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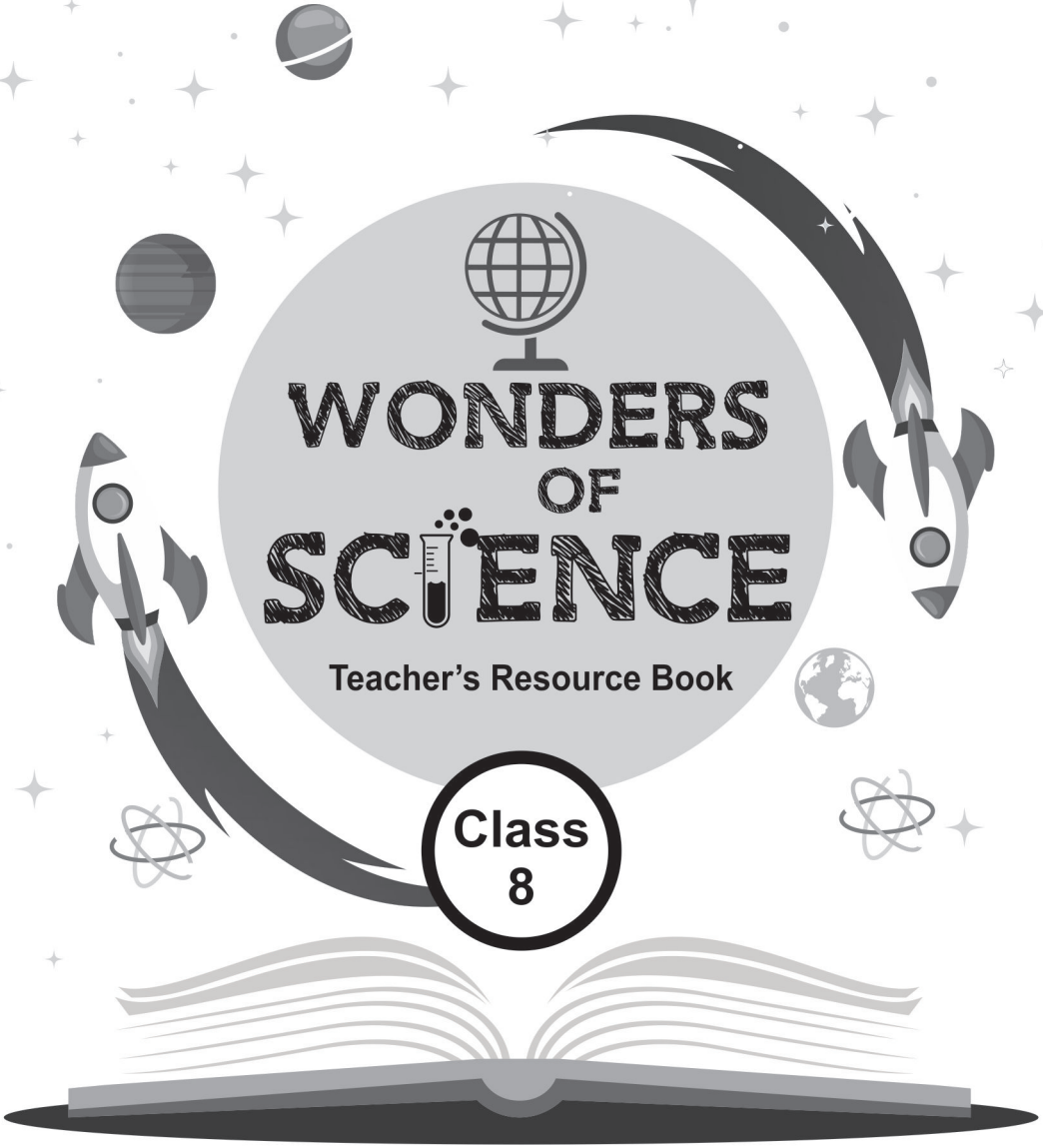


WONDERS OF SCIENCE

Teacher's Resource Book

Class 8

Wonders of Science-8

Unit-1 : Food

1. Food Production and Management

Assess Yourself

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

1. (c) Groundnut, **2.** (b) Cotton, **3.** (c) October, **4.** (d) hybridization, **5.** (b) winnowing.

B. Fill in the blanks :

1. ploughing, **2.** agriculture, **3.** humus, **4.** bacteria and viruses **5.** 78%.

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

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

D. Match the columns :

Column A	Column B
1. Plank	(i) Irrigation
2. Drill	(ii) Levelling
3. Harrow	(iii) Harvesting
4. Water-wheel	(iv) Sowing
5. Sickle	(v) Weeding

E. Answer the following questions briefly :

1. Agricultural practices comprises of various activities such as production of plants, livestock, fiber, fuel etc. by utilizing natural resources such as water and land.

2. Two kharif crops are bajra and jowar.

3. The effects of continued waterlogging is that the plant's growth and development is stalled and if the condition continues, the plant dies.

4. Chemicals used to kill pests are called pesticides while weedicides are sprayed over fields to get rid of weeds.

5. Rearing and breeding of fish on a commercial scale is called fishery or pisciculture.

F. Answer the following questions :

1. The unwanted or wild plants which grow alongwith a cultivated crop are called weeds.

Weeds prevent sunlight and space required for the growth of crops. They absorb the nutrients from the soil and reduce the quality of agricultural product. Therefore, for the growth of crop, it is necessary to remove the weeds.

2. (a) The process of loosening and turning the soil is called tilling or ploughing.

(b) The practice of keeping and breeding chicken and other domesticated fowls is known as poultry.

(c) Rearing and breeding of fish on a commercial scale is called pisciculture.

(d) Nitrogen that is freely available in the air is called free nitrogen.

3. Hybridization is the process of an animal or plant breeding with an individual of another species or variety. The new variety so produced is called hybrid.

Examples : Wheat : Sonalika, Kalyan sona

Rice **:** Jaya, Padma

Brinjal **:** Pusa Kranti and Pusa Purple

4. The diseases of milch animals in India can be broadly classified into two main categories : parasitic diseases and infectious diseases.

Parasitic diseases : These diseases are caused by external parasites, such as fleas, lice, ticks and mites which live on the skin of cows and buffaloes.

Infectious diseases : These diseases are mainly caused by microorganisms, such as bacteria and viruses. These are communicable diseases and spread by contact from animal to animal. **For example :** anthrax, mastitis, etc.

5. In the life-cycle of honeybee, the transformation of an egg into an adult honeybee is called metamorphosis. The complete metamorphosis is made up of four stages *i.e.,* egg, larva, pupa and adult. The queen bee lays eggs in each cell of the comb. Egg hatches into larva after three days. The larval stage lasts for six days. Then the larva changes into a pupa. The pupa takes seven days to become an adult (embryo).

G. Answer the following questions in detail :

The differences between menure and fertilizer are as follows :

1.

Manure	Fertilizers
Manure is an organic substance obtained from the decomposition of animal wastes like dung, urine and plant wastes by the action of microbes.	Fertilizers are mixtures of chemical compounds which are rich in nitrogen, phosphorous and potassium, etc.

2. Proper spacing between two seeds should be done to avoid overcrowding, because it is harmful for the growing seedlings as growing plants may compete for proper sunlight, water and nutrients.

3. Two advantages of manure over fertilizers are as follows :

(i) It enhances the water holding capacity of the soil.

(ii) It makes the soil porous due to which exchange of gases becomes easy.

4. Safeguards to be taken to prevent diseases in animals are as follows :

(i) The animals should be kept in good and clean shelters.

(ii) They should be provided nutritive food and clean drinking water.

(iii) Vaccines should be given to animals regularly to immunise them against certain diseases.

(iv) Sick animals should be isolated from other animals.

(v) Rats should be kept away from animal shelters.

5. Nitrogen is an essential constituent in all living oragnisms. The atmospheric nitrogen cannot be used directly by plants and animals as it needs to be converted into forms that can be used by living organisms. Some such conversion happens when lightning strikes, but most of it is done by free-living and symbiotic bacteria *Rhizobium* living in the root nodules of leguminous plants, such as beans and peas. It converts atmospheric nitrogen into nitrogenous compounds. This conversion process is known as *nitrogen fixation*. The nitrogenous compounds are taken in by plants through their roots and utilized in synthesising plant proteins and other compounds. When plants die, the nitrogenous compounds present in their bodies are converted back to nitrogen and released into the atmosphere by certain denitrifying bacteria. This cycles continues and is known as the **nitrogen cycle**.

2. Microorganisms

Assess Yourself

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

1. (b) alcohol, **2.** (b) *Paramecium*, **3.** (c) Streptomycin, **4.** (c) pathogentic microbes, **5.** (a) an algae.

B. Fill in the blanks :

1. chlorophyll, **2.** protozoa, **3.** *Kelp* **4.** aerobic, anaerobic.

C. Name three :

1. bacteria : *Clostridium*, *E.coli*, *Lactobacillus*

2. fungi : Mushrooms, *Penicillin*, Yeast

3. algae : *Spirogyra*, *Kelp*, *Rhodophyta*

4. protozoa : *Paramecium*, *Amoeba*, *Hydra*

5. viruses : Tobacco Mosaic virus, Flu virus, Measle virus

D. Match the columns :

Column A	Column B
1. Measles	(iv) Protozoa
2. Malaria	(iii) Virus
3. Cholera	(ii) Bacteria
4. Skin infection	(i) Fungi

E. Answer the following questions briefly :

1. Algae resemble plants as both contain chlorophyll and produce their own food.

2. The metabolic products of one microbe which kill or stop the growth of some other microbes are called antibiotics.
   Three examples of antibiotics are penicillin, streptomycin, tetracycline.
3. Genetic engineering is the process used by scientists to modify the characteristics of an individual organism. **Example :** New bacteria.
4. Viruses are considered both living and non-living because they contain both characteristics, *e.g.*, like living organisms, they have genetic material, and like non-living organisms, they can be crystallised.
5. On the basis of shape, four types of bacteria are as follows :
   (i) Coccus or Spherical-shaped (ii) Bacillus or Rod-like shape
   (iii) Spirillum or Spiral-shaped (iv) Vibrio or Comma-shaped

F. Answer the following questions :

1. An organism which is too small to be seen by a naked eye and can only be seen by a microscope is called a microorganism.
   On the basis of habitat, microorganisms (microbes) are of three types :
   (i) Free living microbes : Microbes living in air, water or soil.
   (ii) Parasitic microbes : Microbes living inside plant or animal bodies.
   (iii) Symbiotic microbes : Microbes which live in a mutually beneficial relationship.
2. Yeast, are usually unicellular organisms which can survive in both aerobic and anaerobic conditions while moulds are multicellular organisms which a filament-like appearance. They are aerobic.
3. The method of preserving food is called pasteurisation. In this process, milk is first heated to 70°C and this temperature is maintained for a short time (15 sec.) and then suddenly chilled. This way, most of the active microbes are killed and souring of milk is prevented.
4. Naphthalene balls are kept between woollen clothes because their peculiar smell keeps moths and insects away and protects them.

G. Answer the following questions in detail :

1. Do it yourself.
2. **Nutrition :** Most bacteria lack chlorophyll and so, are unable to synthesize organic compounds which they need as food from simple inoragnic substance. They depend on external sources. Hence, most bacteria are heterotrophic. They live in places where organic food is readily available either from living-organism or their dead remains and waste products. The former are called parasites while the latter are called saprophytes.
   Reproduction : Bacteria normally reproduce (multiply) by binary fission under favourable conditions. During binary fission, the body of a fully grown bacteria cell elongates and a cross (transverse) wall is

developed dividing it into two. The two daughter cells separate and redivide after maturity. They generally reproduce very fast.

3. Viruses display the characteristics of both living and non-living beings. Like living beings, they have genetic material. They grow and multiply but only inside another living cell. On the other hand, like non-living organisms, they do not have a cytoplasm, nucleus or cell membrane. They do not respire or reproduce outside a living system and can be crystallised.
4. Some precautions to prevent microbial diseases are as follows :
   (i) We should keep our surroundings clean so as to control the breeding and growth of insects.
   (ii) We should stay away from an infected person (suffering from a communicable disease).
   (iii) Water and milk should be boiled before use.
   (iv) We should not consume uncovered food which may be contaminated by dust, flies, cockroaches, etc.
   (v) Food should be properly cooked and consumed when fresh.

Activity Time

J. Complete the Table :

S. No.	Diseases	Microorganism	Mode of Transmission
1.	Tuberculosis	Bacteria	Air
2.	Polio	Virus	Air/Water
3.	Small pox	Virus	Air/Contact
4.	Common cold	Virus	Air
5.	Measles	Virus *(Myovirus)*	Air
6.	Mumps	Virus	Saliva
7.	Rubella	Virus	Air
8.	Hepatitis	Virus	Water/Food
9.	Rabies	Virus	Saliva
10.	Chicken pox	Virus	Air/Contact

K. Science Puzzle :

1. F U N G I
2. P R O T O Z O A
3. M I C R O B E S

4. | L | O | C | O | M | O | T | I | O | N |

5. | T | R | E | A | T | M | E | N | T |

Unit-2 : Materials

3. Materials : Plastics and Synthetic Fibres

Assess Yourself

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

1. (b) Polyvinyl chloride, **2.** (b) Bakelite, **3.** (c) PVC **4.** (b) KNO_3, **5.** (a) thermosetting plastic.

B. Fill in the blanks :

1. flexible, **2.** bad, **3.** Nylon, **4.** Teflon.

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

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

D. Match the columns :

Column A	Column B
1. Cellulose	(i) Primary nutrient
2. Nylon	(ii) Natural polymer
3. Nitrogen	(iii) Man-made polymer
4. Gypsum	(iv) Nitrogen fertilizer
5. Urea	(v) Indirect fertilizer

E. Answer the following questions briefly :

1. Nylon, polythene, rayon and telfon.

2. Terylene, terene and dacron.

3. Acrylic is used to make shawls, sweaters and blankets.

4. The full form of PVC is Polyvinyl Chloride.

5. Bakelite is a thermosetting plastic.

F. Answer the following questions in detail :

1. Plastics are man-made compounds which, on heating, can be moulded into desired shapes or drawn into fibres.

Chemicals to make plastics are derived from coal tar and crude oil. These combine to form synthetic resin and form plastic.

Some common plastics are polythene, polyvinyl chloride, polystrene, etc.

2. Synthetic fibre, just like natural fibre, is made from units or monomers, joined together. A synthetic fibre is also strong and sturdy.

3. Reaction of an alkali with an oil or fat is called saponification. Ordinary soap is made by heating oil or fat with concentrated water solution of sodium hydroxide.

Fat + Sodium hydroxide $\rightarrow$ Soap + Glycerol (Glycerine)

4. Differences between soaps and detergents are as follows :

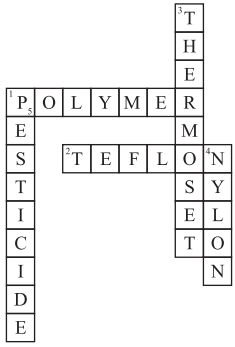
	Soaps	Detergents
1.	Soaps are sodium salts of fatty acid.	Detergents are sodium salts of sulphuric acids.
2.	They are less soluble in water than detergents.	They are more soluble in water than soaps.
3.	They cannot be used for washing with hard water.	They can be used for washing with hard water.
4.	They can be decomposed by microorganisms and hence do not pollute.	They are not decomposed by microorganisms and hence cause pollution.

5. Properties :

(a)	Nylon	(i)	It is made of polyamide polymer.
		(ii)	Its fibres are strong, hard and water-resistant.
(b)	Polyester	(i)	Polyester fibres are made of polyster polymer.
		(ii)	It is blended with cotton fibres (terycot) and wool (terywool).
(c)	Acrylic	(i)	These have the same feel as wool.
		(ii)	They are resistant to moth, washable and shrinkproof.
(d)	Rayon	(i)	Rayon is made from cellulose.
		(ii)	It is used for making tyre cords.
(e)	Plastic	(i)	Malleable
		(ii)	Plastic is strong and durable.

Activity Time

I. Science Puzzle :



Assess Yourself

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

1. (c) Copper, **2.** (d) Sodium, **3.** (a) Gold, **4.** (c) aluminium, **5.** (c) Galvanising, **6.** (a) Mercury, **7.** (d) they are ductile, **8.** (a) acidic, **9.** (a) Au and Ag, **10.** (a) copper.

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

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

C. Match the columns :

Column A	Column B
1. Lead	(ii) Galena
2. Iron	(i) Haematite
3. Gold	(v) Noble metal
4. Mercury	(iii) Liquid metal
5. Oxygen	(iv) Non-metal

D. Complete the following chemical equations :

1. $4Na + O_2 \rightarrow 2Na_2O$

2. $2Zn + O_2 \rightarrow 2ZnO$

3. $Fe + CuSO_4 \rightarrow Cu + FeSO_4$

4. $Ca + H_2 \rightarrow CaH_2$

5. $2Al + 6HCl\,(dil) \rightarrow 2AlCl_3 + 3H_2(\uparrow)$

6. $4Fe + 3O_2 + 3H_2O \rightarrow 2Fe_2O_3 \,.\, H_2O + 2H_2O$

7. $4Al + 3O_2 \rightarrow 2Al_2O_3$

E. Explain with equation what happens when :

1. As hydrochloric acid is poured on an aluminium foil, aluminium reacts mildly with dilute hydrochloric acid due to the outer layer of aluminium oxide. As the oxide layer slowly dissolves in acid, fresh aluminium is exposed and the reaction proceeds vigorously.

$$\underset{\text{Aluminium}}{2Al} + \underset{\text{Hydrochloric acid}}{6HCl} \longrightarrow \underset{\text{Aluminium chloride}}{2AlCl_3} + \underset{\text{Hydrogen}}{3H_2(\uparrow)}$$

2. When sodium is placed in water, it reacts violently to form sodium hydroxide and hydrogen.

$$\underset{\text{Sodium}}{2Na} + \underset{\text{Water}}{2H_2O} \longrightarrow \underset{\text{Sodium hydroxide}}{2NaOH} + H_2(\uparrow)$$

3. When zinc granules are kept in copper sulphate solution, the blue colour of copper sulphate disappears and the solution becomes colourless.

$$\underset{\text{Copper sulphate}}{CuSO_4\,(aq)} + \underset{\text{Zinc}}{Zn\,(s)} \longrightarrow \underset{\text{Zinc sulphate}}{ZnSO_4\,(aq)} + \underset{\text{Copper}}{Cu\,(s)}$$

F. Give reasons for the following :

1. Silver is used to make good quality mirrors because it has a great ability to reflect light.
2. Aluminium is used to make electrical wires because it provides a better conductivity to weigh ratio than copper.
3. Iron is used to construct bridges and buildings because it is extremely strong and cheap.
4. Copper loses its shine when exposed to moist air because it combines with carbon dioxide and water to form a green coating of copper carbonate ($CuCO_3$). Copperware loose their shine and acquire a green coating as they grow older.

G. Answer the following questions briefly :

1. Iron is obtained from two ores namely, haematite and magnetite.
2. Two common alloys are brass and bronze.
3. Brass is made from copper and zinc while bronze is made from copper and tin.
4. Metals which are non-reactive and do not develop rust are called noble metals.
5. In medical field, oxygen is used in intensive case treatment, inhalation therapy, etc.

H. Answer the following questions :

1. **Uses of lead :** (i) Lead is widely used as a shield in laboratories to handle radioactive material because it absorbs radiation without becoming radioactive itself.
   (ii) One of the greatest use of lead is in alloys.
   (iii) Due to its high density weight to volume ratio and resistance against corrosion, lead is used in scuba diving weight belts.

   Uses of Magnesium : (i) It is normally used to make alloys with metals, such as aluminium, zinc which make it harder and stronger.
   (ii) In powder form, it is used in flares and fireworks.
2. Mecury is used in thermometers, blood pressure devices and thermostats due to its ability to expand and contract uniformly which makes it useful for measuring changes in temperature and pressure.
3. Hydrogen gas is valuable for chemical industry because it combines directly with nitrogen to form ammonia, which is made into fertilizers and nitric acid.
4. Sulphur is usually found near volcanoes, which gives off sulphurous gases. It is used for hardening or vulcanising rubber for tyres, in making gunpowder, matches, paper and insecticide sprays.
5. Due to its ductility and electrical and thermal conductivity, copper is often used in the manufacturing of electrical conductors, switches, transformers and in telecommunication.

I. Answer the following questions in detail :

1. Differences between metals and non-metals :

S. No.	Characteristics	Metals	Non-metals
1.	Malleability	They are malleable and brittle except sodium and potassium.	They are non-malleable and very brittle.
2.	Ductility	They are ductile *i.e.*, they can be pulled into wires.	They are non-ductile *i.e.,* they break easily on stretching
3.	Conductivity	They are good conductors of heat and electricity.	They are bad or poor conductors of heat and electricity except graphite.

2. Corrosion is a deterioration and loss of material due to its reaction with moisture and oxygen. Some ways to prevent corrosion or rusting are as follows :

(i) Coating with grease or oil. (ii) Coating with paint.

(iii) Coating with other metals. This processis named differently as follows :

(a) Galvanizing (b) Tinning

(c) Electroplating

(iv) Anodising

(v) Alloying

3. Action of water on Na

$$\underset{\text{Sodium}}{2Na} + \underset{\text{Water}}{2H_2O} \longrightarrow \underset{\text{Sodium hydroxide}}{2NaOH} + \underset{\text{Hydrogen}}{H_2(\uparrow)}$$

Action of water on Mg

$$\underset{\text{Magnesium}}{Mg} + \underset{\text{Water}}{2H_2O} \longrightarrow \underset{\text{Magnesium hydroxide}}{Mg(OH)_2} + \underset{\text{Hydrogen}}{H_2(\uparrow)}$$

Action of water on Fe

$$\underset{\text{Iron}}{4Fe} + \underset{\text{Water}}{6H_2O} \longrightarrow \underset{\text{Iron oxide}}{2Fe_2O_3} + \underset{\text{Hydrogen}}{6H_2(\uparrow)}$$

4. (a) Prevention of corrosion : To prevent corrosion, contact between the metal surface and air should be prevented. To prevent corrosion, one of the method is as follows :

Anodising : Anodising is an electrolytic process by which a metal, like aluminium is coated with a thin uniform layer of its oxide. Aluminium objects, such as cookers, other cooking

utensils and window frames are anodised to protect them from corrosion.

(b) Platinum : As a precious metal, platinum is more valuable than gold. Like gold, it does not lose its silvery white shine and can be easily shaped. It is heavier and harder than gold. It is expensive to extract.

(c) Noble metals : Noble metals are non-reactive and so, do not develop rust. The known noble metals are gold and silver. Gold is a precious metal that never dulls nor corrodes and is easily shaped. Just like gold, silver can be shaped easily and has good resistance to corrosion.

Activity Time

L. Given below is a list of few materials. Write their symbols and tick (✓) against most reactive metal and cross out (✗) against least reactive metal :

S. No.	Metal Name	Symbol	Most reactive (✓) or Least reactive (✗)
1.	Iron	Fe	✗
2.	Sodium	Na	✓
3.	Mercury	Hg	✗
4.	Lead	Pb	✓

5. Carbon Compounds : Fuels

Assess Yourself

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

1. (b) CH_4, **2.** (c) coal, **3.** (a) petroleum, **4.** (c) CNG, **5.** (d) electric generators.

B. Fill in the blanks :

1. methane, **2.** Charcoal, **3.** sedimentary, **4.** pop, **5.** sulphur, potassium nitrate.

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

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

D. Match the Columns :

Column A	Column B
1. Solid fuel	(i) Hydrocarbons
2. Liquid fuel	(ii) Fossil fuel
3. Gaseous fuel	(iii) Kerosene
4. Petroleum	(iv) Biogas

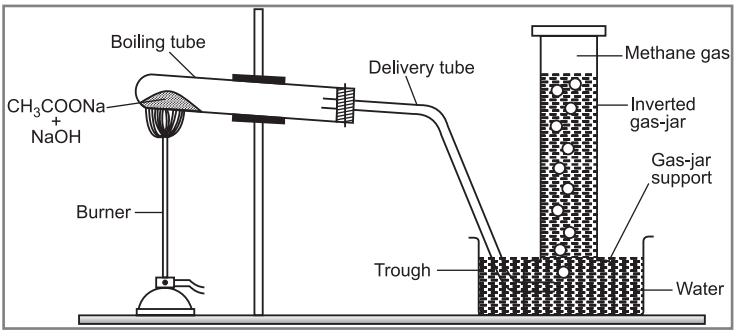
E. Answer the following questions briefly :

1. The full form of LPG is Liquefied Petroleum Gas.
   The full form of CNG is Compressed Natural Gas.
2. The main constituents of natural gas are hydrocarbons such as methane, ethane, propane and butane. Natural gas contains about 90% methane.
3. Ethyl mercaptan is mixed with butane to detect its leakage.
4. When a substance combines with oxygen, it burns with evolution of heat and light. This is called combustion.
5. The three main fossil fuels are coal, petroleum and natural gas.

F. Answer the following questions in detail :

1. **Laboratory Preparation of Methane :** Methane gas is prepared in the laboratory by heating a mixture of sodium acetate and soda lime. Soda lime is a mixture of soda (sodium hydroxide or NaOH) and lime (Calcium oxide or $CaCO_3$)

$$\underset{\text{Sodium acetate}}{CH_3COONa} + \underset{\text{Sodium hydroxide}}{NaOH} \xrightarrow{\text{heating}} \underset{\text{Sodium carbonate}}{Na_2CO_3} + \underset{\text{Methane}}{CH_4}$$



Laboratory preparation of methane

The mixture is first heated gently and then strongly to release methane gas. The gas, being insoluble in water, is collected in a boiling tube by the downward displacement of water.

2. Coal is a complex mixture of carbon and its compound with hydrogen and oxygen. Coal is an important solid fuel used at homes, industries and power stations. The higher the carbon content of coal, the higher is its calorific value.

   It is of four types : peat, lignite, bituminous and anthracite.

   Peat : It is the first stage in the formation of coal. It is soft and easily compressed.

   Lignite : It is also low in carbon content (60-70%) and hence produces low energy. It is generally used at power plants to produce electricity.

Bituminous : It is the most commonly used coal, also called domestic coal. It is formed in greater depths. Its carbon content is 70-85%. It is also an important fuel for steel and iron industries.

Anthracite : It is the best quality coal, formed at greater depth. It is hard, black and lustrous coal. The carbon content in it is the highest of all the varieties of coal (85-95%).

3. Natural gas is a mixture of gases which is often found with crude oil. It is formed due to the slow decomposition of fossils. It is an important fuel. It is made up of hydrocarbons which have a very high calorific value.

LPG (Liquefied Petroleum Gas) : Butane is a gas which is obtained from petroleum and natural gas. It can be easily liquefied under pressure. Liquefied butane filled in cylinders is sold for domestic use called LPG. As it has no odour, it is mixed with ethyl mercaptan (C_2H_5SH) to detect its leakage.

$$2C_4H_{10} + 13O_2 \longrightarrow 8CO_2 + 10H_2O + \text{energy}$$

4. Combustion is a process of oxidation (combining with oxygen) accompanied by evolution of heat and light.

Combustion is mainly of four types :

(i) Explosion : In the process of combustion, the oxidation of carbon and sulphur takes place at a high speed because potassium nitrate provides oxygen for combustion. The evolution of large amount of gases speedily creates high pressure which results in bursting of thick paper or mud pot containing the explosive. Such a speedy process of combustion is called explosion.

(ii) Spontaneous combustion : It occurs because the ignition temperature of the substance is lower than the room temperature. This type of combustion does not evolve any external heat at room temperature is called spontaneous combustion.

(iii) Rapid or Fast combustion : The process of combustion in which fuel burns rapidly is called rapid combustion.

(iv) Slow combustion : Some substances such as wood, coal and candle have moderate ignition temperature, so they burn slowly. Such a combustion is called slow combustion.

5. Fire breaks out in homes and factories due to negligence or faulty equipments. As combustion requires fuel, oxygen (air) and heat, removal of any of these three is necessary to control a fire. As it is not possible to remove all the combustible material, we have to fight fire mainly on following two principles :

(i) Cutting off the air supply : Burning solid fuel can be isolated from air by covering it with sand, solid or blanket to put off fire. CO_2 and foam are very effective in cutting off the supply of air to burning liquid fuels.

(ii) Cooling the material below its ignition temperature : Water cools the fuel below its ignition temperature and prevents fire from spreading.

Activity Time

I. Science Puzzle :

Guess, what is written on this board by writing the correct letters in the boxes given for each number. Find the suitable letters by writing answer to the clues :

[1] C	[2] A	R	B	[3] O	N	[4] C	O	M	P	O	U	[5] N	D

(i)

[1] C	A	R	B	O	N

(ii)

M	E	T	H	[2] A	N	E

(iii)

P	E	T	R	[3] O	L	E	U	M

(iv)

A	N	T	H	R	A	[4] C	I	T	E

(v)

[5] N	A	T	U	R	A	L	G	A	S

Unit-3 : The World of the Living

6. Conservation of Plants and Wildlife

Assess Yourself

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

1. (a) maintenance of ecosystem, **2.** (a) Gir forest, **3.** (b) afforestation, **4.** (a) Sunderbans, **5.** (c) Milk.

B. Fill in the blanks :

1. IWC, **2.** Biodiversity, **3.** fencing, **4.** rare, **5.** 1972.

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

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

D. Answer the following questions briefly :

1. Conservation may be defined as the management and sustainable use of natural environment and natural resources.

2. An important goal of conservation is to help protect those species of plants and animals that face the danger of extinction.

3. Forestry is the practice of caring for forests to maintain the quality and number of trees.

4. Botanical gardens are protective areas reserved exclusively for preserving the flora and fauna, landscape, the entire ecosystem and monuments. This way they help in conservation.

5. Four national parks in India are as follows :

(i) Satpura National Park

(ii) Ranthambore National Park

(iii) Corbett National Park

(iv) Gir National Park

E. Answer the following questions in detail :

1. We need to conserve wildlife as it is an important constituent of various food chains and food webs.

Two reasons for wildlife conservation are as follows :

(i) Uncontrolled hunting and poaching threatens many animal species.

(ii) Growing human population needs large land parcels for which forests are cut down, which ultimately harm the animals.

2. Various methods of conserving plants are as follows :

(i) Forestry : Forestry is the practice of caring for forests in the following ways :

(a) Foresters plant and care for young trees and select trees for felling.

(b) They keep a watch on the forest and its users, and help to fight any fires that may break out.

(c) They fence the forests to prevent animals.

(ii) Wise deforestation : Deforestation is essential to meet human needs but the following precautions should be taken while felling trees :

(a) Only a small proportion of the total number of trees should be cut down at a time.

(b) Trees may be felled here and there throughout the forest, in which case the trees are left to replace themselves naturally by scattering seeds.

(c) Alternatively, the foresters may clear a patch at a time. When it is cleared, it should be replaced with small trees which have been growing for two or three years in a nursery.

(iii) Afforestation : We should plant seedlings in areas where forests formerly grew to afforest these areas.

(iv) Prevention of overgrazing : It should be controlled by suitably fencing the plants and by other methods.

3. Threats to wildlife are as follows :

(i) **Destruction of plants** has a direct impact on wildlife or animals when tropical forests are cleared.

(ii) **Thoughtless killing by people :** Like plants, wild animals too have been destroyed as people hunt and kill them thoughtlessly.

(iii) Uncontrolled hunting.

(iv) Growing human population.

4. Breeding endangered animals under controlled condition to protect their babies is called captive breeding. Captive breeding has been highly successful and has saved many endangered species from extinction.

7. The Cell

Assess Yourself

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

1. (a) Protoplasm, **2.** (b) Mitochondria, **3.** (b) Phloem, **4.** (d) store food.

B. Fill in the blanks :

1. Robert Hooke, **2.** protoplasm, **3.** homeostasis, **4.** Lysosomes, **5.** Vacuoles.

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

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

D. Match the columns :

Column A	Column B
1. Nucleus	(i) Suicide bags
2. Lysosomes	(ii) Ribosomes
3. Protein-maker	(iii) Vacuoles
4. Powerhouse of the cell	(iv) Control Room
5. Storage tanks	(v) Mitochondria

E. Answer the following questions briefly :

1. The first structure of protoplasm is a thin, flexible envelope, called the cell membrane.

2. Nucleus is the control centre of the cell.

3. Ribosomes are the protein making sites of the cell.

4. DNA or deoxyribonucleic acid is a long molecule that contains a body's unique genetic code. It is one of the building blocks of the body.

5. Lysosome is the structure which plays a role in the digestive activities of the cell.

F. Answer the following questions in detail :

1. Differences between a Plant Cell and an Animal Cell

S. No.	Basis	Plant cell	Animal cell
1.	Cell wall	Most plant cells have a cell wall made up of a substance called cellulose.	Animal cells do not have a cell wall and do not contain cellulose.

2.	Chloroplasts	Most plant cells have special structures called chloroplasts which contain chlorophyll.	Animal cells do not have chloroplasts.
3.	Centrioles	Centrioles are absent in plant cells. Only some lower plants (algae and fungi) have centrioles.	Centrioles exists in animal cells.
4.	Vacuole	Plant cells have one large vacuole.	Animal cells usually have a few small vacuoles.
5.	Lysosomes	Lysosomes are not often observed in plant cells.	Lysosomes are common in animal cells.

2. Five functions of a cell and the structure involved in each function are as follows :

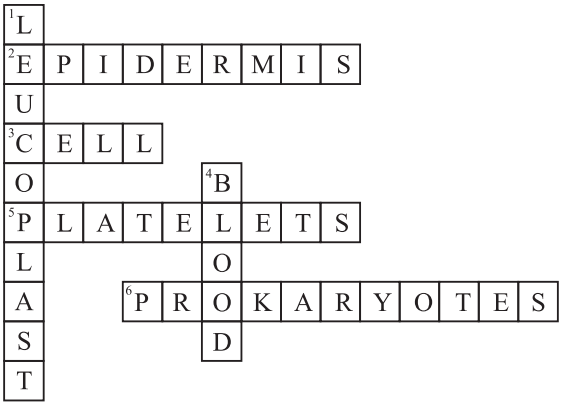
	Cell parts	**Functions**
(i)	Cell wall	Structure in plants made of cellulose *i.e.,* outside of the cell membrane.
(ii)	Mitochondria	Energy production
(iii)	Golgi apparatus	Protein modification and export
(iv)	Vacuoles	Act like storage tanks
(v)	Lysosomes	Plays a vital role in digestive activities of the cell
(vi)	Cytoplasm	It is a living material and all the functions which a cell performs are generally carried out in the cytoplasm.

3. Plastids are doubled membrane 'sac like' organelles which are involved either in the manufacture or storage of food.
Various types of plastids in plant cells are chloroplasts, chromoplasts and leucoplasts.

4. Do it yourself.

Activity Time

J. Science Puzzle :



8. Reproduction and Development

Assess Yourself

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

1. (b) sperm, **2.** (a) ovum, **3.** (d) Eight weeks, **4.** (a) XX, **5.** (b) fallopian tube.

B. Fill in the blanks :

1. testes, **2.** fallopian, **3.** foetus, **4.** puberty, **5.** monotremes.

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

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

D. Match the columns :

Column A	Column B
1. Testes	(i) Eggs
2. Ovaries	(ii) Sperms
3. Egg-laying	(iii) Reptiles
4. Fertilization	(iv) Zygote

E. Answer the following questions briefly :

1. The testes produces sperms.

2. During menstruation, an egg develops in the ovary. The mature egg is released into a fallopian tube. This process is called ovulation.

3. The time between fertilization and birth is called pregnancy.

4. The cry of a baby at birth is a strong respiratory effort, thereby helping it to take its first breath.

5. Advance aging can cause changes in the heart and blood vessels.

F. Answer the following questions :

1. The monthly cycle of change that occurs in the female reproductive system is called menstrual cycle.

2. The sex chromosomes are referred as X and Y and their combination determines the sex of a child.

With the help of these chromosomes, sex of a child can be easily determined because a male has XY chromosomes whereas a female has XX chromosomes.

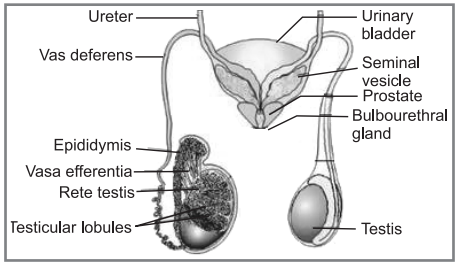
3. Egg-laying mammals (monotremes) are very primitive mammals because like reptiles and birds, they lay eggs.

They have highly modified snouts or beaks and modern adult monotremes have no teeth.

4. Do it yourself.

G. Answer the following questions in detail :

1. The male reproductive system



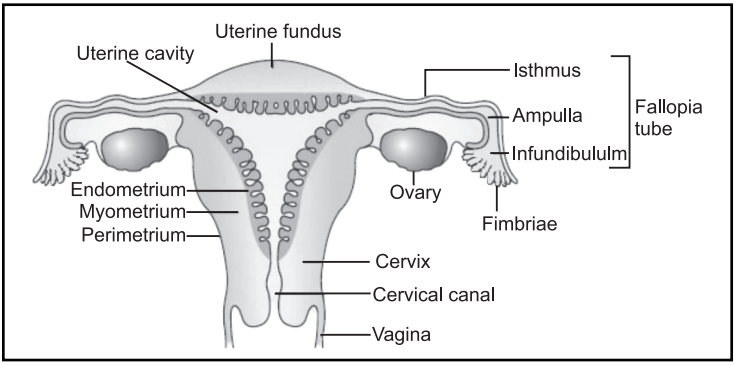
The male reproductive system includes two testes, which produce sperm and the hormone testosterone. Sperm travels from each testis through small tubes to the urethra.

The male reproductive system consists of a pair of testes, a pair of ducts in each testes, accessory glands and a penis. The testes are two oval-shaped organs found outside the abdominal region in a bag like structure called sac or scrotum. The testes produce sperm which travels from each testis through many small tubes to a larger tube called the urethra. It runs through the penis through which urine is expelled out of the body. In addition to sperm, the testes produce a hormone, testosterone which is helpful in broadening the shoulders.

The female reproductive system

All the parts of the female reproductive system are within the female's body. The ovaries are located in the abdominal region on each side. They produce eggs and hormones which are helpful in the growth of body.

Fallopian tubes are tube-like structures connected to each ovary at one end and with the uterus at the other.



In the female reproductive system, the ovaries produce eggs as well as hormones. Located near each ovary is a fallopian tube, which leads into the uterus. At the lower end of the uterus is the cervix, which opens into the vagina.

The egg travels through these tubes from the ovary. Soon, it reaches a hollow, muscular organ called the uterus or womb, a pear-shaped structure in which the early development of a baby takes place. A narrow section called the cervix neck is present at the lower end of uterus. The cervix opens into a wider channel called the vagina or birth canal. The vagina is the canal through which the baby passes during birth.

2. The beginning of adolescence is called puberty. In an adoloscent, the following changes occur during puberty :

(i) Sex organs develop rapidly.
(ii) Menstruation begins rapidly.
(iii) Production of sperms begins in boys.
(iv) Growth spurt takes place in both boys and girls.

Unit-4 : Moving Things, People and Ideas

9. Force, Friction and Pressure

Assess Yourself

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

1. (b) Newton, **2.** (a) Gravitational force, **3.** (d) All of these, **4.** (b) Static friction, **5.** (a) equal to zero.

B. Fill in the blanks :

1. magnetic, **2.** less, **3.** different, **4.** reduce, **5.** pascal.

C. Match the columns :

Column A	Column B
1. Newton	(i) unit of pressure
2. Pascal	(ii) an instrument measure atmospheric pressure
3. Nanometer	(iii) unit of force
4. Barometer	(iv) used to measure liquid pressure

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

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

E. Answer the following questions briefly :

1. The push or pull which is applied on an object gives it energy and causes it to start moving, stop moving or change its motion is called force.

2. The metric unit of force is newton. A force of 1 newton changes the speed of 1 kilogram mass by 1 metre per second.

3. The force that opposes the motion of an object is called friction.

4. Sliding friction is less than static friction.

5. The force exerted by an electrostatic charge is called electrostatic force.

F. Answer the following questions in detail :

1. Force : Refer to section E, Q.1

Effect of force : Force produces the following effects :

(i) Change in the state of rest or motion : A force can make a body move and stop a moving body.

(ii) Change in speed : A force can increase or decrease the speed of a moving object.

(iii) Change in direction : A force can change the direction of a moving object.

(iv) Change in shape : A force can change the shape of an object.

2. When a charged body is brought close to an uncharged body, they attract each other. But when both the bodies are charged,they repel each other. The activity to demonstrate the same is given below :

Activity

Take a dry comb or a plastic ball-point pen. Rub it into your dry hair for about a minute. Now, bring it near the tiny pieces of paper. The pieces of paper move toward the pen and stick to it. An electrostatic charge is produced in the pen on rubbing it into dry hair. This shows that electrostatic force moves the objects. The force between the pen and the small pieces of paper is known as electrostatic force.

3. Advantages of friction :

(i) Writing and drawing is made possible because of the friction between the pen or pencil and the paper.

(ii) We are able to walk because friction prevents us from slipping.

(iii) Without friction, the wheels of a car would not grip the road.

(iv) The brakes of vehicles would not work without friction.

Disadvantages of friction :

(i) Machine parts which rub each other are worn out.

(ii) Energy is wasted in overcoming friction in the machines.

(iii) Due to friction between the sole of the shoe and the floor, the sole wears out.

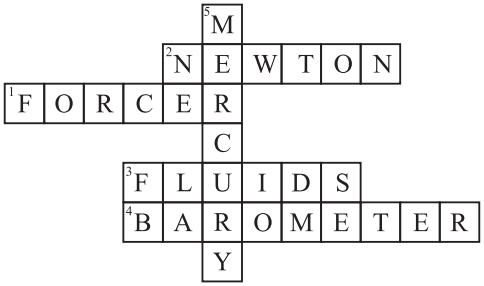
(iv) The tyres of vehicles wear out because of the friction between the tyres and the road.

4. (i) **Aneroid barometer :** Aneroid barometer is just the size of a small clock and reads the atmospheric pressure in any position because no liquid is used in it.

(ii) **Buoyancy :** The fluid pressure pushes objects up. The force that pushes an object up is called buoyancy.

Activity Time

H. Science Puzzle :



10. Sound

Assess Yourself

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

1. (d) vacuum, **2.** (d) Iron, **3.** (b) pitch, **4.** (c) Steel, **5.** (d) 75000 Hz.

B. Fill in the blanks :

1. vacuum, **2.** 0.1 sec, **3.** frequency, **4.** hertz, **5.** hertz.

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

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

D. Match the columns :

Column A	Column B
1. SI unit of frequency	(i) Violin
2. Unit of intensity of sound	(ii) Hertz
3. String instrument	(iii) Shehnai
4. Wind instrument	(iv) Mridangam
5. Percussion instrument	(v) Decibel

E. Answer the following questions briefly :

1. No, we will note hear the sound because moon does not have an atmosphere and sound does not travel in vacuum.

2. The range of audible frequencies of humans is 20 Hz to 20,000 Hz.

3. Cochlea.

4. Two precussion instruments are *tabla* and *mridangam*.

5. No, humans have more distinctive hearing than animals.

F. Answer the following questions :

1. Any substance that has the ability to transmit a sound is called its medium. We do not hear sound on the moon because it has no medium to transmit sound.

2. Frequency of sound wave is the number of wave cycles that, occur in one second. Its SI unit is Hertz.

3. The loudness of a sound is determined by the energy used to produce it. Energy moves molecules from their mean/rest positions. So, it can be concluded that the intensity of a sound depends upon the amplitude of the sound wave or vibration.

4. Distance = speed × time.

= 340 m/s × 1.2 s = 408 m

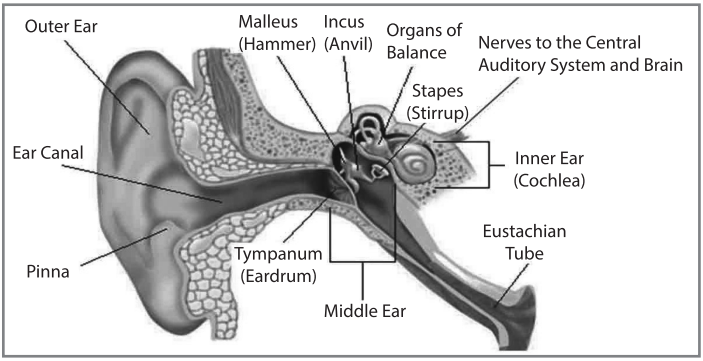
G. Answer the following questions in detail :

1. Humans ear has three parts : Outer ear, middle ear and inner ear.

Outer ear : The outer ear is made mostly of cartilage covered with skin. It acts as funnel to gather sound waves.

Middle ear : The middle ear receives the vibrations from the eardrum. The middle ear is made up of the three smallest bones in the body. The hammer, a delicate bone, picks up the vibrations from the eardrum. These vibrations are passed along to anvil or second bone. Finally, the vibrations go to the stirrup, the last bone. It vibrates against another membrane which transfers the vibrations of sound into the internal ear.

Inner ear : The inner ear consists of a complicated system of canals filled with liquid. Vibrations in the inner ear pass through the fluid and are channelled into a spiral tube called cochlea. It contains nerve endings. Nerve impulses beginning in the cochlea are carried by the auditory nerves to the brain, where they are interpreted.



The ear consists of an outer, middle, and inner part. Sound vibration entering the ear travel through these parts to the auditory nerve, which carries a nerve impulse to the brain.

2. Difference between percussion instruments and wind instruments

	Percussion instruments	**Wind instruments**
(i)	It is generally played by striking.	In wind instruments, a column of air vibrates.
(ii)	In these instruments, usually a taut skin is struck to produce a note.	These instruments have holes that are covered by fingers or pads operated by fingers.
(iii)	In these instruments, the frequency of vibration can be increased by stretching the skin more.	These alter the length of the vibrating column of air. The shorter the column, the higher the pitch.

3. Refer to Q.1.

4. Difference between musical sound and noise :

	Musical sound	**Noise**
(i)	Pleasant, smooth and agreeable to the ear.	Unpleasant, jarring and disagreeable to the ear.
(ii)	Produced by periodic vibrations which are regular and continuous.	Produced by irregular vibrations which are discontinuous.
(iii)	Sound level is generally high.	Sound level is generally low.

Activity Time

J. Science Puzzle :

1.

H	E	R	T	Z

2.

Q	U	A	L	I	T	Y

3.

D	E	C	I	B	E	L

4.

M	E	D	I	U	M

5.

P	I	T	C	H

Unit-5 : How Things Work

11. Static Electricity : Electric Charges at Rest

Assess Yourself

A. Choose the correct answer : (Multiple Choice Questions)

1. (d) An inflated balloon, **2.** (b) becomes positively charged while the cloth has a negative charge, **3.** (c) piece of thermocol has a charge opposite to that on the charged body, **4.** (a) detect charge, **5.** (b) conductors.

B. Fill in the blanks :

1. repel, attract, **2.** electroscope, **3.** charged, opposite, **4.** insulators, **5.** electrons.

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

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

D. Match the columns :

Column A	Column B
1. Positive charge	(i) Proton
2. Negative charge	(ii) Neutron
3. Neutral	(iii) Electron
4. Insulator	(iv) Copper
5. Conductor	(v) Plastic

E. Answer the following questions briefly :

1. The subatomic particle that carries a positive charge is proton.

2. Materials that do not allow electrons to flow freely are called insulators, *e.g.,* plastics, ceramics, wood, etc.

3. When a charged body is touched with hand, the charged body loses its charge as our body acts as conductor of electric current.

4. The subatomic particle that has no electric charge is neutron.

F. Answer the following questions :

1. Static electricity is the build up of electric charges on an object because electrons have moved from one object to another.

2. An electroscope consists of a metal rod with a knob at the top and a pair of thin metal leaves at the bottom. The rod is inserted in a one-hole rubber stopper, which fits into a flask. The flask contains the lower part of the rod and the metal leaves.

3. Differences between conduction and induction

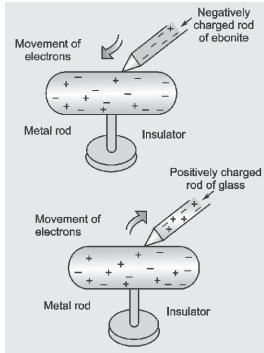
	Conduction	**Induction**
(i)	Charging by conduction involves the direct contact of objects.	In this process, a charged body is brought near another body but not touched, the other body can be charged.
(ii)	In this process, a body gets charged when it is brought in contact with a charged body.	This method of charging a body by bringing a charged body near it is called charging by induction.

G. Answer the following questions in detail :

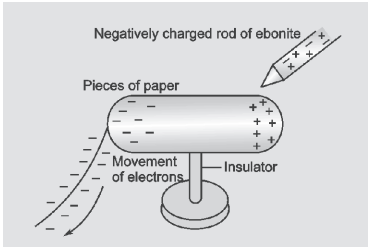
1. Different methods of charging an object are as follows :

(i) Charging by friction : Rubbing a balloon with a piece of cloth is an example of charging an object by friction. When two bodies are rubbed together, both become charged and the charges acquired by them are equal but opposite.

(ii) Charging by conduction : It involves the direct contact of objects. In conduction, electrons flow through one object to another object. In other words, a body gets charged when it is brought in contact with a charged body. Most metals are good conductors of electricity.

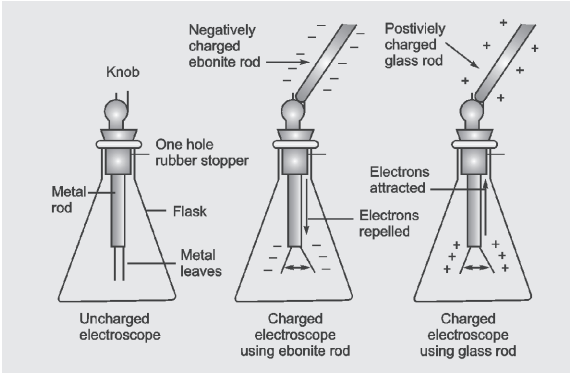


(iii) Charging by induction : When a charged body is brought near another body but not touched, the other body can be charged. This method of charging a body by bringing a charged body near it is called charging by

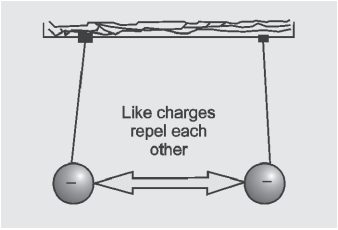


induction where the charge acquired by the neutral body is opposite to that of the body that induces it.

2. An electroscope can be charged by conduction. A charged object is brought in direct contact with the knob of the electroscope. *For example*, if a negatively charged ebonite rod touches the knob, electrons from the charged ebonite rod move to the knob of the electroscope and then down the metal rod to their metal leaves. The leaves gain a negative charge, repel each other and spread apart.



3. Take two rubber balloons and fill them by blowing air in them with your mouth. Tie their mouths with threads and suspend them. Rub both with a woollen cloth. Both the balloons acquire negative charge. Now, hold both the balloons close to each other. But you will find that both the balloons with like charges move away from each other.



Activity Time

J. Something to do : Write names of three conductors and three insulators of the electricity :

S. No.	Conductors	Insulators
1.	Silver	Rubber
2.	Copper	Glass
3.	Aluminium	Wood

Assess Yourself

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

1. (d) All of these, **2.** (b) coulomb, **3.** (a) Dry cell, **4.** (d) Solar cells, **5.** (c) dynamo.

B. Fill in the blanks :

1. negative, neutral, **2.** repulsion, **3.** electric current, **4.** shellac, ammonia, **5.** ampere.

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

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

D. Match the columns :

Column A	Column B
1. Unit of electric charge	(i) Primary cell
2. Voltaic cell	(ii) Coulomb
3. Solar cell	(iii) Insulator
4. Salt solution	(iv) Secondary cell
5. Leather	(v) Conductor

E. Answer the following questions briefly :

1. Subatomic particles with electric charge are proton and electron.

2. The SI unit of electric charge is coulomb.

3. The flow of electrons through a wire is called an electric current.

4. The SI unit of electric current is ampere.

F. Answer the following questions :

1. Protons and electrons have a basic property called electric charge. Protons have a positive charge which is indicated by (+) symbol. Electrons have a negative charge which is indicated by (–) symbol. Neutrons are neutral *i.e.,* they have no electric charge.

2. The flow of electrons through a wire is called an electric current. Scientists use ammeter and galvanometer to measure it.

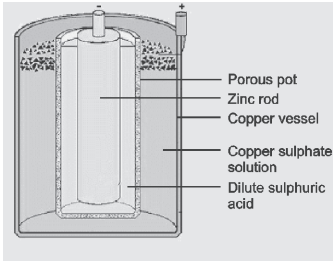
3. In primary cells, irreversible changes take place and the chemicals are used up as current is drawn from them.

In secondary cells, the chemical changes are reversible. Once used up, a secondary cell can be charged and used again since its chemical is reusable.

4. Daniel cell

This cell was invented by J.F. Daniel in 1836. It consists of a copper container which contains copper sulphate solution as an electrolyte. A porous pot containing dilute sulphuric acid and a zinc rod is put in the copper sulphate solution. The copper container acts as a positive electrode while the zinc rod acts as a negative electrode. When the copper container and the zinc rod are connected to an external circuit,

a current flows in the circuit from copper to zinc or electrons flow from zinc to copper.



G. Answer the following questions in detail :

1. The process in which a layer of one metal is deposited over another metal by the process of electrolysis is called electroplating. It is done to improve the appearance of metals and for protection against corrosion.

Uses : Electroplating in widely used for coating metal objects with a thin layer of a different metal which has some desired property which the object to be plated lacks. Very often the object is made from a cheaper metal and the metal coated is expensive. This gives the object a rich look and at the same time, makes it economical.

- Chromium is plated on car and cycle parts, taps, kitchen gas burners, bicycle handle bars, wheel rims and many other things.
- Iron vessels and containers used for storing food have to be plated with tin which is less reactive with food and it does not rust, so the food is protected from getting spoilt.
- Jewellers electroplate gold and silver over inexpensive metals like iron and copper and make ornaments look precious at a lower cost.

2. Dry cell consists of a small zinc container which acts as the negative electrode. It contains ammonium chloride (NH_4Cl) made into a paste with zinc chloride, flour and gum which acts as electrolyte. A carbon plate carrying a brass cap and placed at the centre of the container acts as the positive electrode. It is surrounded by a compressed mixture of powdered manganese dioxide and charcoal contained in a muslin bag. The zinc container is sealed at the top with shellac which has a fine hole to allow ammonia gas to escape.

The cell commonly used in torches, transistors and clocks is a dry cell. It is a portable form of Leclanche cell.

Activity Time

K. Science Puzzle :

1.

P	R	I	M	A	R	Y

2.

C	H	A	R	G	E

3.

P	O	S	I	T	I	V	E

4.

N	E	G	A	T	I	V	E

5.

C	U	R	R	E	N	T

Unit-6 : Natural Phenomena

13. Thunder, Lightning and Earthquakes

Assess Yourself

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

1. (a) lightning, **2.** (c) voltmeter, **3.** (a) electric discharge,
4. (b) sheet lightning.

B. Fill in the blanks :

1. negative electric, **2.** summer, **3.** lightning, **4.** fault, **5.** Epicentre.

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

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

D. Match the columns :

Column A	Column B
1. Thunderstorm	(i) Seismograph
2. Lightning from cloud to the earth	(ii) Sheet lightning
3. Epicentre	(iii) Cumulonimbus clouds
4. Lightning within a cloud	(iv) Origin of earthquake
5. Instrument used to measure earthquake	(v) Forked lightning

E. Answer the following questions briefly :

1. A cumulonimbus cloud is formed by water vapour which is carried by powerful upward air currents.

2. A measure of the energy available to move electrons is called voltage.

3. Instrument used to measure voltage is called voltmeter.

4. Lightning is simply a large spark of electricity, a current flowing between a cloud and the Earth, between clouds or within a cloud.

5. **Forked lightning** is lightning from cloud to the Earth.
Sheet lightning is lightning within a cloud.

F. Answer the following questions in detail :

1. Lightning is an electrical discharge that moves through the clouds in a thunderstorm. A thundercloud in the sky has many frozen droplets of water in the form of small pieces of ice. When wind blows, the frozen droplets collide with each other and become electrically charged by friction. This gives rise to a whole cloud filled up with electrical charges. Generally, the positive charges form at the top of the cloud and the negative charges form near the lower edges of the cloud. Once a few electrons begin to move across the gap, they heat up the air so that more and more electrons jump across the gap. This heats the air

even more. It all happens very fast, and the air gets so hot that it glows for a short time. This causes a spark which is called lightning. Thunder happens together with lightning.

2. To protect ourselves from lightning, we should take the following precautions :

(i) No open place is safe. We should seek shelter inside a house or a large building.

(ii) Stay away from windows and metal objects like a phone, wire fences, etc.

(iii) Get away from water.

(iv) Stay low to the ground and squat on your feet.

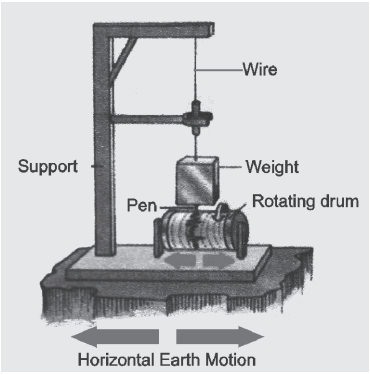
(v) Do not stand under a tree.

(vi) Avoid riding a bicycle.

(vii) Unplug electrical appliances like computer, TV, AC and converter.

3. Tsunami : Earthquakes occurring under water produce dangerous ocean waves called **tsunamis**. These waves spread from the shock centre like ripples from a stone dropped in water. The 'ripples' spread out at speeds of upto 720 km an hour. The average distance between them is about 500 km. At sea, these waves are only about a metre high. As the waves are low, they are hardly noticeable but as they approach the shallow water offshore, these waves rapidly increase in height. Tsunamis have tremendous energy and may reach upto heights of more than 40 meters as they crash onto a beach.

4. A seismograph is used to detect and measure earthquake waves. There are five basic parts of a seismograph : a support, a heavy object that hangs from the support, a pen that makes marks on a rotating drum and a base that rests on the ground.



In a seismograph, a heavy weight attached to a wire holds a pen motionless while the support structure anchored in the earth moves with the earthquake waves. The difference in motion between the support structure and the motionless pen is recorded on a rotating drum.

When the waves of an earthquake make the ground vibrate, the base of the seismograph vibrate. The rotating drum attached to the base also vibrates next to the pen. The pen and the heavy weight do not move at all. So, the motion of the rotating drum moving back and forth next to the pen causes lines to appear on the drum. The longer the lines, the more powerful is the earthquake.

14. Light and Human Eye

Assess Yourself

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

1. (c) retina, **2.** (d) pupil, **3.** (b) Louis Braille, **4.** (a) Vitamin A, **5.** (b) short sightedness.

B. Fill in the blanks :

1. congenital, acquired, **2.** concave lenses, **3.** lens, **4.** milk, cheese, **5.** convex.

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

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

D. Match the columns :

Column A	Column B
1. The innermost layer of eye	(ii) Retina
2. Short sightedness	(iii) Myopia
3. Long sightedness	(i) Hypermetropia

E. Answer the following questions briefly :

1. Retina is the innermost layer of the eye which is sensitive to light.

2. The pupil allows the light to enter the eye.

3. Myopia is a disease of the eye where the person has difficulty seeing objects at a distance but no trouble seeing nearby objects. It is also called short-sightedness.

4. Hypermetropia or long sightedness is caused due to too short eyeball and too long focal length of the eye lens.

The disease can be corrected by using spectacles fitted with convex lenses. These lenses converge the incident rays so that they can be focussed properly on the retina.

5. Braille is the method of writing that blind people can read and understand.

6. Deficiency of vitamin A may cause night blindness.

F. Answer the following questions :

1. Congenital blindness : It is the condition when a person is born blind. In this condition, the eye lens become opaque before birth. It may be an effect of some medicines taken by the mother during pregnancy.

Acquired blindness : It occurs to a person who is born with good eyesight but becomes blind afterwards mainly due to disease such as cataract and glaucoma.

2. When someone sees a distant object, the parallel rays of light falling on the eyes are focussed by the lens on the retina. Therefore, the object is seen distinctly. A normal eye can see an object distinctly at infinity which is called the *'far point'* of the normal eye.

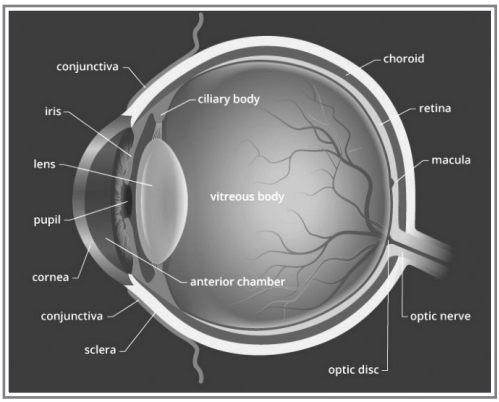
   When a person sees a nearby object, the muscles contract to increase the curvature of the lens. Hence, the focal length of the lens decreases and again a clear image of the object is formed at the retina.

   This power of changing the focal length of the eye is called *'power of accommodation'*.

3. Braille system was invented by a Frenchman **Louis Braille**, in 1819. Braille is a method of writing that blind people can read and understand. Each letter of the alphabet is represented by a pattern of raised dots on a page.

   Pattern : Each braille character contains upto six dots in a pattern. This pattern is upto three dots high and two dots wide.

   Characters : There are 63 combinations of dots altogether. In addition to letters of the alphabet, the characters stand for simple words and combinations of letters as well as numbers and punctuation marks. Thus, one dot means *a* and six dots means *for* : Braille can be read at a speed of 200 words a minute.

4. 

The human eye

Activity Time

H. Here is a diagrams of human eye for you. Observe it carefully and give the names of its various parts :

Refer to Q.4 of Sec. F

I. Science Puzzle :

1.

P	U	P	I	L

2.

S	C	L	E	R	A

3.

C	O	R	N	E	A

4.

I	R	I	S

15. The Universe

Assess Yourself

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

1. (a) Little Dipper, **2.** (c) Jupiter, **3.** (b) Moon, **4.** (b) meteorite.

B. Fill in the blanks :

1. definite age, definite size, **2.** reflecting, **3.** star, **4.** circular, elliptical path, **5.** gaseous, **6.** Polestar.

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

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

D. Match the columns :

Column A	Column B
1. Constellation	(iii) Ursa major
2. Inner planet	(i) Venus
3. Outer planet	(iv) Uranus
4. Meteors	(v) Shooting star
5. Earth's natural satellite	(ii) Moon

E. Answer the following questions briefly :

1. Two main theories about the origin of the universe are the Evolutionary theory and the Tidal theory.

2. A planet is a spherical object made of rocks or gases that orbit a star.

3. The moon is the celestial object closest to the Earth.

4. The star is a hot, massive and luminous ball of gas that makes energy by nuclear fusion.

5. The moon is the earth's only natural satellite.

F. Answer the following questions :

1. The streak of light produced by the rubbing of meteroids against the gases of the earth's atmosphere is called a meteor. It is also called 'a shooting star'.

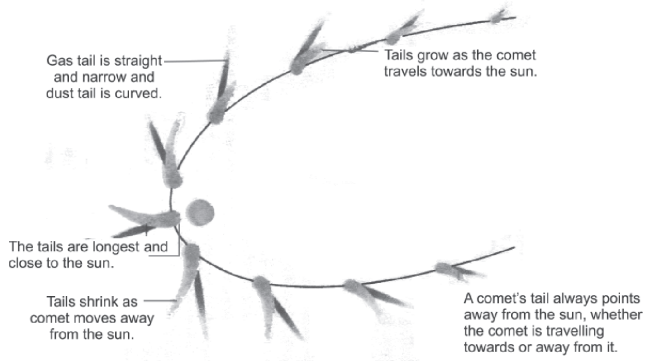
On the other hand, a meteor that strikes the earth's surface is called a meteorite.

2. To collect information about universe, the astronomers collect more and more light from the space. This light is collected by using different types of telescopes.

3. Long-period comets have long elliptical orbits, perhaps reaching out to the very edge of the solar system. They may take thousands of years before they return to Earth's neighbourhood again. Whereas short-periods comets return to the Sun every few years.
4. Constellations were originally patterns of bright stars in which people of ancient civilizations saw animals, people and mythical beasts.
5. A communication satellite is used to relay telephone calls, television broadcasts and the Internet. It connects different places and makes communication possible with remote regions. Since 1990s, a large number of communication satellites have been launched to carry signals for growing number of mobile phones.

G. Answer the following questions in detail :

1. There are billions of comets in the solar system, living at its edge and forming enormous spherical *Oort cloud*, named so for the Dutch astronomer Jan Oort. Individually, they are small irregularly shaped lumps of snow and rocky dust, each following its own orbit around the Sun.



The core of the comet is called its nucleus. The cloud of gas and dust surrounding the nucleus is known as the coma. The nucleus and the coma make up the head of the comet. During its approach to the Sun, the head of the comet continues to grow warmer and expand. In time, the head can expand to become as large as a few hundred thousand or even a million kilometres.

2. The star is a hot, massive and luminous ball of gas that makes energy by nuclear fusion. However, stars are born, they age and eventually, even the brightest stars must die. When stars die, much of their matter is used again in the formation of new stars.

   Stars are formed out of huge nebulae of mainly hydrogen gas mixed with dust. Over millions of years, some of the gas and dust are pulled together by gravity into a single spinning cloud. As collisions become more and more frequent, the matter begins to heat up.

When the temperature at the centre of this cloud reaches about 15 million degrees, fusion begins. The energy from fusion heats the *protostar*, or new star and it begins to shine brightly.

3. (a) First reflector

Isaac Newton, who pioneered many theories of science, also made a study of how light was spilt up by a lens. He concluded that lenses would always form images with coloured fringes, and so set about designing a telescope that collected light with mirrors instead.

(b) First refreactor

In 1609, Galileo was the first to realize that a combination of lenses could be used to magnify the heavens. His telescopes were no more powerful than toys, but with them, he discovered craters on the moon, four moons of Jupiter and the stars of the Milky Way.

4. Life is present only on the earth as, unlike other stars, air and water are present on it. These two are essential for life.

Activity Time

K. Science Puzzle :

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

Unit-7 : Natural Resources

16. Natural Resources

Assess Yourself

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

1. (d) Petrol, **2.** (b) coal, **3.** (c) soil erosion, **4.** (a) fossils.

B. Fill in the blanks :

1. 30, **2.** soil, flood, **3.** human, **4.** new plants.

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

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

D. Match the columns :

Column A	Column B
1. Forests	(i) Desertification
2. Wood	(ii) Varnish
3. Forest product	(iii) most useful raw material
4. Deforestation	(iv) Renewable resource

E. Answer the following questions briefly :

1. Forests, animals → Living resources
Fossil fuels, copper → Non-living resources

2. Forests are living and renewable resources.

3. Deforestation is usually caused by human activities in order to fulfill their needs.

4. Wood is the most valuable raw material.

5. Deforestation leads to desertification, drought and less rainfall.

F. Answer the following questions in detail :

1. On the basis of abundance and availability, natural resources are usually categorised as inexhaustible and exhaustible. Exhaustible resources are further classified into renewable and non-renewable resources. Forests are renewable resources.

2. Forest are useful for different reasons. They are as follows :

(i) Purification of atmosphere : Plants exhale oxygen and inhale carbon dioxide. They also help in purifying the air.

(ii) Climate control : Trees and soils regulate the atmospheric temperature through the process of transpiration.

(iii) Habitat for animals and birds : Forests serve as a home for numerous species of wild animals and birds. It is essential to sustain biodiversity.

(iv) Natural watershed : The trees form a shade over the rivers and lakes, running from the forests and prevent them from drying up.

(v) Means of livelihood : Millions of people around the world rely on forests for their livelihood directly or indirectly.

(vi) Source of wood : Wood is one of the most valuable raw materials for human beings. It is used as fuel, for making furniture and for building houses or boats.

3. Deforestation means indiscriminate cutting of forest trees. It is usually caused by human activities to fulfil human needs. It can happen when people clear land for farms, cities and other large settlements or it can happen to fulfil human needs of wood, fuel wood and timber.

4. Forestry is the process of managing forest lands for using, conserving resources for human and environmental benefits.

The foresters do following remedies to conserve forests :

(i) Controlled deforestation : While deforestation cannot be avoided completely, we must look to control it. Young and immature trees should not be felled.

(ii) Protect against forest fires : Forest fires are the most common cause of loss of forests. Foresters taken precautions for such incidents.

(iii) Afforestation : This is the process by which foresters plant more trees in the area. It is an attempt to balance our ecosystem to reduce the effect of deforestation and environmental pollutions.

5. Jhoom farming is one such practice which we can employ to combat forest pollution. In the North-east region of India, the land is kept barren after cutting the crops. Weeds, creepers and wild plants grow on this land and make it fertile in time. Then the land is cultivated again.

Activity Time

I. Science Puzzle :

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

17. Air and Water Pollution

Assess Yourself

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

1. (b) Sulphur dioxide, **2.** (a) oceans, **3.** (d) chlorofluorocarbons,
4. (c) potable water, **5.** (c) Both of these.

B. Fill in the blanks :

1. fossil, **2.** refrigeration, aerosols, **3.** 97.3%, **4.** typhoid, cholera.

C. Match the columns :

Column A	Column B
1. Sewers	(i) Sulphur dioxide
2. Burning of coal	(ii) Black water
3. Ozone layer gets depleted by	(iii) Chlorine
4. Water purifying agent	(iv) Chlorofluorocarbons

D. Answer the following questions briefly :

1. Pollution is the contamination of the atmosphere, the soil, the rivers and the seas, etc. by chemicals, rubbish and other substances.

2. Carbon monoxide is released by motor engine.

3. Burning coal produces sulphur dioxide.

4. Typhoid, cholera and jaundice are diseases caused by water pollution.

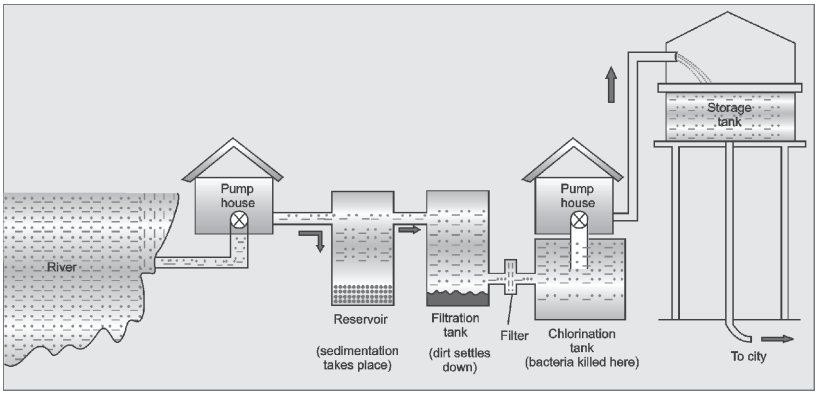
5. Nuclear power plants use radioactive materials for generating electricity.

E. Answer the following questions :

1. Motor vehicles burn a lot of fossil fuels to work. Emissions from automobile engines contain various pollutants which are highly dangerous *e.g.,* carbon monoxide.

2. Clean water is fit to drink. But for this water to be clean, it has to made free of dirt, dust, bacteria, etc. This is cleaned by different purification processes.

3. First, water is pumped from the rivers into artificial storage lake or reservoir. In the reservoir dirt in the water settles on the bottom, and many of the bacteria die. From the reservoir, the water passes to a filtration plant where beds of sand and gravel remove more dirt and bacteria. The water finally goes through a chlorination plant where chlorine gas kills any remaining bacteria. Now, the water is fit for drinking.



4. Oceans are polluted by oil due to spills from tankers carrying petrol and other oil across the seas. The thin film of oil on the surface of water suffocates fish and other aquatic life, it also blocks light and reduces the rate of photosynthesis in aquatic plants.
5. When coal is burned, it produces sulphur dioxide which goes up into the air, reacts with pollutants in the air to produce acid. When these mix up with water vapour in the air and fall down to the earth, it is called as acid rain.

F. Answer the following questions in detail :

1. Causes of air pollution are as follows :
   - **(i) Use of chlorofluorocarbons :** The release of chlorofluorocarbons (CFCs) into air depletes the ozone layer which is present in the upper atmosphere. Due to this depletion, harmful ultraviolet rays can enter the atmosphere and may prove fatal.
   - **(ii) Pesticide sprays :** These chemicals are inherently toxic but they have serious effects on atmosphere. DDT sprayed on crops escapes into the air and pollutes it dangerously.
   - **(iii) Radioactive fallout :** Radioactive fallout from explosion of nuclear bombs is potentially the most dangerous pollutant of all.

Nuclear power plants always release a little of radioactive emissions which increase the radioactivity in atmosphere and pollute it.

2. Causes of water pollution are as follows :

(i) Industries dump poisonous chemicals into water bodies, such as lakes, rivers and streams which can cause cancer to the consumer of the polluted water.

(ii) Rivers, lakes and streams are polluted with sewage and factory wastes.

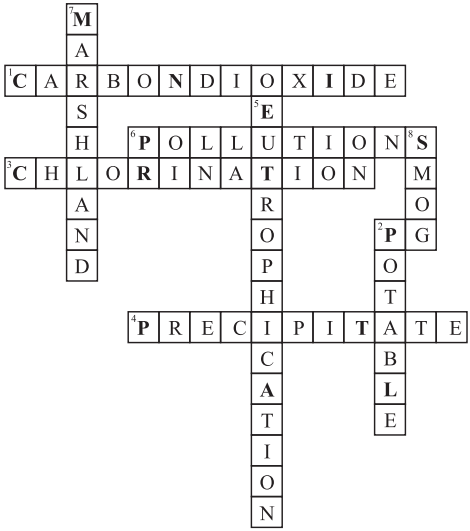
(iii) Ground water or underground water which many people use for drinking, is polluted by substances that sink into the ground.

(iv) Ground water pollution can also happen by accident such as the cracking of a oil storage tank under a service station on spreading pesticides over the land.

3. An example of severe affect of acid rain is the defacing of the Taj Mahal. It has been rightly said that centuries of wars have not been able to do what pollution has done to Taj Mahal by turning its white marble stone monument pale yellow.

Activity Time

H. Science Puzzle :



Half-Yearly Model Test Paper

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

1. (c) Groundnut, **2.** (b) *Paramecium*, **3.** (a) Gold, **4.** (b) fallopian tube, **5.** (d) 75000 Hz.

B. Fill in the blanks :

1. ploughing, **2.** protozoa, **3.** Nylon, **4.** monotremes, **5.** hertz.

C. Match the columns :

Column A	Column B
1. SI unit of frequency	(i) Violin
2. Unit of intensity of sound	(ii) Hertz
3. String instrument	(iii) Shehnai
4. Wind instrument	(iv) Mridangam
5. Percussion instrument	(v) Decibel

D. Answer the following questions briefly :

1. Agricultural practices comprises of various activities such as production of plants, livestock, fiber, fuel etc. by utilizing natural resources such as water and land.

2. The metabolic products of one microbe which kill or stop the growth of some other microbes are called antibiotics.

Three examples of antibiotics are penicillin, streptomycin, tetracycline.

3. Metals which are non-reactive and do not develop rust are called noble metals.

4. Advance aging can cause changes in the heart and blood vessels.

5. No, humans have more distinctive hearing than animals.

E. Answer the following questions :

1. The unwanted or wild plants which grow alongwith a cultivated crop are called weeds.

Weeds prevent sunlight and space required for the growth of crops. They absorb the nutrients from the soil and reduce the quality of agricultural product. Therefore, for the growth of crop, it is necessary to remove the weeds.

2. Yeast, are usually unicellular organisms which can survive in both aerobic and anaerobic conditions while moulds are multicellular organisms which a filament-like appearance. They are aerobic.

3. Hydrogen gas is valuable for chemical industry because it combines directly with nitrogen to form ammonia, which is made into fertilizers and nitric acid.

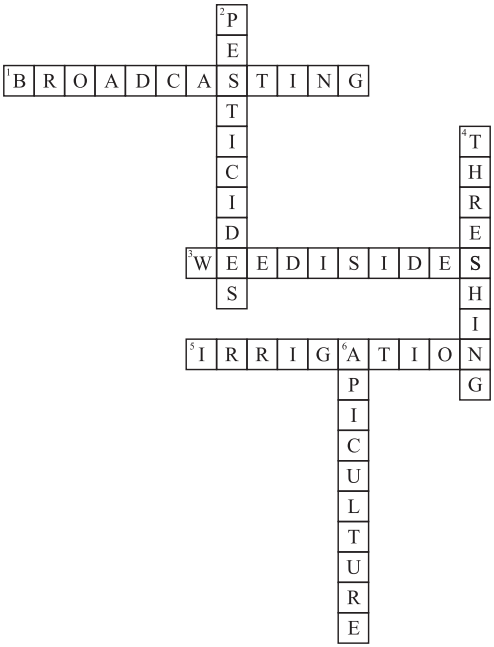
4. The sex chromosomes are referred as X and Y and their combination determines the sex of a child.

With the help of these chromosomes, sex of a child can be easily determined because a male has XY chromosomes whereas a female has XX chromosomes.

5. Distance = speed × time.

= 340 m/s × 1.2 s = 408 m

F. Science Puzzle :



Annual Model Test Paper

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

1. (d) An inflated balloon, **2.** (b) coulomb, **3.** (a) electric discharge, **4.** (b) meteorite, **5.** (c) Both of these.

B. Fill in the blanks :

1. repel, attract, **2.** repulsion, **3.** lightning, **4.** circular, elliptical path, **5.** typhoid, chloera.

C. Match the columns :

Column A	Column B
1. Positive charge	(i) Proton
2. Negative charge	(ii) Neutron
3. Neutral	(iii) Electron
4. Insulator	(iv) Copper
5. Conductor	(v) Plastic

D. Answer the following questions briefly :

1. Proton.

2. Coulomb.

3. Voltmeter.

4. The star is a hot, massive and luminous ball of gas that makes energy by nuclear fusion.

5. Nuclear power plants use radioactive materials for generating electricity.

E. Answer the following questions :

1. Static electricity is the build up of electric charges on an object because electrons have moved from one object to another.
2. The flow of electrons through a wire is called an electric current. Scientists use ammeter and galvanometer to measure it.
3. Tsunami : Earthquakes occurring under water produce dangerous ocean waves called **tsunamis**. These waves spread from the shock centre like ripples from a stone dropped in water. The 'ripples' spread out at speeds of upto 720 km an hour. The average distance between them is about 500 km. At sea, these waves are only about a metre high. As the waves are low, they are hardly noticeable but as they approach the shallow water offshore, these waves rapidly increase in height. Tsunamis have tremendous energy and may reach upto heights of more than 40 meters as they crash onto a beach.
4. Constellations were originally patterns of bright stars in which people of ancient civilizations saw animals, people and mythical beasts.
5. When coal is burned, it produces sulphur dioxide which goes up into the air, reacts with pollutants in the air to produce acid. When these mix up with water vapour in the air and fall down to the earth, it is called as acid rain.

F. Science Puzzle :