Fly Leaf

ANSWER KEY

SCIENCE TODAY

CLASS
6 TO 8

PURPLE STROKE

Written By :
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CH. 1 FOOD RESOURCES (A) 1. (d) 2. (a) 3. (b) 4. (b) 5. (b) **(B)** 1. Honeybee 2. Herbivore 3. Root 4. Herbivore 5. Poultry animals **(C)** 1. False 2. True 3. False 4. True 5. True **(D)** 1. (a) 2. (e) 3. (d) 4. (c) 5. (b) **(E)** 1. Chlorophyll 2. Sweet Potato 3. Curry Leaves **(F)** 1. Plants can make their own food. Plants make food with carbon dioxide and water in the presence of chlorophyll using solar energy. This process is called photosynthesis. This is the reason green plants are called producers. 2. Cow and Goat. Curd and Ghee 3. Omnivores 4. Herbivores: Animals that eat only plants are known as herbivores. Example deer Omnivores: Animals that eat both plants and animals are known as omnivores. Example Bear 5. Some living things derive nutrients from dead and decayed matter, they are known as decomposers. **(G) 1. Photosynthesis:** The process by which plant make their own food is called photosynthesis. Plants make food (glucose) with carbon dioxide (from air) and water (from soil) in the presence of chlorophyll using solar energy. This process is called photosynthesis. Parasite: Some plants or animals live on or inside other plants or animals in order to get food. They are known as parasites like deer tick, round worm etc. 2. Fibre in Food: Dietary fibre is found in cereals, fruits and vegetables. Fibre is made up of the indigestible parts of plants which pass relatively unchanged through our stomach and intestines. The main role of fibre is to keep the digestive system healthy. 3. Fruits are the ripened ovaries of flowers. Fruits are commonly eaten raw. Fruits are rich in vitamin, mineral and sugar. Fruits of plant usually have the seeds of the plant inside them. Many plants have evolved fruits that are attractive as food source to animals, so that animals eat the fruits and excrete the seeds some distance away from the plant. Fruits, therefore, make up a significant part of the diets of many living things. 4. Plants are the most important sources of our food ingredients. Different parts of a plant are sources of food for living organisms. (fig. From page no. 5) We eat stems, roots, leaves and flowers of different plants. We get vegetables, fruits, pulses, cereals, spices and beverages from plants. 5. Generally, Indian cuisine can be divided into four categories North Indian, South Indian, East Indian and West Indian. Despite this diversity, Indian food has some common features. Uses of spices are an integral part of food preparation in India. Spices are used to enhance the flavour of a dish. Cuisine across India has also been influenced by various cultural groups that came to India throughout history, from countries of West Asia, Central Asia and Europe. The most frequently used spices in Indian cuisine are chilli pepper, black mustard seed, cumin, turmeric, fenugreek, asafoetida, ginger and garlic. One of the popular spice mixes is garam masala which is usually a powder of five or more dried spices. Lets Evaluate and Activity : Students will do themselves.

CH. 2 SUPPLIERS OF FOOD (A) 1. (c) 2. (d) 3. (a) 4. (b) 5. (a) **(B)** 1. Vitamin A 2. Vitamin B 3. Carbohydrates 4. Proteins 5. Proteins **(C)** 1. True 2. True 3. False 4. False 5. False **(D)** 1. (c) 2. (f) 3. (e) 4. (a) 5. (b) 6. (d) **(E)** 1. Roughage 2. Fats 3. Night blindness 4. Proteins **(F)** 1. Proteins are necessary to help the body grow and be strong. They help repair any damages in the body. 2. Sources of proteins: Pulses, Dry fruits, Meat, Egg and Fish 3. Fats are the energy reservoirs of the body. When we consume more carbohydrates than are required, our body stores the excess carbohydrates which are not burnt, as fats and lipids. These are stored just below the skin. We get fats from foods like butter, ghee, nuts, cheese and oils. Fats act as insulators and keep our body warm. 4. Kwashiorkor, a protein deficiency disease in children, leads to slow physical and mental development. Children with kwashiorkor have swollen belly with thin, skinny legs. 5. A disease caused due to lack of one or more nutrients in the diet

is called deficiency disease. Example of deficiency diseases is Kwashiorkor and Marasmus 6. Amino Acids are made of carbon, hydrogen, oxygen, nitrogen, sulphur and phosphorus. Proteins are made of amino acids. **(G)** 1. 2. Food contains seven essential components that we need to live and grow. They are known as nutrients. Nutrients give us energy and protect us from diseases. (i) Carbohydrates (ii) Vitamins (iii) Water (iv) Fats (v) Minerals (vi) Proteins (vii) Fibre 3. Carbohydrates are the energy giving nutrients. Carbohydrates consist of carbon, hydrogen and oxygen. We get carbohydrates from foods like rice, bread, potato, chapattis and sugar. Glucose, fructose and starch are some form of carbohydrates. The biggest portions of our regular diet consist of carbohydrates. Carbohydrates burn to give us energy. 4. Most of our body is made up of water. Water makes up almost 70 percent of our body weight. Water plays a very important role in the body's system. It transports food wastes, chemicals and gases through the body. In the digestive system, water helps to break down the food. Water removes wastes from the body in the form of urine and sweat. Sweat also helps the body to stay cool. 5. Balanced Diet: A diet that contains proper amounts of each nutrient according to the age/weight of an individual is known as a balanced diet. **Lets Evaluate and Activity :** Students will do themselves.

CH. 3 FIBRE AND CLOTH (A) 1. (c) 2. (c) 3. (c) 4. (b) 5. (c) **(B)** 1. Wild silk 2. Kemp 3. China 4. Sericulture **(C)** 1. True 2. False 3. True 4. True 5. False **(D)** 1. (c) 2. (e) 3. (d) 4. (a) 5. (b) **(E)** 1. Gunny bags 2. Cotton 3. Jute 4. Sericulture 5. Nylon **(F)** 1. (i) Cotton is a soft, staple fibre that grows in a form known as a "boll", around the seeds of the cotton plant. (ii) The fibre is most often spun into yarns or threads and used to weave a soft, breathable textile which is the most widely used natural fibre from which cloth is made. 2. Silk was first used and developed in China about 2000 years ago. From China it came to India, and then went to the Middle East, Europe and Africa. 3. Coir is the fibre obtained from the outer covering of the fruit of the coconut palm. 4. Cotton, Jute and Coir 5. Jute is a long, soft, shiny plant fibre that can be spun into coarse, strong threads. It is produced from the skin of the jute plants stem. It is the second most important plant fibre after cotton. It is one of the cheapest natural fibres and is second only to cotton in the amount produced and variety of uses. Jute is 100 percent biodegradable. Commercially jute is the most important fibre next to cotton that is why it is called the Golden Fibre. 6. Uses of Jute: Jute is one of the cheapest natural fibres and has variety of uses. It is used for making jute sacks are called gunny bags. It is also used to make containers for young saplings which can be planted directly along with the container. Jute fibres are also being used to make pulp and paper. 7. Wool is the fibre obtained from the hair of sheep and some other animals like rabbit, deer etc. The process of removing wool from sheep by using special clippers is called shearing. After shearing, the wool is packed in bales. It is cleaned and combed by a machine in mills. It is then separated and spun into a fibre. The fibre is then woven or knitted to make woollen clothes. **(G)** 1. Natural Fibres are either obtained from plants, for example cotton and jute or from animals, for example silk, wool and fur whereas, Synthetic fibres are made from materials which are artificially prepared in factories for example nylon, terrylene etc. 2. Cotton is used to make a number of textile products. These include terrycloth, used to make highly absorbent bath towels and robes, and denim. Socks, underwear and most T-shirts are made from cotton. Cotton is also used to make yarn used in crochet and knitting. It is widely used to make mattresses. Cotton is cultivated in Punjab, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Andhra Pradesh, Tamil Nadu and Karnataka. 3. People wear woollen clothes in cold weather because it is a fluffy fibre and hence retains air. Since air is a bad conductor of heat, wool has the property of retaining heat. Woollen clothes do not allow our body heat to escape and thus keep us warm. 4. (i) Nylon are made from chemicals that are mainly obtained from petroleum. (ii) Clothes made from synthetic fibre like nylon are stronger than the clothes made from natural fibres. (iii) They do not wrinkle easily and dry quickly. 5. Knitting is a method by which a thread or yarn is turned into cloth. Knitting consists of loops called stitches which are pulled through each other. A set of stitches are held

on a needle until another loop can be passed through them. Sweater is made by knitting. **Lets Evaluate and Activity :** Students will do themselves.

CH. 4 KINDS OF MATERIALS (A) 1. (b) 2. (c) 3. (d) 4. (c) 5. (a) **(B)** 1. Volume 2. Wood 3. Transparent 4. Miscible 5. Liquid **(C)** 1. False 2. False 3. True 4. True 5. False **(D)** 1. (b) 2. (c) 3. (e) 4. (a) 5. (d) **(E)** 1. Insulator 2. Lustre 3. Wooden 4. Density **(F)** 1. Texture: is the way that something feels when we touch it. Some materials are rough, some are smooth, some are powdered and some are hard. 2. (i) Materials present around us can be of different sizes, colours, shapes or may be living or non living. (ii) Materials are classified on the basis of their common properties. 3. Things that can be made from glass: (i) Window (ii) Mirror (iii) Computer Screen (iv) Watches (v) Cups and Glasses 4. Magnetic Material: The materials which are attracted by a magnet are called magnetic materials. Iron, cobalt and nickel are magnetic materials. 5. Diffusion: The process of gases and liquids spreading into a surrounding substance is known as diffusion. **(G)** 1. (a) Hard and Soft Material: You can easily scratch some materials, while some cannot be scratched so easily. Materials which can be pressed or scratched easily are called soft while some other materials which are difficult to press are called hard. (b) Miscible and non-miscible liquids: The liquids which dissolve in one another when mixed with each other are called miscible liquids, whereas the liquids which do not dissolve in one another and form separate layers are called non-miscible liquids. 2. The two properties of material are mass and volume (a) Mass- It is the amount of substance that something contains. The mass of an object in measured in kilograms on pounds. (b) Volume - The amount of space occupied by a material is called volume. 3. The five things made of glass are windows, mirrors, clocks, watches and cups. 4. Density: Materials differ from each other on the basis of their mass and volume. These two properties can be studied together through one property, namely, density. The mass per unit volume of a substance is called its density. It is because of density that some materials float in water while others sink. The materials with a lower density than water, for example wooden logs, float on water. The substances with a greater density than water, for example, iron nails, sink in water. 5. Materials can be classified into three categories, transparent substances, translucent substances and opaque substances. (i) Transparent Substances are the substances through which we can see clearly and light can pass through them easily, such as windowpanes, water and air. (ii) Translucent Substances are the substances through which we can see partially and light can pass through them partially, such as butter paper and frosted glass. (iii) Opaque Substances are the substances through which no light can pass and one cannot see through them such as, wood, sand and brick. Opaque substances cast a shadow. **Lets Evaluate and Activity:** Students will do themselves.

CH. 5 (A) SEPARATING SUBSTANCES 1. (d) 2. (b) 3. (b) 4. (c) 5. (c) 6. (a) **(B)** 1. Heterogeneous 2. Pure 3. Coagulants 4. mud, liquid 5. Separating funnel **(C)** 1. True 2. False 3. False 4. False 5. True **(D)** 1. (e) 2. (a) 3. (b) 4. (d) 5. (c) **(E)** 1. Sieve 2. Centrifugation 3. Distillation 4. Homogeneous mixture **(F)** 1. Threshing is the process of separating grains from the stalks after the harvesting of the crop. 2. By adding alum we can speedup sedimentation. 3. Separating funnel is used to separate immiscible liquids. 4. The fine particles are made heavier by using alums, a solid which is soluble in water. The alum particle load the fine particles due to which they form sediment easily and the liquid can then be cleaned. **(G)** 1. Properties of Mixture: (a) The composition of a mixture is variable. (b) Each of its components retains its characteristic properties. (c) Its components are easily separated. 2. (a) Evaporation: Evaporation is used to recover a solid substance from its solution. If a liquid evaporates or is evaporated, it changes into gas or vapour. Sea water, also called brine solution, consists mainly of sodium chloride and other dissolved salts in it. The salt or sodium chloride used in our foodstuffs can be separated from sea water by evaporation. (b) Decantation: The process of separating out the clear liquid on top without disturbing the sediment is called decantation. (c) Loading: Sometimes, the insoluble particles in a liquid are very fine and cannot be removed by decantation. The particles can be

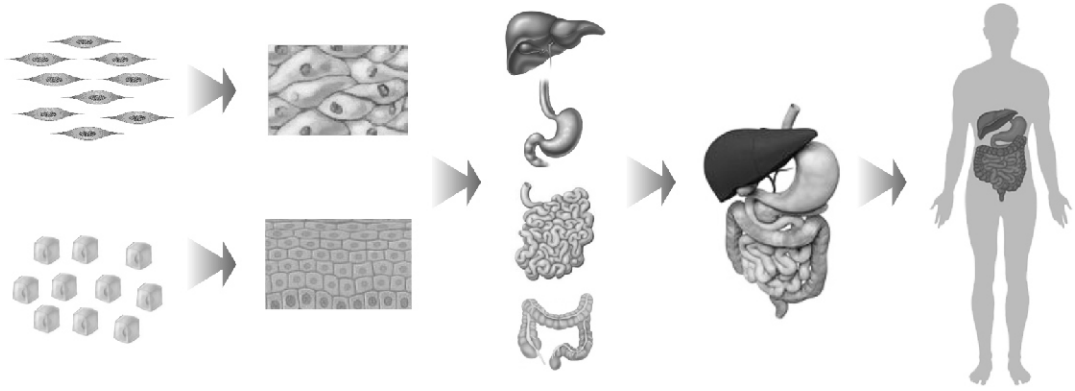
made heavier so that they sediment quickly. The process of sedimentation of insoluble fine particles by making them heavier is called loading. 3. Hand-picking: This is the simplest method of separating unwanted materials from the useful ones. This method is used when, (a) The unwanted material is present in smaller quantity. (b) Size, shape or colour of the unwanted material is different from that of the useful ones. 4. Winnowing: is the process of separating grain from the chaff. It is based on the principle that if one of the components of the mixture is very light in weight then it can be separated from the other constituents of the mixture by blowing it away. **Lets Evaluate and Activity:** Students will do themselves.

CH. 6 THE STUDY OF CHANGES (A) 1. (c) 2. (c) 3. (b) 4. (d) **(B)** 1. Solvent 2. Solution 3. Solute 4. Reversible 5. Irreversible **(C)** 1. True 2. True 3. True 4. False 5. True **(D)** 1. (e) 2. (c) 3. (d) 4. (b) 5. (a) **(E)** 1. Rust 2. Minerals 3. Chemical Energy 4. Saturated solution **(F)** 1. Physical Change: A physical change is generally reversible. The change in which no new substance is formed and the substance only undergoes a change in its shape, size, appearance or state is known as a physical change. Example of physical changes are Freezing of water and wool knitted to sweater. 2. Irreversible change: A change which cannot be reversed back to the original state is known as irreversible change. 3. Chemical Change: The change in which new substances are formed with properties that are different from the original substance is known as a chemical change. Examples of chemical changes are Cooking food, Rusting of Iron and Conversion of milk to cottage cheese. 4. Saturated Solution: The solution in which no more solute can be dissolved at any temperature is known as a saturated solution. 5. Solubility: The maximum amount of substance that can be dissolved in 100 millimetres of a liquid at a particular temperature is known as the solubility of the liquid. **(G)** Changes, whether physical or chemical, happen under these conditions. 1. Heating :- Heat is a form of energy. Heating is one of the most important conditions required for change to take place. Melting of ice, evaporation of water, cooking of food, burning of paper or wood, etc., are both physical and chemical changes which take place only when the original substances are heated. 2. Mixing solutions of different substances :- Mixing solutions of different substances may result in the formation of new substances or chemical changes. 3. Passing electricity :- Passing electricity through some substances causes them to change. For example, when electricity is passed through water, it breaks down to hydrogen and oxygen gas. 2. ● Freezing of water : Water can easily be frozen into ice. Internally, the molecules of water remain the same, only its state changes, when it becomes a solid from a liquid. ● Dissolving a solid in water : Dissolving sugar or salt in water is an example of a physical change as the sugar or salt breaks down to its molecules. These molecules go inside the inter spaces of water and therefore, disappear. These solids can easily be recovered from water and therefore this process is a reversible process. ● Condensation and evaporation : The process of converting vapours into liquid is called condensation. The process of converting liquid to vapours is called evaporation. 3. The process of forming new types of molecules by chemical change is called a chemical reaction and the original molecules taken are called reactants and the new molecules formed are called products. 4. Many materials expand on being heated and contract on being cooled. Solid expand or contract the least, while gases expand or contract the most. A common example of expansion is the bursting of a cycle tube. A cycle tube sometimes bursts on its own when the cycle is kept in the Sun. This is because the air inside the tube expands by absorbing heat from the sun. 5. Water can dissolve a large number of substances in it. Rivers carry vast amounts of minerals, dissolved in water, from one place to another. We need water to digest our food. During digestion, food is reduced to simple substances that are soluble in water and are absorbed in the body in a soluble form. Plants absorb nutrients from the soil through water. Minerals from the roots of plants and food from their leaves are transported to the other parts of the plant in the form of solutions in water.

CH. 7 THE LIVING AND THE NON-LIVING (A) 1. (b) 2. (b) 3. (a) **(B)**1. Cell 2. Organ 3. Sweating 4. Response to Stimuli 5. Response **(C)** 1. True 2. True 3. False 4. True **(D)**1. (c) 2. (a) 3. (d) 4. (e) 5. (b) (E)

1. Stomata 2. Phototropism 3. Latex 4. Molecule 5. Reproduction **(F)**1. The living as well as the non-living are made of matter. Anything that is made of matter has mass and occupies space. Thus, everything around us, whether living or non-living, has mass and occupies space. 2. Tissue: When a group of cells work together to perform function, they form a tissue. 3. Characteristics of Living Being: (i) Living things grow (ii) living beings follow a life cycle (iii) living beings need food (iv) living beings respire (v) living beings excrete.4. Organ System: Many of the complex functions performed by an organism need the cooperation of many organs. A group of organs which co-operate with other to perform a particular function is called an organ system. 5. Excretion: A living organism uses food to produce energy. The process of breaking down food (digestion) and combining food with oxygen (respiration) produce, wastes, which the organism needs to throw out. This process of throwing out (expelling) waste is called excretion.6. Respiration: All living beings use food to produce energy in their bodies. For this they need oxygen, which they get from the air or water surrounding them. Oxygen combines with food within their bodies to release energy. This is a chemical change in which carbon dioxide and water vapour are produced. The carbon dioxide and water vapour are wastes, which the body throws out. This process of taking in air (or water), letting oxygen combine with food, and throwing out carbon dioxide and water vapour is called respiration. 7. Plants throw out gases through the stomata in their leaves. They also store wastes in special cells. Some of these wastes are useful to us. For instance, the rubber we extract from the rubber trees is plant waste called latex. Gum obtained from Acacia trees is also a waste product. So is the resin extracted from coniferous trees.

(G) 1. Diagram



Organisation in living beings

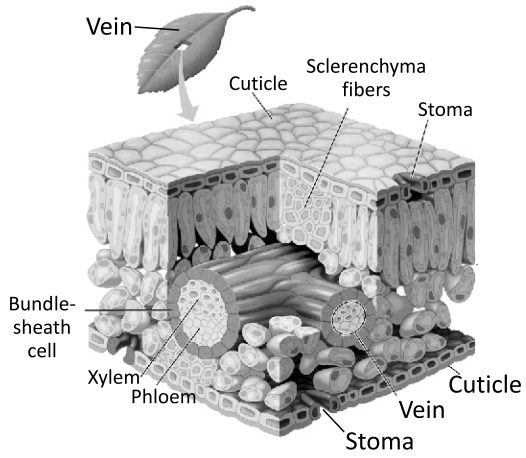
2. The time for which an organism lives, or the time between its birth and death is its lifespan. This lifespan is different for different organisms. Some insects (like the ones you see near lights during the rainy season) live only for a few hours, while some trees live for hundreds of years. The lifespan of some organisms are given in Table 7.1.

lifespan of some organisms

Organism	Lifespan	Organism	Lifespan	Organism	Lifespan
House spider	3-4 days	Alligator	50-55 years	Elephant	57 years
Mouse	2-3 years	Pigeon	60-65 years	Horse	62 years
Dog	16-18 years	Man	60-100 years	Lion	29 years

3. Green plants are called autotrophs (autos: self) because they make their own food through the process of photosynthesis. The green pigment in leaves, called chlorophyll, helps plants make food from

carbon dioxide and water in the presence of sunlight. Carbon dioxide enters the leaves through pores called stomata. If you did the activity of observing the cells in the peel of a Rhoeo leaf, you would have noticed pairs of bean-shaped cells with a pore in the middle. The pores are the stomata, the opening and closing of which is regulated by the bean-shaped cells.



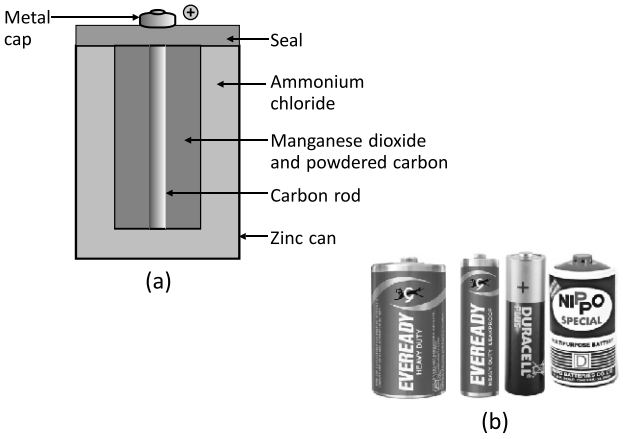
Stomata are mostly present on the lower surface of the leaf.

4. A living organism uses food to produce energy. The processes of breaking down food and combining food with oxygen produce, wastes, which the organism needs to throw out. This process of throwing out waste is called excretion. We, and many other animals, excrete waste from the body in the form of faeces and urine. Sweating is also a way of expelling waste from the body. Plants throw out gases through the stomata in their leaves. They also store wastes in special cells. Some of these wastes are useful to us. 5. All living beings start from a single cell. In many plants, this cell grows and multiplies inside a seed until the seedling bursts out, and the new plant grows. In many animals (like birds and snakes,) the single cell grows and multiplies inside an egg until the baby breaks out of the shell. The baby then grows into the adult. In other animals, the baby grows inside the mother's body, is born, and grows into the adult. However it happens, a small organism grows into on adult organism. Then it reproduces, or produces offspring. Then it grows old, and finally it dies. We can say that all organisms follow a life cycle of birth, growth, reproduction, ageing and death.

CH. 8 HABITAT AND ADAPTATION (A) 1.(a) 2. (b) 3. (b) 4. (c) 5. (d) 6. (a) 7. (b) 8. (c) **(B)** 1.Carnivores 2. Microorganisms 3. 4. Hibernation 5. Spines 6. **(C)**1. True 2. False 3. True 4. False 5. True **(D)** 1. (d) 2. (b) 3. (a) 4. (a) **(E)**1. Permafrost 2. Hydrophytes 3. Streamlined 4. Cactus 5. Hibernation **(F)** 1.The place where an organism lives naturally is called its habitat. Ponds, rivers and lakes are called freshwater habitat. 2. Fish have gills to help them make use of the oxygen dissolved in water for respiration. Whales and some other large marine animals need to breathe like us. They come up to the surface of the water to take in air. They can 'hold their breath' for a long time. 3. Vulture and Jackal 4. Herbivores are called primary consumers, since they feed directly on plants. 5. Two group of decomposers are biodegradable and nonbiodegradable. 6. A food chain can be defined as a series of organisms linked together by the process of eating and being eaten. 7. Camouflage is the ability of an animal to blend with its surroundings. It is used by prey to help hide from predators and is also used by predators to help them conceal themselves as they stalk their prey. The arctic fox, for example has a white coat in winter, while its summer coat is brown. 8. The amount of water available is another important factor

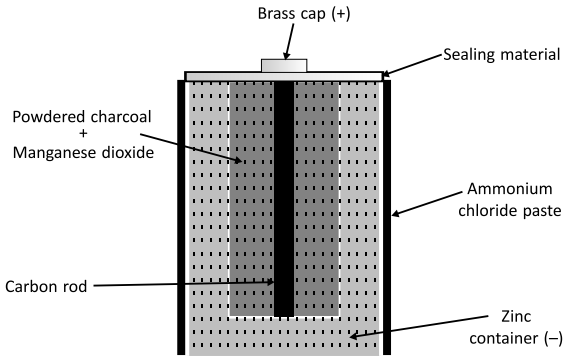
that determines the kind of organisms found in a habitat. Plants of dry or desert areas, for example, are very different from those living in areas that receive a lot of rainfall. These plants called xerophytes, develop adaptations to cope with the intense heat and light and shortage of water. 9. Coniferous trees (pines and firs) grow well in less cold regions. The shape of these trees is such that snow slides off them and does not accumulate. They also have needle-shaped leaves to reduce the loss of water through transpiration. This helps them cope with shortage of water when the ground is frozen in winter. Animals in these regions with a long, cold winter adapt in different ways. Many, like the yak and mink, have very thick fur. Some, like hedgehogs, frogs, snakes and lizards, sleep through the bitterly cold winter. This is called hibernation. Many birds, like the Siberian crane, migrate to warmer areas during winter. **(G)** 1. The place where an organism lives naturally is called its habitat. The natural habitat of the zebra, for example, is dry grassland, while that of the whale is the ocean. Habitats on land are called terrestrial whether they are grasslands, deserts, forests or mountains. Habitats in water are called aquatic. Ponds, lakes, rivers and seas are aquatic habitats. 2. Fish have gills to help them make use of the oxygen dissolved in water for respiration. They gulp in water through the mouth. The water then flows over their gills, where the oxygen in the water is absorbed. The carbon dioxide released by the gills dissolves in the water and passes out. The scales on the body of fish and their streamlined shape with a tapering head are other adaptations which help them cope with their habitat. A streamlined body has a smooth outline. This shape and the slippery scales help fish overcome the resistance of water while swimming. 3. The type of animals and plants found in different habitats is different. The type of animals and plants living in a particular habitat are adapted to make the best of the conditions which characterize that habitat. Adaptations are structural or functional adjustments that help an organism survive in its habitat. They develop over hundreds of years. Responses, on the other hand, are behaviours to cope with changes in the surroundings in which an organism lives. A camel is adapted to live in conditions of extreme heat, while we respond to rise in temperature by sweating. 4. Components of a habitat: Any habitat, be it terrestrial or aquatic, is made up of living beings and non-living things. The living beings in a habitat, that is, the plants, animals and micro-organisms make up its biotic component. The non-living things, like air, water, temperature and rainfall are often referred to as climatic factors, while the characteristics of the soil are called edaphic factors. Following are the components of a habitat: (i) Light & Temperature (ii) Water (iii) Air (iv) Soil (v) Producers (vi) Consumers (vii) Decomposers 5. Plants need sunlight to manufacture food, and all other organisms depend on plants for food. Thus, without light, there would be no life. But that is not all. Changes in light affect all organisms. The day-and-night, or light-and-dark, cycle determines many activities of living organisms. We respond to it ourselves by being active during the day and sleeping at night. So do many other animals, for example, most birds. The amount of light available is a major biotic factor that determines the kind of organisms found in a particular area. In a dense forest, sunlight reaches the forest floor through the gaps between the leaves of the big trees. These trees get the maximum sunlight. The shrubs growing underneath can make do with the light that penetrates through the leaves of the trees. 6. Very few organisms can survive in the intense heat of deserts. Small animals like rats, snakes and lizards, rest in the shade or in burrows during the day in order to avoid the heat. They become active only during the night. Some even spend the entire summer in a state of sleep, called aestication. The camel is an animal that has developed marvellous adaptations to cope with the heat ad shortage of water in deserts. **Lets Evaluate and Activity:** Students will do themselves.

CH. 9 ELECTRIC CIRCUITS (A) 1. (c) 2. (d) 3. (a) **(B)** 1. two, electric 2.battery of cells 3. fused 4. Complete 5. Electric circuit **(C)** 1. False 2. True 3. False 4. True **(D)**1. (e) 2. (a) 3. (b) 4. (c) 5. (d) **(E)** 1.Button Cell 2. Batteries 3. Switch 4. Filament **(F)** 1. The path along which an electric current can flow is called an electric circuit. 2. A switch is a device used for opening and closing an electric circuit. It has two terminals, to which wires can be connected. 3. Materials which allow electricity to flow through is called conductor. There are two conductors' good conductors and bad conductors. 4. Inside a cell: The zinc container is the negative terminal of the cell. It is sealed on top and covered with thick paper or a metal sheet to prevent leakage. The metal cap fitted with a carbon rod is the positive terminal of the cell.



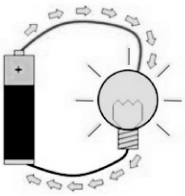
(a) Inside a cell (b) Cells come in different shapes and sizes.

(a) 5. Switch: The circuit you have made represents all electric circuits in a simple sort of way. It has source of current, a device which uses the current, and wires through which current can flow. There is just one problem. Once you complete or 'close' the circuit and the bulb starts glowing, the only way you can turn off the bulb is by disconnecting one of wires. A more convenient thing to do would be to use a switch. **(G)** 1. Diagram (dry cell) Advantages of Dry Cell: - Dry cells are light in weight and small in size. Dry cells can be transported from one place to another easily. There is no fear of leakage/spillage in dry cells. 2. Insulators play an important role in electrical circuits and equipment. The electric wires used in most circuits are insulated either by a plastic or rubber cover, or by a coat of insulating enamel. The insulation on wires ensures that an alternative circuit is not created in case the wires touch, i.e., it prevents a short circuit. The insulation on wires also protects us from electric shocks, which we would get if we touched a conductor connected to the mains.

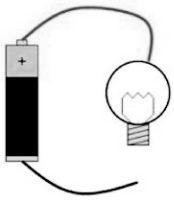


The inner view of a dry cell

3. An Open circuit is a circuit where the path has been interrupted or opened at some points so that current will not flow. In open circuit current does not flow but in closed circuit current flows.

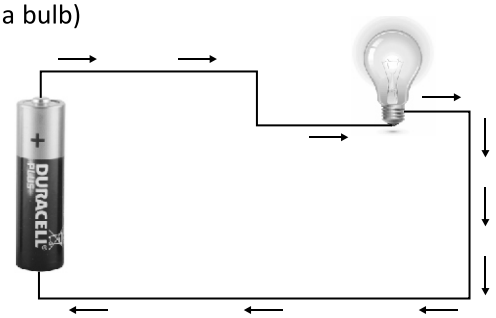


Closed circuit



Open circuit

4. Diagram (flow of current in a bulb)



Flow of current in a bulb

5. A dry cell gives a voltage of 1.5 V. In many electrical gadgets, more than one dry cells are used. This is done to increase the voltage in the circuit. In such cases, the dry cells are connected in such a way that the positive terminal of one cell is in contact with the negative terminal of the other. Such a combination of cells is called a battery of cells. **Lets Evaluate and Activity:** Students will do themselves. **CH. 10 GETTING TO KNOW PLANTS (A)** 1. (b) 2. (b) 3. (c) 4. (b) 5. (d) **(B)** 1. Tap roots 2. Roots 3. Sunlight 4. Chlorophyll 5. Stems 6. Spines 7. Root system and shoot system 8. Parallel 9. Peepal 10. Trunk **(C)** 1. False 2. True 3. True 4. True 5. False **(D)**1. (d) 2. (a) 3. (e) 4. (b) 5. (c) **(E)**1. Botany 2. Corolla 3. Flower 4. Trunk **(F)** 1. Plants have two types of root system : Tap roots and Fibrous roots 2. Tap roots: Basil has a main root which grows vertically downward in the soil. This is the primary root. Primary roots give out lateral roots called secondary roots. Such roots are called tap roots. 3. Herbs: plants with soft green stems are called herbs. Shrubs: Plants with hard stem which branch near the surface of the soil are called shrubs. Trees: Plants that are tall and have thick, hard, brown stems are called trees. 4. Functions of leaves : - Leaves manufacture food with the help of chlorophyll, in the presence of sunlight, from water and carbon dioxide by the process of photosynthesis. - Leaves in some plants are modified into tendrils to give support to their weak stems. - Some leaves store food and are a rich source of vitamins and minerals. Parts of leaves are petioles, node, lamina and veins. 5. Functions of stem: - The stem bears the leaves, flowers and fruits of a plant and holds them upright. - The stem helps to transport water and minerals from roots to leaves and food from leaves to all parts of the plant. - Some stems are modified to store food as starch and are generally underground like in onion etc. - In xerophytes like cactus, stems become green and succulent to perform photosynthesis. 6. The flower consists of the following parts: - Pedicel: The cylindrical portion by which a flower is attached to the tem is called the stalk or the pedicel. - Sepal: The outermost whorl of a flower which is green and protects the other parts in the bud stage is called the sepal. - Petal: The second whorl of a flower which is colourful and bright is called the petal. - Stamen: The third whorl of a flower is group of male reproductive parts of the plant. - Carpel: The innermost whorl of a flower consists of the female reproductive part.

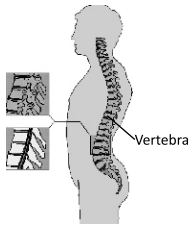
(G)1. Leaf Petioles: Leaves are thin, green, flat, structures that perform photosynthesis. These are attached to the stem by a soft, thin cylindrical structure called petioles. Pedicel: The cylindrical portion by which a flower is attached to the stem is called the pedicel. 2. Stamen: The third whorl of a flower is group of male reproductive parts of the plant. It consists of a long tubular filament and a swollen portion at its top called the anther. This

Compound leaves

bears the pollen grains or the male gametes. This is also called androecium. Carpel: The innermost whorl of a flower consists of the female reproductive part. This is also called gynoecium. It consists of three distinctive parts namely the stigma, style and ovary. The lower swollen base forms the ovary, which bears the ovules. Each ovule is a female gamete. The ovary extends into a cylindrical long stalk called the style which ends into a flat sticky portion called the stigma. 3. (a) Pollination: The transfer of pollen grains from the stamen to the stigma of the same flower or another flower by wind, water, animals and insects is known as pollination. (b) Prop Roots: Roots that arise like additional ropes from branches and trunks and grow towards the soil are known as prop roots. 4. Seed: Every seed contains a tiny plant (embryo) with leaves, stems and root parts waiting for the right things to happen to make them germinate and grow. The fertilized ovule is called the seed. Germination of seeds: Given the optimum temperature, water and light, a seed germinates to give rise to a plant. 5. (a)Functions of Fruits: - A fruit is the edible part of a plant and it stores food. - A fruit contains the seed within and protects it from harsh climatic changes. (b)Functions of Stem: - The stem bears the leaves, flowers and fruits of a plant and holds them upright. - The stem helps to transport water and minerals from roots to leaves and food from leaves to all parts of the plant. (c)Functions of Flower: - Flowers help in pollination by attracting insects. - Flowers grow into fruits and seeds which give rise to new plants. **Let's Evaluate and Activity:** Students will do themselves.

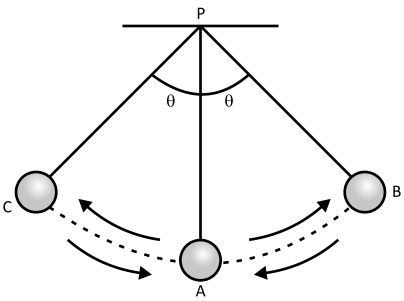
CH. 11 MOVEMENTS OF THE ANIMALS BODY (A)1. (d) 2. (a) 3. (d) 4. (c) 5. (c) **(B)**1. Bones, Skeletal 2. Protect, Cranium and Ribcage 3. Shape, skeleton and joints 4. Move **(C)**1. False 2. False 3. True 4. True 5. False **(D)**1. (b) 2. (d) 3. (a) 4. (c) **(E)**1. cartilage 2. Joints 3. Slithering 4. Skeleton **(F)**1. The framework of bones and cartilages which supports the body of an animal or human is called its skeletal system. 2. Functions of the Skeletal System:- It forms framework of the body. - It helps to protect and keep the delicate organs of the body in their proper positions. - It provides support and gives shape to the body. 3. Joints: The place of contact between two bones is called a joint. 4. At the time of the birth, human body has about 300 bones. Some of the bones gradually get fused together. An adult has 206 bones in his/her body. 5. The chest bones form a cone-shaped bony cage. The elliptical bones of the cage are called ribs. 12 pairs of ribs curve round the sides. Ribs are attached to the sides of each vertebrae at the back. 10 pairs of these ribs are attached to the breast bone at the front with the help of cartilage. Two ribs in the front are free. The chest bones protect lungs and heart. 6. Cartilage is the strong, elastic substance found where two bones connect in the human body. **(G)** 1.(a) Bone Marrow: The long bones such as thigh bone, upper arm bones have bone marrow inside them. The soft spongy material present inside the bone is called bone marrow. Bone marrow produces red blood cells and some white blood cells. (b) Movement of a snail: The body of a snail is covered with a hard shell. The shell cannot help the snail in locomotion. The snail comes out of a circular hole in the shell. The snail has a muscular foot

which is a part of its belly and helps it in locomotion. The snails move very slowly with a wavy motion. 2. - Birds have two kinds of locomotion. - Birds can walk on any surface with their legs. The bones of the hind limbs are fit for walking and perching. - Birds fly in the air by spreading their wings. They use their chest muscles to flap their wings. - The body of birds is streamlined and suitable for flying. Their bones are hollow and light in weight. The boney parts of the forelimbs are modified as wings. 3. Organs used by the following animals for movement: (a) Snakes: loops on its sides (b) Earthworm: bristle-like projections called setae on their bodies which help in movement. (c) Cockroach: The three pairs of jointed legs attached to the breast region help cockroach to walk. 4. Backbone: The backbone (or the vertebral column) extends from the base of the skull to the hip. It consists of 33 small ring-like vertebrae joined end to end. The fist 24 vertebrae are joined serially by elastic like cartilages. The main nerve cord passes through the hollow bony tube formed by the vertebrae. The five vertebrae of the hip are fused and inseparable. The four vertebrae of the tail are also fused. The backbone has five regions. Starting from the neck, chest, belly, hip and tail. Diagram (The backbone) 5. Ball and Socket Joints: The joint in which the rounded end of one bone fits into the cavity of the other bone is called ball and socket joint. Ball and socket joint permits movement of the bones in all directions. Hinge Joints: The joint which allows movement only in one plane and only up to 1800 is called a hinge joint. The knee joint is a hinge joint. **Let's Evaluate and Activity:** Students will do themselves.



The backbone

CH. 12 MOTION (A) 1. (d) 2. (c) 3. (c) 4. (a) 5. (b) **(B)** 1. Oscillatory 2. Rectilinear 3. Periodic 4. Circular 5. Rotatory **(C)** 1. False 2. True 3. True 4. True 5. False **(D)** 1. (b) 2. (d) 3. (a) 4. (e) 5. (c) **(E)** 1. Curvilinear motion 2. Periodic 3. Oscillatory 4. Diameter **(F)** 1. Rectilinear Motion: Rectilinear motion is a translational motion in a straight line. 2. Translatory Motion 3. The main difference between these types of motion is that circular motion is a special case of rotational motion, where the distance between the body's centre of mass and the axis of rotation remains fixed. Rotational motion is based around the idea of rotation of a body about its center of mass. In rotational motion, the axis of rotation and centre of mass could change whereas in circular motion, the axis of rotation and centre of mass does not change. Circular motion is a movement of an object along the circumference of a circle or rotation along a circular path and can either have a constant angular rotation rate and constant speed, or it can exist with a changing rate of rotation. 4. In some kinds of motion, the object repeats its motion after a fixed interval of time. Such motion is called periodic motion. Some rotator motions are periodic motions. However, all oscillatory motions are periodic motions. 5. Motion can be classified mainly into three different types: (i) Translatory Motion: Example- when we pull a chair from one place to another in a room, every part of the chair, its arms, legs, seat etc. move the distance. (ii) Rotatory Motion: Example- The movement of a CD in a CD Player (iii) Oscillatory or Vibratory Motion: Example- The movement of our hands while walking. **(G)** 1. Periodic Motion: In some kinds of motion, the object repeats its motion after a fixed interval of time. Such motion is called periodic motion. A pendulum displaced from its men position oscillates about its mean position. The time taken by the pendulum for one complete oscillation from position A to B to A to C to A is called the period of oscillation. During its oscillatory motion, a pendulum repeats its motion after each period of oscillation. Thus, periodic motion can be used to measure the intervals of time. Diagram (periodic motion of a pendulum) 2. Rectilinear motion is the motion of a body, undergoing translational motion in a straight line is called rectilinear motion whereas, Curvilinear motion is the motion of a body, undergoing translational motion along a curved path. 3. Relative motion is the calculation of the motion of an



Periodic motion of a pendulum

object with regard to some other moving object. Thus, the motion is not calculated with reference to the earth, but is the velocity of the object in reference to the other moving object as if it were in a static state. For example, a person sitting in an airplane is at zero velocity relative to the airplane, but is moving at the same velocity as the airplane with respect to the ground. Relative motion is a concept, and its calculation occurs with relative velocity, relative speed, or relative acceleration (which is the change in velocity divided by the change in time). 4. Rotatory Motion: Let us observe the motion of a ceiling fan. Following conclusions can be drawn about this motion. - The fan itself does not change its position. - The blades move around the fixed central point in a circular path. - Different portions of the blades moves in circular paths of different radius. Such a motion, in which different parts of an object move around a central fixed point or axis, in a circular path with different radii, but the body as a whole does not move from one place to another is called a rotator or circular motion. Examples of rotator motion: (i) the movement of a CD in a CD player. (ii) the motion of a potters' wheel. (iii) the motion of a spinning top. 5. (a) The movement of an object attached to a suspended spring: Translational and oscillatory (b) The motion Earth spinning around the Sun: Translational, circular and periodic motion. **Let's Evaluate and Activity:** Students will do themselves.

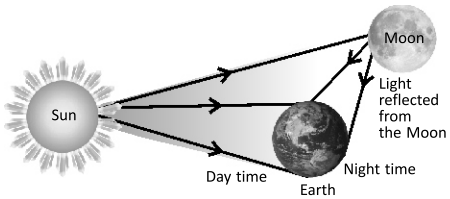
CH. 13 FUN WITH MAGNETS (A)1. (a) 2. (c) 3. (b) 4. (c) 5. (d) **(B)** 1. Magnetic pole 2. Iron 3. North-south 4. Poles 5. Lose **(C)**1. True 2. True 3. False 4. True 5. False **(D)** 1. (e) 2. (c) 3. (a) 4. (b) 5. (d) **(E)** 1.Compass 2. Electromagnet 3. Poles of magnet 4. Magnet **(F)** 1. Yes artificial magnets are easily available. 2. The phenomenon of the attraction of a substance by a magnet is called magnetism. 3. The pieces of lodestone were called magnets. A magnet is an iron object that makes pieces of iron or steel move towards it. We can find magnets in door closer in refrigerators, iron pin holder, magnetic stickers etc. 4. There was Greek shepherd names Magnes. One day, he found that the nails in his shoes and the iron tip of his stick were attracted to a certain spot on the ground. To find the source of this mysterious attraction, he started digging the ground. Below the surface, he found some stones that attracted the iron. It is believed that natural magnets were discovered in this way. 5. Different shapes of magnets available in market are: horseshoe magnets, round and cylindrical magnets and bar magnets. 6. Diagram(horseshoe) Horseshoe magnet has two poles North Pole and South 7. Attraction and Repulsion between magnets: There is a power of attraction and repulsion between magnets. The similar poles of two magnets repel and opposite poles attract each other. - The South Pole of a magnet will be attracted towards the North Pole of another magnet. - The North Pole of a magnet will be attracted towards the South Pole of another magnet. - The South Pole of a magnet will be repelled by the South Pole of another magnet. - The North Pole of a magnet will be repelled by the North Pole of another magnet. **(G)** 1. (a) Magnetic Material: are materials that are attracted to a magnet. Non- magnetic Material: are materials that are not attracted to a magnet. (b) Natural Magnet: is an iron ore called magnetite. Artificial Magnet: are made by mechanical or electrical methods. 2. In every magnet, there are two regions where its magnetic strength is maximum. These two regions or points of every magnet where its magnetic strength is maximum are called poles of magnet. The Earth also has two poles. The two geographical poles of the Earth are called its North Pole and South Pole. Likewise, the two poles of a magnet are called its North Pole and South Pole. If a magnet is divided into two parts, it will form two magnets and both magnets will have a North and a South Pole. Thus, irrespective of the shape of a magnet, every magnet has two poles. These poles are marked on a magnet by printing N (North) and S (South) on its tip. 3. Artificial magnets made by passing electricity are called electromagnets. Some of the important uses of electromagnets are :- Horseshoe shaped electromagnets are used to make electric doorbells. - Heavy iron cargo containers are lifted using large

Bar magnet | Horseshoe magnet | Round and cylindrical magnet

Different shapes of magnets

electromagnets. - Electromagnets are used in electric generators and electric motors. - High-speed magnetic levitation trains run without touching the track, on the power of electromagnets. 4. Following are the precautions while dealing with magnetic materials:- Never heat a magnet, it may lose its magnetism. - Keep magnetic materials away from hot objects. - Do not hammer magnets with other objects. - Keep magnets away from devices which use magnets like mobile phones, television sets, computers and music systems. 5. These are some common uses of magnets: - iron pin holder - door closer in refrigerators - magnetic stickers - magnetic pencil boxes. **Let's Evaluate and Activity:** Students will do themselves.

CH. 14 LIGHT (A)1. (c) 2. (c) 3. (c) 4. (a) 5. (b) **(B)** 1. Non-luminous 2. Propagation 3. Object and light 4. Opaque objects 5. Reflection **(C)**1. False 2. False 3. False 4. True 5. True **(D)** 1. (a) 2. (b) 3. (c) 4. (d) 5. (e) **(E)**1. Reflection 2. Shadow 3. Light 4. Transparent objects **(F)** 1. All objects which emit a light of their own are called luminous objects. 2. A pinhole camera produces an upside down image of objects. This happens because light rays travel in a straight line. 3. Reflection is the bouncing back of light when it falls on smooth shining surfaces. Reflection of light can be used to change the direction of light rays. 4. The objects which do not emit a light of their own are called non-luminous objects. Wood, stones, chairs, fans, human beings and clothes are examples of non-luminous objects. Such objects cannot be seen in the dark. These objects become visible only when light from a luminous object falls on them and travels from there to reach our eyes. 5. Light is something that helps us to see objects. There exist various objects which give us light. The Sun is the biggest source of light on the Earth. Fire, electric bulbs, tube lights and a firefly are some of the other objects which emit a light of their own. 6. (i) Image shows all details of an object whereas, shadow is a dark outline formed behind an opaque body. (ii) Image is not misleading whereas shadow of the object can be misleading. (iii) Image may be upright or inverted whereas shadows are not inverted. Pinhole camera produces an image of the object. **(G)**1. When a opaque object is kept in the path of a light, from any light source, it blocks the passage of the light. The area of darkness behind the opaque object is called the shadow of the object. Objects of different colour but of similar shape will have the same type of a shadow. Shadow of a bottle lying in the sunlight be longer in the afternoon. 2. Diagram (moon reflects sunlight towards earth) Moon is not a luminous body. It has no light of its own. The light which we see coming from the Moon us actually the light of the Sun reflected by the Moon's surface towards the Earth. 3. Light always travels in a straight line. This property can be used to make camera without a lens too. It is called a pinhole camera. In this, a small hole in a thin sheet is all that is needed to take a photograph. In a pinhole camera, the small pinhole acts as lens and the image is obtained on the tracing paper that acts as screen. A pinhole camera is a very simple device. It is good to take pictures of brightly lit objects. These types of cameras were used earlier to take still photographs. In those pinhole cameras, a photographic film used to be kept in place of tracing paper. Usually, the inner sides of the cylinder are painted black, it helps in improving the picture quality by avoiding unnecessary reflection of light inside the camera. A pinhole camera produces an upside down image of objects. This happens because light rays travel in straight line. Another important point to note is that images formed by pinhole cameras are real and coloured and are not shadows. 4. We use mirrors to look at our faces. These mirrors are small glass pieces coated with silver polish at the back. We can see our images in the mirrors and images of other objects kept in front of the mirror by the phenomenon called reflection. Yes mirror gives us a flipped image. The left side will appear as the right side and vice versa. 5. Examples of Transparent objects: glass, water, thin clear plastic sheets Examples of Opaque objects: human and animal bodies, metals like iron, steel etc. Examples of Translucent objects: tracing paper, tissue paper, muddy water, milky water etc 6. Mirrors are small glass pieces coated with silver polish at the back. We can see our images in the



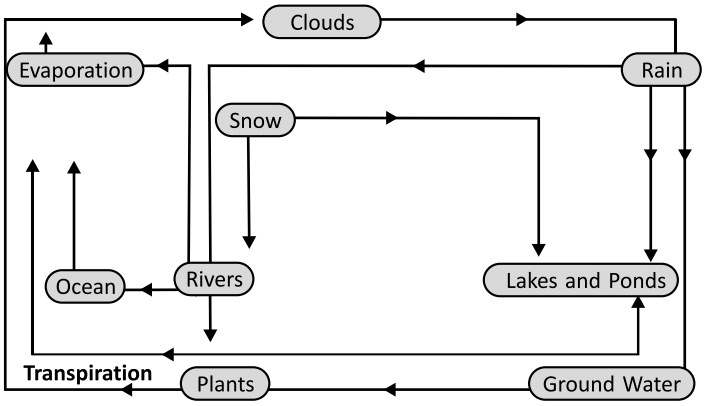
Moon reflects sunlight towards Earth

mirrors and images of other objects kept in front of the mirror by the phenomenon called reflection. Where as glass is a transparent object which allow light to pass through it. **Let's Evaluate and Activity:** Students will do themselves.

CH. 15 WASTE (A)1. (c) 2. (a) 3. (c) 4. (b) 5. (a) **(B)** 1. Non-biodegradable 2. Domestic 3. Decompose 4. Vermin composting 5. Toxic **(C)** 1. True 2. False 3. True 4. False 5. True **(D)**1. (b) 2. (a) 3. (c) 4. (d) 5. (e) **(E)**1. Leaching 2. Compost 3. Vermi Compost 4. Biomedical waste **(F)**1. Landfills: are commonly used for the disposal of solid waste. A landfill is a natural slope or a man-made through that is filled up with waste. 2. Organic wastes can be decomposed by natural decomposers. 3. Incineration: To incinerate means to burn. Waste can be burnt in huge incinerators, or ovens, at a high temperature. Hospital waste is disposed of this way. 4. The waste generated by homes is called domestic waste. The solid waste produced by an urban home includes vegetable and fruit peels, food leftover, paper, glass, plastic, metal (cans, tins), batteries, bulbs, garden waste etc. 5. Recycle means make use of the materials with which things are made example old newspapers, magazines etc. Paper is pulped to make new paper and, plastic, glass and metal are melted down to make new things. Recycling saves the resources needed to make paper from wood, mine and refine metals, and so on. 6. Composting is nature's process of recycling decomposed organic materials into a rich soil known as compost. **(G)** 1.Advantages of Incineration: The thermal treatment, or burning, of waste reduces its volume, and the ashes can be disposed of more easily than the huge amount of unburnt waste. Disadvantages of Incineration: First, it is a waste of material that can be recycle. Second, precautions have to be taken to see that harmful gases and particles are not released into the air. Lastly, municipal waste in our country has a lot of 'wet' waste. Fuel is needed to burn this kind of waste, which also means a waste of money and natural resources. 2. Separating waste into biodegradable and recyclable is the first step in waste disposal. If all of us could segregate our waste before handing it over to the person who collects it or throwing at the collection point, it would be a great help. Segregation is done mostly by rag pickers, who rummage through the waste collected at collection points. Sleeping bags and more bottles can be made from reusable soft drink bottles. 3. The basic difference between biodegradable and non-biodegradable is that biodegradable items decompose or break down naturally. Non-biodegradable items don't. Typically, biodegradable waste is matter derived from plants and animals and other organisms, such as paper, food waste, plant-based plastics, and grass clippings. Non-biodegradable waste is waste that cannot be broken down through natural processes. These items tend to be very durable and last a long time in the environment, even hundreds of years. These materials include items such as plastic bags, synthetic materials, plastic bottles, and aluminium cans. Electronic items such as computers do not break down. 4. E-waste is a popular, informal name for electronic products nearing the end of their "useful life." Computers, televisions, VCRs, stereos, copiers, and fax machines are common electronic products. Many of these products can be reused, refurbished, or recycled. Compost is a natural fertilizer produced by the composition of organic waste from kitchens, farms, vegetable markets, sugar mills, and so on. 5. The really harmful component of agricultural waste is pesticides. They are used to kill organisms which harm crops, but they also harm other helpful organisms, like decomposers in the soil and insects which help to carry pollen. Besides, they contaminate the very crops they are meant to protect, and enter our bodies when we eat these crops. They also contaminate soil and groundwater, and get washed off into water bodies. **Let's Evaluate and Activity:** Students will do themselves.

CH. 16 WATER THE VALUABLE RESOURCE (A) 1. (c) 2. (b) 3. (c) 4. (d) 5. (c) **(B)**1.Metabolism 2. Digestion 3. Transpiration 4. Higher the temperature of 5. Merges 6. Oxygen **(C)**1. False 2. False 3. True 4. True 5. True **(D)** 1. (c) 2. (d) 3. (a) 4. (b) 5. (e) **(E)**1. Desalination 2. Natural springs 3. Drought 4. Water **(F)** 1.A long period when there is little or no rain is known as drought. 2. Clouds form when the invisible water vapour in the air condenses into visible water droplets or ice crystals. 3. Loss of water vapour by plant

through their leaves is called transpiration. 4. A condition in which an area gets submerged in water due to heavy rains or cyclone is known as flood. The crop fields, forests, villages and cities may get submerged by floods. Crops fail to grow in such condition which leads to shortage of food. The communication systems, telephonic as well as electronic, fail in flooded places. 5. Only a small fraction of the water available on the Earth is fit for use by plants and animals. Most of the water cannot be used directly. The level of ground water decreasing drastically. The demand for water is increasing day by day. Hence, it is very important that water is used carefully. We should try to use minimum water for our daily need and all care should be taken save water and to prevent its wastage. **(G)** 1. Because of pollution in the air, acid gases from factories, cars and homes, the rain is becoming dangerous for the life of every living creature. This rain is known as 'acid rain'. Acid rain makes waters acidic, and causes them to absorb the aluminium that makes its way from soil into lakes and streams. 2. We use water for drinking, bathing, cooking, washing and watering plants in everyday life. 3. One of the best ways to increase the availability of underground water, which is our main source of drinking water and the water is used for agriculture, is to collect rain water and store it for later use. Collecting rainwater in this way is called rainwater harvesting. In this, the rain water is collected where and when it falls, and is prevented from flowing into the rivers. If the rainwater falls in places that are mostly covered with concrete roads and building it flows down to drains and then to rivers. This water does not replenish the underground water. 4. Diagram (flow sheet diagram of water cycle)

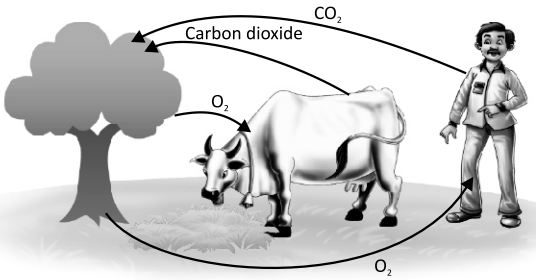


Flowsheet diagram of water cycle

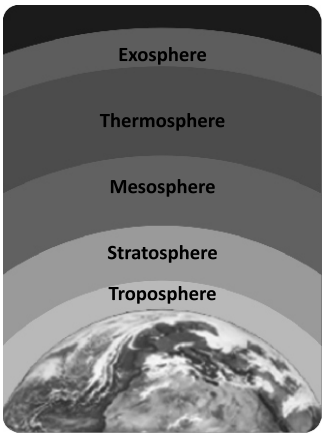
5. Rain water and water from water bodies such as rivers, ponds, lakes and streams pass through the soil to rocks lying beneath the ground. As these rocks are nonporous, water collects there and this is called groundwater and the water level of this water is called the water table. This underground water sometimes comes out of the land in the form of streams called natural springs. Groundwater is commonly used for agriculture and drinking purposes by digging wells or through tube wells. This water contains dissolved salts but is free from suspended impurities as when this water passes through the soil, these impurities get separated. **Let's Evaluate and Activity:** Students will do themselves.

CH. 17 AIR AROUND US (A) 1. (a) 2. (b) 3. (d) 4. (a) 5. (c) **(B)** 1. 32km 2. Wind 3. Breeze 4. Air 5. Solution **(C)** 1. True 2. False 3. True 4. True **(D)** 1. (d) 2. (a) 3. (b) 4. (e) 5. (c) **(E)** 1. Amphibians 2. Ozone layer 3. Mesosphere 4. Air pollution **(F)**1. Humidity is the amount of water vapour present in the air. Water vapour is the gaseous state of water and is invisible to the human eye. 2. Oxygen supports life and all living beings inhale oxygen. Oxygen is used by living beings to get energy from the food they

eat. Oxygen is taken in through the lungs by the living beings which live on land. Worms and other living beings which live in marshy areas, like the earthworm, breathe through their moist skin. Animals living in water breathe through a special organ called gills, which take the dissolved oxygen out from the water. Some animals, like amphibians, have both lungs and gills to breathe, which enables them to live in water as well as on land. Plants breathe through small openings which they generally have on the lower side of their leaves called stomata. 3. The addition of substances to the environment in quantities which are harmful for living beings is known as pollution. 4. Nitrogen is a major component of air. Air contains 78% nitrogen. 5. Diagram (Balance of oxygen in the air)

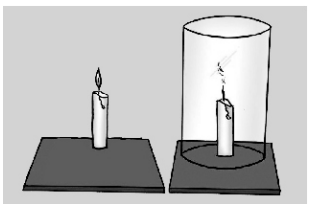


(G)1. The addition of substances to the environment in quantities which are harmful for living beings is called pollution and such substances are called pollutants. Air pollution is mainly caused by the burning of fuels, gaseous waste from industries, volcanic eruptions and forest fires. This polluted air causes difficulty in breathing, lung diseases like asthma, lung cancer and eye conjunctivitis. It also harms the crops, buildings and monuments. 2. The troposphere is the lowermost layer of the atmosphere. It is the densest part of the atmosphere. Formation of clouds and weather changes take place in this layer whereas, Stratosphere is the second layer from the Earth. Aeroplanes and weather balloons fly in this layer. The ozone layer which protects us from harmful ultraviolet radiations coming from the Sun is in the stratosphere. Diagram (the layers of air surrounding the earth) 3. Importance of air in our life is so and it is the prime cause of life on Earth. Without it life would not be possible as seen on other planets in our Solar system. Hence air is a natural virtue on earth which sustains life. All living beings including plants & animals are dependent on air oxygen for generation of valuable life energy. Air helps in pollination of crops. Air maintains temperature on the earth surface. 4. Oxygen supports combustion. Burning can only occur in the presence of oxygen.



The layers of air surrounding the Earth

Experiment :- Objective: To show that burning needs oxygen
Equipment: A plate, a candle, a drinking glass



Introduction: At lower classes we teach that air contains oxygen and burning needs oxygen. This statement can be supported by this demo experiment.

Procedure: Put a candle vertically in a plate. Light the candle. The candle keeps on burning. Cover the burning candle by an inverted glass. The candle goes off. Now explain that the glass originally had air in it and when covered only that much of air was made available to the candle. This air had some amount of oxygen and when that was consumed, the candle went off.

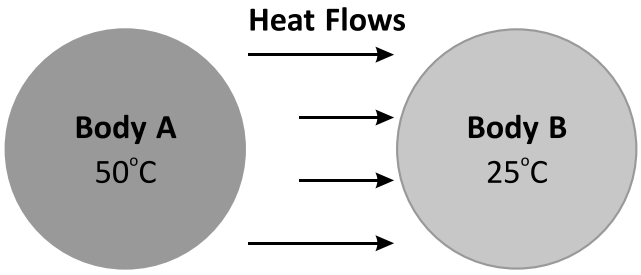
5. In photosynthesis plants make their own food and oxygen is released. Plants also consume oxygen for respiration, but they produce more of it than they consume. It is obvious that animals cannot live without plants as they are all dependent on them for their food but plants also cannot survive for long without animals as they need carbon dioxide to prepare food, which is released by animals. Therefore, both plants and animals need each other, as the balance of oxygen and carbon dioxide in the atmosphere is thus maintained. This shows the interdependence of plants and animals. **Let's Evaluate and Activity:** Students will do themselves.

CH. 18 ENERGY AND ITS FORMS (A)1.(a) 2. (d) 3. (b) 4. (d) 5. (a) 6. (b) **(B)** 1. Coal 2. Limited 3. Light 4. Light 5. Carbon dioxide and water 6. all **(C)** 1. True 2. True 3. 4. 5. False 6. True **(D)** 1. (d) 2. (f) 3. (a) 4. (b) 5. (c) 6. (e) **(E)**1. Energy 2. Kinetic energy 3. Gravity 4. Fossil fuel 5. Electromagnetic energy **(F)** 1.Thestrength and vitality required for sustained physical or mental activity is called Energy. 2. Stored energy is called potential energy because it gives something the potential to use its stored energy. Examples are plates on a table, books on a shelf, a child at the top of a slide and an apple growing on a branch. 3. The force of gravity between an object and the Earth pulls the object towards the centre of the planet. If an object is in a position above the surface of the Earth, it possesses stored energy called gravitational potential energy. Due to this gravitational force any object supported by something accelerates to the Earth's surface, when the support is removed. 4. Some materials can be easily squashed, stretched or bent, but spring back into shape once the force acting on them is removed. They are called elastic materials. 5. The energy which a body possesses by virtue of being in motion is called kinetic energy. 6. The internal energy of an object due to the kinetic energy of its molecules is called thermal energy. Example: Adding ice to a glass of water causes the temperature of the water to decrease because the thermal energy in the water causes the ice to melt. **(G)** 1.Coal is formed from large plants that grew in swamps about 275 million years ago. These plants used energy from sunlight in the same way that plants do today. When they died they fell into the swamps. There was a lack of oxygen in the swamp water, which prevented bacteria growing ad decomposing the dead plants. Eventually the plants formed peat. Later the peat became buried and was squashed by the rocks that formed above it. The increase in pressure squeezed the water out of the peat and warmed it. These processes slowly changed the peat into coal. 2. There is a form of energy that can travel through space at the speed of light. This kind of energy travels in waves that have some properties of electricity and some properties of magnetism. They are called electromagnetic waves. Electromagnetic waves are split into seven groups according to wavelength. The different groups have different properties and different uses. The two most familiar groups are light and radio waves. 3. Electric current is the movement of electric charges through a conductor such as copper or graphite. The electric charges are given electrical energy by the battery ad carry it to the working parts of a circuit. This may be a lamp, for example, where the energy is changed into light and heart. 4. Strain energy is also called elastic potential energy. Some materials can be easily squashed, stretched or bent, but spring back into shape once the force acting on them is removed. They are called elastic materials. When their shape is changed by squashing, stretching or bending they store energy, which will allow them to return to their original shape whereas, Sound energy is produced by the vibration of an object such as the twang of a guitar string. The energy passes through the air by the movement of the atoms and molecules. They move backwards and forwards in an orderly way. This makes a wave that spreads out in all directions from the point of the vibration. 5. Chemical Energy: Energy can be stored in the chemicals from which a material is made. The chemicals are made from atoms that are linked together to make molecules. The chemical energy is stored in the links between the atoms. Food, fuel and the chemicals in an electrical cell are examples containing stored chemical energy. **Let's Evaluate and Activity:** Students will do themselves.

CH. 19 HEAT (A) 1. (a) 2. (d) 3. (b) 4. (c) 5. (a) 6. (b) 7. (a) **(B)**1. Thermometer 2. Good conductor of heat 3. Radiation 4. Temperature 5. Celsius, Fahrenheit or Kelvin 6. Conduction 7. Radiant energy **(C)** 1. True 2. False 3. False 4. True 5. False **(D)**1. (c) 2. (e) 3. (a) 4. (b) 5. (d) **(E)**1. Temperature 2.Thermometer 3. Degree 4. Conduction 5. Insulators 6. Copper **(F)** 1. Hot air balloons work on the principle that hot air

rises up as the result of heating of the gas in the balloon by the burner which in turn makes it float in air. 2. A link is present just after the mercury bulb that does not allow the mercury column of fall back. This avoids changing of the recorded temperature while reading the thermometer. 3. Insulators do not allow heat to pass through them therefore; vehicles carrying inflammable materials such as petrol are covered or coated with insulators. Otherwise, the petrol can get heated up and catch fire. 4. Thermometer is a glass tube with a bulb at one end containing mercury which expands in a uniform manner through the column. A laboratory thermometer is filled with alcohol which appears red in colour. Precautions to take while handling thermometer- Both laboratory and clinical thermometers should be washed before and after using with an antiseptic solution. - Do not hold the thermometer from the bulb as the heat from your hand might increase the mercury level of the thermometer before taking the reading. - A laboratory thermometer should be inserted vertically in the object whose temperature reading is to be taken. 5. Objects can have color two ways: they can either reflect light or emit light. Light can be thought of as a wave. We perceive color because of different wavelengths of light. (Keep in mind that we can only see a small portion of the full electromagnetic spectrum of light. See microworlds for an example of all the different wavelengths of light) When an object absorbs and reflects light, the energy in that light is transferred to that object and dissipated as heat. When an object absorbs most of the light in the visual spectrum, it looks black. If it scatters most of the light, it looks white. Black objects absorb more heat than white objects. If an object is orange, that object reflects orange light and absorbs light that is not orange. As far the effect of specific colors on heat, it is difficult to judge for example whether something orange or something green would absorb more heat. It depends on whether the two objects are the same material, the shininess of the objects, exactly what shade of green or orange they are, and what kind of light source is illuminating them. 6. Heat is another name for internal energy that is stored inside a substance. It is a form of energy that moves from one place to another due to difference in the temperature. Heat always flows when there is temperature difference between the two bodies. 7. When you stand in front of a gas stove, an electric heater or a bonfire, you feel hot. This is because heat reaches you by the process of radiation. 8. (a) Clinical thermometers are also called medical thermometers. They are used for measuring the temperature of the human body, with the tip of the thermometer being inserted either into the mouth under the tongue or in the armpit. (b) Celsius and Fahrenheit Scale: On the Celsius scale, the freezing point of water is 00 C, and the boiling point of water is 1000 C. On the Fahrenheit scale, the freezing point of water is 320 F and the boiling point of water is 2120 F. 9. A thermometer is a very delicate instrument which should be handled carefully whenever it is used. The following steps must be kept in mind while using a thermometer: - take a thermometer and shake it properly so that the temperature can be recorded from the least possible value. - wash the bulb of the thermometer with water. Insert thermometer properly into the object/body whose temperature has to be recorded. Place it there for one minute. - while taking the temperature reading, the thermometer should be held in line with the eye of the observer. **(G)** 1. It is often noticed that fever is generally checked by touching the forehead of a person by hand. This can mislead us, depending upon the temperature of our hands. Therefore, it must be confirmed by checking it with a thermometer to ensure the degree of the hotness of the body and only then curative medications should be taken. It is important to note that the terms heat and temperature are closely related but do not mean the same. 2. Heat always flows when there is temperature difference between the two bodies. For example, if we have a Body A at 500 C and Body B at 250 C, then heat flows from Body A to Body B, i.e., from the body

at higher temperature to the one at lower temperature. Diagram (Heat Flows)



3. Convection is the process of heat transfer which takes place in fluids. If a liquid or a gas is heated, it expands, becomes less dense and rises. Cooler, denser liquids or gases then sink to take its place. Thus convection current is set up. For example heating water in a vessel. As the water in the vessel is heated, the molecules of the water at the bottom become hot and rise up. The cold or unheated water molecules at the top move down from the sides of the vessel and get heated on reaching the bottom of the beaker. Thus, the entire water in the beaker gets heated. The above process demonstrates the process of convection in water. Application of convection: (i) In winter, hotels and other buildings are centrally heated on the principle of convection. (ii) Land and sea breezes arise due to convection. 4. Applications of Conductors and Insulators: - Cooking utensils are made of good conductors of heat. Such utensils get heated quickly. Food can be cooked efficiently in a shorter time. The utensils are generally made of copper, brass, steel or aluminium. - The base of an electric iron conducts heat which in turn helps in ironing the clothes effectively. - The handles of kettles and utensils are made of insulators such as wood, plastic or ebonite. They help in holding the utensils comfortably as they do not get heated. - Building materials like brick, asbestos, mud and grass are insulators of heat. They do not permit heat or cold to pass through the walls of the bricks. - Vehicles carrying inflammable materials such as petrol are covered or coated with insulators. Otherwise, the petrol can get heated up and catch fire. **Let's Evaluate and Activity:** Students will do themselves.

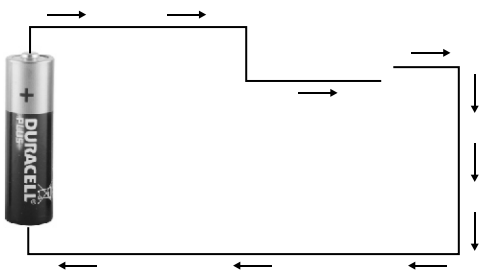
CH. 20 SOIL PROFILE (A)1. (a) 2. (d) 3. (b) 4. (c) 5. (d) 6. (c) **(B)**1. Humus 2. Regur 3. Soil 4. Colour 5. Growing plants 6. Percolation rate **(C)**1. False 2. 3. True 4. False 5. True **(D)**1. (e) 2. (f) 3. (a) 4. (b) 5. (c) 6. (d) **(E)**1. Lithosphere 2. Deforestation 3. Red soil 4. Moist soil **(F)**1. Clayey soil has maximum water retention capacity but it absorbs water slowly. It has very fine particles and less number of pores. 2. A vertical section that shows the distinct layers of soil when we cut straight down into the soil is known as soil profile. 3. Laterite soil is found in typical monsoon conditions i.e. high temperature and heavy rainfall with alternate wet and dry periods. 4. Removal of upper layer of soil by running water, wind or human activities is called soil erosion. 5. Causes of soil erosion: - when heavy rain falls on weak soil, rain water loosens the soil particles which get carried from one place to other. - when drought occurs, vegetation gets depleted. Wind blows away the fine particles of soil during drought. - overgrazing leads to soil erosion. 6. Prevention of soil erosion: Soil erosion can be prevented by planting more and more trees and plants. The roots of plants and trees bind soil with them and stop soil erosion. Plants also slow down the speed of bowing water and wind. **(G)**1. Soil is composed of a thin layer of mineral particles and dead, decaying remains of plants and animals called humus. Soil formation is a complex process. Over billions of years, the action of air, water and ice has converted rocks into soil. This process is called weathering. Physical weathering: In this process, rocks disintegrate to form smaller pieces by the action of water, ice, frost, penetrating roots of trees and temperature

differences. However, the smaller pieces have the same characteristics as the rocks they broke from. Chemical weathering: Sometimes, water acts on the minerals present in rocks and that change the chemical nature of the rock. 2. Layers of Soil: (i) Horizon or topsoil: is the uppermost layer. It consists of fine particles. It contains humus so it is dark in colour. It is soft, porous and can hold water. Plants grow in this layer. Humus is the decomposed dead organic matter which makes the soil fertile. (ii) Horizon or subsoil: does not have much humus so it is lighter in colour. It has more minerals and pieces of rocks. It has oxides of iron and other minerals. It is a hard layer. (iii) Horizon or parent rock: consists of small pieces of rocks with cracks and crevices. The particles of rock found in soil come from this layer. (iv) Horizon or bedrock: is the lowermost layer which is very hard and non-porous. The properties of this rock help in determining the properties of soil. This layer is very difficult to dig. Water collects over this layer to form the water table. Bedrock can also be the loose materials deposited in huge quantities by rivers, glaciers and wind. 3. The different types of soil in different regions of India is according to the climatic conditions prevailing in those regions. The availability of soil that match the criteria of climate boost the production of a given crop. In this way, varieties of crops can be grown in the country itself to cater the needs of people. 4. Properties of Soil: (i) Colour of the soil: Each soil has different colour and texture. Texture is how soil feels to touch. The colour of the soil depends on the chemicals present in a soil. (ii) Moisture in the soil: Soil has spaces or pores. When one-third of the pores of spaces are filled by air and two thirds of its by water, this ratio constitutes the most favourable condition for the growth of plants. (iii) Soil Temperature: Soil temperature affects seed germination, root growth and microbial activity. (iv) Presence of organic matter: Organic matter is present in the soil in different amounts. Decomposition of organic matter provides nutrients to growing plants. Organic matter decomposed by micro-organisms is a source of food to them. (v) Water retention capacity of soil (vi) Percolation rate of water in soil: For proper growth of plants, soil should not hold water for a long time, because it will block air pores of the soil and proper aeration will not occur for the roots of the plant. 5. Causes of soil erosion: - when heavy rain falls on weak soil, rain water loosens the soil particles which get carried from one place to other. - when drought occurs, vegetation gets depleted. Wind blows away the fine particles of soil during drought. - overgrazing leads to soil erosion. - During intensive farming, the excessive use of fertiliser and irrigation, damage the land sometimes permanently. - On steep slopes, water flows faster, soil creeps, slips or slumps down the hill. - When roads are constructed, not enough attention is paid to rainwater flow and maintenance of sides of the road. Prevention of soil erosion: Soil erosion can be prevented by planting more and more trees and plants. The roots of plants and trees bind soil with them and stop soil erosion. Plants also slow down the speed of bowing water and wind. **Let's Evaluate and Activity:** Students will do themselves.

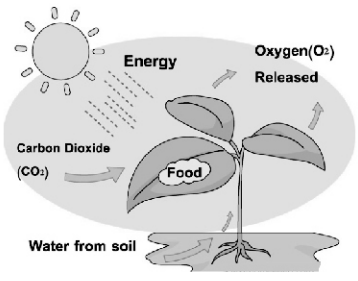
Model Test Paper 1 (A)1. (a) 2. (c) 3. (b) 4. (a) 5. (a) **(B)** 1. Insulators 2. Fats 3. Radiant energy 4. increases 5. Pray **(C)**1. True 2. False 3. False 4. True 5. True **(D)**1. (c) 2. (d) 3. (a) 4. (e) 5. (b) **(E)** 1. Non renewal resources 2. Roughage 3. Sericulture 4. Cell 5. Xerophytes **(F)**1. Clinical Thermometer are also called medical thermometers. They are used for measuring the temperature of the human body, with the tip of the thermometer being inserted either into the mouth under the tongue or in the armpit. It was invented by Sir Thomas Allbut in 1866. Thermometer is a glass tube with a bulb at one end containing mercury which expands in a uniform manner through the column. As kink is present just after the mercury bulb that does not allow the mercury column to fall back. This avoids changing of the recorded temperature while reading the thermometer. 2. Materials are made up of very small particles. The smallest unit into which something can be divided is known as an atom. The smallest

particle of iron is an iron atom and that of silver is a silver atom. When the molecules of elements or compounds are present together, it is called a Mixture. Heterogeneous mixture: mixture in which particles of the substances present can be seen easily is called heterogeneous mixtures. Homogeneous mixture: Mixtures in which the particles of the substance present cannot be seen are called homogeneous mixture. 3. (a) Proteins are called body building food: Proteins are called as body building food as it helps our body to grow. Proteins are made of amino acids. Amino acids are made of carbon, hydrogen, oxygen, nitrogen, sulphur and phosphorus. (b) We should take iodized salt: The deficiency of iodine results in a disease like goitre, stunted growth, mental retardation etc. Iodised salt is the major source of the iodine in our food. Hence, we should use iodised salt while cooking our food. 4. Chemical Energy: Energy can be stored in the chemicals from which a material is made. The chemicals are made from atoms that are linked together to make molecules. The chemical energy is stored in the links between the atoms. Food, fuel and the chemicals in an electrical cell are examples containing stored chemical energy. The energy is released when the links between some of the atoms are broken and the molecule in which the energy was stored is broken down into smaller molecules. For example, carbohydrates are a store of chemical energy in food.

Model Test Paper 2 (A) 1. (b) 2. (d) 3. (c) 4. (b) 5. (d) **(B)** 1. Tap and Fibrous 2. Fish 3. Alluvial soil 4. Black 5. Nitrogen **(C)** 1. True 2. False 3. False 4. True 5. True **(D)** 1. (e) 2. (d) 3. (a) 4. (c) 5. (b) **(E)** 1. Pollination 2. Moist Soil 3. Ozone layer 4. Shadow 5. Biogas **(F)** 1. Diagram (flow of current in a bulb) A electric current can flow only when there is a closed path for it to travel along. The path along which an electric current can flow is called, an electric circuit. When you connect a bulb to a cell with wires, you create a closed path, or a circuit, through which current can flow. It is this current flowing through the filament of the bulb that makes the bulb glow. Electric current flows through the wires from the cells positive terminal to the bulb, and from there, to the negative terminal of the cell. The direction of arrows shows the direction of current. The cell, the bulb and the connecting wires are all part of the circuit. If there is any break in the wires or in the filament of the bulb, the circuit is broken and the bulb does not glow. 2. Diagram of a leaf. Leaves manufacture food with the help of chlorophyll, in the presence of sunlight, from water and carbon dioxide by the process of photosynthesis. Leaves have tiny pores that help in exchange of gases during respiration. These pores present on both sides of the leaves are called stomata. Excess of water present in plants is lost through stomata present in the leaves. 3. Air that is moving is called wind. Properties of air: - Air Takes up Space: Take an empty ziploc bag, open it and pull it through the air like a parachute. Now close it, seal it and try to squish the bag. There's nothing in the bag, right? Wrong. The ziploc bag is full of air. - Air Has Mass/Weight: Place an empty balloon on a scale and weigh it. Take this same balloon and inflate it. Weigh it again. What do you see?. A really clear way to show this is to make a balance with a stick or coat-hanger suspended by a string in the middle. Tie an empty balloon on each side to prove they weigh the same. Inflate one balloon and re hang it. That side of the balance will be heavier. If air had no mass, there would've been no change. 4. Functions of the Skeletal System: - It forms framework of the body. - It helps to protect and keep the delicate organs of the body in their proper positions. Knee hinge joint, wrist gliding joint, neck pivot joint, spine - 5. Causes of soil erosion: - when heavy rain



Flow of current in a bulb

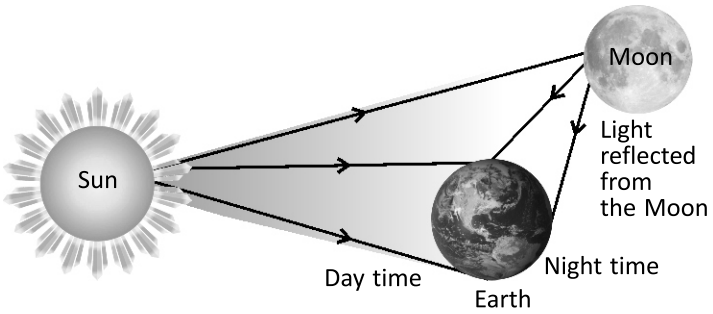


falls on weak soil, rain water loosens the soil particles which get carried from one place to other. - when drought occurs, vegetation gets depleted. Wind blows away the fine particles of soil during drought. - overgrazing leads to soil erosion. - During intensive farming, the excessive use of fertiliser and irrigation, damage the land sometimes permanently. - On steep slopes, water flows faster, soil creeps, slips or slumps down the hill. - When roads are constructed, not enough attention is paid to rainwater flow and maintenance of sides of the road. Prevention of soil erosion: Soil erosion can be prevented by planting more and more trees and plants. The roots of plants and trees bind soil with them and stop soil erosion. Plants also slow down the speed of bowing water and wind.

Model Test Paper 3 (A)1. 2. Troposphere 3. Liquid waste 4. Compound 5. Kinetic Energy 6. Volume **(B)**1. True 2. False 3. True 4. True 5. False 6. False **(C)**1. Collision 2. Stratosphere 3. Rodents 4. Terylene 5. Skeletal **(D)**1. (d) 2. (f) 3. (a) 4. (e) 5. (b) 6. (c) **(E)**1. (c) 2. (a) 3. (c) 4. (c) **(F)**1. Chlorophyll 2. Alluvial Soil 3. Conduction 4. Exosphere 5. Drought 6. Battery **(G)**1. Magnetism: Magnetism is the phenomenon of the attraction of a substance by a magnet. 2. Physical Change: A change in which no new substance is formed and the substance only undergoes a change in its shape, size, appearance or state is known as a physical change. 3. Radiation: The mode of heat transfer which takes place in vacuum and does not require any medium like solid, liquid or gas. 4. Rectilinear motion: Rectilinear motion is a translational motion in a straight line. **(H)**1. Sieving and Winnowing: A sieve is usually a plate with many holes or a gauze with hole of a specific size. The size of the holes of a sieve depends on the size of the particle to be separated from the mixture. This method if used when the mixture has substances of different sizes. A sieve with very fine holes is used to separate undesirable substances from flour and sieve with bigger holes is used to separate stones from the sand, whereas Winnowing method is based on the property that grains are heavier than husk and hay with the help of wind. Winnowing is the process of separating the grains from the chaff. It is based on the principle that if one of the components of the mixture is very light in weight then it can be separated from the other constituents of the mixture by blowing it away. In this, the threshed grain is placed on a tray and is allowed to fall from a height. The lighter chaff is blown away with the wind while the heavier grain falls straight down and gets separated. 2. The Shoulder bone and the Pelvic bone: The shoulder bone is formed by the collar bone and the shoulder blade. It connects the upper part of the chest and bones of the arm whereas; the Pelvic bone or the hip bone is formed by the fusion of three bones. The hipbones together with the hip and the tail parts of the backbone form a large bony bowl, called pelvis. 3. Kinetic Energy and Potential Energy: The energy which a body possesses by virtue of being in motion is called kinetic energy whereas; stored energy is called potential energy because it gives something potential to use its stored energy. 4. Clinical Thermometer and Laboratory Thermometer: Clinical thermometer is also called medical thermometer as they are used for measuring the temperature of the human body whereas; laboratory thermometer is used for measuring temperature of all materials. 5. Tap roots and Fibrous roots: Basil has a main root which grows vertically downward in the soil. This is the primary root. Primary roots give out lateral roots called secondary roots. Such roots are called tap roots whereas; some plants like grass do not have the main root. Instead, a bunch of roots arise from the base of the plant. These spread out into the soil and give support to the plant. Such roots are called fibrous roots. **(I)**1. Types of soil on the basis of Geographic Region:- (i) Alluvial Soil: It is formed by the deposition of silts brought by the rivers. It is rich in oxides of iron and is fertile soil. It is found in most parts of India. (ii) Black Soil: It is also called Regur. It contains compounds of iron and aluminium. It is good for the growth of cotton crop. Cereals, oil seeds, citrus fruits, vegetables, tobacco and sugarcane also grow well

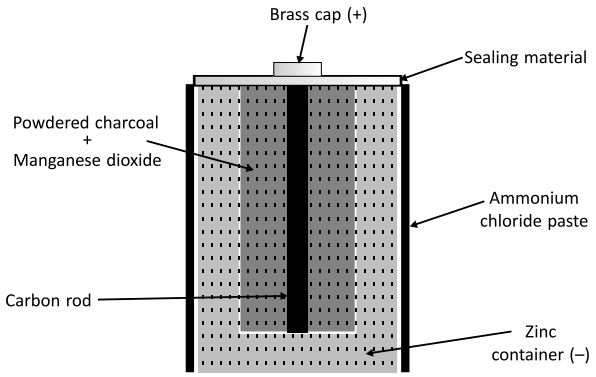
in this soil. This type of soil is formed due to the solidification of lava spread over large areas during volcanic activities in the Deccan, Plateau, thousands of years ago. (iii) Red Soil: The type of soil is mainly formed due to the decomposition of ancient crystalline rocks like granite and gneiss and from rocks rich in iron and magnesium. The red colour is due to presence of oxides of iron. (iv) Laterite Soil: It is found in typical monsoon conditions i.e. high temperature and heavy rainfall with alternate wet and dry periods. This causes leaching away of silicious matter and lime of rocks. It is a soil rich in oxides of iron. (v) Forest and Mountain Soil: It is found in hill slopes covered by forests. This type of soil is formed mainly by the deposition of organic matter from forest growth. It is rich in humus but deficient in potash, phosphorous and line so it needs fertilisers. (vi) Arid and Desert Soil: A large part of Rajasthan and adjoining areas of Punjab and Haryana receive less than 50 cm of annual rainfall. These areas are covered by sand which inhibits soil growth. It has phosphorus content like alluvial soil but low nitrogen content. (vii) Saline and Alkaline Soil: This type of soil is found in the dry parts of Bihar, UP, Haryana, Punjab, Rajasthan and Maharashtra. This type of soil is also called as Usar, Kallar or Reh. Accumulations of salts make it infertile and unfit for agriculture. (viii) Peaty and Marshy Soil: It originates in the humid region as a result of accumulation of large amount of organic matter in the soil. It contains considerate amount of soluble salt and 10-40% organic matter. 2. According to its physical state, waste can be grouped in to solid, liquid or gas. Solid waste: wastes that are solid and are generally generated by house hold and industrial activities are known as solid wastes. For example packing cases, glass bottles, polythene bags. Newspapers and iron scrap are solid wastes. Liquid waste: the waste released along with water or any other liquid are liquid waste. Sewage from the house contains human excreta; effluents from industries and agricultural drainage are few examples of liquid waste. Gaseous waste: the harmful gases like sulphur dioxide and nitrogen oxides are discharged in to the atmosphere in the form of gases, primarily from the factories and automobiles constitute gaseous waste. 3. Attraction and Repulsion between magnets: There is a power of attraction and repulsion between magnets. The similar poles of two magnets repel and opposite poles attract each other. - The South Pole of a magnet will be attracted towards the North Pole of another magnet. - The North Pole of a magnet will be attracted towards the South Pole of another magnet. - The South Pole of a magnet will be repelled by the South Pole of another magnet. - The North Pole of a magnet will be repelled by the North Pole of another magnet. 4. The camel is an animal that has developed marvellous adaptations to cope with the heat and shortage of water in deserts. Some animals do need to take a drink, and the camel can take the largest drink of all. It may gulp down thirty gallons in ten minutes! Some people assume this water is stored in the camel's hump, but actually the hump only stores fat. The water a camel needs to survive is stored in its blood and cells. 5. Chemical change: Chemical changes occur only under suitable conditions. The changes in which new substances are formed which have properties that are different from the original substances are called chemical changes. In all the changes, new types of molecules are formed from the combination of the molecules of the original substances. Mostly chemical changes are irreversible changes as the new substances formed have different properties than the original substances. Here are some examples of such changes: (i) Cooking food: cooking vegetable, rice, pulses and making rotis / breads from wheat flour are all chemical changes in which new substances are formed with different new properties. (ii) Burning of paper, wood and other fuels: burning of paper, wood and other fuels like petrol, diesel, kerosene etc. are all chemical changes as new substances are formed. (iii) Rusting of iron: when iron comes in contact with air and water, it changes to a brown coloured substance called rust. The process of forming rust on iron is called rusting. Rusting eats up iron

and it cannot be reversed. So, it is an irreversible chemical process. 6. Properties of Matter: Other than volume and mass, matter has many other properties on the basis of which we can distinguish them. (i) Appearance: Appearance is the first thing on the basis of which materials can be distinguished from each other. Materials usually look different from each other and if two things look alike then they most likely have some composition. (ii) Texture: Certain materials are smooth, where as some others are rough to touch. Materials differ from each other on the basis of texture. Texture is the way that something feels when we touch it. (iii) Lustre: You may have noticed that many things shine. The shininess in materials is called their lustre. (iv) Hardness: You cannot change the shape of a hard material by pressing it, you can do it easily but when you try to press different materials with your hands, you find that few get easily pressed with others do to a little extent and there are some materials which do not get pressed at all. 7. Diagram (moon reflects sunlight towards earth)



Moon reflects sunlight towards Earth

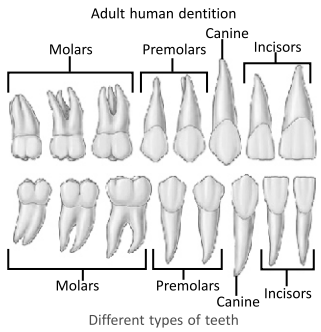
Moon is not a luminous body. It has no light of its own. The light which we see coming from the Moon is actually the light of the Sun reflected by the Moon's surface towards the Earth. 8. Label the Diagram (inner view of a dry cell)



The inner view of a dry cell

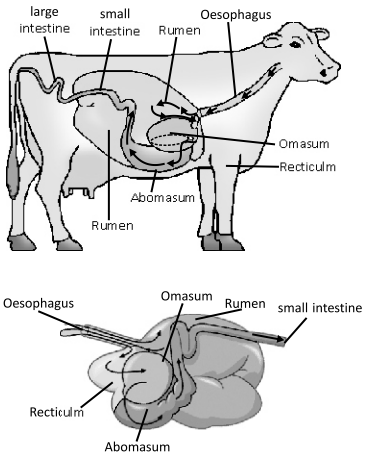
CH. 1 Nutrition in Flora (A) 1. b 2. a 3. b 4. b 5. b **(B)** 1. enzymes 2. nutrition 3. Rafflesia 4. symbiotic 5. sunlight **(C)** 1. True 2. False 3. False 4. True 5. False 6. True 7. True **(D)** 1. e 2. c 3. a 4. d 5. b **(E)** 1. Nutrition 2. Parasites 3. Photosynthesis 4. Stomata 5. Saprophytic Nutrition (Heterotrophic Nutrition) **(F)** 1. Carnivores 2. Saprophyte 3. Root hair 4. Cuscuta 5. Rhizobium **(G)** 1. Food performs four main functions: 1. Food provides the organism with the energy necessary for its activities. 2. Food is essential for growth. Without food, an organism will stop growing. The living cells in our body multiply after being nourished from the food we eat 3. The body also needs food for the repair of any damage done to it, either accidentally, or through constant work 4. Minerals and vitamins that exist in our food are essential for the protection of the organism against illness. 2. The chemical substances that provide nourishment to living organisms are called nutrients. Depending on the mode of nutrition the organisms are classified as autotrophs and heterotrophs. Autotrophs : Organisms which utilise carbon dioxide as their sole source of carbon for the formation of organic food by the process of photosynthesis are called autotrophs (self nourishing). In addition to carbon dioxide, autotrophs require water and several inorganic ions. If the autotrophs prepare their own food by utilising chemical energy they are called chemoautotrophs. Heterotrophs : Organisms which are incapable of photosynthesising, obtain certain organic compounds from other autotrophs and they are called heterotrophs and this type of nutrition is referred to as heterotrophic nutrition. Different types of heterotrophic nutrition are as follows : 1) Parasites, obtain their nutrition from hosts. These parasites maintain physical contacts with the host plant through haustoria (parasitic roots) These haustoria penetrate into host tissue and make connections with the conducting elements of host and draw nourishment. 2) Saprophytes get their nutrition from dead and decaying organic matter. Example: Fungi like Rhizopus, Agaricus. Insectivorous plants : Otrophic and partly heterotrophic. These autotrophs supplement their nutritional requirements by trapping and digesting insects and other small animals. The trapped insects are killed and their proteins are digested by proteolytic enzymes secreted by the epidermis of the leaf. Example: Pitcher plants, Drosera, Utricularia and Dionea. 4) Symbionts : In a symbiotic association, two organisms live in close physical contact with each other and are of mutual benefit to one one another. Examples: Lichen and Micorrhiza 3. The process by which green plants and some other organisms use sunlight to synthesize nutrients from carbon dioxide and water. The three main things affecting the rate of photosynthesis are : 1. Light 2. Temperature 3. Carbon dioxide 4. Leaves enable photosynthesis to happen. Photosynthesis is the process by which leaves absorb light and carbon dioxide to produce carbohydrate (food) for plants to grow. Leaves are adapted to perform their function . They have a large surface area to absorb sunlight. 5. The mode of nutrition in which two different organisms live together, share shelter and nutrients is called symbiotic nutrition. In organisms called lichens, alga and a fungus live together. Alga contains chlorophyll and is autotroph, while fungus lacks chlorophyll and is heterotroph. 6. Plants need mineral nutrients from the soil. So, their amounts in the soil keep on declining. These nutrients need to be added from time to time to enrich the soil. Usually crops require a lot of nitrogen to make proteins. After the harvest, the soil becomes deficient in nitrogen. Though nitrogen gas is available in plenty in the air, plants cannot use it in the manner they can use carbon dioxide. They need nitrogen in a soluble form. The bacterium called Rhizobium can take atmospheric nitrogen and convert it into a soluble form. In this way nitrogen is replenished in the soil. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 2 Nutrition in Fauna (A) 1. b 2. d 3. d **(B)** 1. mouth 2. Premolar and 3. teeth 4. digestion, smaller 5. enzymes 6. large intestine 7. egestion 8. rumen, reticulum, omasum, abomasum **(C)** 1. False 2. True 3. True 4. False 5. True 6. False 7. True 8. False **(D)** 1. e 2. a 3. d 4. c 5. b **(E)** 1. Amoeba 2. Chewing 3. Buccal cavity 4. Kidney 5. Pseudopodia **(F)** 1. Pseudopodium: The outer body surface of Amoeba contains very small organs called pseudopodia that help them to collect food particles. 2.Rumen : the first stomach of a ruminant, which receives food or cud from the oesophagus, partly digests it with the aid of bacteria, and passes it to the reticulum. 3. Enamel : The hard glossy substance that covers the crown of a tooth is known as enamel 4. Cud : partly digested food returned from the first stomach of ruminants to the mouth for further chewing 5. Dentine Formula : A formula expressing the number and kinds of teeth possessed by a mammal. A dental formula is usually written in the form of four fractions, one for each type of tooth, with the upper and lower lines describing the upper and lower jaws respectively. **(G)** 1. Four types of heterotrophic nutrition : Parasitic nutrition : In this mode of nutrition animals derive nutrients from other animals or plants called host. This kind of relationship between the parasite and the host is called parasitism. Mosquito & louse are the examples of human parasite that feeds on human blood. Saprozoic nutrition : In this mode of nutrition, organisms derive nutrition from dead organic matter. Millipedes, woodlice and dung flies accomplish their nutrient requirements by this method. They are also called detritivores. Mutualistic nutrition : In this mode of nutrition, two animals live close to each other and they interact in such a manner that either both are benefited or one of them is benefited. But none of them is harmed from this association. Example of mutualistic association is the association between remora and shark. Holozoic nutrition : This type of nutrition is seen in humans and other commonly found animals. Organisms take whole solid food or liquid substances in this mode of nutrition. Holozoic animals are herbi-vores (plants-eating), carnivores (animals-eating) or omnivores (eating both animals and plants). 2. 1. The digestive process is as follows: 1. Ingestion The food is taken through the mouth. Here saliva breaks down the food while it is being chewed by our teeth. The food then goes down towards the oesophagus. 2. Digestion : Digestion involves the breaking down of food into smaller particles. During this process complex food molecules are broken down into simpler molecules, so that they can be absorbed by the body. The major part of digestion takes place in the stomach and in the small intestine. In these two organs the food particles are acted upon enzymes. 3. Absorption : The soluble digested food is taken into the tissues by absorption. This process takes place inside the small intestine from where the soluble food enters the blood stream and is carried into the tissues after that. Small intestine has finger-like projections called villi (singular: villus) that help in absorption. Absorption of water takes place in the large intestine. 4. Assimilation : In this process the food which is in its simplest form and has been absorbed is oxidised to release energy. 5. Egestion : Removal of undigested food or waste matter from the body is called egestion. This process takes place through the anus. 3. The different types of teeth in an adult man are : 1. Incisors : There are two pairs of incisors in each jaw. They have chisel-like ends and are meant for cutting and biting. 2. Canines : There is a pair of canines in each jaw. They have pointed ends and are meant for tearing the food. Canine teeth are well-develop in carnivores. 3. Premolars :There are two pairs of premolars in each jaw. They are bigger than incisors and canines and are flattened on top. There are four premolars each on upper and lower jaw, two on either

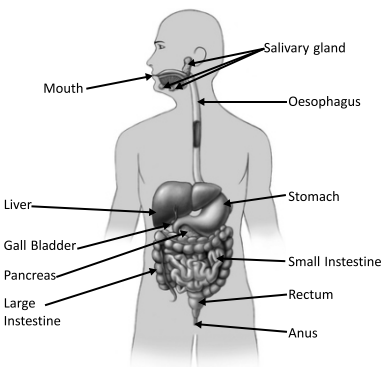


Different types of teeth

side. The surface of a premolar has small humps which facilitate grinding and mastication of food. 4. Molars : There are three pairs of molars in each jaw. We, the human beings have 12 molars. They are used to chew food. Molars are also flattened on top. 4. The stomach of a ruminant has four chambers rumen, reticulum, omasum and abomasum. Such a four chambered stomach is called a compound stomach. The food swallowed by the ruminant enters the first biggest chamber rumen. Here the food is grinded. Then it moves into the reticulum, from where it is returned into the mouth to be broken into smaller pieces and converted into a soft pulp called cud. It is now chewed thoroughly. The process of chewing cud is called rumination. During rumination, the cud mixes with saliva and becomes a semi-liquid paste. Then it is pushed directly into the third chamber omasum and then into the last chamber abomasum. In this fourth chamber, digestive juices mix with the semi-liquid cud. These juices break down the food into simpler form. The semi-digested food now enters the small intestine from where the remaining digestion process continues as it does in human beings. 5.



Ruminant stomach



Digestive system of humans

Let's Evaluate – Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 3 Fibres Obtained from Animals (A) 1. d 2. b 3. b 4. d 5. a 6. d **(B)** 1. Cotton, silk 2. Jute 3. saliva 4. egg, larvae, pupa, imago 5. raw silk 6. Silk 7. wool, silk 8. wool 9. leaves 10. electrocution, anthrax **(C)** 1. True 2. False 3. True 4. True 5. True **(D)** 1. e 2. c 3. a 4. b 5. d **(E)** 1. Rayon 2. Wool 3. Angora 4. Sheep 5. Mulberry **(F)** 1. Shearing 2. Sericulture 3. Combing 4. Cleaning or Scouring 5. Saliva **(G)** 1. Let us discuss the life cycle of silk worm. The female silk moth lays eggs in groups. The eggs develop into silkworms are called larva or caterpillars. The silkworm eats large amounts of leaves for 20-30 days and moulds through four changes of their skin. Before moving to the next stage it spins a solid cocoon around its body and changes to the next stage pupa inside the cocoon. The cocoon takes about three days to be fully complete. The cocoon is made of a fibre which changes to silk on exposure to air. The pupa emerges from the cocoon as a silk moth. In cultivated silk, the larva is killed inside the cocoon in order to extract the silk from cocoon. 2. In India, many people earn their livelihood from wool and silk industries. But, workers employed in these industries get adversely affected by many health problems and diseases. Some of the serious ones are discussed below. Sorter's job in wool industry is risky as sometimes they get infected by bacterium called anthrax, which causes a fatal blood disease called sorter's disease. The workers who dip the cocoons in boiling water to extract silk stand in water for long

hours. As a result of this their skin becomes raw and blistered. 3. The stages of silk production are given below : 1. The silk moth (Bombyx mori) lays eggs on mulberry tree. 2. The eggs hatch into caterpillars (silkworms). They are fed chopped mulberry leaves for 20-25 days. 3. When the silkworms are about 25 days old, they become 10,000 times heavier than their first stage. They are now ready to spin a silk cocoon. 4. Silk is produced from the silkworm's head and then forced out in liquid form through opening called spinnerets. The silk solidifies when it comes in contact with air. 5. The silkworm completes its cocoon, which is about 4 cm long, in about five days by producing 600-1200 metres of silk filament. 6. The cocoons are then put in hot water, which kills the worms as well as loosens the filaments. Some cocoons are preserved to get silkworms that are used later for breeding. 7. One cocoon contains approximately 1,000 yards of silk filament. The silk at this stage is known as raw silk. The filaments from several cocoons are reeled off together to prepare a continuous strong thread. Just one thread consists of 48 individual silk filaments. 8. Finally, the threads are dried, and the raw silk is reeled and packed according to quality. 4. 1. Sorting : Now, the wool is divided into sections and graded by quality. Wool of the same quality is processed together to obtain different types of textiles. 2. Combing : The sorting process is followed by combing, in which the wool is combed to pull the fibres into alignment and to remove chunks of material which may be caught in it. Combed wool is then run through very fine wire brushes to line the fibres up, pull out short segments, and give the fibres their final shape and direction. 3. Making yarn : The fibres are then spun into threads or yarn for weaving, crocheting, or knitting. The width of the finished thread depends on how it is handled during spinning. The quality of the wool depends on the breed of the sheep and it is decided on the basis of thickness, length, strength, colour, and shine of the wool. 5. Killing silkworms for obtaining silkworms should be banned because Silk is the fibre that silkworms weave to make their cocoons outer casings that protect them during the pupal stage. But most of the insects used by the silk industry don't live past this stage, because they are boiled or gassed alive inside their cocoons, which causes the cocoons to begin unravelling so that workers can obtain the silk threads. Some 6,600 silkworms are killed to make just 1 kilogram of silk. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 4 Heat & Temperature (A) 1. c 2. b 3. b 4. c 5. c 6. d **(B)** 1. a substance when heated 2. vacuum 3. weather constant 4. energy 5. Joule **(C)** 1. False 2. False 3. True 4. True 5. False 6. True 7. False 8. True **(D)** 1. a 2. e 3. b 4. c 5. d **(E)** 1. Convection 2. Kilo joule 3. Joule 4. Plastics 5. Ventilation **(F)** 1. Heat 2. Thermometer 3. Celsius Scale 4. Convection 5. Ocean currents **(G)** 1. The thermometers that doctors use to measure our body temperature are called *clinical thermometer*. It is generally a mercury thermometer and uses the Fahrenheit scale. This scale starts from 32° and is divided into 180 equal divisions. In Celsius scale each division measures a temperature difference of 1°C where as each division in Fahrenheit scale measures 1°F. There is a little arrow at 98.4°C on the glass tube of a clinical thermometer. It marks the normal body temperature. The tube has constriction near the bulb. It is made to ensure that mercury cannot go back to the bulb till temperature is read. 2. Following are the steps that need to be taken to read a thermometer. 1. Shake the thermometer vigorously so that the mercury goes below the 'normal' mark. 2. Keep the thermometer either in the arm pit or under the tongue of the person whose temperature is to be taken. Wait for two minutes. 3. Take out the thermometer and read the mark where the silver mark of mercury ends. 3. During the day, the land gets heated faster than water. The air over the land becomes hotter and rises up. The cooler air from the sea rushes in towards the land to take its place. The warm air from the land moves towards the sea to complete the cycle. The air moving from the sea towards the land is called sea breeze. At night, it is exactly the opposite. The land cools down faster than the water. So, the cool air from the land moves towards the sea. This is called the land breeze. 4. Conduction is the spontaneous transfer of heat energy from a region of higher temperature to a region of lower temperature. Therefore, conduction

acts to equalize temperature differences. It is also described as heat energy transferred from one material to another by direct contact. Conduction involves transfer of heat energy between adjacent molecules in a solid. Heat increases the vibrations of the molecules which collide with their slowly moving neighbours and make them vibrate faster. They in turn, pass the vibration on to their neighbours and so on. Thus, heat energy is passed on from one molecule to the next, although each individual molecule remains in its original location. Liquids and gases are together called fluids, since both can flow. In the case of fluids, the molecules themselves carry energy from a hotter region to a colder region. This process of heat transfer is called conve-ction. When a fluid, such as water, comes in contact with an object whose temperature is higher than that of the fluid, convection occurs. The Sun rays heat up the surface of the Earth. This heat is then transferred in the air by convection. Thus, convection helps keep our atmosphere warm. Convection also plays an important role in maintaining a moderate temperature in coastal areas. 5. Today, to benefit humankind, radiation is used in medicine, academics, and industry, as well as for generating electricity. In addition, radiation has useful applications in such areas as agriculture, archaeology (carbon dating), space exploration, law enforcement, geology (including mining), and many others

CH. 5 Physical & Chemical Changes & Reactions (A) 1. b 2. d 3. b 4. a 5. a 6. c 7. d **(B)** 1. iron oxide 2. blue 3. Chemical 4. reversible 5. irreversible 6. chemical 7. chemical 8. released 9. chemical 10. physical 11. chemical 12. zinc **(C)** 1. True 2. False 3. True 4. False 5. True **(D)** 1. c 2. a 3. e 4. b 5. d **(E)** 1. Ageing of living beings 2. Physical change 3. Ammonium Chloride 4. Crystallization 5. Moist air **(F)** 1. Physical change 2. Physical change 3. Displacement reaction 4. Chemical change 5. Galvanization **(G)** 1. Don't get fooled into thinking that all physical changes are irreversible. In fact, many physical changes can be reversed. Remember that when a substance changes physically, it is still the same substance, just in a different form. Water turning into ice is a great example of a reversible physical change. 2. When a liquid is heated sufficiently or when the pressure on the liquid is decreased sufficiently, the forces of attraction between molecules do not prevent them from moving apart, and the liquid evaporates to a gas. This is called evaporation. Condensation is the change of the physical state of matter from gas phase into liquid phase, and is the reverse of evaporation. 3. Everything around us undergoes certain changes. Changes can be either physical or chemical. Physical change : When matter changes it observable properties, we can say it has undergone a physical change. Physical change is a type of change where the physical properties of matter change. A change of state of matter, change in color, odor, solubility, etc. all are examples of physical change. During a physical change, neither the composition nor the chemical nature of matter is changed. During this change, molecules rearrange themselves without affecting the internal composition. A physical change doesn't affect the chemical property. A common example of physical change is the conversion of states of water. Ice, water, and steam are the three physical states of water. But all the three forms contain H_2O. Other examples are whipping egg albumin, crushing of tomato, breaking of a bar magnet, etc. Chemical change : Different substances have different chemical property. According to this property, substances show variation in their reactivity. Chemical change is a type of change where the chemical properties of matter change. It is commonly called a chemical reaction. A chemical reaction results in a new product. During a chemical change, bonds between the molecules break and the composition of the substance change. In other words, chemical change leads to the breaking and making of bonds. Combustion, rusting, fermentation, etc. are few examples of chemical change. 4. (a) Chemical and Physical (b) Physical change (c) Chemical change (d) Physical change (e) Chemical change (f) Chemical change (g) Chemical change (h) Chemical and physical 5. All chemical reactions have the following characteristics. 1. Change in energy : All reactions are accompanied by energy changes. Energy usually is the form of heat, is either given out and/or absorbed in the reaction. 2. Change in state : In many chemical reactions, physical state of the substance gets changed. For example, when calcium carbonate (lime) is heated, it gives off carbon dioxide which is a gas. 3. Change in colour : When a reactant changes to a product,

the latter may have a different colour. For example, when zinc powder is added to copper sulphate solution, the blue colour of copper sulphate solution fades away due to the formation of zinc sulphate which is colourless. 4. Release of gas : In a chemical reaction, the product (s) formed may be in the gaseous state. If the reactants are in liquid state (solution), the gaseous product (s) is released in the form of bubbles. The gaseous product in the reaction is represented by an upward arrow (↑). 5. Formation of Precipitates Some chemical reactions lead to the formation of an insoluble substance that settles down at the bottom of the test tube. This insoluble substance is called precipitate. 6. The sublimation is a physical change because solids directly change into a gas and the reverse of this process can also occur. 7. The germination of a seed is a complicated process that involves many chemical reactions as well as changes in the physical appearance of the growing plant. Clearly, the process is too complicated to say that it is merely one or the other. It begins with water. Water soaks through the outer layers of the seed and combines with an enzyme inside the seed to start the reactions that result in the growth of the embryo. Again there are both physical and chemical changes that occur, but primarily the changes are chemical. 8. Burning of LPG is our kitchen is an example in which a physical change occurs when LPG come out of cylinder and is converted from liquid to gaseous state and a chemical change occurs when this gas burn is air. 9. The chemical reaction that occurs during rusting Iron + Oxygen (air) + Water Iron Oxide (rust). 10. The conditions required for rusting to take place are presence of moisture and air (oxygen). 11. Another way is to deposit a layer of metal like chromium or zinc on iron surface. This process is called galvanization. Iron surface is coated with zinc so that it can be prevented from rusting. 12. 1. A physical change is reversible, a chemical change is not. For example, the freezing of water would be a physical change because it can be reversed, whereas the burning of wood is a chemical change - you can't 'unburn' it 2. A physical change is a change in which no new substance is formed; a chemical change results in the formation of one or more new substances. Again, consider the previous examples: Freezing water into ice just results in water molecules which are 'stuck' together - it's still H_2O. Whereas burning wood results in ash, carbon dioxide, etc, all new substances which weren't there when you started. 13. The process of forming crystal of a solid substance from its solution is called crystallization. Crystallization also helps to remove impurities from the solid. Therefore, the salt crystals obtained by this method are free from any undesirable objects or impurities. Crystals of copper suphate can be obtained by preparing its solution in which no more copper sulphate can be dissolved. Heat the solution and leave it overnight. Next morning, you will find beautiful blue crystals of copper sulphate separated out at the bottom of the solution. 14. Chemical reactions often involve changes in energy due to the breaking and formation of bonds. Reactions in which energy is released are exothermic reactions, while those that take in heat energy are endothermic. Physical changes only change the appearance of a substance, not its chemical composition. Cutting, tearing, shattering, grinding, and mixing are further types of physical changes because they change the form but not the composition of a material. For example, mixing salt and pepper creates a new substance without changing the chemical makeup of either component. Phase changes are changes that occur when substances are melted, frozen, boiled, condensed, sublimated, or deposited. They are also physical changes because they do not change the nature of the substance. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 6 Adaptations According to Weather, Climatic Changes & Temperature (A) 1. (d) 2. (b) 3. (b) 4. (d) 5. (a) (B) 1. meteorology, meteorologist 2. weather forecasting 3. temperature, precipitation 4. temperature, wind, humidity 5. living beings, storage 6. South-East, widespread 7. penguins 8. arboreal 9. are tigers and leopards 10. polar bears, enemies, prey **(C)** 1. False 2. True 3. True 4. False 5. True 6. True 7. True 8. True 9. True 10. False **(D)** 1. c 2. a 3. e 4. b 5. d **(E)** 1. Average monthly 2. Climate 3. Coastal area 4. Polar region 5. Temporary adaptation **(F)** 1. Leeward 2. Windward 3. Climate 4. Latitude 5. C-Horizon **(G)** 1. Humans can also affects soil formation by cutting trees in an area leading to soil erosion. Dead plants and dropped leaves and stems decompose on the soil, where organisms feed

on them and mix them with the upper soil layers. These organic compounds become part of the soil formation process and ultimately shape the type of soil formed. 2. Soil organisms, which range in size from microscopic cells that digest decaying organic material to small mammals that live primarily on other soil organisms, play an important role in maintaining fertility, structure, braining and aeration of soil. 3. A large number of animals live in the rainforest. Although animals in tropical rainforests have wide variety of food available, but there is lot of competition for food. As a result, many animals have adapted to a particular food which is not eaten by other animals. These animals have developed several methods for obtaining food. 4. Camels store water in their blood for future use. The hump of a camel stores fat which is a source of food. A camel can go a week or more without even a drop of water. It can also survive for several months without food. Sweat glands are less in camel's body to prevent water loss. Camels excrete concentrated urine to conserve body water. Camels have wide feet with thick soles which help them to walk effectively on sand. Eyelids of camels are transparent and cover the eyes to protect them from sand storm. Unlike most mammals, a camel can withstand body temperature fluctuations throughout the day from 34°C to about 42°C. 5. The factors on which climate of a region depends are geographical location, attitude, distance from the sea, latitude, ocean currents, winds and mountain ranges. 6. The tendency of an organism to develop certain features which improve the chances of its survival in the environment, in which it lives is known as adaptation. For example, animals living in very cold climate must possess certain special features to protect themselves from cold. Similarly, camel and desert rat are adapted to hot climate of the desert. **(H)** 1. (A) Animals living in Polar Regions are usually white or light coloured. It makes them note easily visible in the snowy background and protects them from their predators. It also helps them to catch their prey. Most animals living in polar region hibernate during winter and utilize the energy from the food already stored in the body. Hibernation also minimizes their metabolic activity. The animals in these regions have thick wool and fleece on their bodies. This protects them from extreme cold. The fat under the skin also gives them protection against cold. (B) Following adaptations are found in the animals of tropical rain forests. Most tropical rainforest animals are herbivorous due to plenty of vegetation around them. The bird Toucan has a long and large beak. This helps it to reach fruits on the branches of a tree on which it cannot sit. Most tropical rainforest animals walk on the land on their four feet. Many animals are adapted to live on trees. The animals living in tropical rainforests have Sensitive hearing. Sharp eyesight. Skin colour which blends with the surroundings (called camouflaging) all these properties help them to. Locate their prey. And protect themselves from the predator because they cannot be seen. (C) Desert is a hot, dry area of land with very few plants. Animals living in a desert adapt themselves to scarcity of water as there is a little rainfall every year. 2. The different layers found in the soil. On horizon or Ground Level : The top layer of soil where plants grow and animals live in known as the 'O' horizon or ground level. A Horizon of Topsoil : The layer found below the O horizon and above the E horizon is called A horizon or topsoil. Seeds germinate and plant roots grow in this dark-colored layer. It is made up of humus (decomposed organic matter) mixed with mineral particles. E Horizon : This layer is light in colour and situated just below the horizon. It is made up of sand and silt. B Horizon or Subsoil : This layer contains clay and mineral deposits (like iron, aluminum oxides, and calcium carbonate) that it receives from the layer above it. This layer is also called subsoil which has very low inorganic matter compared to the topsoil. Minerals and other materials seep down to this layer along with water. Most of the soil's nutrients are found here. Deep plant roots come up to this layer to absorb water. C Horizon : This layer is called regolith. It is situated below the B horizon layer and consists of slightly broken-up pieces of rock. Plant roots do not penetrate into this layer as very little organic material is found here. R Horizon or Bedrock : This is the lowermost layer and mainly consists of the parent rock. This layer undergoes weathering and starts forming soil. 3. Causes of Soil Erosion : The main causes of soil erosion are: Large scale cutting of trees deforestation. Overgrazing in forests. Clearing the forests to make the land available for farming or for constructing building. Leaving the land uncultivated after ploughing and tilling. Deep ploughing and forest fires also lead to soil erosion.

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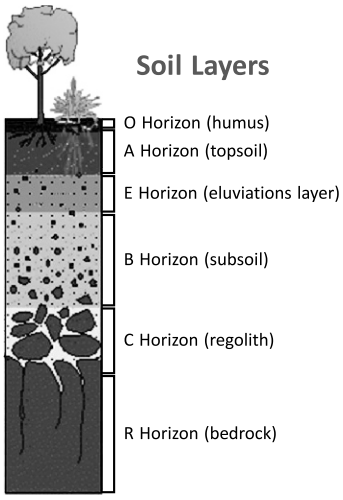


Different layers of soil

5. Difference Between Weather and Climate : Weather and climate differ from each other as follows:

Weather	Climate
1. Weather is applicable to a smaller area, may be a city or a small group of cities.	Climate is applicable to a much larger area, may be a state or region.
2. Weather describes short term atmospheric conditions of a place.	Climate describes the long term average (25-30 years) weather conditions of a particular state/region.
3. Weather at a place may change suddenly.	Climate changes take place very slowly over a long period of time.

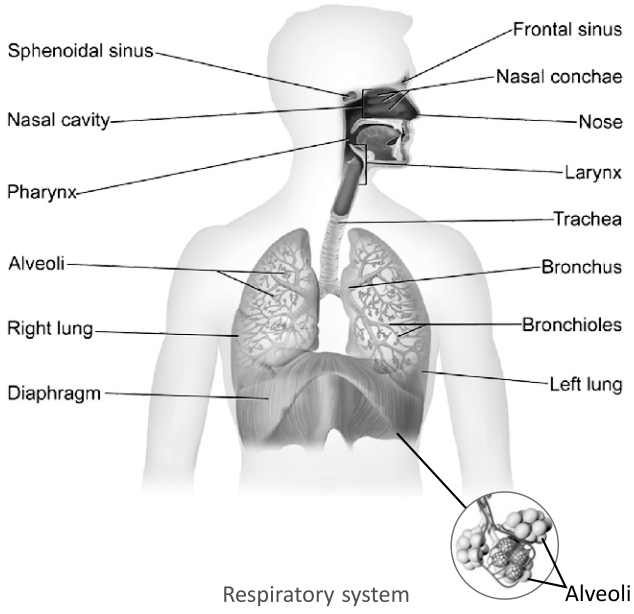
Let's Evaluate – Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 7 Respiration in Flora and Fauna (A) 1. b 2. b 3. ???? 4. b **(B)** 1. respire 2. food 3. yeast and bacteria 4. stomata 5. spiracles 6. upward, downward 7. spiracles 8. roots 9. moist skin, water 10. expand **(C)** 1. False 2. False 3. True 4. True 5. False 6. True 7. True 8. True 9. True 10. True **(D)** 1. e 2. c 3. a 4. b 5. d **(E)** 1. External respiration 2. Muscles 3. Exhalation 4. Expansion of chest 5. night time **(F)** 1. Respiration 2. Aerobic respiration 3. 15-18 times 4. Alveoli 5. Respiration **(G)** 1. Whatever food we eat is first digested in our body. The digested food is then burnt inside the cells of our body to release energy. Oxygen is required for this process as it helps in burning. The process of taking oxygen into the cells, using it to release energy and then elimination of the waste products (carbon dioxide and water) is known as respiration. While the physical process in which an organism takes in (inhales) oxygen and gives out (exhales) carbon dioxide. Thus, the process of inhalation and exhalation is known as breathing. Respiration is primarily of two types anaerobic respiration and aerobic respiration. Anaerobic respiration : The process of respiration that takes place in absence of oxygen is called anaerobic respiration. Tiny organisms like yeast and some bacteria perform this kind of respiration. Therefore, they are called anaerobic organisms or anaerobes. Aerobic respiration : The process of respiration that takes place in presence of oxygen is called aerobic respiration. This kind of respiration takes place in almost all living organisms. More energy is released during this respiration process. Water, carbon dioxide and energy are the end products of this respiration. 2. Stomata : Stomata are the tiny openings present on the lower surface of the leaves. Oxygen, carbon dioxide and water vapour diffuse in and out through stomata. The oxygen diffuses in through the stomata and then enters the leaf cells. Similarly, the carbon dioxide produced in aerobic respiration diffuses out through the stomata. Each stoma (plural: stomata) is surrounded by two bean-shaped guard cells. The opening and closing of stomata is carried out by expansion and shrinking of the guard cells. Guard cells expand and shrink due to the flow of water in and out of the cells. 3. The chemical equation for anaerobic respiration is as follows: Sugar → Ethyl alcohol + carbon dioxide + Energy (less) The equation for this respiration is as follows : Sugar + oxygen → water + carbon dioxide + Energy (more). Stomata are the tiny openings present on the lower surface of the leaves. Oxygen, carbon dioxide and water vapour diffuse in and out through stomata. The oxygen diffuses in through the stomata and then enters the leaf cells. Similarly, the

carbon dioxide produced in aerobic respiration diffuses out through the stomata. 4. Fishes have specialized structures called the gills (Fig. 8.3) to carry out exchange of gases. The gills are made up of a large number of thread-like structures called filaments. These filaments are richly supplied with small blood vessels called capillaries. Gills are supported by soft bony structures called the gill arch. Water flows over the gill filaments during which exchange of gases between the capillaries and water takes place. The blood in the capillaries absorbs oxygen from the water, and gives out carbon dioxide. The oxygen in transported by blood. Therefore, in fish, taking in water and thereby oxygen is called inspiration and exit of water is called expiration.Gaseous exchange in frogs : Frogs are amphibians. They live both in water and on land. When in water, frogs breathe through their moist skin. On the other hand, they breathe through their nostrils and lungs when they live on land. The skin of frog is moistened by secretions of mucus, and it is used for respiration at times. There are a number of blood vessels near the skin. When a frog is under water, oxygen is transmitted through the skin directly into the bloodstream. 5. Respiration in Human Beings : Respiration in human beings consists of two stages- gas exchange or breathing and cellular respiration. Breathing : The physical movement associated with the gaseous exchange is called breathing. When we breathe, the air we inhale passes through a system of organs called the respiratory system. The respiratory system consists of nostrils, nasal cavity, wind pipe (trachea), bronchi and lungs. The path of respiration is as follows :

Nostrils → Nasal Cavity → Larynx → Trachea → Bronchi → Lungs Alveoli

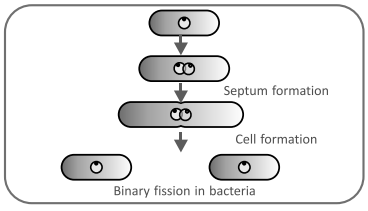
The natural air contains about 21 per cent oxygen and 0.03 per cent carbon dioxide. Thus, the amount of oxygen is more in the air that we breathe in. This oxygen-rich air is taken in by the nostrils. In the nasal cavity, the air is filtered by the fine hair. The cavity also has a rich supply of food vessels that keep the air warm. This air then enters the pharynx, then the larynx and then the trachea. The trachea and the bronchia are lined with special secretary cells that secrete mucus. Mucus moistens the air as it passes through the respiratory tract and also traps any fine particles of dust or bacteria that have escaped the hairs of the nasal cavity. The air from the bronchus then enters the bronchioles and then the lungs.



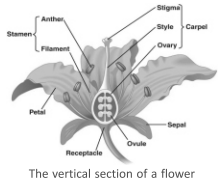
Respiratory system

Let's Evaluate – Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

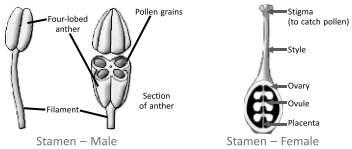
CH. 8 Reproduction in Plants (A) 1. b 2. a 3. a 4. c **(B)** 1. Seeds 2. algae 3. Steam, root and leaves 4. roots, tubers 5. vegetative 6. Cucurbita **(C)** 1. False 2. False 3. True 4. False 5. True 6. True 7. True 8. True **(D)** 1. c 2. a 3. e 4. b 5. d **(E)** 1. Pollination 2. Strawberry 3. Vegetative propagation 4. Regeneration 5. Insects **(F)** 1. Sexual reproduction 2. Vegetative reproductions 3. Crafting 4. Pollination 5. Stamen **(G)** 1. The Male Reproductive Part of a Flower Stamen : Stamen is the male reproductive part of the flower. Each stamen consists of filament and anther. The anther carries several pollen grains. Pollen grains produce the male gametes. The Female Reproductive Part of a Flower Pistil : Pistil is the female reproductive part of the flower. It is broader at the base and tapers at the top. The lower broader portion is the ovary. Ovary contains ovules, which contain eggs. The upper portion of the pistil is called the style. Style has on its tip a sticky end called stigma. In flowers, the process of reproduction starts with the transfer of pollen grains from the anther to the stigma by air, water, insects etc. 2. The formation of a new plant from the vegetative parts of a parent plants is called vegetative reproduction. This is an asexual method of reproduction. Vegetative parts of the plants like stem, root or leaves are involved in this type of reproduction. There are two ways in which vegetative reproduction takes place natural method and artificial method. 3. Self pollination : Pollination which takes place within the same flower or between two flowers of the same plant is called self-pollination. Cross-pollination : Pollination which takes place between two flowers present on two different plants of the same species is called cross-pollination. 4. The formation of new individuals from an unfertilized egg is called parthenogenesis. Parthenogenesis represents a modification of the normal sexual process. 5. The three main agents which help in the dispersal of seeds and fruits are : 1. Wind 2. Water 3. Animals Dispersal of Seeds by Wind : The seeds which are light, small or have tufts of silky hair on their body are carried away to distant places by the wind. Seeds of Dandelion, Drumstick, Maple, Madar and fruit of Acer and Sunflower are dispersed by wind. Seeds and fruits having structure favourable for floating are dispersed by water. For example seeds/fruits of Coconut, Lily, Lotus are dispersed by water. Coconut trees grow near the sea-shore. Seeds and fruits which are dispersed by animals are either edible or have hooks, barbs, spines, bristles, and stiff hair on their surface. Such seeds stick to the skin of animals or clothes of human beings and are carried to distant places. **(H)** 1. Binary fission : In some unicellular organisms, like bacteria, the parent cell divide into two daughter cells. These daughter cells divide again to produce more cells. This kind of division is called binary fission. 2. Can be obtained from their modified underground stems. In mint under ground stems are divided into nodes and internodes. New shoots develop from the nodes. When the intermodal region decay, each shoot separates and forms a new plant. These plants are called suckers. Sugarcane is grown from is cutting. A small piece of stem of a plant, having some leaf buds is cut and planted into moist soil, it develops root and grows into a new plant. 3. 4. Ability of living things to repair themselves or a to grow lost parts is known as regeneration. Every species is capable of regeneration, from bacteria to humans. Regeneration is fundamentally regulated by asexual cellular processes. For eg. Hydra perform regeneration but reproduce by the method of budding. 5. Mechanism of Sexual Reproduction in Plants : The sexual reproductions in plants proceed through the following steps: 1. Pollination: Pollination involves transfer of pollen grain from anther of the stamen to stigma of the pistil. 2. Fertilization: During fertilization, the male and female gametes unite to form a zygote. 3. Formation of seed: Here,



Binary fission in bacteria

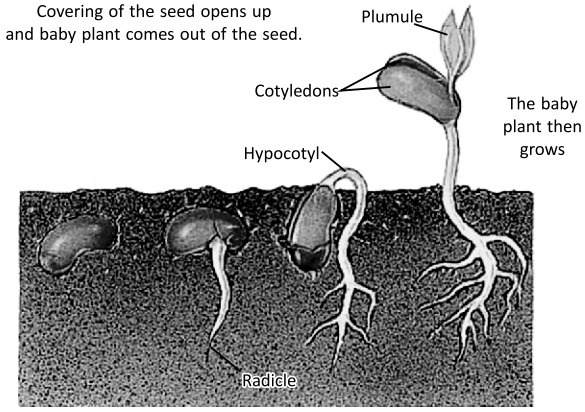


The vertical section of a flower



Stamen – Male reproductive organ
Stamen – Female reproductive organ
The reporductive parts (organs) of a flower

the zygote develops into a seed. 4. Formation of fruit : Ovary matures into fruits. 5. Germination of seed: In the presence of moisture, the seed swells up and the shell bursts open. Its radical goes into the soil to form the root. The plumule grows upward and forms the shoot of the plant. 6. Germination of seeds : A seed has a hard covering. When a seed is placed in moist soil, its covering becomes soft. The food inside swells up and the shell bursts open. In the presence in the seeds, digest the stored food and make it soluble. This soluble food helps radical and plume to grow. The radical grows first and moves into the soil forming the root. The plumule moves upwards and comes out of soil to form the stem. The plumule now utilizes the sunlight to start photosynthesis. At this stage, the plant starts making its own food.

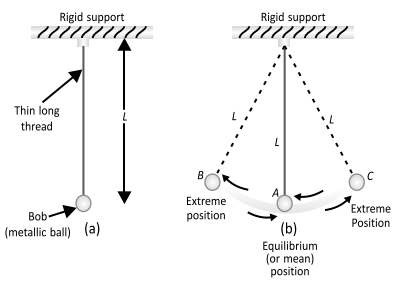


Germination of a seed

Let's Evaluate – Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 9 Time, Speed Motion & Rest (A) 1. d 2. a 3. a 4. d 5. a 6. c 7. c **(B)** 1. uniform 2. vibratory 3. stop watch 4. maximum, equilibrium, displacement 5. Speed of the body 6. meter 7. Linear graph 8. second **(C)** 1. True 2. False 3. True 4. True 5. False 6. False **(D)** 1. c 2. e 3. a 4. b 5. d **(E)** 1. Random motion 2. Table clock 3. Balance Wheel 4. Meter per second 5. 

(F) 1. Circular motion 2. Base unit 3. Stop watch 4. Uniform motion 5. Distance time graph **(G)** 1. The object which change their position with time are said to be in motion. 2. Nothing is at absolute rest or in absolute motion in the universe. Any object said to be in the state of rest or motion is relative to a fixed point. Such a fixed point is chosen arbitrarily. Let us imagine ourselves to be sitting inside a compartment of a running train. Take a situation when everybody in the compartment is sitting at rest. Then, each passenger is at rest relative to the compartment as well as with respect to the other passengers. But, if we consider any point outside the compartment, e.g., platforms, as the reference point then the compartment, as well as the passengers in it are in motion. This example shows that the same object may be at rest with respect to one reference point, and in motion with respect to another at the same time. So, we can say that the motion is actually a relative motion and the states of rest and motion are relative. 3. (a) Linear (b) Circular (c) Linear (d) Vibratory (e) Circular (f) Oscillatory 4. A sundial is a device that tells the time of day by the apparent position of the Sun. It cannot be used at night and has to be kept out side. It cannot be worn on the wrist. 5. A simple pendulum consists of a small metallic ball (called bob) suspended by a light string (thread) from a frictionless, rigid support. A simple pendulum is shown alongside.

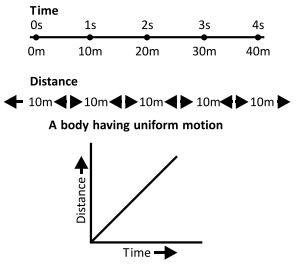


Basic design of a simple pendulum:
(a) in the rest position (b) showing its motion

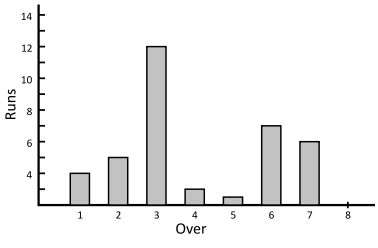
6. The time taken by the bob of the pendulum to travel from B to C and back to B [Fig. (b)] is called the time period of the pendulum. The maximum displacement of the bob from its mean position is called amplitude of the pendulum. The displacement AB or AC [Fig. (b)] is called amplitude of the pendulum. 7. A vehicle such as car, scooter etc. moving on the road, seldom moves with a constant speed. During the journey, its speed may be fast, slow or even zero (at places like Red light). While calculating speed under such conditions, we usually measure the total distance covered by the vehicle and the total time taken. Actually, such a speed is the average speed of the vehicle during that interval of time.

$$\text{Therefore, Average speed} = \frac{\text{Total distance covered}}{\text{Total time taken}}$$

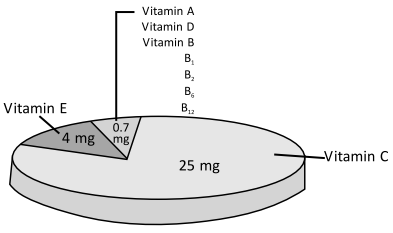
The average speed of a moving vehicle may be different for different intervals of time. In general, all measured speeds are average speeds. The units of measuring speed are cm/sec, m/min, km/hr. 8. Uniform motion is a state of a moving body. This is defined as follows. "A body is said to have uniform motion when it travels equal distances in equal interval of time." 9. The Bar Graph : A typical bar graph between the runs made per over and the serial number of the over is shown below. The Pie Graph : The pie chart showing the daily requirements of some vitamins is shown below. The Line Graph : The graph drawn on Cartesian axes is called line (or curve) graph. A line graph is shown alongside.



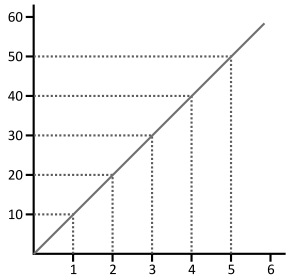
Distance-time relation for a body in uniform motion



A bar graph showing the runs scored in each over by a cricket team



A pie chart showing daily requirements of some vitamins in adults

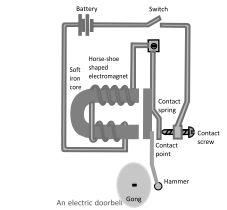


A line graph showing the distance covered by a bus is each minute.

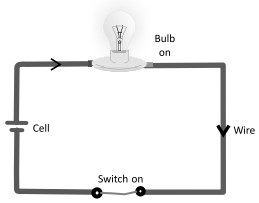
10. Car runs 10 km at the speed of 40 km/hr for 15 min. Then it runs 15 km at the speed of 60 km/hr. for 15 min. Total distance travelled by the car = 10 + 5 km = 25 km. **Numerical –** Do your self. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 10 Electric Current and its Effect & Electrical Circuits (A) 1. b 2. d 3. a 4. b 5. a 6. b **(B)** 1. circuit 2. Shorter line 3. Electric bulb 4. nichrome 5. tungsten, low 6. two or more cells 7. DC 8. and tin 9. low 10. iron **(C)** 1. True 2. True 3. False 4. False 5. True **(D)** 1. b 2. a 3. d 4. c **(E)** 1. Ground or earth 2. Circuit diagram 3. Electrical Fuses and Circuit breakers 4. Electromagnetic lifter 5. Electric Bell 6. The appliances based on the effect are cranes, electric bell. Current passing through a wire produces a magnetic field in its surrounding region. It is called the magnetic effect of electric current. 7. Iron steel and cobalt are used in making the core of an electromagnet. A magnet made by electric current is known as electromagnet. 8. We use a soft iron core in an electromagnet because the soft iron inside the coil makes the magnetic field stronger. Soft iron is used also because it loses its magnetism as soon as the current stops flowing. 9. 1. Electromagnets are used in loudspeakers, television sets, fans, telephones and electric motors. 2. Electromagnetic cranes are used to lift magnetic materials from garbage. 10. Let us see how the doorbell works. Step 1- When you press on the switch, current flows

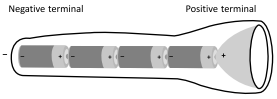
through the electromagnet coil. It generates a magnetic field around the coil. Step 2- The soft iron armature is attracted by this magnetic field. Thus, the armature hanging from the pivot moves toward the coil. Step 3- Because of this movement, the hammer strikes the gong making a sound. Step 4- Once the hammer strikes the gong, contact between the screw and armature breaks. This breaks the circuit leaving it an open circuit. Thus, current flow stops and the coil no longer attract the soft iron armature. The process repeats again if current flows through the circuit. **(F)** 1. On and off 2. Compact Fluorescent lamps 3. Horseshoe **(G)** 1. 2. A battery is a combination of cells. It is a device that stores chemical energy and makes it available in electrical form. The symbol of a battery is formed by the combination of symbols of cells. An electrical battery consists of several identical cell connected together one behind another as shown in Fig. In making such a battery, the negative terminal of a cell is placed in contact with the positive terminal of the preceding cell. Like a cell, a battery also has two electric terminals a positive terminal and a negative terminal. 3. Electromagnets are temporary magnets, i.e., they loose their magnetism the moment current stops flowing through the wire. Usually, large amount of current flows in a circuit due to two reasons. 1. short circuit 2. overloading 1. Short circuit happens when two wires touch each other. This may happen if the insulation covering over the wire gets damaged by heating effect. Some time jumbled up wiring also leads to a short - circuit. 2. Overloading of a circuit happens when a large number of devices are connected to the same power supplying point. For example, if we connect a television set, an electric iron and a refrigerator to a single plug point in a household circuit, it will heat up and damage the electric plug due to overloading. 5. There is a safety device, called electric fuse, which is used in an electric circuit to prevent excess heating due to flow of electric current in the circuit. This device itself is based on the heating effect of the electric current. Each electric fuse consists of a metal wire fixed between two clamps. The fuse wire melts quickly when current more than a specified value passes through it. Fuses are commonly found inside the electric plugs. The symbol used to represent a fuse in an electric circuit is shown in Figure.



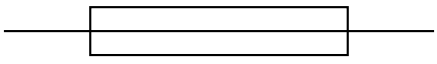
An electric doorbell



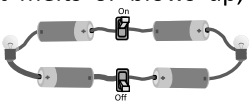
Circuit diagram of a closed electric circuit



A battery has two terminals although it consists of several identical cells connected together.


Symbol of fuse

The fuse wire is usually made up of an alloy of tin and lead. The maximum current, which can pass through a fuse without damaging it, is usually marked on its outer case. When current flowing through the fuse wire exceeds the marked current rating, the fuse wire melts and the fuse blows up. When a fuse connected in a circuit melts or blows up, it makes the circuit an open circuit and the flow of current stops thereafter. 6.



The electric circuit

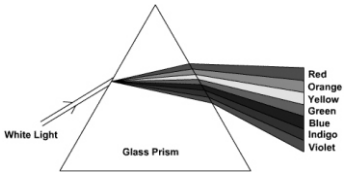
Let's Evaluate – Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 11 Natural Disasters (A) 1. d 2. b 3. b 4. c **(B)** 1. Anemometer 2. Earth 3. Thunderstorm 4. Earth 5. Polar regions. **(C)** 1. False 2. False 3. True 4. True 5. True 6. False 7. True **(D)** 1. c 2. d 3. a 4. b **(E)** 1. Sunny sky 2. Hurricanes 3. 48 Hours 4. Depressions**(F)** 1. Air pressure is measured by another instrument called barometer. A barometer determiners whether a day is going to be calm or stormy. 2. The low-pressure centre of a cyclone is called cyclone or eye of the storm. 3. The words swirl

anticlockwise around the storm centre in the northern hemisphere. 4. Winds are caused by the unequal heating of different parts of the earth. When a place gets heated, the warmer, lighter air rises and cooler air rushes in to take its place. 5. A storm surge is a coastal flood or tsunami-like phenomenon of rishing water commonly associated with low pressure weather systems. **(G)** 1. Cyclones are called hurricanes in the western Atlantic and eastern Pacific and typhoons in the western Pacific. 2. The pressure exerted by air in an area is known as air pressure. The regions around the equator are hotter as they receive maximum heat from the sun. These regions are called high temperature zones. High temperature zones always have low air pressure. However, the regions around poles are cooler as they receive minimum heat from the Sun. These regions are called low temperature zones. These are the high-pressure regions. Thus, it is the uneven heating of the Earth's surface which causes temperature difference and creates air pressure differences. Wind flows because of air pressure differences. 3. Roofs of the huts in village usually blow up when high-speed wind flows. The high-speed wind reduces air pressure on the upper surface of these roofs. However, the air pressure on the lower surface remains the same. This creates an imbalance in pressure and the roof is blown up. 4. wind blowing steadily towards the equator from the north-east in the northern hemisphere or the south-east in the southern hemisphere, especially at sea. Two belts of trade winds encircle the earth, blowing from the tropical high-pressure belts to the low-pressure zone at the equator. They are calked trade winds. Trade winds are caused by hot air rising at the Equator and the consequent movement of air from north and south to take its place. 5. Thunderstorms occur when a moisture-laden column of hot air cools on coming into contact with the cooler layers of air above. It may also occur when a cold current of air meets a rising column of hot air. **(H)** 1. Effective safety measures against cyclones : Safety measures to be Taken by the Government : Following safety measures against cyclones should be taken by the Government. Cyclone forecast and warning system must be installed. People should be given information about the cyclone well in time through rapid communication system. Cyclone-shelters must be constructed in the cyclone-prone areas. There must be administrative arrangement for moving people faster to safer places. Safety Measures (or action) to be Taken by the People : People on their part must actively participate in the programme towards safety from cyclones. People should follow the guidelines provided by the agencies through TV, Radio, Phone etc. for their safety against cyclone.' Do not drive on roads which are under water. The flood might have damaged the road. Keep ready the phone numbers of all emergency services e.g., Police, fire brigade, Hospital etc. 2. The regions around the equator are hotter as they receive maximum heat from the sun. These regions are called high temperature zones. High temperature zones always have low air pressure. However, the regions around poles are cooler as they receive minimum heat from the Sun. These regions are called low temperature zones. 3. The high waves hit the coastal area and wash away everything in its way. Hundreds of people living in coastal areas are often killed and injured in a cyclone. The rains accompanying cyclones lead to floods and cause an enormous damage to people's belongings and farmlands. Towns and villages on coastal areas are flooded after a cyclone. An alkaline flood water of the sea enters the farmlands and affects the fertility of the soil. Thus crop production of a region is severely reduced after a cyclone. 4. Thunderstorm : A storm that has both thunder and lightning is known as thunderstorm. It is the violent weather condition of heavy rainfall and high speed winds. On a hot summer day, severe heating of air creates very strong upward moving winds. As these winds move up, the water vapour present in it changes into droplets and freezes. These frozen droplets than fall down with rain. During the downfall, their interaction with upward moving warm and humid air creates lightning and thundering sounds. Cyclone : A violent storm with very strong winds which move in a circle is called a cyclone. A severe form of thunderstorm leads to a cyclone. Several small thunderstorms merge to form one devastating storm of cyclone. Tornado : Tornado is an extremely strong and dangerous wind that blows in a circle. It proceeds in a rotating column and extends from the surface of the Earth to a thundercloud. The rotating column is about 75 to 100 meters wide and travels with a high speed between 75 to 200 km/hour. 5. Winds are caused by the heat of the Sun. When a place gets heated by the Sun, the air above it also becomes hot. This hot air being lighter than the surrounding cold air moves up. To fill in

this space, cooler and denser air blows in from the neighbouring areas. This movement of air is also called wind flow. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 12 Light & Lenses (A) 1. a 2. a 3. b 4. d 5. b 6. c 7. b 8. c 9. c **(B)** 1. straight 2. parallel 3. reflect 4. inside, object lying 5. can 6. concave mirror 7. on a distance 8. convex 9. convex 10. violet, indigo, blue, green, yellow, orange **(C)** 1. False 2. True 3. True 4. False 5. False **(D)** 1. d 2. e 3. a 4. c 5. b **(E)** 1. Change in direction of light 2. Solar cooper 3. Read image 4. Real image 5. Glass slab **(F)** 1. Incident 2. Concave mirror 3. Virtual image 4. Optical lens 5. Dispersion **(G)** 1. Essentially because the aperture (hole) is so small, it bends the light in a manner that in verts the image. It is not just upside down, but it also a reversed image. 2. When parallel rays of light fall on a curved reflecting surface, the surface will reflect a set of parallel rays in all directions; conversely, it will also take light from all directions and reflect it in one direction. 3. Convex mirrors are used as rear view mirrors in vehicles. Since a convex mirror forms smaller images of objects, it can be used to view a much larger area than would be possible with a plane mirror. For the same reasons, they are also used as side mirrors in vehicles. 4. White light after falling on one surface of the prism splits into its constituent colours as it comes out from the other surface. The constituent colours of white light forms a band of colored strips or lines is called a spectrum. There are lines of seven colours in white light spectrum. They are violet, Indigo, Blue, Green Yellow, Orange and Red. 5. A rainbow appears in the sky on a rainy day. It is formed when sunlight is reflected back by the raindrops present in the atmosphere. 6. A Newton's disc appear white when it is rotated because white light consists seven colours. **(H)** 1. (a) Concave mirror (b) Rear view mirror (c) Concave mirror (d) Convex mirror 2. A beam of light consisting of rays diverging from a point source is called divergent beam of light. For example, beams of light coming from a lighthouse, the headlight of a railway engine, car headlight, torch etc. are divergent beam of light. 3. Use of Plane Mirrors : We all use plane mirrors to see our own image in it. Uses of Concave Mirror : Headlight of cars are concave mirrors which make the light more focused and brighter. Reflectors in flashlights, torches and searchlights are concave mirrors. Uses of Convex Mirror : They are used as safety mirrors in stores and malls. They are used in modern railway stations or metro stations to have a full view of trains. 4. Light travels in straight lines. This is called the rectilinear propagation of light. Its effects include the formation of shadows by opaque objects and of inverted image by pinholes. 5. The formation of spectrum of seven colors shows that white light is a mixture of seven colors (or seven colored light). The effect of transparent medium (like glass prism) is only to separate the seven colors of white light. Dispersion of White Light : White light is a mixture of lights of seven colors: red, orange, yellow, green, blue, indigo and violet. The disperslight occurs because the angle of refraction (or the angle of bending) of lights of different colors is different when passing through the transparent medium (glass prism).



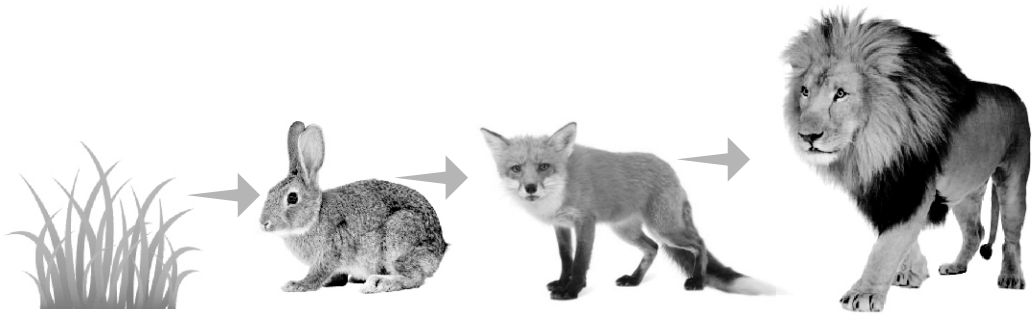
6. In a mirror the right hand side of an object appears as the left hand side of the image. This phenomenon is called lateral inversion of the object. You might have noticed that the word 'AMBULANCE' is written as 'ECNALUBMA' on the vehicles used to carry patients. In the rear view mirror of a preceding vehicle, the word 'ECNALUBMA' appears as 'AMBULANCE'. It helps the driver to read the word correctly and easily so that he can give way to the ambulance coming from behind. It is the duty of every one of us to allow an ambulance to pass without blocking its way. 7. A lens is a piece of transparent material with curved surfaces that is used to form images.

Convex lens	Concave lens
1. Convex lens is thicker in the middle and thinner at the edges. 2. Convex lens is a converg-ing lens. 3. Convex lens forms inverted and real images for all distances except when the object is placed very close to the lens.	1. Concave lens is thinner in the middle and thicker at the edges. 2. Concave lens is a diverging lens. 3. Concave lens always forms virtual, erect and smaller images, whatever be the position of the object.

Let's Evaluate – Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 13 Water : Its Uses & Conservation (A) 1. c 2. b 3. a 4. d 5. a 6. c 7. a **(B)** 1. living things 2. germination 3. water 4. wells, hand pumps 5. rainwater harvesting 6. aquifer 7. aquifer 8. rainwater harvesting 9. pipes, running cause, wastage 10. extinction **(C)** 1. False 2. False 3. True 4. True 5. False 6. True 7. True 8. False 9. True 10. False **(D)** 1. d 2. a 3. e 4. b 5. c **(F)** 1. Sea water 2. Drip irrigation 3. Heavy rainfall 4. Drip irrigation 5. Increased infiltration **(F)** 1. Freezing point 2. Ice, water, vapour 3. Domestic water 4. 22nd March 5. Water table **(G)** 1. Under the plan of vilasrao solanki, Conserving soil and harvesting water was given top priority. A series of contour bunds were raised to trap water and check soil erosion. At the base of the hill slope, a percolation tank that could hold upto a million cubic feet of water was constructed. A well was dug below it and water pumped from there up the hill slope for irrigating the fields. Trees were planted in the rocky areas; fruit trees grown in the more fertile areas and grass and shrubs regenerated on lands not being cultivated. Slowly production from the land increased. As against two to four bags of grain in an year, 100 quintals was harvested and enough employment was generated for the survival of five households and their cattle. 2. North-eastern part of country gets rainfalls twice a year. In India there are some places that have excessive rainfall every year and some areas have very low rainfall. This uneven rainfall causes floods in some areas and droughts in some other areas. Desert areas like some parts of Rajasthan, having a very low rainfall, face the acute problem of water scarcity. 3. The people of a place can take to get over the scarcity of water by using the following ways. 1. Turn off the taps while brushing. 2. Do not use showers for bathing. 3. Mop the floor instead of washing. 4. Plant trees in your locality. 5. Check the taps and get them repaired if they are leaking. 4. Soil moisture is a key variable in controlling the exchange of water and heat energy between the land surface and the atmosphere through evaporation and plant transpiration. As a result, soil moisture plays an important role in the development of weather patterns and the production of precipitation. 5. It may have high concentration of pollutants including very harmful water soluble nitrate and sulfur compounds, hence we will need rigorous treatment before we take it for drinking purposes. 6. Water present on the Earth's surface is called surface water. Rain water that runs off the surface on the Earth forms lakes and rivers which ultimately flow into the seas and oceans. The level of underground water is called water table. The underground water may run along the surface of the non-porous rock and come out of the surface to form natural springs. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 14 Forests (A) 1. d 2. b 3. d 4. b 5. c 6. a (B) 1. renewable 2. trees 3. trunk 4. Forests 5. dispersal 6. Biennials 7. Canopy 8. organic matter of soil 9. inter dependent 10. absorbing, releasing 11. pollution 12. industrialisational 13. Vanmahotsav, number **(C)** 1. False 2. False 3. True 4. True 5. False 6. True 7. True 8. False 9. True 10. True **(D)** 1. c 2. a 3. d 4. b **(E)** 1. eagle 2. tiger 3. bear 4. Amoeba 5. Jasmine **(F)** 1. Forest 2. Perennials 3. Crown 4. Consumers 5. Deforestation **(G)** 1.



2. Animal in a forest also help in the dispersal of seeds. Some seeds stick to the furs of animals and get transported to distant places. Cocklebur plants scatter their seeds by this method. Animals also eat fruits and the seeds beings undigested pass out in their faeces in another place. 3. trees improve the quality of the air that we breathe in by trapping carbon dioxide. Trees also determine rainfall and replenish the atmosphere of an area. We should remember that if forests disappear, the amount of carbon dioxide in air will increase, resulting in the increase of the Earth's temperature. Therefore, we should take necessary measures to conserve our existing forests. 4. Types of forests found in India. 1. Moist tropical forests : Moist tropical forests are found in the Western Ghats and the Andaman and Nicobar Islands, the delta of the Ganga and the Brahmaputra and along the north-eastern region. 2. Montane temperate forests : Montane temperate forests occur in the north and the south India. In the north, it is found in the region to the east of Nepal in Arunachal Pradesh and in the south, it is found in parts of the Niligiri Hills and the high lands of Kerala. 3. Dry tropical forests : Dry tropical forests are found throughout the northern part of the country except in the north-east. They are also found in the areas with black soil and along the Andhra Pradesh and Karnataka coasts. 4. Montane sub-tropical forests : These forests are found in the Himalayas, Western Ghats, and along the Silent Valley of Kerala. This forest type contains a large variety of orchids, oak, rhododendron, pine, chir, bamboo and creepers. 5. Alpine forests : Alpine forests are found all along the Himalayas and on the higher hills near the Myanmar border. Alpine region always receives heavy snowfall. Therefore, the plants found in the region are of short height. 6. Sub-alpine forests : Sub-alpine forests extend from Kashmir to Arunachal Pradesh between 2900 to 3500 meters of height. It is also found in the higher altitude of the western Himalayas. 5. The main objectives of the Van Mahotsav are to: 1. Increase production of fruits 2. Provide fodder leaves for cattle in the forests 3. Plant ornamental trees to beautify the landscape 4. Increase soil fertility and help in soil conservation 5. Increase consciousness about importance of trees 6. Popularize planting of trees in villages, cities and public lands for their aesthetic, economic and protective needs. 6. Burning of fossil fuels releases carbon dioxide and increases its concentration in the atmosphere. Carbon dioxide is a greenhouse gas. As it builds up, it prevents heat from leaving the Earth and contributes to global warming. Actively growing plants in forest help to decrease the amount of carbon dioxide in the atmosphere by using it in photosynthesis and giving out oxygen. Cutting down large areas of forest decreases plants available for photo-synthesis. The trees that are cut down are often burnt, contributing further to the build-up of carbon dioxide. 7. 1. Destruction of forests will lead to soil erosion. This can remove the topsoil and leave ground unsuitable for growing crops. 2. The demand for timber, pulp wood hardwood (for furniture) is rising globally. Long term supplies are threatened. 3. Deforestation increases global carbon dioxide level which may have long-term effects on the global climate. Forests have diverse wildlife communities. Their destruction will lead to extinctions of various forms of life. 8. The interdependence of plants and animals is a food chain helps to maintain the balance in nature. For example, if there are too many giraffes; there will be less number of trees and shrubs for all of them to eat. Many giraffes will then starve and die. Fewer giraffes mean more time for the trees and shrubs to grow to maturity and multiply. Fewer giraffes also mean that less food is available for the lions to eat and some lions will starve to death. When there are fewer lions, the giraffe population will automatically increase. The result is a complete balance in nature. 9. If all frogs are removed then the number of grasshoppers would increase resulting in great loss of grass from the ground. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 15 Waste Water Management (A) 1. a 2. d 3. c 4. a 5. d **(B)** 1. black water 2. pollutants 3. sewage 4. waste water treatment 5. sludge 6. things, trash 7. anaerobic 8. diarrhea **(C)** 1. True 2. False 3. True 4. True 5. True 6. True **(D)** 1. d 2. a 3. e 4. b 5. c **(E)** 1. Clean water 2. Bar screens 3. Sterlized water 4. Used tea leaves 5. Pesticides **(F)** 1. Contaminants 2. Waste water treatment 3. Sewerage 4. Water

treatment plants 5. Water borne **(G)** 1. The wastewater from kitchens and bathrooms is often called grey water, while the wastewater from toilets is often referred to as black water. 2. Sewage sludge is used in reclamation schemes since it improves soil structure as well as providing vital nutrients to the soil. 3. 1. Municipal liquid waste : The wastewater from homes, schools, offices, etc., is called municipal waste water. The wastewater from kitchens and bathrooms is often called grey water, while the wastewater from toilets is often referred to as black water. This is carried by sewage pipes. This contains harmful micro-organisms, chemicals, detergents, organic wastes like faeces and decomposing vegetable matter. 2. Industrial liquid waste : The throwing of industrial effluents into rivers, lakes and seas are the most important sources of water pollution. Industrial wastewater includes harmful chemicals, waste from paints, drugs, and toxic vapour like carbon dioxide, sulphur dioxide, nitrogen dioxide, etc. However, usually industrial wastewater does not get mixed with municipal wastewater. Some industries wrongly pour their wastewater into rainwater drains, which ultimately flows into water bodies like lakes and ponds. 4. We can adopt the following measures to control sewage. Never throw plastic containers of medicines, vegetable oil, beauty products, etc., into the drain. These cannot be removed wastewater treatment plants. Dispose them properly. Get the leaked sewage pipes repaired to stop contamination. 5. The inadequate storage, treatment, and disposal of wastewater can contaminate the water resources on which people depend for domestic, agricultural and recreational purposes. Improper disposal of wastewater, such as septic tanks, causes irreparable damage to the land and the environment. Therefore, in order to protect the water resources, a comprehensive regulatory scheme for wastewater storage, treatment and disposal is required. 6. Rainwater normally flows through open drains in urban areas. However, in most places, rainwater drains get blocked by plastic and other garbage washed into them by rainwater. The clogging of rainwater drains is one of the causes of floods during monsoon. There is a risk of drinking water to be contaminated if the blocked pipelines burst out and the rainwater mixed with clean water. Open rainwater drains also provide an ideal breeding ground of mosquitoes. This may spread malaria and other infectious diseases. 7. The problem of lack of sewage system can be over come by establishing water processing plants in villages. Processing of sewage, can help in multiple ways as the residual organic waste, can be separated from the water and be used for creating organic fertilizer. 8. Primary treatment is a mechanical process. Sewage is first carried by sewers to a treatment plant. Here, the large solids like leaves, rags and plastic are separated by strainers or screens. Then the sewage is passed through settlement tanks, where most of he suspended solids sink to the bottom. The solid part that settles at the bottom is called primary sludge. 9. Human societies generate large amounts of wastes. Many wastes contain valuable materials that can be re-used, reducing the need to exploit new supplies of resource. Reclamation and recycling of scrap metals rather than mining the new materials is an obvious example. Recycling also beneficially reduces the total volume of waste requiring disposal. 10. Ganga Action Plan (GAP) was a programme launched by the Government of India in 1985. The main objective of the programme was to reduce water pollution in the river and to improve the quality of its water. It has been seen that the principal sources of pollution in this river are industrial and domestic wastes. Approximately, 1.7 billion liters of effluents flow into the Ganga every day, out of which 1.4 billion liters is untreated. The programme included diversion of wastewater treatment plants and increasing awareness among people to keep the river clean. Yamuna Action Plan (YAP) was launched in 1993 with the objective to stop drains from dumping wastewater into the river and to intercept and divert sewage. YAP is the largest river conservation project in India. The project received funds from the Japan Band of International Cooperation (JBIC). The various plans of this projects includes building up sewage treatment plants and community toilet complexes near the river, and putting across the Yamuna bridges, prohibiting people from throwing garbage into the rivers. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

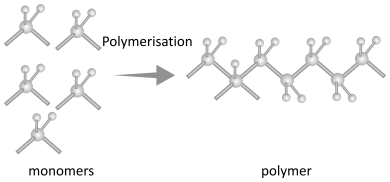
CH. 1 Food Production (A) 1. c 2. a 3. c 4. a 5. d **(B)** 1. ploughing 2. nutrients 3. Manures, fertilizers 4. irrigation 5. field fallow 6. transplanting 7. jute bags, metallic bins **(C)** 1. False 2. True 3. False 4. True 5. True **(D)** 1. c 2. a 3. d 4. b **(E)** 1. Kharif and Rabi 2. Plough, Harrow 3. Ploughing 4. Urea **(F)** 1. Loosening of soil (by ploughing) is important because : 1. Loose soil particles have more air spaces, that help the roots of crops to breathe better. 2. Loose soil particles hold more water for a longer duration. This helps the roots to absorb more water. 3. Loose soil helps roots to penetrate deep through the layers of soil. This helps to fix the plant more firmly. 4. Loose soil mixes with manure and fertilizers more easily. 5. Loosening of soil helps to remove weeds in the field. 6. Loose soil promotes the growth of useful soil microbes. These microbes help to add humus to the soil. 7. While turning the soil during ploughing, nutrient-rich soil is brought up from lower levels of soil. So, the plants can use these nutrients. 2. The healthy seeds, are chemically treated with pesticides and fungicides to make them free from infection and attack of microbes in future. 3. The two advantages of using manure are : (a) It enhances the water-holding capacity of the soil. (b) It make the soil porous due to which exchange of gases become easy. **(G)** 1. According to an estimate, 10% of total production of crops is wasted by pests which badly affects crop production. Birds, rats and insects often eat and damage crop plants and their produce. While birds are scared away from the field, more drastic steps are taken to get rid of pests like rodents (rats) and insects. Rats eat grains, not just in the crop fields but also where grains are stored. Insects attack crop plants as some insects spread plant diseases caused by microorganisms and some causes disease themselves. 2. Removing weeds from a field is called weeding. Weeds are the unwanted plants which geminate along with the crop plants. Grass, Chaulai, Bathua, Hirankhuri etc. are the weeds that grow along with the crop plants. Weeds absorb nutrients necessary for the growth of plants from the field and compete with the main crop plants for sunlight and water which reduces the crop field. 3. Seeds of some crop plants are first sown in a corner of the field or in a small plot called nursery. These seeds are irrigated and fertilisers are added to them and they are allowed to grow into tiny plants called seedlings. These seedlings are then transplanted to a crop field. This helps farmers choose healthy seedlings which is not possible in the case of crops which are sown directly. The crop plants of paddy, tomato, brinjal, onion, chillies etc. are grown by this method. 4. Fertilizers are compounds which supply a specific nutrient to make the soil fertile and these compounds are made by human being. These compounds are rich in nutrient like nitrogen, phosphorus and potassium. The use (high doses) of fertilisers greatly increases crop yield but when fertilisers get washed off through irrigation and rainfall, they reach water bodies like rivers and lakes which cause water pollution. The water of these water bodies becomes polluted and unfit for human consumption. It even kills the aquatic animals such as fish. 5. Modern Irrigation Methods: (A)Sprinkler Irrigation Method : In sprinkler irrigation method, water is taken from source to the fields through pipes, whereas in surface irrigation methods only 30-45 per cent water reaches the crops. Such loss of water is avoided in sprinkler irrigation method. The problem of water logging or 'kallar' may be caused in case of excess water from surface irrigation, whereas no such problem is caused in sprinkler irrigation method. The balance of groundwater is also maintained. (B) Drip Irrigation Method: A newly developed irrigation system known as drip irrigation or trickle irrigation, originally developed in Israel, is becoming popular in areas of water scarcity. In this irrigation system, a small amount of water is applied at frequent intervals in the form of water droplets

through perforations in plastic pipes or through nozzles attached to tubes spread over the soil to irrigate a limited area around the plant. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 2 Microorganisms (A) 1. b 2. b 3. c 4. d 5. b 6. d **(B)** 1. Viruses 2. rod 3. Antibiotics 4. grasses of water 5. Lactobacillus **(C)** 1. True 2. True 3. False 4. True 5. True **(D)** 1. e 2. a 3. d 4. b 5. c **(E)** 1. Rhizobium 2. Fish, Meat 3. Bacteriophage 4. Tuberculosis **(F)** 1. Fungi damage wood, crops and other resources, and can cause serious illnesses in humans. When food or other products are contaminated by fungi, the products are typically destroyed. 2. The two ways of nitrogen fixation are : (a) Biological nitrogen fixation : It is the conversion of atmospheric nitrogen into compounds of nitrogen by the action of certain living organisms, like rhizobium bacteria which reside in the root nodules of leguminous plants. (b) Atmospheric nitrogen fixation : During lighting, atmospheric nitrogen combines with oxygen to form nitrogen oxides. These oxides react with rain water and are carried to the earth in the form of nitrous and nitric acid. This is called atmospheric nitrogen fixation. Minerals in the soil can covert nitric acid to soluble nitrates, which can be used by plants. 3. Nitrate absorber by the plants from the soil through their roots can convert them into biological molecule. Like amino acids, nuclic acids etc. Animals and other organism absorb nitrogen through food chain. 4. Sometimes, even stored food may get spoilt due to a variety of reasons such as: (a) improper cooking (b) food not properly preserved (c) change in temperature of refrigerated foods due to power fluctuations, etc. 5. Pasteurisation is a process for preservation of milk. In this method, milk is heated at about 70oC for 15 to 30 seconds to kill the bacteria present in it and cooling it quickly to 10oC to prevent the remaining bacteria from growing. The milk is then stored in sterilized bottles or pouches in cold places. This method was invented by Louis Pasteur in 1862. **(G)** 1. Ways of transmission of communicable disease : Through air : Common cold or tuberculosis germs are released in air when an infected person coughs, sneezes, or spits. When healthy person breathes this infected air, he/she also gets infected. Some other diseases that spread through air are mumps, measles and flu. Through food and water : When food and water contaminated by pathogens is consumed by a healthy person, he/she becomes vulnerable to infection. For example, cholera, typhoid, polio and jaundice spread through contaminated food and water. Through direct contact : If a healthy person shares items like towels, handkerchiefs, etc., with a patient, he/she is likely to become infected. Diseases such as common cold, tuberculosis, chicken pox, ringworm, etc., spread in this way. Through insects : Insects spread diseases either through their bite or by transferring pathogens to food articles. Such insects are called carriers of germs. 2. Salt is added to pickles to pickles in larger amount because : Salting draws out water from the food, thus, prevents microbial growth and reproduction. 3. Bacteria are the simplest and smallest unicellular microscopic organism and can vary in size from 0.2 to 100 microns (1 micron = $\frac{1}{1000}$ mm). They can be found in air, water, soil and in the bodies of living organism. Bacteria are found in different shapes. Bacteria are found in three different shapes namely, bacillus (Rod shaped), coccus (Spherical) and spiral. Some bacteria are autotrophic i.e., they produce their own food with the help of light or chemical reaction. However most bacteria are heterotrophic, showing saprotrophic or parasitic mode of nutrition. 4. The process by which spoilage of food is prevented using chemical or physical methods is called food preservation. The some common methods by which we can preserve the food. 1. Addition of Preservatives : Food can be preserved by using certain chemical substances which can check the growth of microorganisms. Some chemical substances which are called food preservatives. Which can remove oxygen from the food item. This helps in preventing microbial growth. 2. Preservation by Common Salt : Some food like fish and meat is preserved by salting. Meat and fish are covered with dry common salt. Salting draws out water from the food, thus, prevents microbial growth and reproduction. Salting is

also used to preserve amla, raw mangoes, tamarind etc. 3. Preservation by Sugar : Sugar reduces the moisture content of the food, thus, omit the growth of food-spoiling microorganisms. Jams, jellies and squashes are preserved by sugar. 4. Preservation by Oil and Vinegar : Oil and vinegar are use to preserve the fruit and vegetables. They do not allow bacteria to grow. 5. Pasteurisation : Pasteurisation is a process for preservation of milk. In this method, milk is heated at about 70oC for 15 to 30 seconds to kill the bacteria present in it and cooling it quickly to 10oC to prevent the remaining bacteria from growing. The milk is then stored in sterilized bottles or pouches in cold places. This method was invented by Louis Pasteur in 1862. 6. By Cooling or Freezing : Food like fruits, vegetables, meat and cooked food are kept at low temperature in the refrigerator or deep freezers to prevent their spoilage. Low temperature prevents the spoilage of food and non availability of water and growth of microorganisms. 7. Canning : In this process products are first heated to a high temperature to kill bacteria and then sealed in air tight cans to prevent re-infection by microorganisms. Any puffing or bulging of cans would indicate sterilized. 8. By Dehydration : Removal of water from food materials is an efficient method of food preservation. The process of removal of water from a substance is called dehydration. 5. There are medicines which kill or stop the growth of the disease-causing microorganisms present in our body. They are called antibiotics. Bacteria and fungi are used to make them. Streptomycin, tetracycline and erythromycin are some of the commonly known antibiotics which are made from fungi and bacteria. Antibiotics are even mixed with the feed of livestock and poultry to protect them and check any microbial infections in animals. Antibiotics are also used to control many plant diseases. While taking antibiotics complete the entire course of antibiotics prescribed by the doctor. This completely destroys the disease-causing micro-organisms in our body. We may fall ill again if we do not complete the course. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 3 Fibres and Plastics (A) 1. a 2. a 3. a 4. c **(B)** 1. monomers 2. water 3. Thermosetting 4. Rayon 5. Acyclic fibre **(C)** 1. False 2. True 3. False 4. True 5. True **(D)** 1. c 2. a 3. d 4. e 5. b **(E)** 1. Rayon, Nylon 2. Polymer 3. Terylane, Dacron, Terene 4. Teflon **(F)** 1. Plastics are not corroded easily. For this reason, (a) Polyvinyl chloride (PVC) is used for making water pipes (called PVC pipes), water tanks and sanitary fittings. (b) PVC is used for making soles of shoes and sandals. (c) PVC is used for making raincoats, hand bags, bathroom curtains, etc. 2. Few disadvantages of synthetic fibre are : (a) Meths and burn easily (b) Uncomfortable during summer (c) Develop skin problems (d) Non-biodegradable 3. The problem of plastic pollution is serious and immediate action is required. We must use jute, cloth or paper bags instead of plastic bags. It will reduce the amount of plastic used in packaging which is usually thrown away. Recycling is probably the best way to dispose the discarded plastic. This requires the plastic to be collected, sorted, melted and then remoulded. Reusing of plastics should be encouraged. We should not throw away the plastic bags after using it only once. It will help in reducing plastic pollution. 4. Polymerisation is a process of joining together of a large number of small molecules (monomers) to form a very big molecule (polymer).Cotton, for example, is a polymer called cellulose. Cellulose is made up of a large number of glucose units.



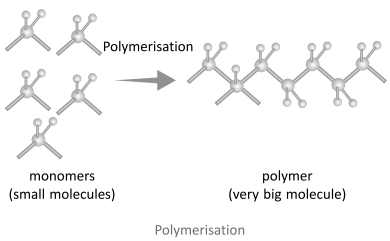
Polymerisation

5.

Differences between thermoplastics and thermosetting plastics

S. No.	Parameters (Points of difference)	Thermoplastics	Thermosetting plastics
1.	Nature	A plastic substance which can be melted repeatedly by heating and can be moulded again and again into different shapes.	A plastic substance which once moulded into a particular shape does not become soft on heating and cannot be moulded a second time.
2.	Effect of heat	They become soft.	They do not become soft.
3.	Toughness	They are less tough as compared to thermosetting plastics.	They are more tough and rigid.
4.	Effect of high temperature	They are less resistant to high temperature.	They are more resistant to high temperature.
5.	Recycle	They can be recycled.	They cannot be recycled.
	Examples	polythene, nylon, PVC, polyesters	Bakelite, melamine, formica

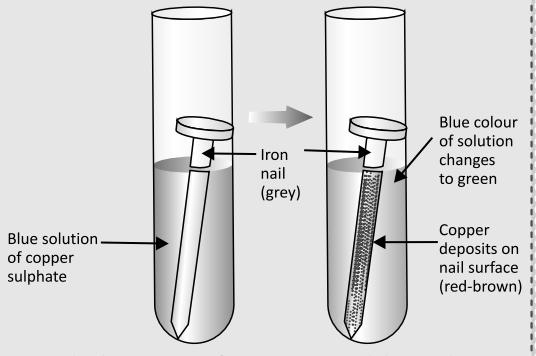
(G) 1. Biodegradable substances are generally things that are organic in nature. This means they are substances that are made from things that were living at some point. Examples of biodegradable substances include paper which is made from trees, meat products which come from animals and leather products. 2. (a) Plastic is strong and durable : Plastics are strong and durable. They can be moulded into different shapes and sizes. Plastics are generally cheaper than metals. For this reason, they are widely used in industry and for household articles. For examples, (a) Melamine is used for making unbreakable dinner-ware and decorative objects. (b) Polythene is used for making carry bags and adhesive tapes etc. (c) PVC is used for making floor tiles. (d) PVC is used for making durable toys. (b) Plastic is poor conductor of heat: Plastics are poor conductor of heat. For this reason, (a) Bakelite is used for making handles of utensils. (b) Polystyrene is also a good thermal insulator. It is filled in the hollow walls of refrigerators, air-coolers and thermos flask. (c) Polystyrene is used for making containers which are used as ice box. (c) Plastic is poor conductor of electricity : Plastics are poor conductors of electricity. For this reason, (a) Bakelite is used for making electrical switches and plugs. (d) Plastic is inert to chemicals: Teflon is used for making non-stick cookware. 3. Polymerisation is a process of joining together of a large number of small molecules (monomers) to form a very big molecule (polymer).Cotton, for example, is a polymer called cellulose. Cellulose is made up of a large number of glucose units. 4. 1. Rayon : It is a artificial fibre prepared from cellulose (obtained from wood pulp) and is called rayon. It resembles silk in appearance and hence, is also called artificial silk. Preparation of Viscose Rayon : Rayon is made from cellulose by the viscose process. The various chemicals required for the preparation of viscose rayon are given below: (a) Cellulose ($C_6H_{10}O_5)_n$ (b) Sodium hydroxide (NaOH) (c) Carbon disulphide (CS_2) (d) Sulphuric acid (H_2SO_4) To preparer rayon, cellulose in the form of wood pulp is treated with NaOH solution and then with CS_2. Cellulose dissolves in NaOH and CS_2 to form a pale yellow syrup-like liquid, called viscose. Cellulose (From wood pulp) Viscose (Syrup-like liquid) The viscose is forced to pass through the fine holes of spinneret into a solution of dilute H_2SO_4 when a silk-like thread of rayons is



Polymerisation

formed. The product, thus obtained, is called viscose rayon. Uses of rayon : 1. It is mixed with cotton to make bed sheets, dresses, aprons and caps. 2. Rayon is used in manufacturing of fabrics like saries. 3. It is used in making tyre cords. 4. It is used for making carpets when mixed with wool. 5. It is used to make bandages and lint for surgical dressing of wounds. Disposal of plastic wastes leads to the following health and environmental hazards: 1. Most of the plastic wastes are dumped in land fills. It causes soil pollution. Since, plastics buried in the soil cannot be decomposed by microorganisms, they prevent rainwater from seeping into the earth. The water, thus remains on the earth's surface forming muddy pools. 2. When plastic wastes are burnt, they produce toxic gases and smoke that cause air pollution. 3. When plastic wastes are dumped in water they result in water pollution. 4. Animals, especially cows, eat food waste from the garbage dumps. In the process of eating the food-waste, they swallow materials like polythene bags and wrappers of food. The plastic materials choke their respiratory system or sometimes digestive tract and can be the cause of their death. 5. The polybags carelessly thrown here and there are responsible for clogging the drains and sewer-lines. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 4 Metals and Non-Metals (A) 1. a 2. d 3. a 4. b 5. c **(B)** 1. Silver 2. solid 3. highly 4. hydrogen 5. Mercury **(C)** 1. False 2. False 3. False 4. True 5. True **(D)** 1. e 2. c 3. f 4. d 5. a 6. b **(E)** 1. Diamond 2. Zinc 3. Na 4. Sodium **(F)** 1. Metals like gold are highly unreactive which do not react with air, water vapour and any other gas in the atmosphere. For this reason, gold ornaments look even new after several years of use. 2. 3. Phosphorus (III) oxide reacts with cold water to give a solution of the weak acid, H3PO3 - known variously as phosphorous acid, orthophosphorous acid or phosphonic acid. Its reaction with hot water is much more complicated. 4. Physical properties of metals • Shiny (lustrous) • Good conductors of electricity and heat. • High density. • High melting point. • Malleable. • Ductile and so can be drawn into wires. • Solid at room temperature except mercury. • Opaque objects? **(G)** 1. PHYSICAL PROPERTIES OF METALS AND NON-METALS 1. Physical State : Metals are generally solids at room temperature. Mercury is the only exception which is liquid at room temperature. Some non-metals are generally solids, liquid or gases. Non-metals are solid at room temperature like sulphure, phosphorus and carbon. Some Non-metals are in gaseous form like hydrogen, oxygen and nitrogen. Bromine is liquid at room temperature. 2. Ductility : Most of the metals can be drawn (or stretched) into thin wires. It is called ductility. Gold and silver are among the best ductile metals. Copper, aluminium, iron and magnesium metals can easily be drawn into thin wires, so, they are very ductile.



Iron displaces copper from a copper sulphate solution.

Observation : The portion of the nail which is inside the solution becomes red-brown. This is because a layer of copper gets deposited over the surface of the nail.

The colour of the solution slowly changes from blue to green due to the formation of **iron sulphate**.

The chemical reaction involved in this activity is as follows:

Fe (iron (grey)) + $CuSO_4$ (copper sulphate (blue)) → Cu (copper (red-brown) gets deposited on iron nail.) + $FeSO_4$ (iron sulphate (green))

This activity shows that iron displaces copper from copper sulphate solution.

Now, take iron sulphate solution in a test tube and place a copper wire in it. we shake the test tube for some time.

Non-metals can not be drawn into their wires. When stretched, non-metals like sulphur and phosphorus break into pieces and do not form wires. 2. Zinc reacts with steam to form zinc oxide and hydrogen gas.

$$\underset{\text{zinc}}{Zn} + \underset{\text{steam}}{H_2O} \longrightarrow \underset{\text{zinc oxide}}{ZnO} + \underset{\text{hydrogen gas}}{H_2}$$

not be drawn into their wires. When stretched, non-metals like sulphur and phosphorus break into pieces and do not form wires. Zinc reacts with steam to form zinc oxide and hydrogen gas. 3. Sometimes a metal or a non-metal is added to a metal to improve its properties. The final substance obtained is called an alloy. An alloy is generally made by first melting the main metal and then dissolving other metals or non-metals in a definite ratio. The properties of a metal can be altered by forming alloys. It is done to improve the properties of a metal so that it becomes more useful. An alloy is a homogeneous mixture of two or more metals (sometimes a non-metal is also added). Alloys are used for: Increasing hardness of metals : Some metals, like iron and copper are not hard enough to be used as construction materials. Increasing resistance to corrosion: Metals like iron are easily corroded, therefore they are alloyed with other metals. For example, the alloy of chromium, nickel, and iron is stainless steel which does not rust. 4. Corrosion is a natural process, which converts a refined metal to a more chemically-stable form, such as its oxide, hydroxide, or sulfide. It is the gradual destruction of materials (usually metals) by chemical and/or electrochemical reaction with their environment. Various treatments are used to slow corrosion damage to metallic objects which are exposed to the weather, salt water, acids, or other hostile environments. Some unprotected metallic alloys are extremely vulnerable to corrosion, such as those used in neodymium magnets, which can spallor crumble into powder even in dry, temperature-stable indoor environments unless properly treated to discourage corrosion. 5. CHEMICAL PROPERTIES OF METALS AND NON-METALS : 1. Reaction with Oxygen : All metals react with oxygen to form metal oxides. A simple metal can form various oxides depending another balance state of the metal atom. Conclusion: Metals react with oxygen to form basic oxides. Sodium reacts with the oxygen of air at room temperature to form which is highly reactionable metal sodium oxide.

$$\underset{\text{sodium (metal)}}{4Na} + \underset{\text{oxygen (from air)}}{O_2} \xrightarrow{\text{room temperature}} \underset{\text{sodium oxide (basic oxide)}}{2Na_2O}$$

Zinc metal burns in air only on strong heating to form a basic oxide called zinc oxide.

$$\underset{\text{zinc (metal)}}{2Zn} + \underset{\text{oxygen (from air)}}{O_2} \xrightarrow[\text{(burns with a blue flame)}]{\text{Strong heating}} \underset{\text{Zinc oxide (basic oxide)}}{2ZnO}$$

Non-metals react with oxygen to form non-metal oxides. They are acidic or neutral in nature. Carbon reacts with oxygen of air is a non-metal. When burnt the resultant is carbon dioxide.

$$\underset{\text{carbon (non-metal)}}{C} + \underset{\text{oxygen (from air)}}{O_2} \longrightarrow \underset{\text{carbon dioxide (acidic oxide)}}{CO_2}$$

Carbon dioxide is an acidic oxide and dissolves in water and become H_2CO_3 or carbonic acid.

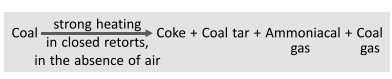
$$\underset{\text{carbon dioxide (acidic oxide)}}{CO_2} + \underset{\text{water}}{H_2O} \longrightarrow \underset{\text{carbonic acid}}{H_2CO_3}$$

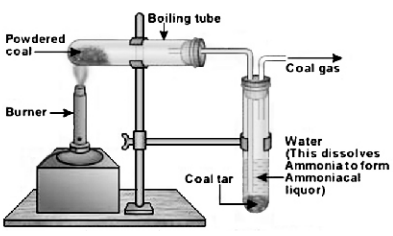
Hydrogen in a non metal at ordinary room temperatures: When hydrogen combines with oxygen, the reaction is

$$H + O_2 \longrightarrow H_2O$$

Hydrogen in a non metal at ordinary room temperatures: When hydrogen combines with oxygen, the reaction is. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 5 Coal and Petroleum (A) 1. d 2. a 3. b 4. b 5. d **(B)** 1. coal, petroleum 2. permeable 3. drilling 4. Clostridium **(C)** 1. True 2. True 3. False 4. False **(D)** 1. d 2. a 3. b 4. c **(E)** 1. Coal, Petroleum 2. Kerosene, Diesel 3. Methane 4. Compressed Natural Gas **(F)** 1. Minerals can be found throughout the world in the earth's crust but usually in such small amounts that they not worth extracting. Only with the help of certain geological processes are minerals concentrated into economically viable deposits. Mineral deposits can only be extracted where they are found. Mineral deposits come in many shapes and sizes depending on where and how the mineral was concentrated. Minerals are concentrated by igneous, sedimentary and metamorphic processes. 2. Uses of coke : 1. Coke is an essential raw material for the iron and steel industry to heat the furnace. 2. Coke is used for extraction of many metals from their ores. 3. Coal : Coal contains carbon although other sub-stance likes oxygen, hydrogen and tracing hydrogen and sulphur are also present. Coal was formed by the decomposition of plants and trees buried under the surface of the earth, millions of years ago. Volcanic eruptions and earthquakes also destroyed entire forests and buried them under ground and were covered with sand, clay, earth and water under the action of high temperature and high pressure deep under the surface of the earth, the remains of plants were gradually turned into coal. The slow chemical process of the conversion of wood into coal is called carbonisation. Coal is a fossil fuel. It is as hard as stone and is black in colour. 4. Uses of Natural Gas : 1. Natural gas is compressed under high pressure to form Compressed Natural Gas (CNG). CNG is used in automobile fuel. It is a cleaner fuel instead of petrol. 2. CNG is also used for power generation. 3. National gas is piped to the homes and factories through a network of underground pipelines, to be used directly for burning. It is reoffered to as CNG. Such network of pipelines exists in Vadodara (Gujarat), some parts of Delhi and some other places. 4. Natural gas is used as a starting material for the manufacture of a number of chemicals and fertilisers. 5. Natural gas was formed by the decomposition of petroleum and coal deposits by the action of the anaerobic bacteria which act in the absence of oxygen. 5. Renewable energy resources. Non-renewable energy resources 1. It can be used again and again throughout its life. It cannot be used again and again but one day it will be exhausted. 2. These are the energy resources which cannot be exhausted. They are the energy resources which can be exhausted one day. 3. It has low carbon emission and hence environment friendly. It has high carbon emission and hence not environment friendly. 4. It is present in unlimited quantity. It is present in limited quantity and vanishes one day 5. Cost is low Cost is high. 6. Renewable energy resources are pollution free. The non-renewable energy resources are not pollution free. 7. Life of resources is infinite. Life of resources is finite and vanishes one day. 8. It has high maintenance cost. It has low maintenance cost as compared with the renewable energy resources. 9. Large land area is required for the installation of its power plant. Less land area is required for its power plant installation. 10. Solar energy, wind energy, tidal energy etc are the examples of renewable resources. Coal, petroleum, natural gases are the examples of non-renewable resources. **(G)** 1. Formalin of Petroleum : Petroleum oil was formed from the decom-position of organism like small plants and animals buried under the sea, millions of years ago. Their dead bodies sank to the bottom of sea and were soon covered by several layers of sand and mud. The dead bodies decayed in absence of air due to high pressure, high temperature, action of bacteria to form petroleum oil and natural gas. 2. Uses of coke : 1. Coke is an essential raw material for the iron and steel industry to heat the furnace. 2. Coke is used for extraction of many metals from their ores. 3. In industries, coal is strongly heated in closed retorts in the absence of air to get some useful

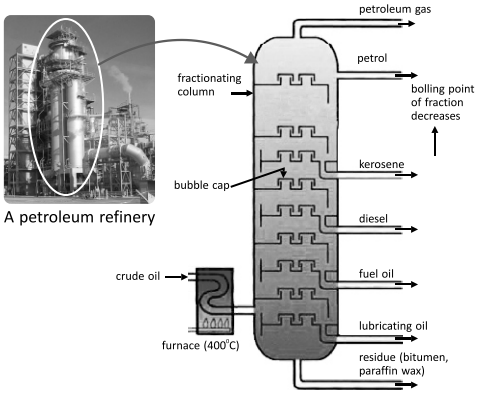




Destructive distillation of coal

Use of coal

products such as coke, coal tar, ammoniacal liquor and coal gas. This process is called destructive distillation of coal. 4. Refining Petroleum : Petroleum is a mixture of several useful constituents. 'The crude oil' cannot be used as such. These constituents can be separated from the method of fractional distillation. This process is called refining and it is candied out in refinery.



A petroleum refinery

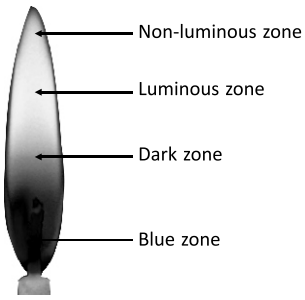
Fractional distillation of petroleum

Petroleum refinery showing fractional distillation of petroleum

Conservation of fossil fuels : 1. Conservation is the sustainable use and protection of national recourses. 2. We should slow down the use of fossil fuels and use these fuels only when absolutely necessary. 3. We should encourage the use of renewable sources of energy like wind energy, solar energy, hydro-energy etc. to meet our energy needs. 4. We should use more fuel-efficient machines. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 6 Combustion and Flame (A) 1. a 2. b 3. c 4. c **(B)** 1. fuel 2. primary fuels 3. carbon dioxide, nitrogen oxide 4. sublimation 5. burn **(C)** 1. False 2. True 3. False 4. True **(D)** 1. e 2. a 3. b 4. c 5. d **(E)** 1. Oxygen 2. Carbon dioxide 3. Magnesium Oxide 4. Outer most zone **(F)** 1. Water cannot be used to put off fires caused by burning of oil or petrol because water being heavier than oil, settles down at the bottom. The oil floats over this water and continues to burn. 2. The calorific value of a fuel is expressed in a unit called kilojoule per gram (kj/g). 3. 1. Slow Combustion : In this type of combustion substance burns at moderate speed like the burning of wood, candle wool. In this type of combustion fuel is not completely burnt up. Another example of this combustion is rusting of iron. The heat is released at such a slow rate that it is difficult to detect it, but no light is produced. 2. Rapid Combustion : When a combustible substance fuel burns in a short period of time. The combustion of the substance is almost complete and large amount of heat and light is produced. Like LPG in gas stove, oxygen hydrogen flame used for welding etc. This type of combustion occurs in the form of fire. 4. Acid rain is a rain or any other form of precipitation that is unusually acidic, meaning that it possesses elevated levels of hydrogen ions (low pH). Acid rain is caused by emissions of sulfur dioxide and nitrogen oxide, which react with the water molecules in the atmosphere to produce acids. Walking in acid rain, or even swimming in an acid lake, is no more dangerous than walking or swimming in clean water. The air pollution that causes acid rain is more damaging to human health. Sulfur dioxide and nitrogen oxides, the major sources of acid rain, can irritate or even damage our lungs. 5. (a) It should be easily available and economical. (b) It should be easily transported and easy to store. (G) 1. There are three conditions which are necessary for combustion to take place: 1) Presence of combustible substance 2) Presence of supporter of combustion 3) Heating the combustible substance to its ignition temperature 2. Various

types of fire extinguishers are used for different types of fires. (a) Water as a Fire Extinguisher : If a fire breaks out in our house or in our neighbourhood, the first thing we must do is to call the fire service by dialing 101. When a fire brigade arrives, the firemen extinguish the fire by throwing water under pressure on the fire. When water is thrown on the fire, it cools the combustible substance below its ignition temperature and this prevents the fire from spreading. (b) Carbon Dioxide as a Fire Extinguisher : Carbon dioxide is the best fire extinguisher for fires involving electrical equipments and inflammable materials like petrol and kerosene. Carbon dioxide being heavier than oxygen surrounds the burning combustible substances like a blanket. Carbon dioxide cuts off the contact between the burning combustible substance and oxygen supply. Hence, the fire is extinguished. (c) Foam-type Fire Extinguisher : The foam-type fire extinguishe consists of a metallic cylinder having a knob and a nozzle tube. The metallic cylinder is filled with a saturated solution of sodium bicarbonate. A glass bottle containing aluminium sulphate is kept inside the metallic cylinder. 3.



Different zones of a candle flame

4. The burning of fossil fuels like coal, petroleum, diesel and wood produces various air pollutants like carbon monoxide, carbon dioxide, oxides of sulphur and nitrogen and unburnt carbon particles which cause severe air pollution. (i) Carbon monoxide : Incomplete combus-tion of fuels gives carbon monoxide gas. It is a very poisonous. If we inhale polluted air containing carbon monoxide, then this carbon monoxide combines with haemoglobin of our blood to form a very stable compound called carboxyhaemoglobin. Due to the formation of carboxyhaemoglobin, the blood cannot carry oxygen to various body parts. (ii) Carbon dioxide : Carbon dioxide released by the burning of fuels is not a poisonous gas. But excess of carbon dioxide given out, traps more sun ray in the Earth's atmosphere. Heating up of the Earth's atmosp-here due to the trapping up of infra-red radiations by greenhouse gases, like carbon dioxide in the atmosphere, is called greenhouse effect. (iii) Sulphur dioxide: Burning of coal and diesel releases sulphur dioxide gas. It is an extremely suffocating and corrosive gas. More-over, sulphur dioxide dissolves in rain water and forms sulphuric acid. The polluted rain contain-ing sulphuric acid is called acid rain. 5. Types of Fuels : Fuels can be classified on the basis of their availability in nature and their physical state. 1. Classification of fuels on the basis of source or availability : Natural or primary fuels : The fuels which occur in nature and are used in the same form are called natural or primary fuels, for example, coal, wood, etc. Processed or secondary fuels : Some fuels cannot be used in their raw form, i.e., in the way they are found in nature. These fuels need to be processed through chemical methods before they can be used. For example, petrol, diesel, and kerosene are secondary fuels obtained from petroleum after fractional distillation. 2. Classification of fuels on the basis of physical state : Solid fuels : Fuels which occur in solid form at room temperature are called solid fuels, for example, coal, wood, coke, paraffin wax, etc. Solid fuels emit smoke and leave ash as residue on combustion. Liquid fuels : Fuels which occur in liquid form at room temperature are called liquid fuels, for example, kerosene, spirit, petrol, diesel, etc. Liquid fuels do not leave any residue

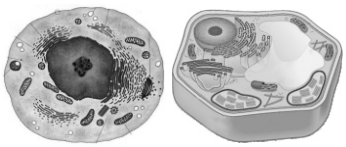
on burning. They usually have lower ignition temperature than solid fuels. Gaseous fuels : The fuels that occur in gaseous form at room temperature are called gaseous fuels, for example com-pressed natural gas (CNG), water gas coal gas, biogas, etc. Gaseous fuels are very clean and do not produce ash or much smoke on combustion. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 7 Conservation of Biodiversity (A) 1. c 2. b 3. a 4. b 5. c 6. d 7. c **(B)** 1. Sanctuary 2. exotic 3. habitat 4. global warming 5. migration **(C)** 1. True 2. True 3. False 4. True 5. False 6. False 7. False **(D)** 1. e 2. a 3. b 4. c 5. d **(E)** 1. Pollution 2. Asiatic lion, Great Indian Bustard 3. National Park 4. Deforestation **(F)** 1. To protect and conserve the wildlife in India, the government has passed the wild life protection Act in 1972. It stated that killing and capturing of wildlife without suitable consent is punishable under the law. Jammu and Kashmir is the only state in India where this law in not valid. 2. 1. Endangered Species : These are those species which face immediate threat of extinction because their number has been drastically reduced to a critical level. If the same causative factors continue, these species would soon become extinct. Asiatic lion, Indian rhinoceros, blue whale, great Indian bustard, crocodile are some examples of endangered species. 2. Vulnerable Species : These species are likely to move into the endangered category in near future, in case the casual factors for their decline are not removed. Spotted deer, black buck, golden langur and musk deer are some examples of vulnerable species. 3. Role of Biosphere Reserve : 1. A Biosphere Reserve Conserves wild population in natural ecosystem. 2. It preserves traditional lifestyles of tribals. 3. It conserves genetic resources of varied domesticated plants and animals. 4. Reasons for migrations : 1. To escape the harsh and unfavourable climatic conditions. 2. To get more favourable conditions of temperature, food or water. 3. To get a suitable place for reproduction. For example, the Salmon migrates from saltwater to freshwater to lay eggs and comes back. Freshwater Eels go to saltwater from freshwater to lay eggs. **(G)** 1. Seasonal movement of birds and animals in large number from one place to another to overcome unfavourable conditions and return back to original habitat when conditions become favourable, is called migration. Seasonal migrations are known to occur in many species of insects, birds, marine mammals and herbivorous mammals. Example : Sibrean Crane. 2. The International Union for Conservation of Nature and Natural Resources (IUCN), now known as the World Conservation Union (WCU) 3. IUCN maintains a comprehensive list known as the IUCN Red List of Threatened Species. It is also known as Red Data Book. 4. The Biological Diversity Act, 2002 is an Act of the Parliament of India for preservation of biological diversity in India, and provides mechanism for equitable sharing of benefits arising out of the use of traditional biological resources and knowledge. The Act was enacted to meet the obligations under Convention on Biological Diversity(CBD), to which India is a party. 5. To protect and conserve the wildlife in India, the government has passed the wild life protection Act in 1972. It stated that killing and capturing of wildlife without suitable consent is punishable under the law. Jammu and Kashmir is the only state in India where this law in not valid. 6. Cutting down forests and using the land for other purposes in known as deforestation. Consequences of Deforestation : Deforestation has serious consequences adversely affecting our environment. It increases the level of carbon-dioxide in atmosphere, there by increasing the atmospheric temperature resulting to GLOBAL WARMING. It results in the depletion of water vapour that has affected cloud formation. It causes an increase in soil erosion. As the top fertile soil is eroded, it exposes the lower, hard and rocky layers which are less fertile. Over a period of time fertile land gets converted into deserts, it is called desertification. It causes reduction in groundwater due the decreased water absorption capacity of the soil which reduces infiltration of water into the ground. As a result, there are frequent floods and the fertile top soil is washed away with water. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 8 Cell-Structure and Functions (A) 1. a 2. b 3. a 4. a 5. c **(B)** 1. Amoeba 2. genes 3. Granule, nerve 4. Robert Brown 5. Nucleus **(C)** 1. True 2. False 3. False 4. False 5. True **(D)** 1. c 2. b 3. d 4. a **(E)** 1. Granule 2. Ribosomes 3. Chromosomes 4. Nerve 5. Cytoplasm **(F)** 1. Chromosomes : They are thin thread-like structure, composed of deoxy-ribonucleic acid (DNA). This contains there hereditary units of chromosome or the genes that are passed from the parents to the offsprings. In other words, chromosomes can be seen only when the cell divides. Functions : The nucleus controls all metabolic activities of the cell. 2. Chloroplasts : These are found only in plant cells. Chloroplasts contain chloro-phyll, the green pigment necessary for the photosynthesis. Since preparation of food takes place in the chloroplasts, they are called 'food factories'. Plant cells also have coloured organelles called plastids. Plastids contain pigments that are used in photosynthesis. 3.

S.No.	Parameters (Points of difference)	Plant Cell	Animal Cell
1.	Size	Plant cells are larger in size.	Animal cells are smaller than plant cells.
2.	Cell wall	Cell wall is present.	Cell wall is absent.
3.	Plastids	Plastids are present.	Plastids are absent.

4. Any of various freshwater protozoans of the genus Paramecium that are usually oval in shape and that move by means of cilia. Although they consist of a single cell, paramecia are large enough to be visible to the naked eye. Like other ciliates, paramecia contain two nuclei, a macronucleus and a micronucleus. 5. Living organisms are made up of one or many cells. Those organisms which are made of a single cell are called unicellular organisms, Amoeba, Paramecium, Euglena, bacteria, yeast are called unicellular organisms. In such organisms all the life processes are performed by one cell. **(G)** 1. The smallest living unit of the body is cell. Many cells of same type organize to form a tissue. The cells have different shapes and sizes depending on the function they perform. Such as spherical (eggs of many animals) elongated (e.g. nerve cells), oval shaped (e.g. Red blood corpuscles), Spindle shaped (smooth muscle fibre) branched (e.g.), kidney shaped (e.g., Guard cells of leaves) and some cells may not have definiteshape (e.g. amoeba and white blind cells). 2. Nucleus : It is called the control centre of the cells. It was discovered by Robert Brown in 1831. Nucleus controls all the activities of cell. It is usually spherical or oval in shape. It consists of the following four parts :- (a) Nuclear membrane : Nucleus is separa-ted from the cytoplasm by a membrane called the nuclear membrane. (b) Nucleoplasm : A present fluid in the nucleus is called nucleoplasm. It is denser than cytoplasm. (c) Nucleolus : It is a small spherical body present inside the nucleus. It is composed of RNA (ribonu-cleic acid). Which is responsible for protein synthesis. (d) Chromosomes : They are thin thread-like structure, composed of deoxy-ribonucleic acid (DNA). This contains there hereditary units of chromosome or the genes that are passed from the parents to the offsprings. In other words, chromosomes can be seen only when the cell divides. Functions : The nucleus controls all metabolic activities of the cell. 3. Cell theory was proposed by two German scientists Schleiden and Schwann. Its main postulates are that – All living things are made up of cells. Cells are structural and functional units of all living organisms. All cells are similar in their basic structure and function but are not identical. They differ in shape and size. Cells arise by the division of the pre existing cells. 4. 5. The organisms made of many cells are called multicellular organisms. The numbers of cells in these organisms varies greatly and reach to billions or trillions. Human



Animal Cell Plant Cell

beings, trees, grass, insects, cows, birds, humans are examples of multicellular organisms. Levels of Organisation : In multicellular organisms, different cells carry out different functions. However, in unicellular organisms single cell performs all the required functions. The bodies of multicellular organisms consists of many types of cells. They are organised into different levels to coordinate various functions of an organism. These levels are: Cells : The smallest living unit of the body is cell. Many cells of same type organize to form a tissue. Tissues : A group of cells performing a similar function form a tissue. For example, cells which form the lining of the skin constitute the epithelial tissue. Organs : Different tissues assemble to form an organ. The organs perform specialised functions. For example, stomach, heart, kidney, etc., are organs. Organ systems : Various organs with different structures work together to perform a specific function. These organsform an organ system. For example, digestive system, respiratory system, nervous system are some organ systems. Organism : Various organ systems in the body are organised to make an organism. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 9 Reproduction in Living Organisms (A) 1. a 2. b 3. b 4. b 5. b **(B)** 1. fertilization 2. internal 3. sperm, ova 4. Binary Fission 5. Scrotum 6. Oviparous **(C)** 1. False 2. False 3. True 4. False **(D)** 1. b 2. a 3. d 4. c **(E)** 1. Zygote 2. Fertilization 3. Oviduct 4. Budding, Binary Fission 5. Metamorphosis **(F)** 1. All organism, from the simplest form of bacteria to complex organism like humans, produce new organisms through the process of reproduction. It is essential for survival of species on this earth. Reproductions involve a single organism or two organism (parents) to produce an offspring. It can be a mainly of two types. (Sexual reproduction and Asexual reproduction) Binary Fission : This kind of asexual reproduction takes place in unicellular organisms like Amoeba and paramecium. The nucleus of the parent cell divides into two followed by the division of the parent cell. Each daughter cells receives a nucleus and two daughter cells are produced. Budding : In this kind of asexual reproduction, a small outgrowth called bud appears on the body of the organism. The nucleus of the parent body divides into two and one nucleus goes into the bud. The bud brows and finally detaches from the parent body to grow into a young individual. As new individual develops from bud, this mode of asexual reproduction is called budding. Example is hydra. 2. The process, that transforms a frog from water to land is called metamorphosis. Meta-morphosis is the transformation from an egg into an adult. Frogs change from egg into an adult frog. Frogs go through four stages in their life: egg, tadpole, metamorphosis (froglet) and adult. This metamorphosis is also known as the frog's life cycle. 3. Animals which give birth to young ones or babies are called viviparous animals. Human beings, monkeys, lions, horses etc. are examples of viviparous animals. The animals which lay eggs are called oviparous animals. Reptiles, birds, insects, frogs etc. are examples of oviparous animals. **(G)** 1. The male reproductive systems consist of the following organs. (a) Testes : A man has paring testes. These are oval in shape. The function of testes is to produce male gametes called sperms and also to produce the male sex hormone called testosterone. Each sperm has a head, a middle piece and a tail. The tail in the sperm helps in its locomotion. (b) Vas deferential or (sperm duct) : Sperm leave the testis through part of a narrow duct called vas deferential. Fluid produced by the seminal vesicles mixes with the sperms to produce semen. This fluid provides nourishment to the sperms. (c) Urethra : The vas deferential open into urethra which arises from urinary bladder. The semen from vas deferens also joins the urethra. Thus, urethra carries urine from the bladder as well as semen (consisting of sperms from the vas deferens), through the penis. (d) Penis : It helps transfer sperms into the vagina of the female body. It is common passage for urine and semen to come out. 2. Fertilisation can be defined as the fusion of the sperm nucleus with the egg nucleus to form a diploid cell known as zygote. The fertilisation is internal in the human reproductive system. It is achieved by the insertion of the male organ, penis into the vagina of the

female. External Fertilization : It involves the fusion of male and female gametes outside the female body. It is called external fertilization. In amphibians (like frogs and toads) and fish, external fertilisation takes place. The eggs and sperms are shed into the water around the animals and fertilization takes place there. Internal Fertilisation : When fertilisation occurs inside the female body it is called internal fertilisation. In this process the eggs remains inside the female body. Sperms are placed inside her body by the males. Internal fertilisation takes place in mammals (including human beings), birds and reptiles. 3. Binary Fission : This kind of asexual reproduction takes place in unicellular organisms like Amoeba and paramecium. The nucleus of the parent cell divides into two followed by the division of the parent cell. Each daughter cells receives a nucleus and two daughter cells are produced. Budding : In this kind of asexual reproduction, a small outgrowth called bud appears on the body of the organism. The nucleus of the parent body divides into two and one nucleus goes into the bud. The bud brows and finally detaches from the parent body to grow into a young individual. As new individual develops from bud, this mode of asexual reproduction is called budding. Example is hydra. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 10 Reaching the Age of Adolescence (A) 1. a 2. a 3. c 4. c **(B)** 1. y 2. x, x 3. menopause 4. sperms, testes 5. testes **(C)** 1. True 2. True 3. False 4. False (D) 1. b 2. c 3. d 4. a **(E)** 1. Pituitary Gland 2. Adam's Apple 3. Increased Activity 4. Menarche 5. Testes **(F)** 1. Adrenaline triggers the body's fight-or-flight response. This reaction causes air passages to dilate to provide the muscles with the oxygen they need to either fight danger or flee. Adrenaline causes a noticeable increase in strength and performance, as well as heightened awareness, in stressful times. 2. The sex of a child is determined by the chromo-somes in the cell. Thus the sex of a foetus in the mother's womb can be determined by testing its cells. 3. As the body undergoes a massive growth spurt during this period, the adolescents should support this by eating nutritious food. A balanced diet that has the right proportions of carbohydrates, proteins, fats, minerals, and vitamins is essential. A good vegetarian diet should consist of rice or chapattis, dal, and vegetables. A good non-vegetarian diet should have the right quantities of rice or chapattis, meat, and vegetables. Milk is a good source of calcium and proteins and is considered a balanced food is itself. Fruits are rich in minerals and vitamins and should be eaten insufficient quantity. A rich fruit diet will prevent you from a falling sick as they are protective foods. Nuts are rich sources of protein and fat. 4. The cycle of producing and releasing a mature egg is called the menstrual cycle. The hormone estrogen and progesterone are also released by ovum. As a result the uterus become thick and prepare itself to receive the wall of egg. If the egg is fertilized by the sperm, it begins to divide and gets embedded in the uterus for development. This marks the pregnancy. However if fertilisaiton does not occur the inner lining of the uterus wall become thickened and collapse and the egg along with blood vessels is discarded by the female body. This results in bleeding in women which is called menstruation. 5. Characteristics of hormones : Hormones are released by endocrine glands. These glands do not have ducts, so they are also known as ductless glands. Hormones regulate various processes in the human body, like growth, develop-ment, behaviour and reproduction. Hormones are required in very small quantities. Hormones do not act at the place where they are produced. As hormones are released by the glands directly into the blood, blood carries the hormones to their site of action called target site. Hormones are very specific in their action. **(G)** 1. The endocrine system consists of several glands called endocrine glands which secrete chemicals called hormones. Characteristics of hormones : Hormones are released by endocrine glands. These glands do not have ducts, so they are also known as ductless glands. Hormones regulate various processes in the human body, like growth, develop-ment, behaviour and reproduction. Hormones are required in very small quantities. Hormones do not act at the place where they are produced. As hormones are released by the glands directly into the blood, blood carries

the hormones to their site of action called target site. Hormones are very specific in their action. 2. Sex Determination : Every human individual possess 23 pairs of chromosomes be it male or female. Biologically, the sex of a child is determined by the chromo-somes in the cell. Thus the sex of a foetus in the mother's womb can be determined by testing its cells. Out of the 23 pairs of chromosomes, 22 pairs are similar in all aspects. The 23rd pair is different and is called sex chromosomes. In males these sex chromosomes are represented as x and y chromosomes while a female has two x chromosomes. Male – 22 pairs + xy chromosomes and Female 23 pairs of xx chromosomes Half of the male gametes (sperms) carry x chromosomes and other half carry y chromosomes. All the female eggs carry only x chromosomes. When a sperm containing x chromosomes fertilizes an egg, the zygote would have two x chromosomes and would develop into a female child. When a sperm containing y chromosome fertilizes the egg (containing only x chromosome) the result-ing zygote would have xy chromosomes and would develop into a male child. The process by which the sex of a person is determined is called sex determination. Both boys and girls show secondary sexual characteristics. Males develop the following secondary sexual characteristics : Facial hair (beard and moustache). Body hair, prominently under arm, abdomen, chest, and pubic hair. Broadening of the shoulders and chest. Females develop the following secondary sexual characteristics : Widening of hips. Body hair, prominently under arm and pubic hair. Milk secreting glands or mammary glands start developing glands start developing inside the breasts. 4. Many times teenagers fall prey to drugs, which can spoil their health, career and life. Drugs are addictive. Once taken, they need to be taken again and again. It is therefore very important to say "NO" to drugs. Drug users can also contract AIDS through the infected syringes and needles while taking drugs. AIDS is caused by a virus called HIV. HIV also spreads through the sexual contact with an infected person, from an infected mother to an infant or by blood transfusion. During the teen years, parents, teachers and other elders are the best guide to solve to solve your problems. Therefore do not hesitate to share your problems with them. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 11 Force (A) 1. d 2. a 3. a 4. d 5. b (B) 1. frictional 2. muscular force 3. non-contact 4. 9.8 **(C)** 1. False 2. False 3. True 4. True **(D)** 1. c 2. d 3. a 4. e 5. b **(E)** 1. SI (Newton) 2. Magnetic Force 3. Electrical Force 4. Weight object **(F)** 1. In international system of units, the unit of force is Newton (N). Other units of force are dyne, kilogram force, and pound force. 2. Heavy vehicles have broad tyres because broad tyres havelarge area of contact and less pressure on the ground. Because of this, heavy vehicles (like tractor) can move even on soft roads and fields without sinking. 3. A fruit detached from the plant always falls on the ground. It so happens because the Earth pulls it down. This pull of the Earth is a force called gravity. Gravity is the force with which the Earth pulls every-thing towards it. It is due to the force of gravity that things on Earth fall downwards and do not go upwards. Gravitational force is negligibly small for objects of ordinary masses, and hence, show no visible effect. But for heavy objects like Sun, Moon, Earth and other planets, the gravitational force becomes so significant that it shows visible effects. 4. The spring balance is a measuring device. The object which is to be weighed is attached to the hook of the spring balance and the spring balance is held vertically in the hand. The spring gets stretched due to the gravitational pull and hence the pointer moves on the engraved scale to show the weight of the object. 5. Friction force is a force resisting the relative motion of solid surfaces, fluid layers and material elements sliding against each other. the muscle force is the force of human agency. **(G)** Effects of Force : We always fell the effects of force in our day to day experience. It can be explained by describing what happens when a force is affixed to an object. 1. Force Can Change The Shape or Size of An Object : When you squeeze a lemon for juice it will be squashed. The shape of dough changes with apply- ing force while kneading and rolling it. 2. Force Can Change The Speed of an

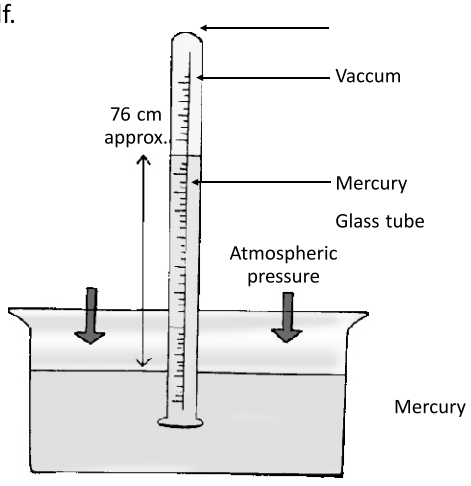
Object : What happens when brakes are applied to a moving car? The car slows down. When you apply brakes, a force acts on all the four wheels of the car due to which the car slows down. When you throw an object in the upward direction, the object goes up to a certain maximum height where its speed becomes zero and then falls towards the Earth. As it falls, its speed increases because this time it is moving in the direction of the force of gravity. This shows that in order to make a body move faster, the force applied must be in the direction of motion. To decrease the speed of the body, the applied force must be in the direction opposite to the direction of the motion. 3. Force Can Change The Direction of an Object : In a cricket match, when a batsman hits a cricket ball, then the direction of the cricket ball changes and it goes in another direction. Similarly when a batsman hits a straight drive and the bowler manages to effect it towards the stumps. A the non striker's end the bowler applies force to change the direction of motion of the ball. In short, the force is needed to change the direction of the motion of a moving object. 4. Force Can Change The Motion of an Object : Objects move if we push or pull them or hit them. It happens because you make a force act on them. For example, when you kick football on the ground, it moves from one place to another. It so happens because you have applied force on it. Similarly when the goalkeeper catches the football he stops its motion by exerting force on it. Thus a force can make a body move and can stop a moving body. 2. Contact Forces are forces come into play only when objects have to be in contact with each other. Such forces are called contact forces, for example, when one body is sliding over another contact forces are acting between them with each other. Some contact forces are : Muscular force : The force applied by the muscles of the body is called muscular force. For example, when you pull the door for open, when you lift your school bag. You apply force using the muscles of your arms. Frictional force : The force exerted by one body on other body to resist the relative motion among themselves is called frictional force. 3. Forces that act even when the agent applying the force and the object on which the force is applied are not physically touching each other are known as non-contact forces. Magnetic force, gravitational force, and electrostatic force are examples of non-contact force. Magnetic Force : You have already learnt in your previous classes that a magnet attracts magnetic substances towards itself. The force of attraction between a magnet and magnetic materials, like iron and nickel, is called magnetic force. This force is used in cranes to lift heavy loads, to separate iron objects from garbage, etc. Electrical Force : A well known fact of electricity is that two similar charge, whether positive or negative charge, repel each other. A positive charge and a negative electric charge always attract each other. Electric charge is a fundamental conserved property of some subatomic particles, which determines their electromagnetic interactions. Electrically charged matter is influenced by, and produces, electromagnetic fields. The interaction between a moving charge and electromagnetic field is the source of the electromagnetic force, which is one of the four fundamental forces. 4. A charge body can attract or repeal another charged body or can attract uncharged body from a distance. This force is called electrostatic force. Example :- When we comb hair by comb on a dry hair and afterward we suddenly put on stripe of paper it will attract. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 12 Pressure (A) 1. c 2. b 3. a 4. b **(B)** 1. density 2. lesser 3. decreases 4. greater **(C)** 1. True 2. False 3. True 4. True 5. False **(D)** 1. d 2. a 3. b 4. c **(E)** 1. Pascal 2. Force per unit 3. Barometer 4. Fortin Barometer **(F)** 1. Pressure arises as you go deeper in the ocean. This is because of an increasing weight of water (hydrostatic pressure) pressing down from above. 2. Pressure applied by atmospheric gases on various object on the earth is called atmos-pheric pressure. This atmospheric pressure at sea level is called normal pressure or standard pressure. It is about 100 kilo pascals or (100 kilo). However, if you go to a high altitude, the atmospheric pressure decreases. Sometimes, atmospheric pressure drops

suddenly but blood pressure remains the same and at times it becomes more than the atmospheric pressure. Due to this many people experience bleeding through the nose or ears because their blood vessels rupture. However, the human body is normally capable of adjusting to such changes. 3. Sometimes, atmospheric pressure drops suddenly but blood pressure remains the same and at times it becomes more than the atmospheric pressure. Due to this many people experience bleeding through the nose or ears because their blood vessels rupture. However, the human body is normally capable of adjusting to such changes. **(G)** 1. Pressure is a term often used in everyday life the wind pressure, water pressure etc. So the pressure is the effect of force over a surface area and created by the weight of an object. Pressure is the force per unit area applied on a surface. Mathematically the pressure is –

$$P = \frac{F}{A}$$

Where – P is pressure, F is the Force, A is the area 2. Pressure applied by atmospheric gases on various object on the earth is called atmos-pheric pressure. This atmospheric pressure at sea level is called normal pressure or standard pressure. It is about 100 kilo pascals or (100 kilo). 3. Pressure depends upon both force and area, its unit is derived from units of both these quantities. In SI system, force is measured in Newton and area is measured is square metres (m^2). The SI unit of pressure is Pascal (Pa), where 1Pa is equivalent to $1N/m^2$. If force is kept constant, pressure is in-directly proportional to area. This means, P = 1/A. So, larger the area over which the force acts, the smaller is the pressure. Smaller the area, greater the pressure. A barometer is a device used to measure atmospheric pressure. It consists of a glass tube which is long and sealed at one end. First, it is filled with mercury and then inverted gently into a trough containing mercury. The mercury in the tube falls because a particular height of mercury in the tube balances the pressure of the atmos-phere. Here the pressure due to weight of the column of mercury equals atmospheric press-ure. The space above the mercury in the tube is vacuum. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.



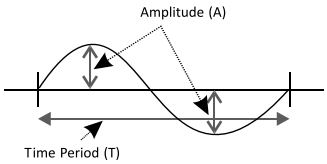
Barometer

CH. 13 Friction (A) 1. a 2. c 3. c 4. b 5. a **(B)** 1. streamlined 2. increases, increased 3. fluid friction 4. heat 5. lubricant **(C)** 1. True 2. False 3. True 4. True (D) 1. c 2. d 3. a 4. b 5. e **(G)** 1. Air and water also offers resistance to movement. Nature's fliers (birds) and swimmers (fishes) have streamlined body to reduce this resistance. A streamlined body which is rounded in the front and narrow at the back. Aeroplanes, rockets, ships have streamlined shape to reduce friction with water and air. The frictional

force that fluids exert on objects is called drag. It depends on the nature of fluid, the shape of the object and the speed of the object with respect to the fluid. 2. Friction can be decreased by lubricating surfaces with oil and grease. As a lubricating layer is formed between the moving surfaces, they do not directly roll against each other. Oiling and greasing of machines and fans are normal routine for less wear and tear and less energy wastage. 3. Tyres of vehicles have grooves on their surface to increase friction so that vehicles do not skid, especially during the rainy season when the roads are wet. Synthetic rubber is used in the manufacture of tyres because of its large coefficient of friction with the road. 4. The force of friction becomes necessary to resist motion. To do so, some of the following methods can be used to increase friction. 1. Treading of tyres : Tyres of vehicles have grooves on their surface to increase friction so that vehicles do not skid, especially during the rainy season when the roads are wet. Synthetic rubber is used in the manufacture of tyres because of its large coefficient of friction with the road. 2. Sanding : Sand is thrown on tracks covered with snow. This increases the friction between the surfaces in contact, preventing the skidding of vehicles on the road. 3. Athletes and players have to run very fast. Their shoes are provided with special spikes to increase friction, so that they do not slip. 4. For cleaning floors, hard brushes are used to increase efficiency of rubbing. 5. The sides of matchboxes are made very rough so that when matchstick is struck against them, there is enough friction to light the matchstick. 5. Depending on the interaction of the sur-faces in contact with each other, friction can be following types. Static Friction : When a body at rest is in contact with a surface and no external force is applied the force of friction in zero and is called static friction. For example when you push a heavy box on the floor, the force that you apply to start it moving on the floor determines the static friction. Rolling Friction : The force of friction that consists between two surface when a body rolls over the other is called rolling friction. For example, small wheels in the suit case appear very less friction and it is to carry heavy luggage. Sliding Friction : This is the frictional force between two surfaces when one body or object moves or attempts to move over the other. For example, when you apply force to an already moving box to keep it moving on the floor with the same speed. The force determining is sliding friction. Fluid Friction : Till now, we have discussed the friction of solid objects when they move in relation and contact with each other. Similarly, when a solid object moves through liquid or gas, its surface experiences friction. 6. Since friction is due to roughness of sur-faces, any process that makes the contact surfaces smooth will reduce friction. The follow-ing methods are employed for reducing friction. Polishing – If we polish a surface, it becomes smooth and reduces friction. Through polishing, unevenness of the surface is reduced. Lubrication – Friction can be decreased by lubricating surfaces with oil and grease. As a lubricating layer is formed between the moving surfaces, they do not directly roll against each other. Oiling and greasing of machines and fans are normal routine for less wear and tear and less energy wastage. Similarly solid lubricants like powder is used in the caromboard to reduce friction between striker and board. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 14 Sound (A) 1. b 2. b 3. c 4. a 5. d **(B)** 1. higher 2. 20 Hz 20000 Hz 3. vaccum 4. hertz 5. soft **(C)** 1. True 2. False 3. False 4. True **(D)** 1. e 2. b 3. a 4. c 5. d **(E)** 1. Dogs 2. Giutar 3. Decibel 4. Noise **(F)** 1. Human ear can hear frequencies ranging from 20 Hz to 20,000 Hz. 2. Loudness depends on the amplitude of the sound wave. The larger the amplitude the more energy the sound wave contains therefore the louder the sound. it also depend on it's frequency and the pitch of sound. 3. A sound wave is produced when something vibrates. When an object vibrates, it disturbs the air around it. The molecules of air in contact with the object begin to vibrate. They gain some energy in the process. These molecules, in turn, transfer their energy to molecules close to them, causing them to vibrate. And a chain reaction starts. This is a sound wave. 4. The highness or lowness of a sound is known as its

pitch. A high-frequency sound produce of high pitch whereas a low-frequency sound have a low pitch. For example, a whistle produces a high-pitched sound because of high frequency of vibration. A drum, on the other hand, produces a low-pitched sound because it vibrates with a low frequency. **(G)** 1. Sound has the following properties: amplitude, time period, and frequency. Amplitude : We know that sound is propagated by vibrations in the particles of medium about a mean position. The maximum distance moved by the particles of the medium on either side of the mean position represents the amplitude of sound. Time period : Time period of a sound wave refers to the time taken by a particle of the medium to complete one vibration. Time period is mea-sured in seconds (s). Frequency : The number of oscillations completed by the air particles in one second is called the frequency of vibrations. The frequency is expressed in hertz (Hz). A frequency of 50 Hz represents 50 oscillations in a second. An increase in frequency means more vibrations or oscillations in a given time. Human ear can hear frequencies ranging from 20 Hz to 20,000 Hz. This is called an audible range. If the frequency of a sound is below 20 Hz or above 20,000 Hz, it is said to be inaudible sound range. No, we can't. 3. Sounds are invisible. They fill the surroun-ding air and are carried through air in the form of waves. The ears, the nerves, and the brain enable us to hear sounds just like eyes help us see. At night you can hear the humming of insects and mosquitoes. You can recognize the voice of your parents or friends even if they are not in front of you. You can also distinguish between sounds produced by different sources. Most sounds are stored in your memory. When a sound wave is received, the brain compares the new sound with a large memory of sounds that you have heard since birth, identifying the source. Outer Ear : It consists of the pinna and the ear canal. When sound enters the pinna, it is allowed to move through ear canal which send the vibrations of the incoming sound to the next part of the year. Middle Ear : It is an air filled cavity which consists of a flexible tissue called eardrum. It is further connected to three interlocked bones which maintain a very delicate balance with each other. The sound vibrations carried forward from the outer ear first vibrate the eardrum which then vibrate the bones. The bones pass on the vibrations to inner ear. Inner Ear : The inner ear has a coiled tube called cochlea which is the real organ of hearing. Tiny hair inside this hearing organ picks up the vibrations from the middle ear. They then send the signal to the auditory nerve of our nervous system. Our brain interprets the signal and make us hear sounds. 4. The presence of excessive and unwanted noise in the environment is called noise pollution. There may arise of transportation, machines in factories, vacuum cleaners etc. Noise is also produced by pressure horns in automobiles, loudspeakers used in marriages and religion place railway trains and by explod-ing crackers in various functions. Harmful Effects of Noise : Some of the effects of noise pollution on human being are given below. 1. It decreases the efficiency of a man. 2. Noise causes anger and nervous tension and may lead to fatigue. 3. Noise produces headaches, irritability and can lead to blood pressure. 4. A long exposures to noise pollution increase many result in hearing impairment as it can cause permanent hearing loss due to damage of ear drum. Controlling Noise Pollution : Although we can not eliminate noise but we can take certain measures to lower down its level to bearable limits. Locating noise-producing factories and industrial units away from the residential area. Putting restriction on playing loud music at public places. Putting restriction on excessive honking by automobiles. Running radios and television at low volume. Trees must be planted along the roads, and around building to cut down on the sounds reaching the residents which will reduce the harmful effects of noise pollution. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.



Sound wave

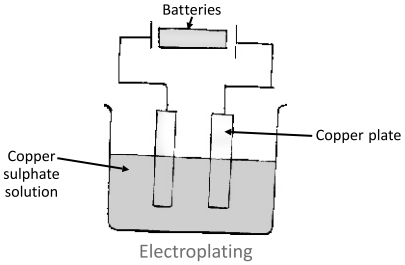
CH. 15 Chemical Effects of Electric Current (A) 1. c 2. b 3. b 4. c 5. d **(B)** 1. conductor 2. ions 3. electrolysis 4. electroplating 5. positive, negative **(C)** 1. False 2. False 3. False 4. True 5. True **(D)** 1. e 2. b 3. a 4. c 5. d **(E)** 1. Hydrogen, Oxygen 2. Chromium, Zinc 2. Chromium 4. Gold **(F)** 1. Adding an acid makes the water conduct electricity. Assuming that distilled water is being in the experiment, which is a non conductor of electricity we need to make the water conduct electricity for electrolysis to occur. Hence the acid is added. 2. Pure water or distilled water does not have any mobile electrons to constitute electric current, so it is an insulator. But if some table salt is dissolved in water, the conductivity of water changes. Tap water has chemicals dissolved in it, so it conducts electricity. 3. When electric current is passed through copper sulphate solution, it dissociates into copper ions and sulphate ions.

$$\underset{\text{Copper Sulphate}}{CuSO_4} \longrightarrow \underset{\text{Copper ion}}{Cu^{2+}} \longrightarrow \underset{\text{Copper ion}}{So_4^{2-}}$$

At the anode, the copper metal loses electrons to produce copper ions that go into the solution.

$$\underset{\text{Copper metal}}{Cu} \longrightarrow \underset{\text{Copper ion}}{Cu^{2+}} \longrightarrow \underset{\text{Electrons}}{2e^-}$$

The positively charged copper ions move to the cathode, where they gain electrons and deposit as copper metal on it. 4. Electrolytes are salts or molecules that ionize completely in solution. As a result, electrolyte solutions readily conduct electricity. Nonelectrolytes do not dissociate into ions in solution; nonelectrolyte solutions do not, therefore, conduct electricity. **(G)** 1. When an electric current is passed through any conducting liquid, a chemical reaction take place known as electrolysis. All ionic substances dissociate or ionize into ions when dissolved in water. The substance which furnish ions in the solution are known as electrolytes. If the liquid is water electrolysis "breaks up" water into two gases hydrogen and oxygen. If the liquid is a solution that contains a metal, electrolysis breaks up the solution, so that the metal is removed. 2. Pure water or distilled water does not have any mobile electrons to constitute electric current, so it is an insulator. But if some table salt is dissolved in water, the conductivity of water changes. Tap water has chemicals dissolved in it, so it conducts electricity. 3. In electroplating, the object to be electroplated is made the cathode (negative electrode) by connecting it to the negative terminal of the battery. The metal which has to be deposited is made the anode (positive electrode) which is connected to the positive terminal of the battery. The electrolyte is usually the salt solution of the metal to be coated on passing electric current, the object gets coated with the desired metal. 1. Silver plating is also common for the same reasons. Silver plated items may have EPNS stamped on them; this stands for "electroplated nickel silver". 2. Chromium is an expensive material that has following properties: it is shiny, resists scratches, and does not corrode. Therefore, a coating of chromium is deposited on objects made from much cheaper metals. This gives the objects a bright attractive appearance and protects them from scratches and corrosion at a low cost. Chromium plating is commonly found on bath taps, car bumpers, bicycle handlebars, tower rails, etc. 4. You can easily carry out electroplating of copper in the laboratory. Take two copper plates and clean them with sand paper. Rinse them with water and dry. Put them in a beaker containing distilled water, a teaspoonful of copper sulphate and a few drops of sulphuric acid. Connect the copper plates to the terminals of a battery and allow the current to pass through the solution. After 1-2 minutes, remove the electro-des from the solution and look at them carefully. You will find that copper gets deposited on the electrode connected to the negative terminal of the battery. It



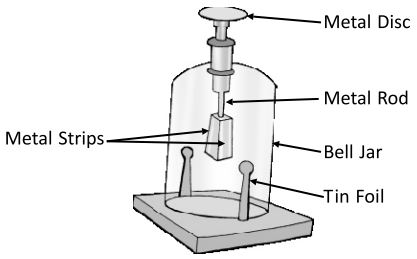
Electroplating

happens because copper sulphate dissociate into copper and sulphate when electric current is passed through the solution. 5. (a) Tin cans used to store food are made of iron coated with zinc. Zinc is less reactive than iron. Thus, the food is prevented from coming in contact with iron and getting spoilt. (b) Cutlery and jewellery items are often gold or silver plated-this gives the exquisite look of the expensive metals at a much lower cost. (c) The iron used in making bridges and automobiles is coated with zinc to protect it from rusting. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 16 Some Natural Phenomena (A) 1. a 2. a 3. c 4. b 5. a **(B)** 1. electroscope 2. lightning 3. epicenter 4. lightning **(C)** 1. True 2. False 3. False 4. True **(D)** 1. c 2. e 3. d 4. b 5. a **(E)** 1. Lighting conductors 2. Waste water injection 3. Epicentre 4. Tsunani **(F)** 1. The reason that the balloon will stick to the wall is because the negative charges in the balloon will make the electrons in the wall move to the other side of their atoms (like charges repel) and this leaves the surface of the wall positively charged. 2. If you are caught in a thunderstorm : Never take shelter under a tall tree or a alone tree. Do not stand on high ground. Don't fly a kite in a thunderstorm, near a power line, or near an air field. 3. No part of Earth's surface is free from earthquakes, but some regions experience them more frequently. They are most common at tectonic plate boundaries where different plates meet. The largest events usually happen where two plates are colliding, or colliding and sliding past one another, particularly around the edge of the Pacific Plate, for example in New Zealand, Vanuatu, the Solomon Islands, Papua New Guinea, Japan and the Americas, and in Indonesia, where the Indo-Australian Plate collides with the Eurasian Plate. The depths of focus in these collision zones can range from 0-700km. 4. The magnitude or intensity of an earthquake is conventionally measured using the richter scale. Thousands of earthquakes happen every year on the land and in the sea. Quakes of magnitude 7 or more can cause serious damage over large areas. **(G)** 1. The Earth's crust and part of the mantle (comprising the lithosphere) are said to be composed of huge slabs of solid rock, called tectonic plates. The plates lie under land as well as oceans. These plates seem to float and move a little due to currents and changes in internal pressure. Sometimes the tectonic plates get stuck instead of sliding smoothly, and this puts a strain on the ground. 2. Electroscope : is an instrument which used to test and detects small electric charge. Gold Leaf Electroscope : It consists of two gold leaves hanging from a metal rod which carry a metal rod at the upper end. The metal rod passing into a glass jar through a tightly fitted rubber stopper. The glass jar rests on a wooden base. Tin foil is attached to the sides of bell jar. The gold leaf electro-scope is very sensitive as even minute quantity of charge on a body can be detected by using it. To detect whether a body is charged or not, touch the body to be tested to the metal disc of the gold leaf electroscope. If the leaves diverge, the body has no charge. The amount of divergence of the leaves is a measure of the amount of charge on the body. Electroscope is also used to test the nature of charge in a body. To test whether a body has positive or negative charge, it is necessary to charge the electro-scope either positively or negatively by conduction. 3. Earthquakes cause damage and destructions to human made structure like bridge, dams, town and cities and can cause a great loss of life. The severity of the damage depends on the magnitude of the earthquake, the distance from epicenter, and local geological features. It can also create landslides, floods, and tsunamis which may cause much damage in hilly and mountainous area. The strong vibrations of an earthquake can cause fire in houses factories and mines. Earthquake may result in diseases, lack of basic necessities and they can also destabilise the base of buildings which may lead to their collapse if an earthquake strikes again. 4. Clouds contain tiny crystals of ice and droplets of water which move against each other. Clouds get charged when water and ice particles move rapidly inside the clouds. This can cause huge amount of change to build up in clouds. Smaller water droplets in the clouds usually acquire a positive charge on them. The larger or heavier

droplets become negatively charged. The positively charged droplets being lighter, move to the upper region while those with the negative charged move to lower regions of the clouds due to the air currents. The negative particles at the bottom of clouds grow bigger and bigger and get attracted to the positive charges on the ground. When attraction between the opposite charges becomes strong, electricity flow from the clouds to ground. Though air is an insulator, it allows the passage of current through it, if the quantity of the charge is large. In such as situation, very high charges passes through the air in a very short time accompanied by heat and light. This phenomena is called electric discharge. This electric discharge is called lightning. During this process, a huge amount of energy is released in the form of light and sound. 5. People struck by lighting receive a severe electrical shock and may be burnt, but they carry no electrical charge and can be handled safely. Someone who appears to have been killed by lightning may be revived by prompt action. Lightning conductors are used to protect buildings and houses from lightning strikes. A lightning conductor is a pointed metal rod attached to the roof of a building. It connects to a huge piece of copper or aluminium wire, which is in turn connected to a conductive grid buried in the ground nearby. The purpose of lightning rods is to provide a low-resistance path to the ground that can be used to conduct the enormous electric currents produced when lightning occurs. The lightning-rod system is an excellent conductor and thus, allows the current to flow to the ground without causing any damage.

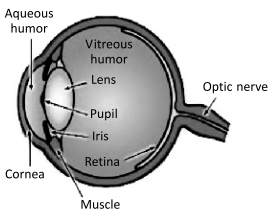
6. It consists of two gold leaves hanging from a metal rod which carry a metal rod at the upper end. The metal rod passing into a glass jar through a tightly fitted rubber stopper. The glass jar rests on a wooden base. Tin foil is attached to the sides of bell jar. The gold leaf electro-scope is very sensitive as even minute quantity of charge on a body can be detected by using it. To detect whether a body is charged or not, touch the body to be tested to the metal disc of the gold leaf electroscope. If the leaves diverge, the body has no charge. The amount of divergence of the leaves is a measure of the amount of charge on the body. Electroscope is also used to test the nature of charge in a body. To test whether a body has positive or negative charge, it is necessary to charge the electro-scope either positively or negatively by conduction. Let us charge it positively. Bring the body whose charge is to be determined near the metal disc of electroscope. If the divergence of leaves increases, the body is positively charged. But if the divergence of leaves decreases, the body is negatively charged. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.



Gold Leaf Electroscope

CH. 17 Light and Reflection (A) 1. a 2. c 3. c 4. b 5. a 6. b 7. a 8. c **(B)** 1. 90^0 2. diffused 3. forming multiple images 4. lens of 5. Astigmatism **(C)** 1. True 2. True 3. False 4. False 5. True **(D)** 1. e 2. a 3. d 4. c 5. b **(E)** 1. Concave mirror 2. Dispersion 3. Cornea 4. Cone shaped, road shaped 5. Braille 6. Night blindness **(F)** 1. A real image is formed when light rays originating from a point on one side of a lens (i.e. the object) are refracted by the lens so that they focus (come together) to a point on the other side of the lens at the image location. This happens when the object is father away from the (converging) lens than the focal length. A virtual image is formed when light rays originating from a point on one side of a lens (i.e. the object) are refracted by the lens so that they diverge (move apart from each other) on the other side of the lens. When these rays are traced back in a straight line (ignoring that they were actually bent by the lens) then appear to diverge from a point on the same side of the lens as the object (this is the location of the virtual image). This happens when the object is closer to the (converging) lens than the focal length. 2. Night blindness : This is a condition caused due

to the deficiency of Vitamin A in the diet. A person suffering from night blindness finds it difficult to see in dim light. A diet rich in vitamins A, C, and E helps in maintaining good eyesight and prevents/delays development of cataract. Therefore, plenty of carrots, papaya, oranges, sprouts, greens, and milk should be included in the diet. 3. Dispersion is the splitting up of white light (or a composite light) into its constituent colours. Dispersion occurs when light is passed through a prism. The dispersion is caused due to the difference in the angle of deviation for different colours. In the case of a glass slab, the opposite sides are parallel and therefore different colors emerge parallel to each other and are seen simultaneously. Therefore, dispersion doesn't occur in a glass slab. Regular reflection : 1) After reflection rays are parallel. 2) It obeys law of reflection 3) Surface used for reflection is smooth. Irregular Reflection 1) After the reflection rays are not parallel. 2) It does not obey law of reflection. 3) Surface used for reflection is rough. 5. The process by which white light breaks into its components is known as dispersion. Dispersion can be seen on transparent scales, CDs, water droplets, oil film, etc. In laboratory, prism is used to disperse light. A prism is a transparent medium bounded by 5 faces out of which 3 are rectangular faces and 2 are triangular faces.This phenomenon is due to the fact that light gets reflected from the upper and lower layers of the oil film and these rays add up to give beautiful patterns. **(G)** 1. The phenomenon of reflection follows certain principles which remain the same under all conditions. These are termed as the laws of reflection. First Law : The angle of incidence is equal to the angle of reflection. Where, Incident ray – Ray carrying light from the source to the object. Reflected ray – Ray carrying the reflected light from the object. Normal – Line perpendicular to the surface at the point of reflection. Angle of incidence = $\angle i$ = Angle between the incident ray and the normal. Angle of reflection = $\angle r$ = Angle between the reflected ray and the normal. Second Law : The incident ray, reflected ray, and the normal ray at the point of incidence lie in the same plane. 2. Images formed by a plane mirror have the following characteristics : 1. Virtual : The reflected rays from an object in front of a plane mirror never actually intersect at a point. So, the image formed in a plane mirror is a virtual image. Virtual images cannot be obtained on a screen. 2. Same size : The image formed in a plane mirror is of the same size as the object. 3. Erect : A plane mirror forms an erect (upright) image. 4. Laterally inverted : The image formed is laterally inverted, i.e., it is reversed from left to right. 3. When two mirrors are placed in front of each other at a slight angle, they form many images. This phenomenon is called multiple reflection. The number of images formed depends on the angle between the mirrors. 4. The human eye is a remarkable optical instrument designed by nature. The simplest "eyes", such as those of unicellular organism, do nothing but detect whether the surroundings are light or dark, which is sufficient for the entertainment of circadian rhythms. The eye ball is almost spherical in shape having diameter of 2.3 cms. The front transparent part of the eye is called cornea, which is bulged outward. Cornea serves as the window of the eye as light from objects to be seen enters the eye through cornea. Behind the cornea is a circular diaphragm called iris with a hole in its center. The hole is called pupil of the eye. The iris has muscles and coloured pigments. The colour of the eye depends on colour of these pigments. The main function of iris is to control and regulate the amount of light entering the eye by adjusting the size of the pupil. When the light in surrounding is bright, the pupil contracts so that less light enters the eye. When intensity of outside light is low, the pupil expands so that more light enters the eye. Behind the pupil is a double convex lens, called the eye lens. This lens is made up of fibrous, jelly like material and is held in position by the ciliary muscles. Human eye can be regarded as an optical instrument. 5. Plane mirrors have a number of uses in our daily life some of which are listed below : 1. As a looking glass.



Various Parts of Human Eye

2. In box-type solar cookers. 3. In kaleidoscopes. 4. In periscopes, generally used in submarines, battle tanks, and underground bunkers. 6. Hypermetropia and Myopia , both are refractive defects in vision and are nearly opposite in nature. Below are the differences between the two . Difference Between Myopia And Hypermetropia Myopia Myopia is also known as near-sightedness . Hypermetropia Hypermetropia is also known as far-sightedness. Myopia ? Hypermetropia ? Myopia In myopia , a person is not able to see distant objects clearly. Hypermetropia In hypermetropia , a person is not able to clearly see the nearby objects. Myopia In this defect , lens are not able to produce sharp image of the distant objects on the retina instead the image is formed in front of the retina . Hypermetropia In this defect , image is formed behind the retina. Myopia The reduction in the focal length of the eye lens may be a possible cause. Hypermetropia The increase in focal length of the eye lens may be a cause. Myopia Another cause can be the elongation of eye ball. Hypermetropia It may also be caused due to flattening of the eyeball . Myopia Myopia can be corrected by using concave lens of suitable focal length. Hypermetropia Hypermetropia may be corrected using convex lens of suitable focal length. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 18 The Universe (A) 1. c 2. c 3. b 4. a 5. d **(B)** 1. galaxy 2. star, satellite 3. meteors 4. Mercury, Venus 5. Venus **(C)** 1. True 2. False 3. True 4. False 5. False **(D)** 1. b 2. a 3. e 4. c 5. d **(E)** 1. Near Earth Object (NEO) 2. Light year 3. Pole star 4. Milky Way 5. Electromagnetic radiation **(F)** 1. The names of two constellations are Ursa Major and Ursa Minor. 2. The satellites are used for : Communications (TV signal transmission) : Since they are always available over a particular area. Monitoring weather : They continuously take and send pictures of weather conditions on the Earth. Satellites are also used for remote sensing, i.e., sensing or studying from a distance. This facilitates scientists to study areas far away from them. Satellites also help search for sites rich in petroleum or mineral deposits. 3. Rocky remains of planets which were split long time ago, sometimes fall on the Earth. As they enter the Earth's atmosphere, they experience a large amount of air resistance. This burns them and lights up the sky. These burning pieces are called meteors. Some large meteors that are able to reach the Earth's surface before vaporizing completely are known as meteorites. 4. Ursa Minor is also known as the Little Dipper or the Little Bear. It also consists of a group of seven stars. The arrangement of stars in Ursa Minor is similar to that in Ursa Major, the only difference being that the stars are closer and smaller. The stars are not as bright as the stars of Ursa Major. At the end of the handle of the little dipper is the pole star. This constellation is also sometimes called the pole star constellation. It seems fined in its position because it lies just about directly the 167 Earth's North Pole. **(G)** 1. Comets are composed mainly of frozen gases and dust particles and rocks and follow an elliptical orbits around the Sun. Their period of revolution around the Sun is very long. This is why they take a long time to return. Comets have a small solid part surrounded by a cloud of glowing gases. The surface of the comet begins to vaporise as it approaches the Sun, forming a bright sphere followed by a gas tail and a dust tail. The tails lengthen as the comet moves closer to the Sun and are always directed away from the Sun. 2. A man-made satellite that revolves around the Earth at regular time periods is called the artificial satellites. India has also developed and launched a number of artificial satellites. Some of these satellites are noted below. 1. Aryabhatta : India's first indigenously built satellite. 2. Bhaskara-I : First experimental remote sensing satellite built in India. 3. A large group of celestial bodies like stars, planets, comets, asteroids, etc. is collectively called a galaxy. The universe is made up of billions of galaxies, each having innumerable stars and celestial bodies. Galaxies are of various sizes and shapes. 4. The celestial bodies are separated from each other by very large distances. It becomes very difficult to represent these distances in the units of metre or kilometre. Such large distances are therefore

measured in the units of light years. '1 light year' is the distance covered by light in one year, **i.e.**, 1 light year = 9.5×10^{12} km. So, in terms of light years, the distance between the Sun and Earth is approximately 0.0000158 light years. A light-year is how astronomers measure distance in space. It's defined by how far a beam of light travels in one year – a distance of six trillion miles. Think of it as the bigger, badder cousin of the inch, the mile, the kilometer, and the furlong. If you like to keep up with what's going on in astronomy, it's worth spending a little bit of time understanding what the deal is with this funny unit of measurement. 5. The solar system consists of the Sun, the eight planets asteroids, and comets that revolve around it. The Sun is the nearest star to the Earth. It accounts for about 99% of all the mass in the solar system. The Sun exerts a large gravitational force which keeps the Sun the planets and other smaller bodies together as the Sun's family. The combined effect results in the revolution of the bodies around the Sun in elliptical parts called orbit. The Sun : The age of the Sun is estimated about five thousand millions years and it is assumed that the Sun will continue emitting energy for the next five millions years. The centre of the Sun is extremely hot. The surface temperature of the Sun is about 6000 ^{O}C and the temperature of its core is about 20×10^{6} ^{O}C. The Sun is the principal source of heat and light energy for the Earth and other planets of the solar system. The light of the Sun takes about 8 minutes and 29 seconds to reach the Earth. 6. A group of stars seem to form a figure resembling a known shape or pattern. Such a group of stars that forms a recognizable shape or pattern is called a constellation. Each group of stars resembles the shape of some animals or human being like bear, hunter etc. Orion or Hunter : It look like a hunter with shield and club upraised. It dominates the winter sky. It has around eight bright stars that are arranged in a pattern that resembles the body of the hunter. It is also called 'The Hunter'. The major stars of the Orion forms the body of a hunter. It is called vyadha in India astronomy. Cassiopeia : Cassiopeia is a constellation that can be seen far in the northern sky, opposite the Big Dipper. It is seen during winter. Its name in Indian astronomy is sarpustha. It is a group of five stars which are shaped like "W" or "M". **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

CH. 19 Pollution : Threat To Environment (A) 1. b 2. b 3. a 4. d **(B)** 1. greenhouse 2. air pollution 3. Pollution 4. potable 5. ozone **(C)** 1. False 2. False 3. False 4. True 5. True (D) 1. c 2. a 3. e 4. b 5. d (F) 1. Carbon monoxide, Sulphur dioxide 2. CO_2 3. Sulphuric acid, nitric acid 4. Cholera **(F)** 1. Greenhouse gas (abbrev. GHG) is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. (a) The primary greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. 2. The loss of dissolved oxygen from water in water bodies is called, eutrophication. The oxygen dissolved in lakes, rivers, and oceans is crucial for the organisms and creatures living in it. As the amount of dissolved oxygen drops below normal levels in water bodies, the water quality is harmed and creatures begin to die off. Indeed, a water body can "die", a process called eutrophication. 3. The water available in seas and oceans is salty. ?Ocean wate contains about 35,000parts per million of salt. Seawater contains a lot of salt. When salt enters your body it will absorb a lot of water through a process called osmosis. This will cause the water content of your body to fall, which causes serious dehydration.?That is the main reason why we cannot drink pure seawater and why salt is removed from seawater during drinking water preparation processes. 4. Rainwater harvesting involves collecting and using the rainwater run-off from your household roof. Typically this water would be collected in the roof gutter and run into the storm water system via a down spout. **(G)** 1. The water being supplied to your house needs to be purified before drinking. This is because of widespread pollution of water. When water contains substances which are harmful to humans, plants, and animals, then it is said to be polluted. The importance of water in our lives cannot be under estimated, and when this essential resource gets

contaminated, it has a huge impact on our lives. 2. A greenhouse is an enclosure of glass in which plants are kept to protect them from the cold air outside. It traps the heat from the Sun, making the air warmer inside. In the same way, the carbon dioxide (CO_2) in the air traps the heat of the Sun radiated back by the Earth. This makes the air warm and makes it possible for life to exist on Earth. However since so much fuel is burnt today that CO_2 content in the air is increasing. Also deforestation has reducing the number of trees, which utilize CO_2 from atmosphere during photosynthesis. It has meant that the atmosphere has become warmer as more heat is trapped. This is known as the Greenhouse effect and the increase in the temperature world wide is called Global Warming. 3. The following methods can be used for reducing air pollution. Planting of trees or afforestation is an important step in reducing air pollution because plants purify the air. They absorb carbon dioxide and give out oxygen. You must have seen waste gases coming out of the chimneys of factories. Before being discharged, the gases must be free from fro pollutants. Unleaded petrol should be used because it causes less air pollution and does not release toxic lead on burning. Use of smokeless fuels like LPG (liquefied Natural Gas) reduces the emission of poisonous gases like carbon monoxide. 4. At home water can be made potable by killing the germs in the following ways. 1. Ultraviolet Rays : Ultraviolet rays lamps radiate high energy rays which kill germs. Now a days they are used in several purifiers to make water potable for drinking. 2. Boiling : Boiling of water for 15-20 minutes kills the germs present in water. This makes water safe for drinking. 3. Using Bleaching Powder : In rural and backward areas water is lifted in buckets from wells. Well water gets contaminated and is generally disinfected by mixing some bleaching powder. The bleaching powder slowly reacts with water to give chlorine, which kills the germs. 4. Reverse Osmosis (RO) : Water is passed through a special membrane called semipermeable membrane. It has very fine pores through which water can pass through but not the impurities. These filters not only remove impurities but also germs. 5. Places like chemical factories and industries emit harmful gases, dust, smoke, and fumes. The presence of these substances in the air makes it unclean and unfit for breathing. When the air gets contaminated by the pres-ence of undesirable substances released into it due to natural or man-made causes, it is called air pollution. The unwanted substances which cause air pollution are called pollutants. Effect of Air Pollution : 1. Acid Rain : Presence of acids like sul-phuric acid and nitric acid in the atmosphere makes rain water acidic. This rain water falls on Earth as acid rain. 2. Depletion of ozone layer : The ozone layer of the atmosphere protects the Earth's environment from the harmful ultra-violet radiations of the Sun. Extensive use of CFCs has led to the formation of holes in the ozone layer. These holes do not absorb harmful ultraviolet rays of the Sun. Exposure to ultra-violet rays of the Sun can cause skin and eye damage, including cancer. 3. Carbon monoxide poisoning (CO) : Carbon monoxide is the main air pollutant. It is a poisonous odourless gas produced by faulty vents and chimneys or burning of charcoal indoors. It is produced during incomplete combustion of fuels. Inhalation of this gas can lead to death as the gas cuts off supply of oxygen to the blood. **Let's Evaluate –** Do your self. **Activity –** Do your self. **Project Work –** Do your self. **Group Discussion –** Do your self.

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