. a 8. d 9. d 10. a

B. 1. hydro electricity 2. groundwater 3. drought

4. fossil fuels 5. gills 6. gills

7. medium

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

6. F 7. T

D. 1. Natural resources refer to the things that exist freely in nature for human use and don't necessarily need the action of man-kind for their productions.

2. Surface water, groundwater and ice caps including glaciers together constitute hydrosphere.

3. Two main source of water are-

   (i) underground water (ii) surface water

4. Groundwater can be used by pumping it but through hand pump or electric pump.

5. The process used to store rain water from roofs is called rainwater harvesting.
6. Respiration is the process in which energy is released from the food.
7. The atmosphere envelopes the earth and is made up of air.
8. Neon gas is used in tubelights and glow signs.

E. 1. Water carries nutrients to different parts of our body. It also helps in excretion of wastes from the body in the form of urine and sweat. It also mantains our body temperature.

2. Groundwater keep on getting recharged by the rain that seeps into the ground, rivers that disappear underground and melting snow.

3. Drought may be caused due to low or no rainfall.

Causes of low or no rainfall are-

— Deforestation

— Excessive use of surface water due to population growth and industrilisation.

4. Effect of drought on people-

— Shortage of food grains.

— Drought displaces people from a large number of villages and towns.

— Due to shortage of water people have to travel long distance to fetch water.

5. Effect of drought on aquatic life-

— Aquatic animals die due to loss of their habitat.

6. Effect of flood on soil is-

— Heavy rainfall causes soil erosion.

— Flood causes water logging in fields for a long time.

7. Uses of water vapour

— Water vapour helps in water cycle.

— Water vapour saves us from sun burn and sunstroke.

8. During summer season the temperature is high so rate of evaporation becomes faster due to which wet clothes dry quickly.

F. 1. Use of water are as follows-

— Water is essential for germination of seeds and growth of plants.

— Water is used to irrigate fields.

— Human beings use water for bathing, cleaning, washing and cooking.

— Water is used in number of industries for producing goods.

— Plants need water to carry out the process of photosynthesis.

2. About 71% of the earth's surface is covered with water. About 97% of the hydrosphere is contained in world's ocean. About 2.16% is available as groundwater and only 0.03% of water is available in rivers, lakes, ponds etc. Only 0.01% of water is fit for consumption and agriculture.

3.

Flood	**Drought**
It occurs due to heavy rainfall.	It occurs through no rainfall.
Often takes place in coastal areas.	It takes place in dry region.

4. A drought occurs when there is a lack of precipitation over an extended period of time. It imparts human activities and causes a great loss of life to plants and animals.

Causes

Drought is cause due to low or no rainfall.

Low or no rainfall is caused due to

— Deforestation

— Excessive use of surface water

Effects

— Soil becomes dry.

— Shortage of food.

— Living organisms of the soil die.

5. The natural occurence where an area of land that is normally dry abruptly becomes submerged in water is known as flood.

   Causes:

   — Due to excessive rainfall.

   — Due to overflow of streams, rivers, lakes or oceans.

   Effects

   — Heavy rainfall causes soil erosion

   — Houses get destroyed.

   — Water logging in field.

   — Roads, electric supply, telephone lines, supply of drinking water etc., get disrupted.

   — Animals get drowned in flood water.

6. Collecting rainwater and storing it for future use is called rainwater harvesting. Rainwater is collected on the roofs of the buildings. This water is discharged in pits through pipes. The water gradually percolates and reaches to the level of groundwater. In this groundwater is recharged. The water thus stored is treated before use.

7. The components of air are-
   (i) Nitrogen- It is the main constituent of air which controls burning.
   (ii) Argon- This is an inert gas. It is used in electric bulbs.
   (iii) Neon- This is also an inert gas. It is used in tubelights.
   (iv) Water vapour- It helps in watercycle and also protect us from sunburn and sunstroke.

8. Plants need air because they need carbon dioxide to carry out photosynthesis atmospheric carbon dioxide move in and out by simple diffusion through stomata and prepare their food through photosynthesis.

Scientific Thinker

Do it yourself

Enrichment Learning

A. Do it yourself

B. Do it yourself

C. Do it yourself

D.

1. Breathing	2. Water	3. Leaves	4. Respiration	5. Snow
6. Floods	7. Drought	8. Conservation	9. Argon	
10. Renewable	11. Nitrogen			

E. Do it youself

Hots

1. Carbondioxide is important for plants to prepare their food by the process of photosynthesis. We depend on plants for food therefore carbondioxide is important for our survival.
2. (i) Oxygen (ii) Nitrogen
   (i) 20.95% (ii) 78.08%
3. Q, (Nitrogen)
4. Q (Nitrogen)

C. The impurities in rainwater are dust present in air. The rain mixes with this dust present in air.
Pollutant like sulphur dioxide and nitrogen dioxide in air react with water vapour present in air to form sulphuric and nitric acid. These acids mix with rain and make acid rain.
This acid rain corrodes building material like marble and the phenomenon is called marble cancer.

D. (i) P - water
Q - rain
R - drought
flood
(ii) Ice

Value Based Question

Do it youself

Chapter - 19 — GIGO–GARBAGE IN, GARBAGE OUT

Page 202

1. Sources of food wastes are fruit and vegetable peels, leftover food, residues of meat, fish etc.
2. Bacreria and Fungi
3. Garbage can be biodegradable or non-biodegradable. To keep them separated blue and green bins are made. Blue for non-biodegradable and green for biodegradable. It becomes easier to be disposed off.

Exercise

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

B.
1. food waste
2. coal
3. Biodegradable and non-biodegradable
4. Dumping and composting
5. Resue and recycling

C. 1. T 2. T 3. T 4. T 5. T
6. F 7. T

D.
1. Useless and discarded material is called waste.
2. Food wastes such as fruit and vegetable peels, leftover food and paper, plastics, egg shell are

all solid wastes.

3. Paper, plastic, rubber, wood, glass, metallic wastes etc., are called rubbish.
4. Gaseous waste is produced by motor vehicles, industries and thermal power plants.
5. Sources of waste generation are-

   Home kitchen

   Factories

   Industries

   Bathroom

   Office, schools.
6. Food wastes include fruit and vegetable peels, leftover food, residuces of meat etc.
7. Waste which can be decomposed into the raw materials by mircroorganisms are called biodegradable wastes.
8. Organisms that decompose organic materials are called decomposers. Such as fugi and bacteria.

E. 1.

Biodegrable waste	Non-biodegradable waste
Waste which can be decomposed.	Waste which cannot be decomposed.
Example- wood, paper, leather etc.	Example- plastic, metal oxides, mercury.

2. Liquid waste includes chemicals, metal wastes etc., which are harmful for water bodies. They pollute the water bodies and sometimes block them.
3. It is a method of waste disposal. In this method, solid wastes are spread in thin. compact layers and covered by a layer of clean Earth. The layer of Earth on the wastes does not allow insects or flies to breed on the wastes.
4. Polybags are dangerous because they are non-biodegrable. Besides animals eat these polybags which may be fatal for them.
5. Vermicompositing is a technique of converting organic waste into manure. In this, earthworms are used. Earthworms eat soil and various kind of organic matter and excrete it as manure.
6. Compositing is a natural process in which biodegrable wastes are decomposed by microbes and converted into manure. It is the best way because this manure is very useful and does not pose any threat to environment.
7. Recycling is a way to reduce waste. In this method, certain kinds of wastes are used as raw materials to produce fresh goods.
8. Waste can be recycle by : (i) Reuse (ii) Recycling

F 1. Solid wastes discarded from homes are:

   (i) Food wastes: Fruit and vegetable peels, leftover food, residuces of meat and fish.

   (ii) Rubbish: Plastic, paper, rubber, wood, glass, metalic waste, polythene bags, cardboard etc.
2. Dumping and compositing are the two commonly used methods for the disposal of wastes.

   Dumping: This method helps in proper decomposition of solid wastes. In this method, solid wastes are spread in this, compact layer and covered by a layer of clean earth. The layer of earth on the wastes does not allow insects or flies to breed on the wastes.

   Compositing: It is a natural process in which biodegradable waste are decomposed by microbes and converted into manure.
3. Harmful effects of acumulation of wastes are:

   • It causes harm to our environment which ultimately cause harm to our health.

- It destroys the beauty of our suroundings.
- It attracts flies, mosquiutoes, rats etc. which spread diseases by contaminating food and water.
- Liquid waste if discharged into water bodies pollute the water and harm aquatic animals and plants.
- Harmful smoke from motor vehicles cause respiratory diseases.

4. We can reduce waste in two ways:

(i) Reuse: The wastes material is separated which can be used in one way or the other.

Example: • Use old clothes as duster. • Use bottles to make flower pots.

(ii) Recycle : In this method, certain kinds of wastes are used as raw materials to produce fresh goods. For example - Paper can be recycled to make fresh paper.

5. Materials can be reused as :

(i) We can use old clothes as dusters.

(ii) We can use bottles and cans to make flower pots.

(iii) Rainwater can be used for washing and cleaning.

(iv) Old mobile phone can be donated to friends or family.

(v) Big tins cans or containers can be used to store household items.

Scientific Thinker

A. Dead bodies will rot and start smelling which will cause various diseases to people. Also, if they start accumulating, there won't be any place for plants and animals.

B. Do it yourself.

Enrichment Learning

A. Do it yourself.

B. Do it yourself.

C. 1. Segregation 2. Biodegradable 3. Landfil 4. Gizzard
5. Recycling 6. Earthworms 7. Garbage 8. Compositing

D. Do it yourself.

E. Do it yourself.

HOTS

A. 1. (*i*) Non-biodegrable (*ii*) Biodegradable
2. (*i*) plastic (*ii*) cotton
3. Decomposers

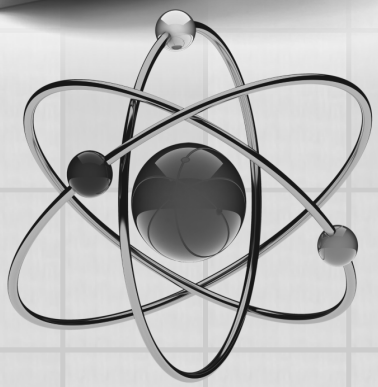
B. 1. (*i*) Blue (*ii*) Green
2. (*i*) Blue bin (*ii*) Green bin
3. Dustbin Y (green)
4. Dustbin X (blue)

C. Yes, plastic bags are dangerous. They are non biodegradable and also cause harm to animals.

D. Earthworms make burrows in the soil and make it porous which helps in respiration and penetration of the developing plant roots and hence, are called farmer's friends.

Value Based Question

Do it yourself



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