

Key to

General

7

Science

REVISED EDITION



PROGRESS PUBLISHERS

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1. Nutrition in Plants

- A. 1. symbiotic plants 2. both organisms benefit
3. availability of nitrogen
4. autotrophs 5. xylem 6. all of these
- B. 1. $C_6H_{12}O_6$ 2. host 3. Rhizobium
4. Leaves 5. Insectivorous 6. heterotrophs
7. Symbiosis
- C. 1. True 2. True 3. False
4. True 5. False 6. False
7. True
- D. 1. Autotrophic and Heterotrophic
2. Coral root, Indian pipe
3. Glucose, oxygen
4. Cuscuta, mistletoe
5. Pitcher plant, Venus flytrap
- E. 1. The process of intake of food by an organism and its utilisation by the body is called nutrition.
2. Plants that derive some of their nutrition from insects are called insectivorous plants. These plants have special features to trap insects and derive nutrition from their bodies.
3. The cells of green leaves and young stems of plants contain various green structures called chloroplasts. Their green colour is due to the presence of a green pigment called chlorophyll that traps energy from sunlight.
4. The tiny pores present on the underside of the leaves are called stomata. Stomata help in exchange of gases – carbon dioxide and oxygen, during photosynthesis.
5. Nitrogen-fixing bacteria, rhizobium, present in the root nodules of leguminous plants, convert atmospheric nitrogen into a usable form through the process of nitrogen-fixation.
- G. 1. Pitcher plant 2. Mushroom 3. Oxygen
4. Chlorophyll 5. Cuscuta 6. Stomata

Hints for HOTS

1. No, as they don't make their own food. They simply cook raw food into edible form.
2. Blocked stomata_no photosynthesis_no production of food.
3. Plants manufacture own food and don't need to digest food like humans.

Crossword

Across:

- | | | |
|-----------------|------------|---------|
| 4. Heterotrophs | 7. Stomata | 8. Host |
| 9. Glucose | 10. Oxygen | |

Down:

- | | | |
|-------------|---------------|----------------|
| 1. Xylem | 2. Nutrition | 3. Chlorophyll |
| 5. Parasite | 6. Saprophyte | |

2. Nutrition in Animals

- | | | |
|---------------------|-------------------|-----------------|
| A. 1. grinding food | 2. water | 3. heartburn |
| 4. omnivores | 5. anus | 6. abomasum |
| 7. liver | | |
| B. 1. gall bladder | 2. mucous | 3. small |
| 4. villi | 5. ruminants | 6. hydrochloric |
| 7. diarrhoea | | |
| C. 1. False | 2. True | 3. True |
| 4. True | 5. True | 6. True |
| 7. False | | |
| D. 1. chyme | 2. stomach | 3. oesophagus |
| 4. anus | 5. salivary gland | 6. villi |
| 7. pancreas | | |
- E. 1. The mode of consuming food varies from organism to organism. Mammals like elephants have long trunks to grasp and pull leaves and plants into their mouth for chewing. Dogs and cats use their tongues to lick milk and water. Butterflies, bees and moths have long thin sucking tubes to sip nectar from flowers.
2. Incisors - They help to cut and bite the food into small pieces.
Canines - They help to pierce and tear the food.
Premolars and molars - They both help to grind the food and break down into smaller pieces.
3. (a) The temporary teeth, called milk teeth, start developing when a child is around 3 months old. There are 20 milk teeth. These teeth are small and weak.
The permanent teeth develop around the age of 6 years. These teeth are 32 in number. They are strong and powerful.
- (b) Chyme is the semi-solid form of food after partial digestion in the stomach of humans. Cud is the partially digested food in the stomach of ruminants that is brought back into mouth for rechewing.

4. Tooth decay is the slow decaying of teeth due to formation of plaque and other harmful bacteria on the surface of the teeth. To prevent tooth decay:
 - (a) Brush after every meal.
 - (b) Rinse the mouth well after each meal and avoid eating too many sweets.
 - (c) Get a dental checkup done every six months.
5. The food stays in the stomach for about two and a half hours. The inner lining of the stomach contains gastric glands which secrete gastric juice. Gastric juice mainly contains hydrochloric acid which starts digestion of protein. The food gets partly digested in the stomach and gets converted into a semi-solid food called chyme.
6. The oesophagus and trachea share a common opening at the back of our throat called the epiglottis. Sometimes, especially when we are laughing or talking while eating, the epiglottis does not close in time. Pieces of food can slip down into the trachea causing discomfort. Thus, it is advised not to speak or laugh while eating or drinking.
7. When amoeba comes in contact with food particles, it pushes out its pseudopodia around the particles. The tips of the pseudopodia fuse with each other gradually and a cup like structure is formed called food vacuole. The digestive juices in the vacuole decompose the food into simpler soluble substances.

Crossword

Across:

- | | | |
|-----------------|------------|---------------|
| 1. Chyme | 2. Liver | 5. Oesophagus |
| 7. Assimilation | 9. Canines | |

Down:

- | | | |
|-----------------|-------------|-----------|
| 1. Constipation | 3. Egestion | 4. Saliva |
| 6. Plaque | 8. Rumen | |

Hints for HOTS

1. Grass and bark of trees contain cellulose which cannot be digested by humans.
2. These food items contain simple carbohydrates which give instant energy.

3. Fibres from Animals

- A. 1. rayon 2. cashmere goat 3. all of these
4. cocoon 5. all of these 6. sericulture
7. mulberry leaves
- B. 1. Silk 2. shearing 3. Mohair
4. fleece, kemp 5. silkmoth 6. Sorter's disease
7. filature or reeling
- C. 1. True 2. False 3. True
4. False 5. True 6. True
7. True
- D. 1. Animal fibres – wool, silk; Plant fibres – jute, cotton
2. Merino
3. Jammu and Kashmir, Arunachal Pradesh, Himachal Pradesh
4. Hissardale, nilgiri, bhakrawal
5. Egg – larva – pupa – silkmoth
6. China
- E. 1. Some hazards involved with production of wool are:
(a) The bacteria anthrax, present in infected wool, causes Sorter's disease.
(b) Various chemicals used for washing and dyeing of wool lead to irritation in eyes and allergies in skin.
(c) There is a risk of spinal and skeletal disorders and injuries due to head butts from sheep.
2. Some hazards involved with production of wool are:
(a) Reeling of silk fibres can cause arthritis of hands and fingers.
(b) There is a risk of getting burns during the process of dipping cocoons in boiling water.
(c) Skin infections can occur due to handling of dead silkworms and pupae.
3. Natural fibres are obtained from plants and animals, e.g. wool, silk and cotton. Synthetic fibres are manufactured in factories from various chemicals, e.g. nylon, rayon, polyester, and plastic.
4. (a) Sorting - Sorting of wool involves removal of inferior or broken fibres obtained after scouring.
(b) Scouring - Scouring is the removal of dust, dirt, dried sweat, grease, and dry plant matter from the sheared hair of the animal.
(c) Moulting - The process of shedding of skin by the caterpillar to become a larva is called moulting.

- (d) Reeling - The process of separating the silk filaments from the cocoons is called reeling.
5. Silk is an animal fibre produced by the silkworm. Its properties are:
 - (a) It is the thinnest and strongest natural fibre.
 - (b) It can be dyed easily in any colour.
 - (c) It is a good insulator of heat.
6. Wool is an animal fibre obtained from the hair of certain animals such as sheep, goat, angora rabbit, alpaca, yak, and camel. Its properties are:
 - (a) Wool is extremely durable and elastic.
 - (b) It burns slowly without producing any flame.
 - (c) It absorbs heat and acts as an insulator.
7. Breeding is the process of rearing animals with desired characteristics. Through the process of selective breeding, high yielding breeds of sheep are obtained.
8. Four varieties of silk produced in India are:
 - (a) Mulberry silk is obtained from the cocoons of silkworms which feed on the leaves of mulberry plant.
 - (b) Tussar silk is obtained from the cocoons of silkworms which feed on the leaves of sal, saja and arjun plants.
 - (c) Muga silk is obtained from the cocoons of silkworms which feed on the leaves of som and soalu plants.
 - (d) Eri silk is obtained from the cocoons of silkworms which feed on the leaves of castor plants.

Crossword

Across:

- | | | |
|------------|-------------|----------------|
| 3. Fleece | 6. Cocoon | 7. Sericulture |
| 8. Anthrax | 9. Filature | |

Down:

- | | | |
|-------------|-------------|-------------|
| 1. Merino | 2. Kemp | 4. Scouring |
| 5. Moulting | 7. Shearing | |

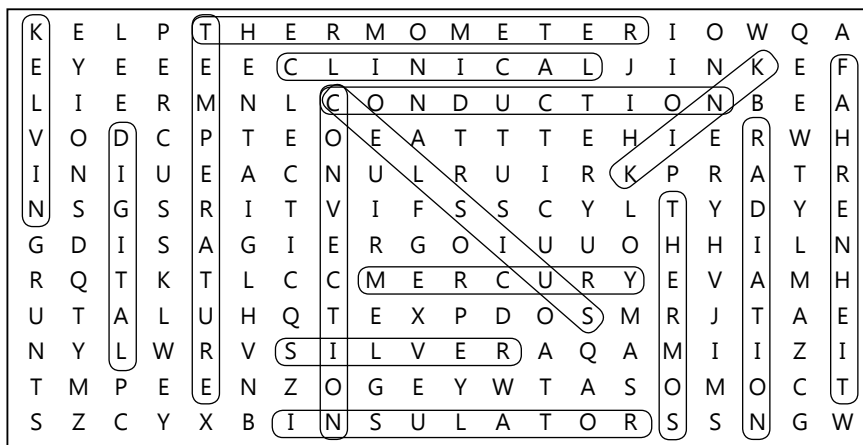
Hints for HOTS

1. The process kills germs and protects sheep from infections.
2. The handling of caterpillars can cause skin infection.
3. The hair of fleece have no nerve endings.

4. Heat and Temperature

- A. 1. 30°C 2. 32°F
3. laboratory thermometer 4. Joule
5. radiation 6. air
- B. 1. $-10, 110$ 2. radiant 3. decrease
4. 212 5. radiation 6. electromagnetic
- C. 1. False 2. True 3. True
4. False 5. False 6. False
- D. 1. The conditions necessary for the flow of heat from one object to another through conduction are:
(a) The objects must be in solid state.
(b) The objects must be kept in contact with each other.
(c) There must be a difference in temperature of the objects.
2. A digital thermometer does not contain any mercury in it. Thus, it is safer than a clinical thermometer.
3. Heat is a form of energy present in every object while temperature is the measure of heat energy contained in an object.
4. Substances that allow heat to flow through them easily are called conductors of heat. Substances that do not allow heat to flow through them easily are called insulators or poor conductors of heat.
5. Some applications of radiation of heat are:
(a) We wear light-coloured clothes in summers as they do not absorb much heat and keep us cool. In winters, we wear dark-coloured clothes as they absorb more heat and keep us warm.
(b) The roofs of factories and furnaces are painted white from outside to increase the radiation of heat in summers and reduce the loss of heat in winters. This helps in maintaining a uniform temperature inside the factory or furnace.
(c) The curved reflector at the back of a room heater is usually made of a shiny surface so that it reflects all the heat coming from the heating coil of the heater.
6. The amount of radiant heat absorbed or radiated by an object depends on its texture, colour, temperature, and surface area.

Word Search



Hints for HOTS

1. These thermometers contain mercury which is toxic.
2. Direct sunlight in summers and higher rate of radiation in winters.
3. Two thin blankets contain a layer of air between them which acts as insulator.

5. Matter and Chemical Formulae

- A. 1. a molecule 2. 118 3. Ca
 4. 1 5. atomicity
- B. 1. element 2. compound 3. Matter
 4. chemical symbols 5. direction
- C. 1. False 2. True 3. True
 4. False 5. False
- D. 1. Calcium, Oxygen, Hydrogen
 2. Fe – Iron, Cu – Copper, Zn – Zinc, Au – Gold
 3. Element, compound and mixture
 4. Aluminium sulphate
- E. 1. $2\text{Al} + 3\text{FeCl}_2 \longrightarrow 2\text{AlCl}_3 + 3\text{Fe}$
 2. $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$
 3. $\text{Ca}(\text{OH})_2 + 2\text{HCl} \longrightarrow \text{CaCl}_2 + 2\text{H}_2\text{O}$
 4. $2\text{C}_2\text{H}_6 + 7\text{O}_2 \longrightarrow 4\text{CO}_2 + 6\text{H}_2\text{O}$
 5. $\text{Na}_2\text{O} + \text{H}_2\text{O} \longrightarrow 2\text{NaOH}$
- F. 1. An element is a pure substance made of only one kind of atoms. It cannot be further broken down into simpler substances by physical or chemical methods. Aluminium and carbon are examples of elements.

2. An atom may not be capable of independent existence while a molecule is capable of independent existence.
3. The number of atoms present in one molecule of a substance (element or compound) is called its atomicity. Based on atomicity, molecules can be classified as monoatomic, diatomic, triatomic, or polyatomic.

4. The valency of an element is a measure of number of atoms with which one atom of the element can combine during chemical reactions.

The valency of the following elements are: Hydrogen – 1, Oxygen – 2, Sodium – 1, Chlorine – 1, Magnesium – 2.

5. The symbol of potassium is K as it is derived from its latin name Kalium.
6. (a) Carbon dioxide – CO_2
(b) Magnesium chloride – MgCl_2
(c) Calcium sulphate – CaSO_4
(d) Iron chloride – FeCl_2

Crossword

Across:

- | | | |
|--------------|--------------|--------------|
| 2. Products | 5. Compound | 7. Atomicity |
| 8. Reactants | 10. Molecule | |

Down:

- | | | |
|-----------|------------|------------|
| 1. Atom | 3. Radical | 4. Valency |
| 6. Matter | 9. Element | |

Hints for HOTS

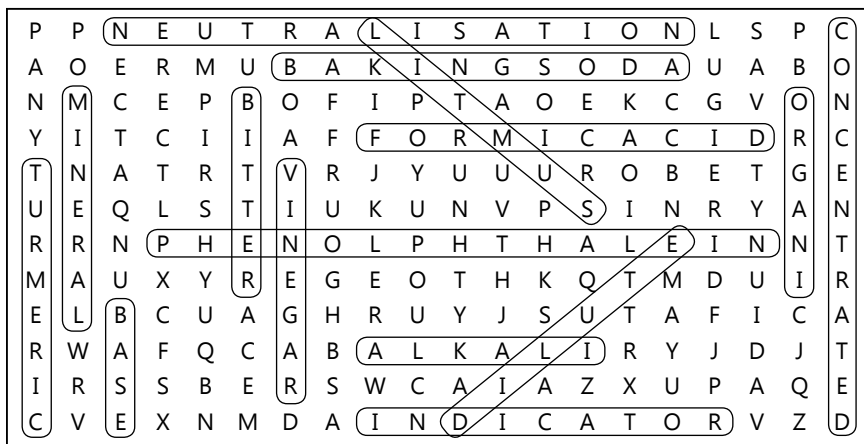
1. The formula of a substance cannot be changed for balancing a chemical equation.
2. Yes as these atoms can exist independently.
3. No, as their composition is not fixed and their properties can change depending on their composition.

6. Acids, Bases and Salts

- | | | |
|-------------------|----------------------|------------------|
| A. 1. nitric acid | 2. strong bases | 3. alkalis |
| 4. lichens | 5. hydrochloric acid | |
| 6. antacid | | |
| B. 1. red | 2. Organic | 3. mineral acids |
| 4. blue, red | 5. bases | 6. baking soda |
| C. 1. False | 2. True | 3. False |
| 4. True | 5. True | 6. False |

- D. 1. Acids in which the amount of water present is minimum are called concentrated acids or pure acids. Acids in which the amount of water present is more than concentrated acids are called dilute acids.
2. Differences between acids and bases are:
- (a) Acids taste sour while bases taste bitter.
 - (b) Acids are warm and corrosive while bases are soapy and slippery.
 - (c) Acids turn blue litmus red while bases turn red litmus blue.
3. The reaction in which an acid reacts with a base to form salt and water is called neutralization reaction.
For example, when hydrochloric acid reacts with sodium hydroxide, sodium chloride (salt) and water are formed.
$$\text{HCl} + \text{NaOH} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$$
4. A salt is a substance formed when an acid reacts with a base. Some properties of salts are:
- (a) Salts are usually solids that are soluble in water.
 - (b) Salts are electrolytes and conduct electricity in solution or molten form.
 - (c) Salts usually have high melting and boiling points.
5. Sodium chloride is used:
- (a) in cooking and for enhancing taste of food.
 - (b) in preparation of soaps and detergents.
- Sodium bicarbonate is used:
- (a) as an antacid in medicines to remove acidity of the stomach.
 - (b) in soda-acid fire extinguishers.
6. The effect of hydrochloric acid on the following indicators is:
- (a) Red litmus – no change in colour.
 - (b) Blue litmus – colour changes from blue to red.
 - (c) Methyl orange – colour changes from orange to red.
 - (d) Phenolphthalein – no change in colour.
7. (a) Metals react with acids and dissolve in them to form salts. Thus, acids are not stored in metal containers. Acids do not react with glass or ceramic.
- (b) Fruits and vegetables contain naturally occurring acids in them. Since, acids taste sour, fruits and vegetables taste sour.

Word Search



Hints for HOTS

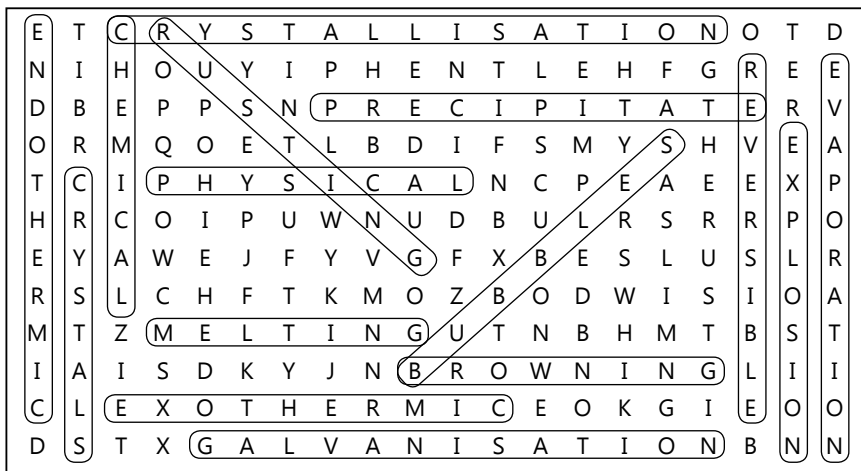
1. Basic
2. Soaps are basic in nature.

7. Physical and Chemical Changes

1. physical change
2. all of these
3. changes from blue to green
4. chemical change
5. milky
1. chemical
2. odour
3. exothermic
4. crystals
5. acetic acid
1. False
2. True
3. True
4. False
5. True
1. A crystal is a piece of pure solid substance having a natural geometrical shape. Three crystalline substances are – sugar, common salt and alum.
2. Three methods to prevent rusting of iron are:
 - (a) Coating the iron objects with a layer of oil, grease or paint.
 - (b) Depositing a layer of molten zinc on the surface of iron objects.
 - (c) Electroplating iron objects with a layer of tin or chromium.
- (a) Tearing of paper, breaking a glass tumbler into small pieces.
- (b) Boiling of water, freezing of water.
- (c) Inflating a football, squeezing a sponge.
- When food is cooked, its ingredients undergo chemical changes and react with each other to form new substances. Thus, cooking is considered a chemical change.

- An exothermic reaction is a chemical reaction in which heat is released or evolved. An endothermic reaction is a chemical reaction in which heat is absorbed during the reaction.
- Browning can be prevented by soaking the cut fruits and vegetables in water. Browning can also be prevented by cooking, adding lemon juice to the cut pieces or by adding preservatives such as sodium bisulphite.

Word Search



Hints for HOTS

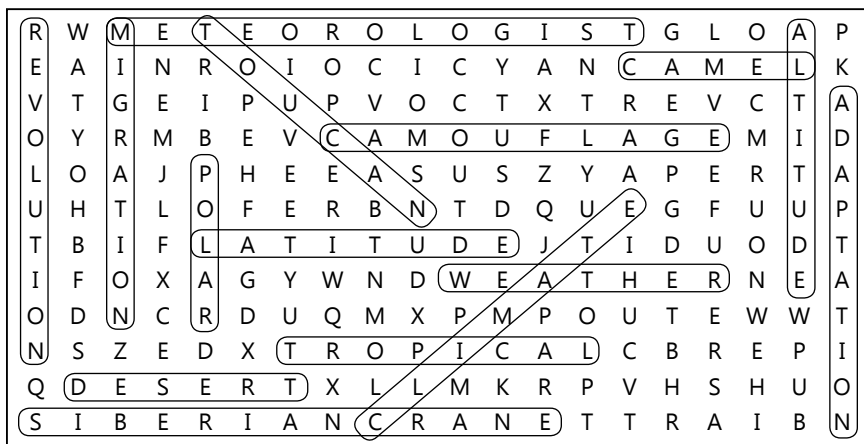
- Only physical state of water changes, no new elements are formed.
- Zinc does not let iron come in contact with air or moisture.
- Curdling of milk, burning of candle, electroplating

8. Weather, Climate and Adaptation

- hibernation
 - polar region
 - skin colour merging with the surrounding
 - 23.5°
 - rain gauge
 - computers
- latitude, altitude
 - meteorology, meteorologist
 - weather forecasting
 - hump
 - arboreal
 - equator
- False
 - True
 - True
 - True
 - False
 - False
 - True
- Birds from polar region migrate to escape the harsh living conditions and shortage of food during winters.
 - The differences between weather and climate are:
 - Weather is the atmospheric conditions of a place at a given time. Climate is the average weather conditions of a place over a long period of time.

- (b) Weather conditions of a place change every day and may change several times during a day. Climate of a place usually remains same for several days.
3. Camouflage is the natural colouring or form of an animal which enables it to blend in with its surroundings. Animals and insects practice camouflage to hide from their predators and prey.
4. Four adaptations in camel to survive in a desert are:
- It has broad, flat and padded feet which enable it to walk comfortably without sinking into the sand.
 - The hump of the camel stores fat that help it survive for long periods without food and water.
 - A camel has two rows of long eyelashes that protect against blowing sand and the glare of sunlight.
 - It excretes highly concentrated urine in little quantity, does not sweat and passes dry stool.
5. The axis of Earth is not perpendicular to the orbit of revolution of Earth and is tilted at an angle of 23.5° . The tilt of the axis of Earth is responsible for unequal duration of day and night throughout the year. It is also responsible for different climates in different parts. The parts of Earth near the Sun enjoy summers while those far from it enjoy winters.
- F. 1. B due to low variation in temperature and rainfall.
 2. A due to large variation in temperature and being dry.
 3. B

Word Search



Hints for HOTS

- Specific climatic conditions favour specific features
- For protection and warmth

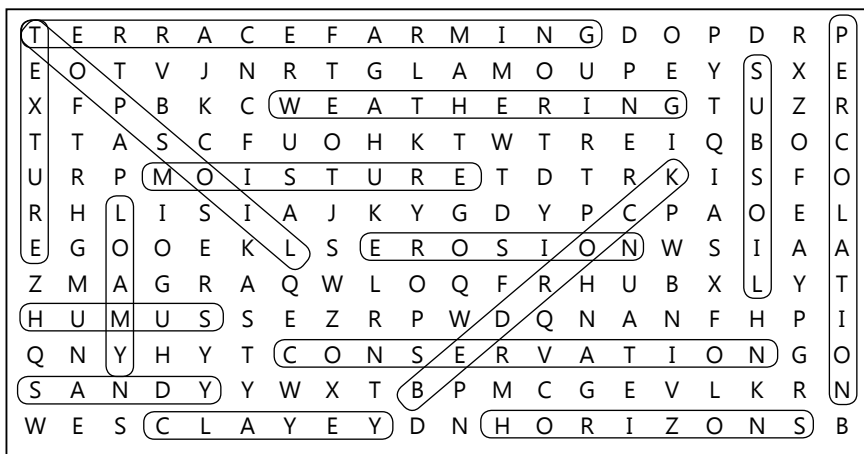
9. Soil

- A. 1. all of these 2. soil erosion 3. clayey soil
4. B-horizon 5. all of these 6. horizons
- B. 1. subsoil 2. percolation rate 3. bedrock
4. Clayey 5. living organisms 6. Humus
- C. 1. False 2. True 3. True
4. True 5. False 6. True
- D. 1. Soil is the thin layer of material covering the Earth's crust. It is one of the most important natural resources essential for sustenance of life on Earth. It is formed by the weathering of rocks and minerals.
2. Four uses of soil are:
- (a) It is used in making pottery and bricks.
 - (b) It provides essential nutrients to the plants required for their growth.
 - (c) It provides habitat for a large number of organisms such as insects, earthworms, bacteria, and fungi.
 - (d) Soil extracts are used in making medicines and herbal beauty products.
3. Fertility of soil means the capacity of the soil to provide adequate amount of nutrients for the growth of plants. The soil in which the following crops grow best are:
- (a) Wheat – clayey and loamy soil
 - (b) Paddy – clayey soil rich in organic matter
 - (c) Pulses – sandy loamy soil
 - (d) Cotton – sandy loamy soil
4. Four causes of soil erosion are:
- (a) Deforestation by humans.
 - (b) Overgrazing by animals on the same tract of land.
 - (c) Leaving the land uncultivated for a long time.
 - (d) Heavy rainfall and floods.
5. The process of weathering can be divided into following three stages:
- Stage 1: Large pieces of rocks and minerals undergo weathering and disintegrate into smaller pieces.
- Stage 2: The smaller pieces of rocks undergo further weathering to form a layer of fine particles, which mixes with microorganisms to form humus.

Stage 3: The minerals and salts present in the top layer of soil dissolve in water and seep underground to reach the bottom layers.

6. The rate at which water moves through the soil is called its percolation rate. Different soils have different percolation rates, which depend on the composition of soil. Percolation rate helps in selection of suitable soil for growing different crops.

Word Search



Hints for HOTS

1. No, as it is too dry for growing crops.
2. No, as these hold soil together and prevent soil erosion.

10. Respiration in Organism

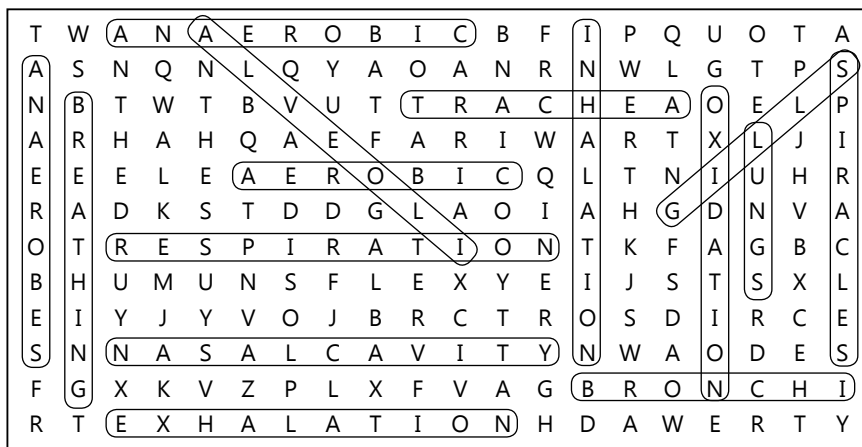
- A. 1. trachea 2. alveoli
3. cellular respiration 4. lactic acid 5. tracheae
- B. 1. lenticels 2. aerobes
3. intercostal muscles 4. Cellular 5. Diaphragm
- C. 1. True 2. True 3. True
4. True 5. False
- D. 1. The primary organ for breathing is the nose which consists of two nostrils. The nostrils contain hair that trap dust and germs present in the inhaled air and filter it. The lining of the nostrils produces a sticky substance, called mucus, which also helps in trapping germs. The blood circulating in the blood vessels makes the inhaled air warm.
2. Rajat suffered cramps due to anaerobic respiration that occurred due to insufficient supply of oxygen during physical activity.

This led to formation of lactic acid in the body which caused the cramps. By rubbing his muscles, Rajat increased the absorption of oxygen which helped in decreasing the amount of lactic acid and the pain in the muscles.

3. (a) The process of respiration that occurs in presence of oxygen is called aerobic respiration. This type of respiration takes place in almost all organisms, including human beings. The process of respiration that occurs in absence of oxygen is called anaerobic respiration. This type of respiration takes place in bacteria, parasites and yeast.
- (b) Inhalation or inspiration is the process of taking in air through the nose. During inhalation, the diaphragm contracts and moves downwards. Exhalation or expiration is the process of letting out air through the nose. During exhalation, the diaphragm expands and moves upwards.
4. The bronchi end into tiny air sacs called alveoli. The alveoli are the organs where the exchange of gases actually takes place during the process of respiration. Alveoli absorb oxygen present in the air that we inhale and release carbon dioxide present in the blood.
5. The number of times we breathe in a minute is called breathing rate. It increases with physical activity as the body requires more oxygen for respiration to produce larger amount of energy required.

- F. (a) nasal cavity (b) nostril (c) pharynx
 (d) trachea (e) bronchiole (f) lung
 (g) diaphragm

Word Search



Hints for HOTS

1. Humans cannot absorb oxygen dissolved in water.
 2. Trees release carbon dioxide gas during night.
 3. Different organisms have different mechanisms and adaptations for breathing.
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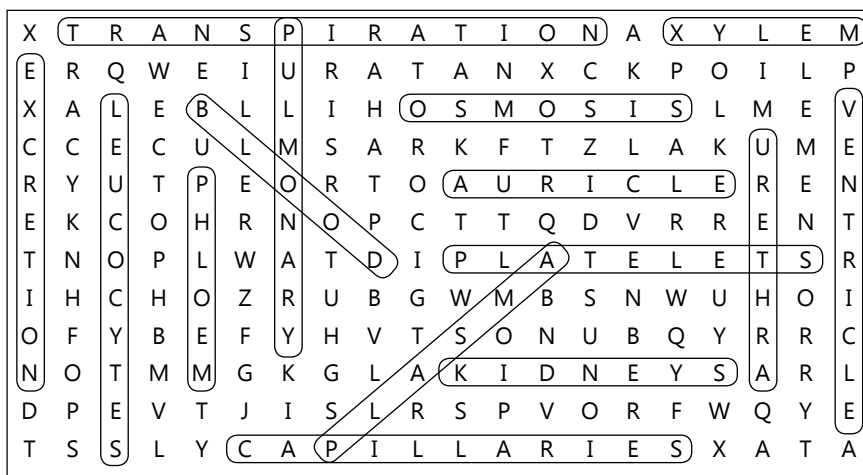
11. Transportation and Excretion

- A. 1. food 2. capillaries 3. septum
4. WBC 5. veins
- B. 1. xylem 2. nephrons 3. platelets
4. heart beat 5. red blood 6. left
- C. 1. False 2. False 3. True
4. True 5. False
- D. 1. Other arteries carry blood rich in oxygen from heart to other body parts but pulmonary artery carries blood rich in carbon dioxide from the heart to the lungs. Other veins carry impure blood rich in carbon dioxide from the lungs to the heart but pulmonary vein carries oxygen-rich blood from the lungs to the heart.
2. Transpiration serves two important functions in plants:
(a) It keeps the plant cool.
(b) It helps in transportation of water from the roots throughout the plant.
3. (a) In amoeba, transportation of substances occurs by the process of diffusion of substances through the cell.
(b) In hydra, substances are transported from one part of the body to another through water.
4. The functions of the various blood cells are:
(a) Red blood cells help in transporting oxygen to different parts of the body and removing carbon dioxide from the body cells
(b) White blood cells move actively in the blood and fight against microbes that may enter the body. They also provide immunity against many diseases.
(c) Platelets help in clotting of the blood and prevent flow of blood from cuts and wounds.
5. a) Arteries carry pure blood rich in oxygen from the heart to various body parts while veins carry impure blood from body parts to the heart.
Arteries have thicker walls while veins have thinner walls. Arteries are situated deep under the skin while veins are situated near the skin.

- Arteries do not have valves while veins have valves in them.
- (b) Xylem is a system of tubular tissues in plants that transports water and minerals from the roots to various parts of the plant. Phloem is a network of sieve-like tissues in plants that carries food from leaves to other parts of the plant.
6. Dialysis is a treatment used for people whose kidneys do not work properly. It involves periodic removal of waste products from the body of a person through a machine called dialyzer. The dialyzer removes wastes from the body of the patient through diffusion and ultrafiltration.

Word Search

Hints for HOTS



1. Veins have valves to prevent the backflow of blood due to the pressure exerted by the heart.
2. Food is required by all parts of the plant.
3. Greater blood pressure may rupture the arteries.

12. Reproduction in Plants

- A. 1. ovary 2. stem tuber 3. anther
 4. style 5. grafting
- B. 1. asexual 2. spore formation 3. scion, stock
 4. Bisexual/Complete 5. zygote
- C. 1. False 2. True 3. False
 4. True 5. True

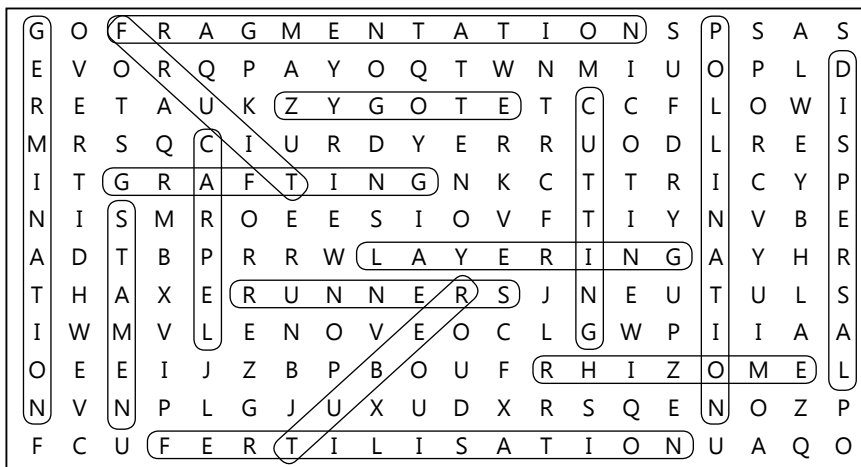
- D. 1. (a) In self-pollination, the pollen grains from the anther of a flower are transferred to the stigma of the same flower directly, without any external agent. It occurs in bisexual flowers only.

In cross-pollination, the pollen grains from the anther of a flower are transferred to the stigma of another flower on the same plant or a flower of another plant of the same kind. It usually occurs through an external agent such as insect or wind.

- (b) Flowers of plants that contain both the male and female reproductive organs in the same flower are called bisexual or complete flowers. Flowers of plants that contain only one reproductive organ (male or female) in a single flower are called unisexual or incomplete flowers.
- (c) Pollination is the process of carrying the pollen grains from one flower to the stigma of same flower or another flower. Fertilisation is the process of fusion of the male gamete with the female gamete to form a single new cell called zygote.
2. After the process of fertilisation, the outer parts of the flower usually fall off. The ovaries containing food ripen into fruits while the ovules containing the embryo convert into seeds. The seeds are covered with a hard covering called seed coat to protect the embryo.
3. Asexual reproduction is the mode of reproduction in which a new plant is formed from a single parent plant, without the involvement of seeds. The offspring produced through asexual reproduction is identical to the parent.
- Sexual reproduction in plants involves the fusion of cells of the male and female reproductive organs of a plant. Sexual reproduction occurs only in flowering plants.
4. Some advantages of vegetative propagation are:
- (a) Seedless varieties of plants can be grown by this method.
- (b) The offsprings are genetically identical to the parent plant.
- (c) New varieties of plants having desired features can be produced.
5. Dispersal of seeds is the process by which seeds get scattered over large areas. If all seeds of a plant fall near the plant and germinate, they will not be able to develop properly due to competition for sunlight and nutrients. Thus, it is necessary

for the seeds to be dispersed over a wide area to stand better chances of survival and growth. Seed dispersal usually occurs through various means called agents of dispersal such as wind, water, animals or explosion.

Word Search



Hints for HOTS

1. Through wind
2. Sexual reproduction brings variety.
3. Grafting as it brings desired properties in fruits.

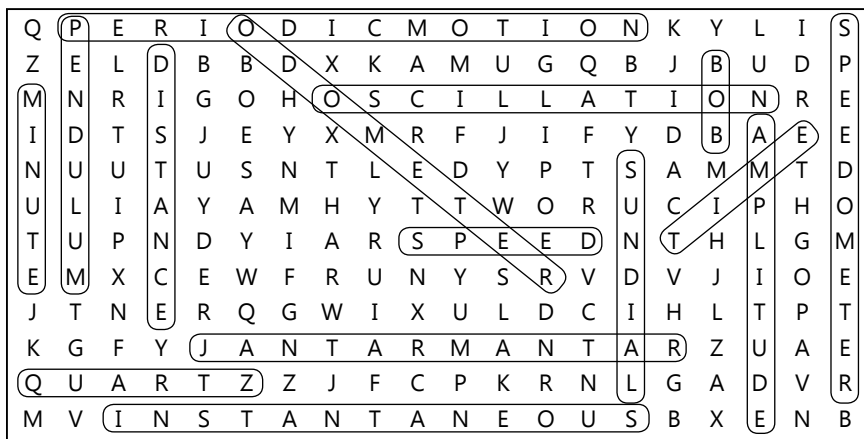
13. Time and Motion

1. m/s
2. sundial
3. 1000 years
4. $2 m/s$
5. atomic clock
1. Christian Huygens
2. uniform
3. Jantar Mantar
4. rest
5. speed
1. False
2. False
3. True
4. True
5. False
1. All our activities are related to passage of time. We eat, sleep, work, and rest at regular intervals. Some tasks like launching of satellites, giving medicine to patients, etc. are critical to passage of time. Thus, it is important to measure time.
2. Average speed of an object is its speed over a long period of time. It is defined as the total distance covered by the object divided by the total time taken to cover that distance.

Thus, average speed = $\frac{\text{total distance covered}}{\text{total time taken}}$

- A quartz clock or watch uses an electronic circuit driven by the vibrations of a quartz crystal. The circuit measures the vibrations of the crystal and turns them into electric pulses. These pulses are used to drive gears that move hands on a dial (analog clocks) or display numbers on an LCD panel (digital clocks).
- Distance covered = 3300 km
Time taken = 5 hr
Thus, speed of jet = $\frac{\text{distance covered}}{\text{time taken}} = \frac{3300}{5} = 660 \text{ km/hr}$
- The speedometer is used for measuring the instantaneous speed of a vehicle. An odometer measures the distance covered by a vehicle.

Word Search

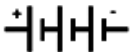


Hints for HOTS

- Time periods can be small or large.
- A sand clock can measure duration of time but cannot measure instance of time.
- They are complex and costly.

14. Electric Current and its Effects

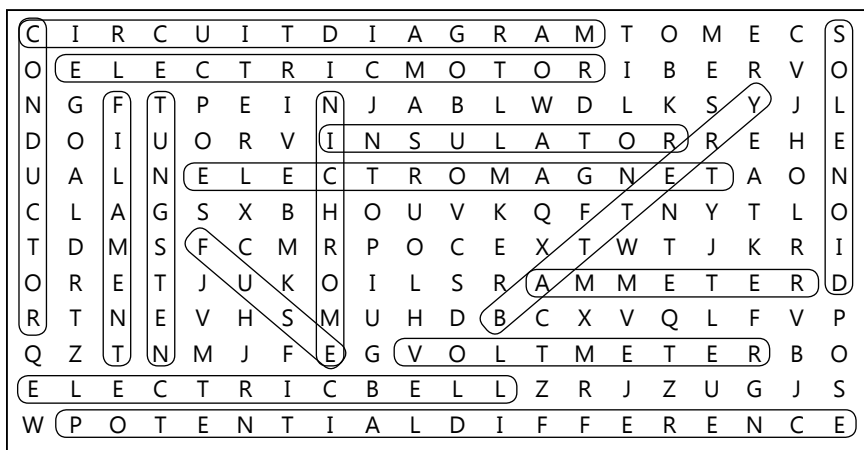
- | | | |
|---------------------|---|------------|
| A. 1. nichrome | 2. electric motor | 3. Oersted |
| 4. electric fuse | 5. increasing number of turns in the coil | |
| B. 1. electromagnet | 2. Tungsten | 3. ammeter |
| 4. soft iron | 5. iron objects | |
| C. 1. False | 2. True | 3. False |
| 4. True | 5. False | |

- D. 1. A solenoid is a long coil containing a large number of close turns of insulated copper wire which acts as an electromagnet.
2. An MCB (miniature circuit breaker) is a kind of fuse that automatically switches off if the current in the circuit exceeds a particular limit. To restore the supply of electric current in the circuit, the MCB is switched on again.
3. The element of a heating device is made of a material that has a high resistance and generates a large amount of heat. The connecting wires are made of copper, which is a good conductor of electricity and does not produce much heat even when electric current passes through it for a long time.
4. The strength of an electromagnet can be increased by :
- (a) Increasing the strength of the current through the wire.
 - (b) Increasing the number of turns of the copper wire.
 - (c) Using a magnetic material as the core for the electromagnet.
5. The symbol for the various components of an electric circuit are:
- (a) 
 - (b) 
 - (c) 
 - (d) 
6. The two types of fuses are:
- (a) A porcelain fuse consists of a socket in which the fuse wire is fitted. If the fuse blows and the wire melts, it can be easily repaired.
 - (b) A cartridge fuse consists of a fuse wire fitted inside a small glass tube with its ends attached to metallic caps at both the ends of the tube. It is compact in size and is usually provided inside an electrical appliance.

Hints for HOTS

1. High melting point will not allow the fuse wire melt easily.
2. An electric power plant generates its own magnetic field.
3. These materials are insulators of electric current.

Word Search



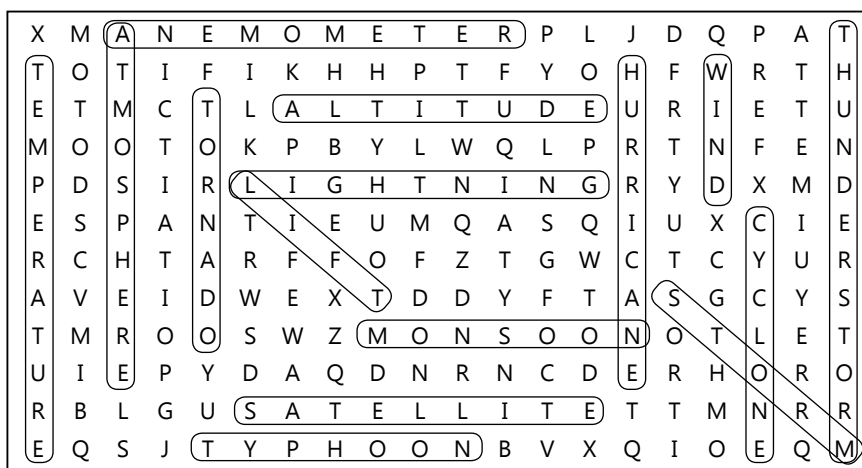
15. Wind, Storm and Cyclone

- A. 1. a weather vane 2. from high pressure to low pressure
3. hot and humid regions 4. sea to land
5. twister
- B. 1. eye 2. speed 3. funnel
4. typhoon 5. eye
- C. 1. True 2. False 3. False
4. True 5. True
- D. 1. Cyclones are formed over regions that are hot and humid. Since, the amount of humidity over land masses is usually not high, cyclones are not produced over land.
2. Different places receive different amounts of sunlight. Due to this, there is a difference in temperature at these places. Cooler air is denser and heavier than warm air. As air absorbs heat, it expands, becomes lighter and rises up. The cooler air rushes to take its place, producing wind.
3. Moving air or wind can produce a lift on objects. The speed of wind is inversely proportional to pressure. Thus, wind blowing at a high speed during a storm creates a region of low pressure. This causes air to move vertically up from a region of high pressure to a region of low pressure, producing a lift on an object like the roof of a tin shed. Hence, the roof is blown away.
4. A tornado is a violent storm consisting of a rapidly rotating funnel-shaped column of wind, with its narrow end towards the ground. Tornadoes develop from thunderstorms and are

mostly formed on land. In a tornado, warm air rising from the land revolves around a column of cold air coming down from a thundercloud.

5. As hot and humid air rises up, the water vapour present in it condenses and forms water droplets. These water droplets become electrically charged when they rub with the layers of cooler air moving down and get collected in clouds. The charges accumulated are discharged, between two clouds or from a cloud to the ground, in the form of lightning. The heat produced during lightning causes air to expand, which produces thunder.

Word Search



Hints for HOTS

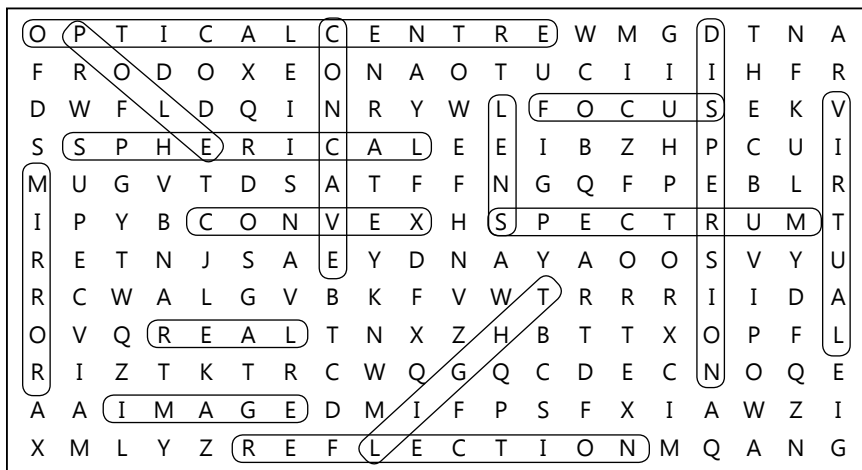
1. Human beings are too heavy to be lifted by wind.
2. They may result in short circuit or electric shock.
3. Cyclones require a region of humidity.

16. Light – Mirrors and Lenses

- A. 1. convex mirror 2. purple 3. erect
4. real 5. concave
- B. 1. dispersion 2. convex 3. concave
4. optical centre 5. convex
- C. 1. False 2. False 3. False
4. True 5. True
- D. 1. A convex mirror is used as side rear-view mirror in vehicles as it forms an erect and diminished image of an object and thus, offer a wider field of view.

2. Lateral inversion is the phenomenon in which the right side of an object appears as the left side of its image and vice versa, when viewed in a mirror. The property of lateral inversion is used in writing the word AMBULANCE on hospital vehicles. The word is written in reverse so that the vehicles ahead of the ambulance can see the word AMBULANCE clearly in their rear view mirror and give way to the ambulance immediately.
3. The uses of spherical lenses are:
 - (a) A convex lens is used as a magnifying glass to view small objects clearly and read text written in small size.
 - (b) Convex and concave lenses are used in various optical instruments.
 - (c) Convex and concave lenses are used in spectacles to correct defects of vision.
4. The phenomenon of splitting of white light into its component colours when it passes through a transparent medium such as a glass prism is called dispersion of light.
5. The focus of a concave mirror is the point where all light rays meet or appear to diverge from after reflection from the mirror.
6. The two laws of reflection are:
 - (a) The incident ray, the reflected ray and the normal at the point of incidence, all lie in the same plane.
 - (b) The angle of incidence is always equal to the angle of reflection. Thus, $\angle i = \angle r$.

Word Search



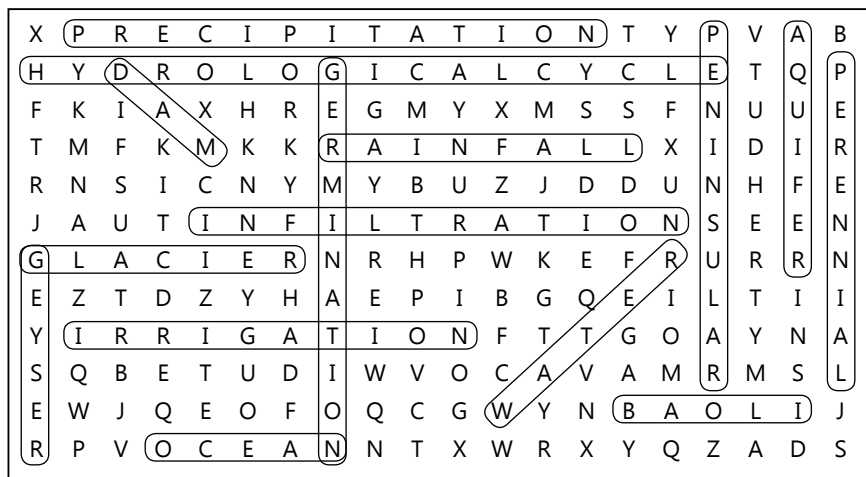
Hints for HOTS

1. 12 m
2. 74°
3. Sunlight focused through a lens can harm the eyes.

17. Water – A Precious Resource

- A. 1. rainwater 2. water table
3. glaciers 4. rainwater harvesting
5. population growth 6. impervious rocks
7. transpiration
- B. 1. aquifer/ground water 2. Water cycle
3. geysers, springs 4. Ocean, sea, river
5. melting 6. concrete 7. Perennial
- C. 1. True 2. False 3. False
4. True 5. True 6. False
- D. 1. The various forms of water in nature are – solid ice, liquid water and gaseous water vapour.
2. The upper level of the groundwater at a place is called water table. It varies from place to place and season to season. The water table at a place decreases during summers and increases during rainy season.
3. Some measures of conserving water at homes are:
(a) Repair leaking pipes and taps.
(b) Close taps properly after using them.
(c) Do not use running water for brushing and shaving.
(d) Instead of a shower, use a bucket of water for bathing.
(e) Avoid washing utensils under running water.
4. Trees prevent rainwater runoff and help in its seepage under the ground. They also help in holding groundwater together by holding the soil together with their roots. Thus, trees help in prevention of depletion of water table
5. Water is essential for plants. Plants need water to get nutrients from the soil and to carry out the process of photosynthesis. If plants do not get water for a few days, they wilt, dry up and die in due course. Without water, all the plants and trees on Earth will perish.
6. (a) Infiltration – The process of seeping of surface water into the ground is called infiltration.
(b) Aquifer – A reservoir of underground water inside the Earth is called an aquifer.
(c) Rainwater harvesting – The process of collecting rainwater from roofs and street corners, and storing it for further use is called rainwater harvesting.
(d) Drip irrigation – Drip irrigation is a technique by which water is delivered directly to the base of the plant in the form of drops by making use of narrow pipes with holes.

Word Search



Hints for HOTS

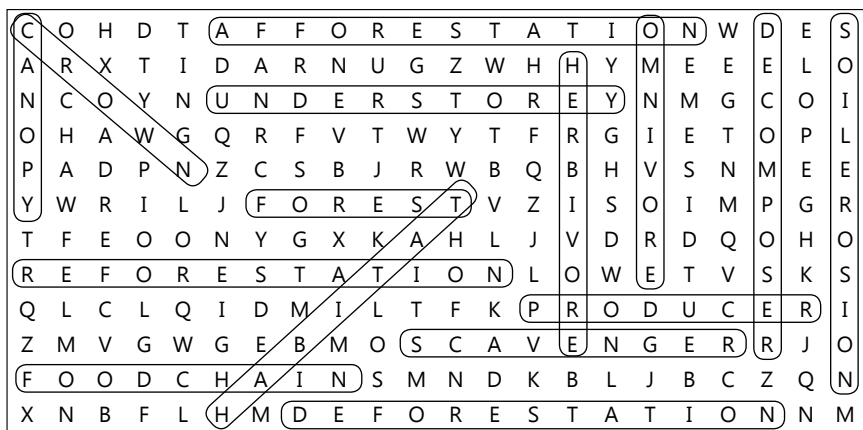
1. The water table has decreased and the amount of pure drinking water has decreased.
2. It comes directly from clouds and is free from dust and other impurities.

18. Forest – Our Life Line

1. greenhouse gases 2. all of these 3. deforestation
4. forest floor 5. humus
1. Understorey 2. dependent 3. food chains
4. neem, cinchona 5. manure 6. pollination
1. False 2. False 3. False
4. True 5. True
1. A food web is an interconnection of two or more food chains existing at the same time. It is a more complex representation of energy flow in nature than a food chain.
2. (a) grass, zebra, tiger
(b) grains, rat, snake, eagle
(c) grass, deer, wolf, lion
3. Three consequences of deforestation are:
 - (a) It disturbs the oxygen cycle leading to increase in the amount of greenhouse gases in the atmosphere and global warming.
 - (b) It causes destruction and extinction of several plants and animal species.
 - (c) It causes widespread soil erosion which makes the soil barren.

4. A forest can be divided into three main layers – canopy, understorey and forest floor.
 - (a) The canopy is the layer of a forest formed by the tops of the trees. The high treetops form a roof of leaves and branches over lower layers.
 - (b) The understorey of a forest consists of smaller trees and vegetation that grow beneath the main canopy of the forest.
 - (c) The bottom layer of a forest is called the forest floor and consists of vegetation that grows upto a short height.
5. Scavengers are organisms such as vultures, hyenas and jackals that feed on dead animals killed by other carnivores. Decomposers are organisms such as worms, ants and fungi that feed on remains of dead plants and animals.
6. Forests are often referred to as lungs of the Earth. Animals breathe in oxygen and release carbon dioxide into the atmosphere. Plants absorb carbon dioxide during photosynthesis and release oxygen in return. Thus, forests help in maintaining the balance of oxygen and carbon dioxide in the atmosphere.

Word Search



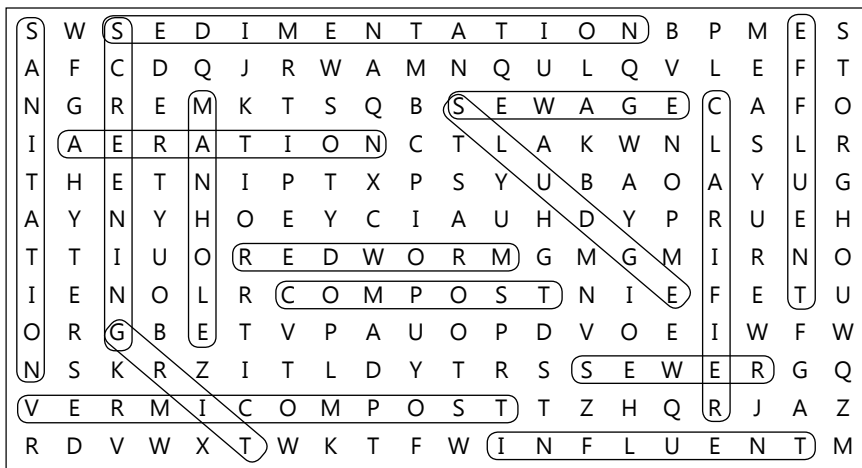
Hints for HOTS

1. The rate of transpiration and absorption of water is more in forests.
2. It destroys vegetation and causes soil erosion.

19. Wastewater Management

- A. 1. sewers 2. bacteria 3. biogas
4. effluent 5. skimmer
- B. 1. sludge 2. contaminants 3. manhole
4. sewers 5. Chlorine, ultraviolet rays
- C. 1. True 2. False 3. True
4. False 5. False
- E. 1. (a) The contaminated or dirty water generated after being used in various activities is called wastewater. Sewage is the household wastewater that contains faeces and urine.
(b) Sludge is the solid waste like food particles and faeces that settles down at the bottom of the sedimentation tank. Scum is the lighter impurity like oil and grease that float on the surface of wastewater.
2. (a) Influent – The sewage that enters the wastewater treatment plant is called influent.
(b) Effluent – The treated water that comes out from the wastewater treatment plant is called effluent.
(c) Manhole – It is a circular opening provided at various junctions in the sewer system for cleaning and maintenance of the sewers.
(d) Clarified water – The water that emerges from the sedimentation tank during wastewater treatment is called clarified water.
3. Compost pits are small pits dug in the ground where human and animal excreta, and vegetable waste are discarded. Vermicomposting toilets have small compost pits dug at the base of public toilets which use redworms to decompose human faeces into manure.
4. Three housekeeping practices to minimize generation of wastewater are:
(a) Do not throw cooking oil or ghee in the sink.
(b) Do not throw solid wastes such as tea leaves, leftover food, cotton, sanitary towels, and plastic bottles into the drains.
(c) Chemicals such as paints, insecticides, organic solvents, and medicines should not be disposed of into the sink or drains.
5. A large amount of rubbish is generated at public places like railway stations, bus stands, hospitals, cinema halls, etc. Public toilets and urinals at these facilities also generate sewage in large amount. If this sewage is not disposed of properly and regularly, it can cause several diseases.

Word Search



Hints for HOTS

1. Prevents choking of vents and pipes
2. Better sanitation

Model Test Paper

Section – A (Physics)

- A. 1. real and inverted 2. 32° F 3. migration
 4. 10 m/s 5. weather vane 6. ammeter
 7. conduction 8. dispersion
- B. 1. kink 2. meteorology 3. straight line
 4. tornado 5. solenoid
- C. 1. False 2. False 3. True
 4. True 5. False
- D. 1. The moisture-laden hot air above seas and oceans rises up, creating a low pressure area. The cooler air from the surrounding regions rushes to occupy the low pressure area created by the hot air. The cycle is repeated a number of times and strong circular winds at high speed are produced forming a cyclone.
 Cyclones are formed over regions that are hot and humid. Since, the amount of humidity over land masses is usually not high, cyclones are not produced over land.
2. A fuse wire should have a high resistance and low melting point. Copper wire has a low resistance and a high melting point. Thus, it cannot be used as a fuse wire.
3. The two laws of reflection are:
 (a) The incident ray, the reflected ray and the normal at the point of incidence, all lie in the same plane.

- (b) The angle of incidence is always equal to the angle of reflection. Thus, $\angle i = \angle r$.
4. Total distance covered = $50 + 120 + 50 \text{ km} = 220 \text{ km}$
 Total time taken = $3 + 4 + 4 \text{ hr} = 11 \text{ hr}$

$$\text{Thus, average speed of truck} = \frac{\text{total distance covered}}{\text{total time taken}}$$

$$= \frac{220}{11} = 20 \text{ km/hr}$$

- F. (a) battery (b) switch (c) electromagnet
 (d) gong (e) connecting wire (f) spring
 (g) contact screw (h) hammer

Section – B (Chemistry)

- A. 1. precipitate 2. manhole 3. scouring
 4. element 5. sodium bicarbonate
 6. browning 7. moulting 8. compost pits
- B. 1. Sorter's disease 2. neutralisation 3. MgSO_4
 4. Air, moisture 5. sludge
- C. 1. True 2. False 3. True
 4. False 5. True
- D. 1. The wasp injects formic acid in our body when it stings. The acid causes pain and inflammation in our body. Medicines and ointments containing basic substances give relief from their stings.
 2. The number of atoms present in one molecule of a substance is called its atomicity.
 The atomicity of the following molecules is:
 (a) $\text{CaCO}_3 - 5$ (b) $\text{AlCl}_3 - 4$ (c) $\text{Ca(OH)}_2 - 5$
3. Septic tanks provide low-cost sewage treatment as a single septic tank can serve a large house or a group of houses and convert domestic sewage into more useful manure.
 4. The process of collecting rainwater from roofs and street corners, and storing it for further use is called rainwater harvesting. It helps reduce the runoff of rainwater, replenish water table, and increase the availability of clean water.
- E. (a) influent (b) screening (c) grit chamber
 (d) clarifier (e) aeration tank (f) denitrification
 (g) UV disinfection (h) effluent

Section – C (Biology)

- A. 1. chlorophyll 2. osmosis 3. bile
 4. sweating 5. fruits 6. percolation rate
 7. both of these 8. directly

- B. 1. Cuscuta 2. faeces 3. pseudopodia
 4. Clayey 5. aerobes 6. spiracles
- C. 1. True 2. False 3. True
 4. False 5. True 6. True
- D. 1. Plants that have a mutually beneficial relationship with other organisms are called symbiotic plants. Lichens are an example of symbiotic association between algae and fungi. The fungi supply water and minerals to the algae which in turn supply food to the fungi.
2. The five steps in the process of nutrition in multicellular animals are – Ingestion, Digestion, Absorption, Assimilation, and Egestion.
3. Arteries carry pure blood rich in oxygen from the heart to various body parts while veins carry impure blood from body parts to the heart.
 Arteries have thicker walls while veins have thinner walls. Arteries are situated deep under the skin while veins are situated near the skin.
 Arteries do not have valves while veins have valves in them.
4. The various components of soil and their function are:
 (a) Minerals – These are essential for proper growth and development of plants.
 (b) Humus – It makes the soil fertile and improves its texture.
 (c) Microorganisms – These help in breaking down dead organic matter and convert it into humus.
 (d) Air and water – Air is needed by plants for respiration through their roots.
 Water is essential for the movement of minerals and nutrients inside the soil.
- F. (a) Salivary glands (b) Oesophagus (c) Liver
 (d) Gall bladder (e) Pancreas (f) Large intestine
 (g) Small intestine (h) Rectum

Test Your Knowledge

Across:

- | | | |
|------------------|--------------|---------------|
| 1. Transpiration | 4. Browning | 7. Alkali |
| 9. Horizons | 10. Filature | 11. Radiation |
| 14. Pole | 16. Molecule | 18. Grafting |
| 19. Amplitude | | |

Down:

- | | | |
|-------------|--------------|-------------|
| 1. Tornado | 2. Parasite | 3. Solenoid |
| 5. Weather | 6. Rumen | 8. Sludge |
| 12. Alveoli | 13. Nephrons | 15. Oxygen |
| 17. Canopy | | |