Lesson 1 Crop Production and Management

Formative Assessment

A. Choose the correct option :

Ans. 1. (iii) 2. (ii) 3. (ii) 4. (iv)

B. Write T for the correct statement and F for the wrong one :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. The plants of the same kind grown and cultivated in large quantities in a field are called crop plants or simply as a crop.

2. The method of cultivation of crops on a very large scale to provide food is called agriculture.

3. It is one of the oldest ways in which seeds are flung or scattered by hand. This method does not ensure a uniform distribution of seeds and needs a lot of time and manual labour.

4. This method is generally used to irrigate uneven land. It prevents wastage of water, especially if the soil is sandy.

B. Short Answer Questions :

Ans. 1. The field is left uncultivated for some time. During this time, remains of the previous crop break down and other nutrients add to the soil, enriching it again.

2. Proper storage of food grains keep away pests. Different ways to prevent pests from damaging food grains are :
   - Dried neem leaves and turmeric are generally used when storing food grains as they keep pests such as insects away.
   - Grains should be stored in airtight containers in a cool dry place.

3. Warning signs of a *pest infestation* include insect droppings, dead or live insects, cocoons, small white larvae, etc. Check the food grains for such signs before buying them.

4. These are chemicals, produced in factories, that provide specific nutrients to plants and increase crop yield. Excessive use of fertilizers can harm the soil, however. When dissolve into water bodies, fertilizers cause water pollution. Examples of fertilizers are super phosphate, urea etc.

5. The rearing of animals on a big scale for food is called animal husbandry. Rearing involves caring, feeding, and breeding of farm animals and keeping them free from diseases. Animal husbandry involves rearing of cattle for dairy products and meat, poultry for eggs and meat, bees for honey, and fish (aquaculture) for food.

C. Long Answer Questions :

Ans. 1. The method of cultivation of crops on a very large scale to provide food is **called agriculture**. It involves many activities which are known as ***agricultural practices***. Preparation of soil, selection and sowing of seeds, irrigation, crop protection, harvesting and storage are some of the agricultural practices. They are carried out using various tools called *agricultural implements.*

2. ***Weeds*** are undesirable plants that grow along with the main crops and compete with them for air, water and sunlight. This can result in a decrease in crop yield. *Amaranthus (chaulai)* and *Cynodon* (*doob* grass) are examples of common weeds. Some weeds may be poisonous for animals and humans, too.

   The process of removing weed from a crop field is called **weeding**. It may be done in the following two ways :

   Manual Weeding

   It is the removal of weeds by uprooting them manually or cutting them close to the ground with a *khurpi* or trowel. This is done during tilling of the land. It is, however, a time-consuming process.

   Using Weedicides

   Weedicides are chemicals used to kill weeds. These chemicals are diluted with water and sprayed over the fields. 2,4-D and metolachlor are some examples of weedicides. Weedicides are much poisonous and farmers should cover their nose and mouth while spraying them. Now a days, natural and safe weedicides are also used.

3. Plants absorb nutrients such as nitrogen, phosphorous, magnesium, potassium, etc., from the soil for survival. However, when plants are grown year after year in the same soil, the supply of these nutrients and subsequently, crop yield becomes low. It can be increased by replenishing the soil with nutrients. This can be done by changing farming practices as well as applying manure and fertilizers to the soil.

   Changing Farming Practices

   Farming practices can be changed either by leaving the field *fallow* or by crop rotation.

   Leaving the Field Fallow

   In this method, the field is left uncultivated for some time. During this time, remains of the previous crop break down and other nutrients add to the soil, enriching it again.

   Crop Rotation

   In this method, different types of plants are grown instead of just one type of plant a year in the same field. For example, wheat grains are grown in one season and legumes in the next. Legumes are plants such as peas and beans that can fix nitrogen. The nitrogen utilized by wheat is thus replenished by the legumes, thereby restoring soil fertility.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Because this method does not ensure a uniform distribution of seeds and needs a lot of time and manual labour.
2. Exersive use of fertilizers can harm the soil. So after a few years soil can be barren.

Fun Time

1. Do yourself
2. Do yourself

Lesson 2 Microorganisms

Formative Assessment

A. Choose the correct option :

Ans. 1. (ii) 2. (i) 3. (iii) 4. (iii) 5. (i) 6. (ii) 7. (ii)

B. State whether the following statements are True (T) or False (F) :

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

C. Fill in the blanks :

Ans. 1. Blue-green algae fix **nitrogen** and increase soil fertility.
2. Bacteria are **larger** in size than viruses.
3. Disease-causing microbes are called **germs**.
4. Alcohol is produced by using **yeast**.
5. The process of conversion of sugar into alcohol in the absence of oxygen is called **fermentation**.

D. Match the two columns :

	Column A		**Column B**
Ans.	1. *Aedes*	(i)	Carrier of dengue virus
	2. Yeast	(ii)	Bread making
	3. *Rhizobium*	(iii)	Soil fertility-fixing nitrogen
	4. Chlorella	(iv)	Decomposition
	5. Bacteria	(v)	Food
	6. Protozoan	(vi)	Malaria
	7. Virus	(vii)	Polio

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Air and water
2. Typhoid
3. Yeast
4. Housefly
5. Microorganisms are mainly classified into five major groups. They are :
(i) Bacteria (ii) Fungi (iii) Algae

(iv) Protozoa (v) Viruses

B. Short Answer Questions :

Ans. 1. Microorganisms are found everywhere in nature. Therefore they can live in all types of habitats.

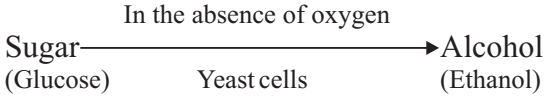
Their habitats can be any/all of the following :

- in air, water and soil,
- inside the bodies of animals including humans, and in dead and decaying organic matter,
- on the surface of objects and living organisms.

They can survive in all types of places, ranging from ice cold climate to hot springs, and dry deserts to marshy places.

2. They are not cells and do not contain cell organelles. They are made up of genetic material surrounded by a protein coat.
   - Smallest of all microorganisms, much smaller than a bacterium.
   - They cannot multiply on their own. For this, they need to enter a living host cell. Outside the host cell, the virus does not show any characteristic of living things. They do not feed, respire, excrete, grow or multiply.
3. Different uses of microorganisms are given below :
   (i) In industry to produce wine, alcohol and vinegar (acetic acid).
   (ii) In preparation of food items such as bread, curd and cheese.
   (iii) In preparation of medicines such as vaccines and antibiotics.
   (iv) In agriculture to increase soil fertility by nitrogen fixation.
   (v) For cleaning the environment.
   (vi) As sources of food.
   (vii) In sewage treatment.
4. Milk contains a sugar called lactose (milk sugar). Curd contains certain bacteria, of which the bacterium *Lactobacillus* helps in the formation of curd. It converts the lactose in the milk into lactic acid.
5. Yeast plays very important role in the formation of bread, cakes, pastries, dosas, idlis and dhokla.
   - To make bread, yeast is added to a mixture of flour (wheat) with sugar and warm water. It is kneaded to make a soft dough. The dough is left for about 2-3 hours.
   - You will see that the dough rises in volume. This happens due to the evolution of carbon dioxide by the respiration of yeast cells. Bubbles of the gas fill the dough and increase its volume. Baking of the dough drives off the carbon dioxide, making the bread porous and spongy.
6. Yeast plays an important role in the production of alcohol, wine and beer on a large scale. For this, yeast is grown on plant materials that have plenty of natural sugars such as grains like barley, wheat and rice, and fruit juices. Yeast cells grow in the absence of oxygen and change the sugar present in the fruit juices and grains into alcohol (ethanol).

The process of converting sugars in the absence of oxygen into alcohol is called **fermentation**.



The fungus *Aspergillus* is used to produce alcohol and citric acid. It is used in the soft drink industry.

Aerobic bacteria like *Acetobacter* is used for the production of vinegar from alcohol.

7. Some bacteria live in the roots of leguminous plants such as bean, pea and gram. These bacteria form root nodules and fix atmospheric nitrogen and convert it into suitable usable forms like nitrates.

   Atmospheric nitrogen cannot be used by plants as such, but it can be used in the form of nitrates. ***The process of fixation of atmospheric nitrogen into useful forms (that plants can use)*** *is called* nitrogen fixation. Nitrogen fixation increases the fertility of soil.

   Blue-green algae are also known to fix nitrogen and increase soil fertility.

C. Long Answer Questions :

Ans. 1. (a) Many microorganisms like bacteria and fungi are necessary for recycling wastes in the environment. This is done by decomposing dead things to simple chemical inorganic substances. These microorganisms are thus called **decomposers**. As mentioned above, they include fungi and certain bacteria, which live in the soil. These feed on waste materials such as dead plants and animals as well as animal droppings.

The inorganic compounds produced during decomposition are gases like carbon dioxide, water vapour and minerals like nitrates, sulphates, phosphates and potassium ions. These are absorbed by green plants during photosynthesis and other processes.

Decomposers in this manner play very important role in maintaining life on earth. They also clean up the environment by preventing an accumulation of the remains and wastes of living organisms.

This feature of microbes can be used to recycle plant wastes from kitchens and gardens and prepare manure.

Microorganisms cannot breakdown waste items like glass bottles, polythene bags and coca-cola cans. Hence, these should be disposed separately.

(b) Microorganisms play an important role in the treatment of sewage to make it harmless. Sewage contains faecal matter, many substances from household wastes (such as soap and detergent) and various chemicals from factories. In cities and towns, sewage is made harmless by treating it in **Sewage Treatment Plants**, before it is discharged into rivers.

2. (a) **Antibiotics are chemical substances produced by microorganisms such as fungi and bacteria which kill or stop the growth of disease-causing microorganisms.**
   Various antibiotics have been discovered, the first of which was penicillin. Now a days, antibiotics are used in the treatment of a large number of diseases.
   (b) **Vaccines** are medicines used to produce immunity to diseases in the living body. **Immunity** is the ability of the body to resist a disease by natural or artificial ways.
3. **Sources of Food**
   - Many algae like *Chlorella* and seaweeds are used as food. Seaweeds are an important source of food in China and Japan.
   - A number of mushrooms (fungus) are edible. They are rich in proteins and vitamins.
   - Yeast is a source of food, being rich in proteins and vitamins.
   - For fish and sea animals, algae are a direct source of food.
4. Pathogens enter the body in different ways :
   - through the food we eat (cholera),
   - through the air we breathe (common cold, influenza),
   - through direct contact with the infected person (chickenpox, smallpox, measles), and
   - through the water we drink (cholera),
   - through carriers such as insects (houseflies, mosquitoes) and animals (rats).
5. Some general precaution/measures should be taken to prevent microbial diseases are as follows.
   (a) Maintain good sanitation
   (b) Drink boiled water
   (c) Keep personal articles of the patient away from those of others.
   (d) Vaccination at proper age.
   (e) Eat properly cooked food.
6. There are certain factors that tell us whether or not a food is good or bad for consumption. Some of them are as follows :
   (i) **Taste :** Bad taste or sourness develops in spoiled food. For example, in milk, souring takes place due to the formation of lactic acid.
   (ii) **Odour :** Spoiled food gives out foul smell (resembling the smell of rotten eggs).
   (iii) **Colour :** Many food items show change in colour.
7. **Advantages of Food Preservation**
   (a) Reduces food wastage due to spoilage.
   (b) Increases the ***shelf life*** (storage period) of food items.
   (c) Ensures food availability during off season and in distant places.

(d) Maintains the nutritional value and flavour of food.

8. **Methods of Food Preservation**

(a) Boiling : Food materials like milk and water are preserved by boiling. Boiling kills microorganisms. You may have seen your mother boiling milk before storing it.

(b) **Drying (dehydration) :** Drying reduces the moisture content of food items. ***Removal of water from the food materials is called dehydration***. Dehydration prevents the growth of microorganisms.
Food items like cereals, pulses, vegetables like spinach, cauliflower and methi leaves, and spices are dried in the sun *(sun drying)*. The dehydrated food is sealed in packets and kept at room temperature.

(c) **Refrigeration and freezing :** Like boiling, cooling by refrigeration and freezing also helps to preserve food materials. Refrigeration and freezing do not kill microorganisms, but only stop them from growing and multiplying.

(d) **Canning** (proper storage and packing) : Food materials are packed in cans which are sealed and heated to 120°C to kill microorganisms. Canned food can remain good to eat for years, provided the cans are not damaged. Dry fruits and vegetables are preserved by this method.

(e) **Use of chemicals :** In addition to salt, vinegar, edible oils, and sugars, chemicals like sodium benzoate and potassium metabisulphite are used as preservatives in case of jams, squashes and ketchups.

(f) **Salting and adding sugars :** Many food materials are preserved by adding salt or sugar. Due to the addition of these,the cells of the microbes lose water. Microbes are, thus, not able to grow in them.
Some spices, oil, vinegar and nitrogen are also used as food preservatives.
Salting is used to preserve pickles, raw mangoes, amla, tamarind, meat and fish. Sugar is used in case of jam, sauce and jelly.

(g) **Pasteurization :** This method is used for preserving milk. In this method, (i) milk is heated to about 70°C for about 15-30 seconds, and (ii) then quickly cooled and stored in sterilized bottles or pouches.

9. Do yourself

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself

Fun Time

Ans. Do yourself

Lesson 3 Synthetic Fibres and Plastics

Formative Assessment

A. Choose the correct option :

Ans. 1. (ii) 2. (i) 3. (ii) 4. (i) 5. (ii)

B. Fill in the blanks :

Ans.
1. **Nylon** got its name from the cities New York and London.
2. **Rayon** is the synthetic fibre that is made from cellulose.
3. **Bakelite** is a plastic used for making electrical switches.
4. Synthetic fibres are prepared by the process of **polymerisation**.
5. Fishing nets are made from **nylon**.

C. Match the following columns :

Ans.

Column I	Column II
1. Teflon	(i) Coating of non-stick cookware
2. Non-biodegradable	(ii) Plastics
3. Polymerisation	(iii) Joining of many monomers
4. Thermocol	(iv) Polystyrene
5. Artificial silk	(v) Rayon

D. State whether the following statements are True (T) or False (F) :

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

Summative Assessment

A. Very Short Answer Questions :

Ans.
1. The materials which occur in nature and used as such are called **natural materials**.
2. The materials obtained from natural materials (also called raw materials) by chemical processes are called **man-made materials**.
3. Synthetic plastics are classified in two groups :
   (a) Thermoplastics (b) Thermosetting plastics
4. Nylon used to make following items :
   (a) Fishing nets, nylon ropes, bristles of toothbrush.
   (b) Dresses, sportswear, swimwear, stockings, sarees etc.
5. Blended fibres such as terycot, terywool etc., which are used to make shirts, paints, suits and other dresses.
6. Plastic substances are light weight
   - They are corrosion resistant, so no problems of rusting or decay.
   - They can be made in various colours
   - They are insulators of heat and electricity. Therefore, they can be used to make bodies of electrical appliances, handles of utensils and covering for electrical wires.
7. **Polymerisation** is the process by which both synthetic fibre and plastic are made.

8. Cotton, wool and silk are three **natural fibres**.

B. Short Answer Type Questions :

1. Give reasons :

Ans. (a) We should not burn left over plastic bags because they give out harmful smoke which pollute our environment.

(b) Synthetic fibres have become very popular because they are not so expensive and they are also easy to wear and they are last longer.

(c) Acrylon fibre is used for making blankets, shawls and to make yarn for knitting sweaters because it is a thick fibre.

(d) Polythene is a good insulator of electricity so it is also used for making insulation of electrical wiring.

(e) Bakelite is stronger than other plastics and it is a good electrical insulator. So it is used for making electrical switches.

(f) Because plastic articals are easy to carry and they are not so expensive. These are easily available at a low cost everywhere.

2. Give two uses each of :

(a) **Nylon :** It is mainly used to make following items :

(i) Fishing nets, nylon ropes, bristles of toothbrush.

(ii) Dresses, sportswear, swimwear, stockings, sarees etc.

(b) **Polyester :**

(i) Polyester is used to make curtains and upholstery.

(ii) Polyester is also used to make water hoses for fine fighting.

(c) **Bakelite :** Bakelite is stronger than other plastics and is a good electrical insulator. Therefore, it is used for making electrical switches and other electrical fittings.

(d) **Polystyrene :** Polystyrene is used in :

- Fabrication of plastic toys
- Packaging
- Delicate objects like cell phones, T.V. etc.

(e) **Polyvinyl chloride :** It is light, yet strong and therefore useful in a variety of ways. It is used to make :

- Soles of shoes and raincoats
- Decorative flooring seen in offices and restaurants known as vinyl flooring.

3. Synthetic fibres have certain features due to which they have become very popular.

- They have a lustre that does not become dull with time.
- They are stronger and therefore last longer.
- They are wrinkle resistant and thus need no ironing.
- They absorb very little water so dry easily.
- They are both resistant and do not need maintenance like wool and silk.

- They are less expensive than natural fibres.

However, besides these features which make synthetic fibres very attractive, there is a disadvantage that they do not absorb sweat and thus are uncomfortable to wear in summers. They are also highly inflammable and generally catch fire easily.

4. Do yourself

C. Long Answer Questions :

Ans. 1. Plastics which soften on heating but once moulded cannot be reshaped are called **thermosetting plastics**. These plastics can be used only once as compared to thermoplastics which can be remoulded by heating.

Examples of such plastics are : Bakelite, formica and melamine. Thermoplastics are synthetic plastics which can be heated and moulded into any required shape. On cooling, they retain that shape but if heated again, they soften and can be reshaped.

A material that can be repeatedly moulded into new shapes by heating is called a **thermoplastic**.

Common examples of thermoplastic are : polythene, polyvinyl chloride (PVC), polystyrene and teflon.

2. Do yourself
3. Some properties of plastics that make it useful are :
   - Plastic substances are light weight
   - They are corrosion resistant, so no problems of rusting or decay.
   - They can be made in various colours
   - They are insulators of heat and electricity. Therefore, they can be used to make bodies of electrical appliances, handles of utensils and covering for electrical wires.
   - They last longer because they are not affected by moisture, temperature, pests or chemicals. Generally all natural substances such as cotton, jute and wool have smaller shelf lives.
   - They have a high tensile strength and therefore strings of rayon and nylon are stronger than strings made of cotton or jute.
   - They can be moulded in any shape or form.
   - They can be used to make nearly everything that we use in our daily life.
   - Plastics have made our life more comfortable and work easier.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Polyster
2. We should go with the use of paper bags because it saves our environment.

Fun Time

Ans. Do yourself

Lesson 4 Metals and Non-metals

Formative Assessment

A. Choose the correct option :

Ans. 1. (i) 2. (iii) 3. (iii)

B. Fill in the blanks :

Ans. 1. The most reactive metal is placed on the **top** and the least reactive metal at the **bottom** of the series.

2. $Mg + \mathbf{2H_2O} \longrightarrow Mg(OH)_2 + H_2$.

3. Graphite and iodine are **non-metals**.

4. $4Fe + H_2O + O_2$ **(2Fe2O3 × H_2O)**.

5. Metals react with dilute acids and liberate **hydrogen**.

C. State whether the following statements are True (T) or False (F) :

Ans. 1. T 2. F 3. T 4. T 5. T 6. T 7. T 8. F 9. T 10. F

D. Match the following :

	Column A	Column B
1.	Acidic oxides	(a) Hydrated Iron oxide
2.	Basic oxides	(b) 'Pop' sound
3.	Iron	(c) Metals
4.	Hydrogen	(d) Non metals
5.	White powder	(e) Magnesium oxide
6.	Sulphur	(f) Yellow in colour
7.	Rust	(g) Corrosion
8.	Melleable	(h) Gold
9.	Iodine	(i) Violet
10.	Bromine	(j) Liquid state

E. Find the odd one out :

Ans. 1. Gold, Silver, Graphite and Platinum.

2. Chlorine, Bromine, Hydrogen and Oxygen.

3. Sulphur, Diamond, Graphite and Iodine.

4. Iron, Mercury, Brass, Gold and Diamond.

5. Aluminium, Copper, Graphite and Phosphorus.

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Mercury 2. Sodium 3. No
4. Noble Metal 5. Aluminium 6. Hydrogen
7. Displacement reaction 8. Graphite 9. Tungsten

B. Short Answer Questions :

Ans. 1. Sodium and potassium react vigorously with simple water and give out a lot of heat. In fact, they sometimes catch fire if left exposed to the air and

produce intense heat. This property of suddenly bursting into flame on its own is known as 'spontaneous combustion'.

Calcium also reacts very vigorously with simple water. This fire is because of the hydrogen produced in the reaction.

Na	+	$2H_2O$		2NaOH	+	H_2
Sodium		Water		Sodium hydroxide		Hydrogen

2. Electric wires are made of metals because electric current can easily pass through them. Some metals allow electricity to pass through them more easily than do other metals. They give less resistance to the current as it flows through them. For example, copper and aluminium allow current to pass through them more easily than do iron or brass. That is the reason why electric wires are made of copper or aluminium.
3. **Reaction of O_2 with Metal—**

i. $2Mg + O_2 \xrightarrow{\text{Heat}} 2Mgo$

Magnesium — Oxygen — Magnesium oxide

ii. $4Na + O_2 \xrightarrow[\text{Virgorously}]{\text{Burns}} 2Na_2o$

Sodium — Oxygen — Sodium oxide

Reaction of O_2 with Non-metal

$C + O_2 \longrightarrow Co_2$

Carbon — Oxygen — Carbon-di-oxide

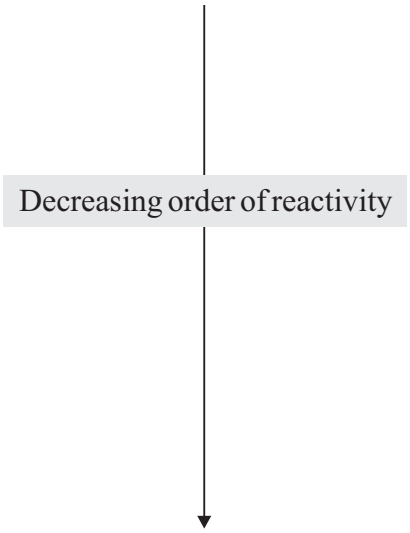
$S + O_2 \longrightarrow So_2$

Sulphur — Oxygen — Sulphur dioxide

4. Copper corrodes when exposed to air and moisture and forms copper carbonate. That is the reason why it is not advisable to keep food materials in any copper utensil that has been lying unused for a long time. You will note a greenish coloured film on the surface of such copper articles.
5. Aluminium is a rust-free and water proof material. For this reason it is used in bathroom doors to prevent them from water and corrosion.
6. Non-metals do not react with water and acids, since they cannot displace hydrogen as metals do.
7. There is a big difference in the melting and boiling points of almost all metals and non-metals. This is so because of the following reasons.
   - Almost all metals are hard, lustrous and good conductors of heat and electricity. Thus, they require a great amount of heat to either boil or melt.
   - Nearly all non-metals are soft (or liquid or gaseos in nature), non-lustrous and poor conductors of heat and electricity. Thus, they boil or melt at a relatively low temperature.
8. Reactivity series of metals—

Metals	Symbol
Potassium	K
Sodium	Na

Calcium	Ca
Magnesium	Mg
Barium	Ba
Aluminium	Al
Zinc	Zn
Iron	Fe
Nickel	Ni
Tin	Sn
Lead	Pb
Hydrogen	H
Mercury	Hg
Copper	Cu
Silver	Ag
Gold	Au
Platinum	Pt



9. A chemical reaction is the reaction between two chemicals under desired conditions. This can be expressed in the form of **equations**. Thus, chemical equation is the expression of a chemical reaction between two chemical substances.
10. When Phosphorus reacts with excess of O_2.

$$\underset{\text{Phosphrous}}{4P} + \underset{\text{Oxygen}}{5O_2} \longrightarrow \underset{\text{Phosphrous pentoxide}}{2P_2O_5}$$

C. Long Answer Questions :

Ans. 1. **Displacement Reactions**

You have seen that hydrogen is liberated when a metal reacts with an acid; this is actually the displacement of hydrogen from the acids. In the same way, a more reactive metal displaces the less reactive metal from their salt solutions.

So, it is clear to you by now as to why copper, silver, gold do not react with dilute acids; this is because hydrogen is placed before them in the reactivity series and so reacts first. But, copper can displace silver from silver nitrate salt, as given in the example below :

$$\underset{\text{Copper}}{Cu} + \underset{\text{Silver nitrate}}{AgNO_3} \longrightarrow \underset{\text{Silver}}{2Ag} + \underset{\text{Copper nitrate}}{Cu(NO_3)_2}$$

2. **To determine the condition required for corrosion.**

Take three test tubes and mark them as 'x', 'y' and 'z'.

Put some new iron nails in test tube 'x', add some calcium chloride and cover it with cotton plug in order to avoid the entry of moisture. Fix a cork on the mouth of the test tube.

Take some boiling water in test tube 'y' and put a few iron nails in it. Seal the test tube with wax. This prevents the entry of O_2. In any case, there is almost no O_2 in boiling water. Take some ordinary tap water in test tube 'z' and put the new iron nails into it. Note down your observations made over several hours.

No rusting takes place in test tubes 'x' and 'y', whereas the nails in test tube 'z' get rusted. Why?

It show that air and water are essential for corrosion.

3. Non-metals react with oxygen and form non-metallic oxides, which are also termed as acidic oxides. Acids are formed when these oxides are dissolved in water. This can be confirmed with the help of the blue litmus paper. If the litmus paper turns red, it shows the formation of acid.

$$\underset{\text{Carbon}}{C} + \underset{\text{Oxygen}}{O_2} \longrightarrow \underset{\text{Carbon dioxide}}{CO_2} \quad \text{(enough supply of } O_2\text{)}$$

$$\underset{\text{Carbon}}{2C} + \underset{\text{Oxygen}}{O_2} \longrightarrow \underset{\text{Carbon monoxide}}{2\,CO} \quad \text{(limited supply of } O_2\text{)}$$

4. **Differences between Metals and Non-metals**

Physical Properties	Metals	Non-metals
• Colour	Mostly grey in colour except for silver (Ag) and gold (Au)	Usually colourless. Only sulphur is yellow and iodine is violet
• State	Solid, except mercury which is liquid at room temperature	Exists in solid, liquid and gaseous states
• Lustre	They have shiny lustre	Diamond, graphite and iodine are the only non-metals that have lustre
• Malleability and ductility	Malleable and ductile	Non-malleable and non-ductile
• Melting point and boiling point	Very high, except gallium and mercury	Low, except for diamond and graphite
• Conductivity of heat and	Good conductors	Bad conductors except for graphite

5. Metals are usually hard ie. they do not break easily. Metal can be stretched to bear heavy loads without breaking. **Metal show a great tensile strength**.

   example : to show that metal show a great tensile strength.

   - Metal can be beaten or rolled into their sheets without breaking or cracking. A person at work he hammered red hot iron to give it various shapes. A goldsmith also does the same thing. Gold can be beaten a very their foil that would appear transparent.

6. Electric wires are made of metals because electric current can easily pass through them. Some metals allow electricity to pass through them more easily than do other metals. They give less resistance to the current as it flows through them. For example, copper and aluminium allow current to pass through them more easily than do iron or brass. That is the reason why electric wires are made of copper or aluminium.

   Copper is best for this purpose; it is also more ductile, but it is costlier. Aluminium is cheaper and lighter but it is less ductile and becomes brittle, if bent too often. Gold is the metal that best conducts heat and electricity, and is so ductile that it can be drawn into wires more thinner than human hair. A piece of gold the size of your thumb can be drawn into a fine wire 80 km (50 miles) long! But since gold is very costly and relatively heavier, it is rarely used for such purposes except in highly

specialised scientific applications, such as in aerospace.

7. A chemical reaction is the reaction between two chemicals under desired conditions. This can be expressed in the form of **equations**. Thus, *chemical equation is the expression of a chemical reaction between two chemical substances.*

   A chemical equation tells us the number of molecules of the chemicals taking part in the chemical reaction and the resultant products formed during the reaction. However, conditions such as temperature, pressure, etc., are normally avoided from such equations. A chemical equation must be balanced, *i.e.,* the numbers of atoms present in the molecules of the reactants and in the products should be the same. In other words, both sides of the equation should have the same number of atoms.

8. Sodium and potassium react vigorously with simple water and give out a lot of heat. In fact, they sometimes catch fire if left exposed to the air and produce intense heat. This property of suddenly bursting into flame on its own is known as 'spontaneous combustion'.

- Calcium also reacts very vigorously with simple water. This fire is because of the hydrogen produced in the reaction.

  $Na + 2H_2O \rightarrow 2NaOH + H_2$

  Sodium — Water — Sodium hydroxide — Hydrogen

- Iron and zinc react with steam.

  $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

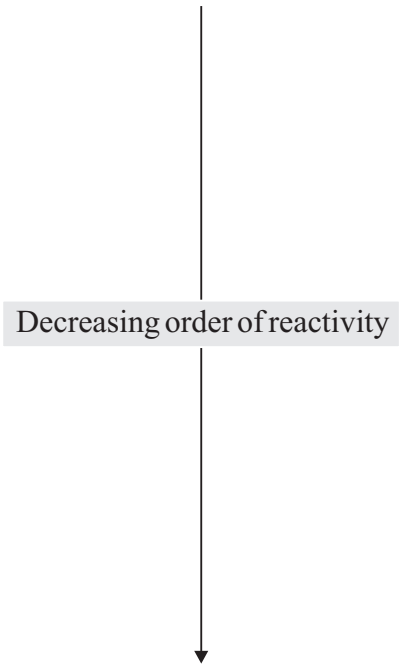
- Magnesium reacts only with hot water.

  $Mg + 2H_2O \longrightarrow Mg(OH)_2 + H_2$

  Magnesium — Water — Magnesium hydroxide — Hydrogen

9. Reactivity series of metals—

Metals	Symbol
Potassium	K
Sodium	Na
Calcium	Ca
Magnesium	Mg
Barium	Ba
Aluminium	Al
Zinc	Zn
Iron	Fe
Nickel	Ni
Tin	Sn
Lead	Pb
Hydrogen	H
Mercury	Hg
Copper	Cu
Silver	Ag
Gold	Au
Platinum	Pt



10. i. $\underset{\text{Copper}}{Cu} + \underset{\text{Silver Nitrate}}{AgNo3} \longrightarrow \underset{\text{Silver}}{2Ag} + \underset{\text{Copper Nitrate}}{Cu(No3)2}$

ii. Magnesium reaction with copper sulphate it displaces copper from copper sulphate.

$\underset{\text{Magnesium}}{Mg} + \underset{\text{Copper Sulphate}}{CuSo4} \longrightarrow \underset{\text{Magnesium sulphate}}{MgSo4} + \underset{\text{Copper}}{Cu}$

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Do yourself.
2. Do yourself.

Fun Time

Ans. Do yourself.

Formative Assessment 1

A. Tick (✓) the correct option:

Ans. 1. (ii) 2. (ii) 3. (i) 4. (ii) 5. (ii)

B. Match the following :

	Column A		Column B
Ans. 1.	*Aedes*	(a)	Carrier of dengue virus
2.	Yeast	(b)	Bread making
3.	*Rhizobium*	(c)	Soil fertility—fixing nitrogen
4.	*Chlorella*	(d)	Decomposition
5.	Bacteria	(e)	Food
6.	Protozoan	(f)	Malaria
7.	Virus	(g)	Polio

C. Find the odd one out :

Ans. 1. Gold, Silver, **Graphite** and Platinum.
2. Chlorine, Bromine, Hydrogen and **Oxygen**.
3. **Sulphur**, Diamond, Graphite and Iodine.
4. Iron, Mercury, Brass, Gold and **Diamond**.
5. Aluminium, Copper, **Graphite** and Phosphorus.

D. Answer the following questions :

Ans. 1. The plants of the same kind grown and cultivated in large quantities in a field are called crop plants or simply as a crop.
2. Air and water are two habitats of Microorganisms.
3. Microorganisms are mainly classified into five major groups. They are :
(i) Bacteria (ii) Fungi (iii) Algae
(iv) Protozoa (v) Viruses
4. Nylon used to make following items :
(i) Fishing nets, nylon ropes, bristles of toothbrush.
(ii) Dresses, sportswear, swimwear, stocking, sarees etc.
5. No, we can't a wire be drawn from wood.

Lesson 5 Combustion and Fossil Fuels

Formative Assessment

A. Choose the correct option :

Ans. 1. (i) 2. (i) 3. (ii) 4. (i) 5. (ii)

B. State whether the following statements are True (T) or False (F):

Ans. 1. F 2. F 3. F 4. F

Summative Assessment

A. Very Short Answer Questions :

Ans.
1. Rapid combustion, Spontaneous combustion and Explosive combustion are the three types of combustion.
2. The minimum temperature at which a combustible substance starts burning is called **ignition temperature**.
3. The amount of heat produced in kilojoules when one gram of a substance is completely burnt in excess oxygen is called its **calorific value**.
4. Using water and carbon dioxide fire can be extinguished.
5. Inexhaustible natural resources do not deplete over a period of time, i.e., their supply is limitless. Examples are water, wind, and sunlight.
6. Fossil fuels are formed from the buried remains of plants and animals over a long period of time. Natural gas petroleum, and coal are examples of **fossil fuels**.

B. Short Answer Questions :

Ans.
1. A combustible substance which on burning produces a large amount of heat and light is called a **fuel**. Fuels can be classified as solid, liquid, or gaseous depending on their physical state at normal temperature.
   Solid fuels : Charcoal, coal, paraffin wax, wood, and cow dung cakes are solid fuels. Solid fuels mostly produce a lot of smoke.
   Liquid fuels : Kerosene oil, diesel, and petrol are liquid fuels. These are obtained from petroleum which is found under the Earth's crust.
   Gaseous fuels : Natural gas, petroleum gas, and biogas are gaseous fuels. Petroleum gas and natural gas are kept as liquids under high pressure. On releasing the pressure, the liquid is converted into gas and ignites readily giving out a huge amount of heat. Cooking gas cylinders contain LPG.
2. **Characteristics of an ideal fuel :**
   - It undergoes complete combustion.
   - It has a low ignition temperature which is generally above room temperature.
   - It burns at a moderate rate with controlled release of heat.
   - It does not leave residue after burning.
   - It is readily available, safe to handle, store, and transport.
   - It has a high calorific value. The amount of heat produced in

kilojoules when one gram of a fuel is completely burnt in excess oxygen is called the **calorific value** of a fuel. It is usually expressed as kj/g (Joules (J) is the SI unit of heat).

3. Hydrogen has the highest calorific value but it is not considered the best fuel. This is because it is highly inflammable, difficult to handle, and store.
4. **Useful Products from Coal**

   Coal is heated at a temperature of about 1000°C in a closed container to produce useful products such as coke, coal gas, and coal tar.

   Coke : It is a porous, hard, dry fuel and almost a pure form of carbon. It is mainly used in the steel industry and in the extraction of iron.

   Coal gas : It is a mixture of methane, hydrogen, carbon monoxide, and other gases. It is used as a fuel for domestic as well as industrial purposes in areas around coal mines. It is not good for health and therefore not in much use these days although industrial use still continues.

   Coal tar : It is a thick, greasy, black liquid which is solid at room temperature. It is used in making explosives, pesticides, dyes, and paints. Earlier, it was also used to produce electricity.
5. Petroleum is extracted by drilling and is converted into useful substances through a process called ***refining***, which is carried out in oil refineries.

   The different components of petroleum obtained after fractional distillation are petrol, kerosene, Diesel, paraffin wax.

C. Long Answer Questions :

Ans. 1. A flame can be mainly divided into three zones, namely, the *outer zone, inner zone,* and the *middle zone.*

   Outer zone : At the base of the wick, the wax vapourises due to heat. This gaseous hydrocarbon burns with a blue flame. The presence of air is sufficient in this zone to allow for complete combustion to take place. It is the hottest part of the flame and gives out very little light.

   Inner zone : This zone is just above the wick and is formed by unburnt wax vapour given off by the molten wax. This zone is completely cut off from the supply of air, and so, no combustion takes place in this zone. It gives no light and is the coldest part of the flame.

   Middle zone : Incomplete combustion takes place in this zone due to an insufficient quantity of air. Unburnt carbon particles are present in the flame which become very hot and give a yellow light. This part of the flame is hotter than the inner zone.

2. Main polluting substances formed due to burning of fossil fuels and their harmful affects are as follow. Burning of fossil fuels gives out several polluting gases into the atmosphere. Diesel and petrol used in vehicles undergo combustion, giving out gases that are harmful. Coal gives out smoke containing unburnt carbon particles on burning. Some of the common polluting substances and their harmful effects are as follows :

Carbon dioxide : Carbon dioxide gas is released mostly on complete combustion of fuels. Due to much use of fuels, the level of carbon dioxide in the atmosphere is increasing which, in turn, is leading to a rise in atmospheric temperature.

Carbon monoxide : Carbon monoxide is given out due to incomplete combustion of fuels. It is a harmful gas and, when inhaled in major quantities, causes nausea, vomiting, and unconsciousness. In severe cases, it can cause death.

Oxides of sulphur and nitrogen : Sulphur dioxide gas is released by burning coal. Oxides of nitrogen are released on burning petrol, diesel and coal. These gases combine with atmospheric moisture to form dilute solutions of sulphuric and nitric acids. These acids cause irritation, watering of eyes, and respiratory health problems. They also damage crops, buildings, and affect marine life when they come down as a phenomenon called **acid rain**.

Soot : Carbon particles in the form of soot are released on burning wood, coal, and fuel oil. These solid particles are present in the smoke released due to incomplete combustion of these fuels. When inhaled, they can lead to asthma and other respiratory health disorders.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself

Fun Time

Ans. Do yourself

Lesson 6 Conservation of Plants and Animals

Formative Assessment

A. Choose the correct option :

Ans. 1. (iii) 2. (i) 3. (ii) 4. (iii)

B. State whether the following statements are True (T) or False (F):

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

C. Match the following :

Ans.

Column A		Column B
1. Biosphere reserve	(a)	Pachmarhi
2. Tasmanian wolf	(b)	Extinct animal
3. Tigers	(c)	Endangered animals

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. The term **biodiversity** refers to the variety of living organisms existing on the earth.

2. A group of organisms which share common features and which can interbreed with each other form a species.
3. International Union for Conservation of Nature.
4. The book which maintains a record of indangered plants and animals is called the Red Data Book.
5. The gradual heating up of the Earth is called global warming.

B. Short Answer Questions :

Ans. 1. Species of plants and animals which are found in a specific geographical area are called **Endemic species**. For example, the lion-tailed macaque is endemic to the Western Ghats in India.
Koala is endemic to Australia. The Nilgiri Tahr is endemic to the Nilgiri hills in the Western Ghats, India.

2. National parks are protected places where, compared to sanctuaries, human activity is highly restricted or not allowed at all. Jim Corbett National Park was the first such park in India. Others include the Gir National Park, Keoladeo Ghana National park, the Valley of Flowers and Kaziranga National Park.
3. Wildlife sanctuaries are protected places where limited human activity is permitted. Examples are the Wild Ass and National Chambal Gharial wildlife sanctuaries in India.

C. Long Answer Questions :

Ans. 1. Many species of plants and animals are disappearing from the Earth day by day, leading to a loss of biodiversity.
Main Causes
(a) **Destroying habitats :** As the human population grows, forests and other natural habitats of some plant and animal species are destroyed to fulfil the need for housing, clothing, and food.
(b) **Indiscriminate killing of animals :** Animals are hunted for their meat, skin, and other body parts. Animals are also hunted for sport and pleasure. These practices have resulted in major reduction in the number of animals.
(c) **Introduction of new species :** New species, when introduced in an area, may have no natural enemies. This helps in their rapid multiplication which later becomes a threat to the species naturally existing there. A common example is the water hyacinth which grows on water bodies covering them entirely, blocking water flow and leading to the death of aquatic life.
(d) **Climatic changes and natural disasters :** Natural and human-induced activities cause climatic changes leading to the destruction of plant and animal species.

2. **Pachmarhi biosphere reserve :** The Pachmarhi biosphere reserve is situated in the Satpura Hills of Madhya Pradesh. It was started in 1999. The reserve has *Satpura National Park* and two wildlife sanctuaries :

Bori and *Pachmarhi.* The place is covered with highly green forests, sandstone peaks, deep valleys, and waterfalls. The *Tawa water reservoir* is also located here. Under the *Project Tiger* initiative taken by the Government of India, tigers are protected in this reserve.

Flora : Ferns are found in plenty in this place. Other species include sal, teak wild mango, tendu, mahua (Indian butter-tree), bel (stone-apple), and bamboos.

Fauna : Indian giant squirrels are endemic to this region. Different species of tigers, Indian Bison *(Gaur)*, deer leopards, wild boar, wild dog, bear, black buck, porcupines, four-horned antelopes, smooth-coated otter, marsh crocodile, monkeys, pangolin etc., are also found.

3. Forests are important natural resources. But, all over the world, trees in forests are being cut at an alarming rate to provide land for agricultural practices and for timber needed to construct buildings and factories. The cutting down of forests is called **Deforestation**.

   Consequences of deforestation are :

   Global warming : Carbon-dioxide is released during respiration and combustion, which is used by plants during photosynthesis. However, large-scale clearing of trees on one hand and the increased burning of fossil fuels on the other, has led to an increase in the levels of carbon dioxide. This increase, in turn, increases the temperature of the Earth's surface. The gradual heating up of the Earth is called global warming. It may result to changes in rainfall patterns and cause frequent floods and droughts.

   Habitat loss : Deforestation leads to the loss of habitat. About 70% of the Earth's species live in forests.

   Depletion of resources : The supply of valuable forest products such as food, fodder, timber, firewood, medicines, etc., gets depleted as forests disappear due to deforestation.

   Change in soil properties and soil erosion : Deforestation can cause changes in physical properties of soil, reduce fertility, and its water-holding capacity. It may also result in soil erosion or loss of the nutrient-rich top soil.This causes fertile land to be converted into deserts, a process known as desertification.

4. Following methods may be adopted to conserve forests :

   Laws to conserve forests : The Forest (Conservation) Act passed by the Government of India aims at preserving and conserving natural forests and meeting the needs of the people living in or near the forests.

   Conservation programmes : Some organizations support conservation of forests through their projects, programmes, and joint efforts with the government. One such famous conservation programme started by the Government of India is known as the **Van mahotsav programme**.

   Reforestation : Reforestation is th*e* act of planting more trees to replace

the ones cut. It may happen naturally if the deforestated area is left undisturbed.

Reduce, Recycle, and Reuse (3Rs) : By reducing the usage of paper, we can save many trees in a year. Paper can also be reused and recycled. By doing this, we save our forests as well as conserve energy and water.

Discourage killing of animals : We should not buy animal parts such as bones, teeth, feathers of wild animals as by doing so we encourage the killing of these animals.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself

Fun Time

Ans. Do yourself

Lesson 7 The Cell

Formative Assessment

A. Choose the correct option :

Ans. 1. (iii) 2. (iii) 3. (i) 4. (ii) 5. (iii)

B. State whether the following statements are True (T) or False (F) :

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

C. Fill in the blanks :

Ans.
1. Cells are organized to form **tissue**.
2. Control centre of a cell is the **nucleus**.
3. Largest cell is of a/an **ostrich's egg**.
4. Yeast in a/an **unicellular** organism.
5. White blood cells are **irregular**.
6. Genes are found in the **nucleus**.

Summative Assessment

A. Very Short Answer Questions :

Ans.
1. Cell membrane
2. Cell wall
3. Slices of cork
4. Cell membrane
5. Nerve cell
6. Ribosomes, golgibody, mitochondria etc
7. Chromosome
8. Chloroplast
9. Prokaryotic cell
10. Eukaryotic cell

B. Short Answer Questions :

Ans.
1. Cells were first discovered by **Robert Hooke**, in 1665 in slices of cork.
2. Cells are generally grouped together to make tissues, organs, organ systems and finally organisms. A **tissue** is a group of cells of the same shape, size and function. An **organ** is a structure that have more than one type of tissues. It is normally big enough to be seen with the naked eye.
   The organs do not work separately. Generally a number of organs work

together to carry out a certain function. A group of organs working together is called an **organ system**. Our digestive system is an organ system.

3. Cells differ in their shapes and sizes. All cells however show some similarities in their structure. A typical cell consists of three basic parts :
   (i) Cell membrane, (ii) Cytoplasm,
   (iii) Nucleus.
4. Do yourself
5. **Protoplasm :** The living substance of the cell is called the protoplasm. It includes the cytoplasm and the nucleus.
6. In the cytoplasm, organelles are present in a cell.
7. In the cell nucleus, chromosomes are present in a cell.

C. Long Answer Questions :

Ans. 1. (a) **Cell membrane :** Cell membrane is also called plasma membrane. It is a thin outer covering of a cell. It is a porous membrane and permits movement of substances both inward and outward.

(b) **Cytoplasm :** The cytoplasm is a jelly-like liquid which occupies the space between the cell membrane and the nucleus. A number of small components or structures called the cell organelles are ribosomes, golgi bodies, mitochondria and endoplasmic reticulum. All the chemical reactions and functions of life take place in the cytoplasm.

(c) **Nucleus :** Nucleus is a spherical body present in centre of the cell and is surrounded by the cytoplasm. It is also known as the control centre of the cell. Mostly only one nucleus is present in a cell, but in some cases, more than one nucleus may be present.

Functions of Nucleus

- Helps in the inheritance of characters from parents to the children.
- Act as a control centre of all the activities taking place in the cell.

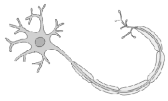
(d) **Cell wall :** In plants cells, one more layer surrounds the cell membrane. This *additional covering layer around the cell membrane is called the* cell wall. A cell wall is made of a tough, non-living substance called **cellulose** and provides (i) protection, and (ii) shape and support to the cell.

(e) **Chromosomes :** Thread like bodies called **chromosomes** are present in the nucleus. Chromosome carry a number of genes. The chromosomes and the genes help in the inheritance of characters from the parent to their offspring.

(f) **Chloroplasts :** Chloroplast (green plastids) are found only in plant cell and its function is photosynthesis takes place in plant cell and plant cell can make food and store potential energy for us.

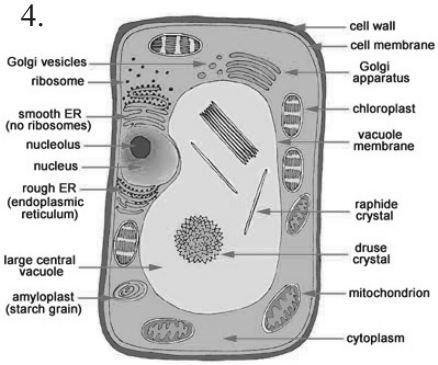
(g) **Mitochondria :** Mitochondrion is a powerhouse of cell.

(h) **Vacuole :** Vacuole is a non-living structure of the cell. Plant cells have a large central vacuole. Vacuole can transport food material and water to the Neighbouring organalles.

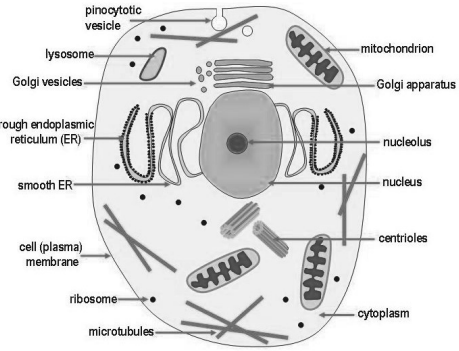
2. 
Nerve cell

Nerve cells are very long and branched shape with their thread-like projection supports it send messages over long distance in the body.

3. As you have already studied, living organisms are made of cells. A cell is the smallest living unit of an organism.
Can the cells of an organism be compared to bricks of a building or pages of a book? You know that bricks are used to make a building. Similarly, a number of pages are used and arranged to make a book. In the same way, cells are arranged to make an oragnism. Can you make a building without bricks or a book without pages? No, it is not possible. Similarly, an organism cannot exist without cells. Bricks or pages or cells are the basic structural units of a building or a book or an organism. Despite this similarity, they differ in one important aspect. While cells are complex living things bricks and pages are non-living.

4. 

Generalized structure of a plant cell



Generalized structure of an animal cell

D. Differentiate between the following :

Ans. 1. The **cytoplasm** is a jelly-like liquid which occupies the space between the cell membrane and the nucleus. A number of small components or structures called the cell organelles are ribosomes, golgi bodies, mitochondria and endoplasmic reticulum. All the chemical reactions and functions of life take place in the cytoplasm.
Protoplasm : The living substance of the cell is called the protoplasm. It includes the cytoplasm and the nucleus.

2. Differences between a plant cell and animal cell

Plant cell	**Animal cell**
1. It has a rigid, non-living cell wall.	1. No such cell wall is present.
2. It usually has one or two large vacuoles.	2. Vacuoles are either absent or are smaller in size.

3. Plastids are present.	3. Plastids are absent.
4. Centrosomes are absent.	4. Centrosomes are present.
5. Lysosomes are absent.	5. Lysosomes are present.

3. *A* **tissue** is a group of cells of the same shape, size and function. Examples of some tissues are nerve tissues and muscle tissues.

   An **organ** is a structure that have more than one type of tissues. It is normally big enough to be seen with the naked eye. Examples of some organs are brain and heart in animals, and stems, roots and leaves in plants.

4. **Cell membrane** is also called plasma membrane. It is a thin outer covering of a cell. It is a porous membrane and permits movement of substances both inward and outward.

   Nuclear membrane surrounds the nucleus. It is a thin porous membrane that separates the nucleus from the cytoplasm. It is, thus, the outermost covering layer of the nucleus. Being porous, it permits the movement of materials between the cytoplasm and the nucleus.

5. Prokaryotic and Eukaryotic cells

   The body of nucleus differs in bacteria and other organisms. In bacteria, the nucleus is not well organized. The nucleus material is not surrounded by a nuclear membrane. Such cells which lack a nuclear membrane are called **prokaryotic cells**. The organisms with prokaryotic cells are called **prokaryotes**. Bacteria and blue-green algae are prokaryotes. All organisms other than bacteria and blue-green algae have a well organized nucleus with a nuclear membrane. These organisms are called eukaryotes and the cells as **Eukaryotic**.

6. **Cytoplasm :** The cytoplasm is a jelly-like liquid which occupies the space between the cell membrane and the nucleus. All the chemical reactions and functions of life take place in cytoplasm.

   Nucleoplasm : A Jelly like substance called the Nuclear Sap (nucleoplasm) fills up the nucleus.

E. Write short notes on the following :

Ans. 1. **Protoplasm :** The living substance of the cell is called the protoplasm. It includes the cytoplasm and the nucleus.

2. **Cytoplasm :** The cytoplasm is a jelly-like liquid which occupies the space between the cell membrane and the nucleus. A number of small components or structures called the cell organelles are ribosomes, golgi bodies, mitochondria and endoplasmic reticulum. All the chemical reactions and functions of life take place in the cytoplasm.

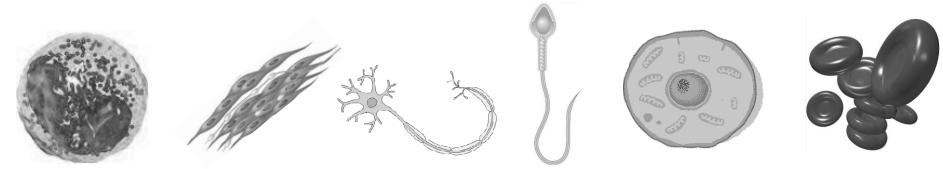
3. **Nucleus :** Nucleus is a spherical body present in centre of the cell and is surrounded by the cytoplasm. It is also known as the control centre of the cell. Mostly only one nucleus is present in a cell, but in some cases, more than one nucleus may be present.

4. **Organelles :** You have already studied that cytoplasm contains a number of small structures called organelles. These include :

   (i) Mitochondria (singular mitochondrion)

(ii) Golgi body or golgi apparatus
(iii) Endoplasmic reticulum
(iv) Lysosomes
(v) Vacuoles (plant cells have a big central vacuole; mostly absent from animal cells; if present vacuoles are smaller.
(vi) Plastids (present only in plant cells).
(vii) Ribosomes.

5. Variations in shapes and sizes of cells : Cells may be of the following shapes :
   (i) Irregular, as amoeba and white blood cells.
   (ii) Spindle-shaped (long and pointed at the two ends), as the muscle cells.
   (iii) Round or spherical, as the red blood cells and egg cells.
   (iv) Kidney or bean shaped, as the guard cells.



Animal cells

   (v) Elongated and branched, as the nerve cells.
   (vi) Long and rectangular, as the mesophyll cells in the leaf.

F. High Order Thinking Skills (HOTS) Questions :

Ans. Do yourself

Fun Time

Ans. Do yourself

Lesson 8 Reproduction in Animals

Formative Assessment

A. Choose the correct option :

Ans. 1. (ii) 2. (iii) 3. (iii) 4. (iii) 5. (i)
6. (i) 7. (i) 8. (ii)

B. Fill in the blanks :

Ans. 1. Fertilization is the process by which male and female gametes fuse to form a **zygote**.
2. Fertilization in frog is **external**.
3. Ovaries produce **egg**.
4. **Oviparous** are animals that lay eggs.

C. State whether the following statements are True (T) or False (F) :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Name the following parts of the body :
   (a) which produces sperms–**Tests**
   (b) which produces ova– **Ovary**
   (c) where fertilization takes place– **Oviduct**
2. In asexual reproduction only single parent produces new individuals. And in sexual reproduction both the male and female parents produces new individuals.
3. Sperm
4. The nuclei of the sperm and the egg fuse to form a single nucleus, which is called a Zygote. Zygote is the beginning of a new individual.

B. Short Answer Questions :

Ans. 1. In sexual reproduction two parents (individuals) male and female take part. Sexual method involves male gametes (sperm) and female gametes (eggs) produced by male and female respectively.
2. The changes in the development (life history) of some organisms from egg to adulthood involving various stages, entirely different from each other, is known as Metamorphosis. Frog and silkworm are the two examples of such animals which undergo metamorphosis.
3. **Internal fertilization—** Fertilization which occurs inside the body of the female.
   External fertilization— Fertilization which occurs outside the body of the female.
4. In human females fertilization occur in (internal) fallopian tube.
5. The product of the fusion of male and female gamete is called **zygote**.
6. The young one develops in the uterus of the mother.
7. It happens when millions of sperms are introduced into the genital tract of female with the help of penis. The sperm actively moves in the oviduct with the help of its tail to meet the eggs. A female produces a single egg in the ovary after every 28-30 days. But out of millions, only one sperm fuses with the egg. This fusion is termed as fertilization. The nuclei of the sperm and the egg fuse to form a single nucleus, which is called a zygote. Zygote is the beginning of a new individual.

C. Long Answer Questions :

Ans. 1. The animals that give birth to young ones are termed as **viviparous** animals and those which lay eggs are called **oviparous** animals. Hens and birds, snakes etc. the eggs hatch out to produce babies like their parents, called as **oviparous** and some animal like dog, cat human beings give birth to their young-ones are called as **viviparous**.

2. **Male Reproductive System**
   The reproductive organs found in a male are :
   (i) **Testes :** A pair of testes lies in a small sac like structure called the scrotal sac.
   The function of testes is to produce sperms (male gametes).
   (ii) **Epididymis :** It stores sperms. Sperms become active and develop motility.
   (iii) **Vas deferens :** It is sperm duct which carries sperms from the testes to the penis for ejaculation.
   (iv) **Penis :** This structure is used for ejecting and depositing sperms in the female genital tract.
3. **Female Reproductive System**
   The reproductive organs found in a female are :
   (a) **A pair of ovaries :** They are situated in the abdominal cavity. Each ovary produces ova, the female gamete.
   (b) **Oviduct or Fallopian tubes :** They are a pair of long tubes that carry the ova from the ovaries to the uterus. Oviduct has a funnel shaped opening near the ovary. Fertilization occurs in the fallopian tube.
   (c) **Uterus (Womb) :** It is a pear shaped organ where the development of the fertilized egg and foetus takes place.
   (d) **Vagina :** The uterus opens into a muscular tube called vagina. It receives sperms from the male. It also serves as the passage through which the fully developed foetus is born.
4. **Binary fission**
   Another method of asexual reproduction is seen in the microscopic *Amoeba* which is a single celled microscopic organism. The process of reproduction, in this organism starts by the division of nucleus into two. This is followed by division of its body into two, each part receiving a nucleus. In this way from a single *amoeba* two daughter *amoebae* are produced. This type of asexual reproduction is termed as binary fission.
5. **Asexual Reproduction in Animals**
   In asexual reproduction only single parent produces new individuals. The following are two common methods by which very small organisms reproduce.
   Budding
   Hydra is a tiny microscopic animal. It lives in water. It reproduces by budding. Under normal conditions, the body of hydra grows one or two bulges. These gradually grow and are termed as buds. After some time, the bud gets detached from the parent body. In due course of time the bud grows into an adult organism similar to that of the parent.
   Binary fission
   Another method of asexual reproduction is seen in the microscopic *Amoeba* which is a single celled microscopic organism. The process of

reproduction, in this organism starts by the division of nucleus into two. This is followed by division of its body into two, each part receiving a nucleus. In this way from a single *amoeba* two daughter *amoebae* are produced. This type of asexual reproduction is termed as binary fission.

D. Higher Order Thinking Skills : (HOTS) Questions :

Ans. Do yourself

Fun Time

Ans. Do yourself

Formative Assessment 2

A. Tick (✓) the correct option:

Ans. 1. (i) 2. (i) 3. (ii) 4. (iii) 5. (i)

B. Match the following :

Ans.

Column A	Column B
1. Biosphere reserve	(a) Pachmarhi
2. Tasmanian wolf	(b) Extinct animal
3. Tigers	(c) Endangered animals

C. Define the following :

Ans. Do yourself

D. Mention the functions of the following :

Ans. Do yourself

E. Answer the following questions :

Ans.
1. Rapid combustion, Spontaneous combustion and Explosive combustion are the three types of combustion.
2. The term biodiversity refers to the variety of living organisms existing on the earth.
3. Cells were first discovered by Robert Hooke, in 1665 in slices of cork.
4. Sperm
5. The nuclei of the sperm and the egg fuse to form a single nucleus, which is called a zygote. Zygote is the beginning of a new individual.

Summative Assessment 1

A. Fill in the blanks :

Ans.
1. Alcohol is produced by using **Yeast**.
2. Fishing nets are made from **Nylon**.
3. Genes are found in **Nucleus**.
4. Fertilization in frog is **External**.
5. Ovaries produce **Egg**.

B. State whether the following statements are True (T) or False (F) :

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

C. Very Short Answer Questions :

Ans. 1. It is one of the oldest ways in which seeds are flung or scattered by hand.

This method does not ensure a uniform distribution of seeds and needs a lot of time and manual labour.

2. Microorganisms are found everywhere in nature. Therefore they can live in all types of habitats. Their habitats can be any/all of the following : in air, water and soil, inside the bodies of animals including humans, and in dead and decaying organic matter, on the surface of objects and living organisms. They can survive in all types of places, ranging from ice cold climate to hot springs, and dry deserts to marshy places.
3. Cotton, wool and silk are three natural fibres.
4. Aluminium
5. Do yourself

D. Short Answer Questions :

Ans.
1. These are chemicals, produced in factories, that provide specific nutrients to plants and increase crop yield. Excessive use of fertilizers can harm the soil, however. When dissolve into water bodies, fertilizers cause water pollution. Examples of fertilizers are super phosphate, urea etc.
2. Uses of microorganisms are given below :
   (i) In industry to produce wine, alcohol and vinegar (acetic acid).
   (ii) In preparation of food items such as bread, curd and cheese.
   (iii) In preparation of medicines such as vaccines and antibiotics.
   (iv) In agriculture to increase soil fertility by nitrogen fixation.
   (v) For cleaning the environment.
   (vi) As sources of food.
   (vii) In sewage treatment.
3. A chemical reaction is the reaction between two chemicals under desired conditions. This can be expressed in the form of **equations**. Thus, chemical equation is the expression of a chemical reaction between two chemical substances.
4. Fossil fuels are formed from the buried remains of plants and animals over a long period of time. Natural gas petroleum, and coal are examples of fossil fuels.
5. **Protoplasm :** The living substance of the cell is called the protoplasm. It includes the cytoplasm and the nucleus.

E. Match the following columns :

Ans.

Column I	**Column II**
1. Teflon	(i) Coating of non-stick cookware
2. Non-biodegradable	(ii) Plastics
3. Polymerisation	(iii) Joining of many monomers
4. Thermocol	(iv) Polystyrene
5. Artificial silk	(v) Rayon

F. Long Answer Questions :

Ans.
1. Plants absorb nutrients such as nitrogen, phosphorous, magnesium, potassium, etc., from the soil for survival. However, when plants are

grown year after year in the same soil, the supply of these nutrients and subsequently, crop yield becomes low. It can be increased by replenishing the soil with nutrients. This can be done by changing farming practices as well as applying manure and fertilizers to the soil.

Changing Farming Practices

Farming practices can be changed either by leaving the field *fallow* or by crop rotation.

Leaving the Field Fallow

In this method, the field is left uncultivated for some time. During this time, remains of the previous crop break down and other nutrients add to the soil, enriching it again.

Crop Rotation

In this method, different types of plants are grown instead of just one type of plant a year in the same field. For example, wheat grains are grown in one season and legumes in the next. Legumes are plants such as peas and beans that can fix nitrogen. The nitrogen utilized by wheat is thus replenished by the legumes, thereby restoring soil fertility.

2. **Methods of Food Preservation**
   (a) **Boiling :** Food materials like milk and water are preserved by boiling. Boiling kills microorganisms. You may have seen your mother boiling milk before storing it.
   (b) **Drying (dehydration) :** Drying reduces the moisture content of food items. Removal of water from the food materials is called dehydration. Dehydration prevents the growth of microorganisms. Food items like cereals, pulses, vegetables like spinach, cauliflower and methi leaves, and spices are dried in the sun *(sun drying)*. The dehydrated food is sealed in packets and kept at room temperature.
   (c) **Refrigeration and freezing :** Like boiling, cooling by refrigeration and freezing also helps to preserve food materials. Refrigeration and freezing do not kill microorganisms, but only stop them from growing and multiplying.
   (d) **Canning (proper storage and packing) :** Food materials are packed in cans which are sealed and heated to 120°C to kill microorganisms. Canned food can remain good to eat for years, provided the cans are not damaged. Dry fruits and vegetables are preserved by this method.
   (e) **Use of chemicals :** In addition to salt, vinegar, edible oils, and sugars, chemicals like sodium benzoate and potassium metabisulphite are used as preservatives in case of jams, squashes and ketchups.
   (f) **Pasteurization :** This method is used for preserving milk. In this method, (i) milk is heated to about 70°C for about 15-30 seconds, and (ii) then quickly cooled and stored in sterilized bottles or pouches.

3. Many species of plants and animals are disappearing from the Earth day by day, leading to a loss of biodiversity.
   Main Causes
   (a) **Destroying habitats :** As the human population grows, forests and other natural habitats of some plant and animal species are destroyed to fulfil the need for housing, clothing, and food.
   (b) **Indiscriminate killing of animals :** Animals are hunted for their meat, skin, and other body parts. Animals are also hunted for sport and pleasure. These practices have resulted in major reduction in the number of animals.
   (c) **Introduction of new species :** New species, when introduced in an area, may have no natural enemies. This helps in their rapid multiplication which later becomes a threat to the species naturally existing there. A common example is the water hyacinth which grows on water bodies covering them entirely, blocking water flow and leading to the death of aquatic life.
   (d) **Climatic changes and natural disasters :** Natural and human-induced activities cause climatic changes leading to the destruction of plant and animal species.
4. Living organisms are made of cells. A cell is the smallest living unit of an organism. Can the cells of an organism be compared to bricks of a building or pages of a book? You know that bricks are used to make a building. Similarly, a number of pages are used and arranged to make a book. In the same way, cells are arranged to make an oragnism. Can you make a building without bricks or a book without pages? No, it is not possible. Similarly, an organism cannot exist without cells. Bricks or pages or cells are the basic structural units of a building or a book or an organism. Despite this similarity, they differ in one important aspect. While cells are complex living things bricks and pages are non-living.
5. **Binary fission**
   Another method of asexual reproduction is seen in the microscopic *Amoeba* which is a single celled microscopic organism. The process of reproduction, in this organism starts by the division of nucleus into two. This is followed by division of its body into two, each part receiving a nucleus. In this way from a single *amoeba* two daughter *amoebae* are produced. This type of asexual reproduction is termed as binary fission.

Lesson 9 Reaching the Age of Adolescence

Formative Assessment

A. Choose the correct option :

Ans. 1. (ii) 2. (i) 3. (iii) 4. (i) 5. (iv)

B. Fill in the blanks :

Ans. 1. Hormones are secreted by **endocrine** glands.
2. Estrogen is secreted by the **ovary**.
3. **Mammary** glands produce milk.
4. Adam's apple is located in the region of **neck**. It is more prominent in **boys** than **girls**.
5. FSH is called **Follicle** stimulating **hormone**.
6. The first menstruation is called **menarche**.

C. Unscramble the following : (Name of the hormones)

Ans. 1. THYROID 2. INSULIN 3. ADRENALIN
4. ESTROGEN 5. PITUITARY

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. **Endocrine glands :** The glands which secrete hormones directly in the blood stream. They do not have duct to carry their secretions.
2. Insulin
3. Pituitary
4. **Testosterone**
   (i) Development of secondary sexual characters in males
   (ii) Sperm production
   Estrogen
   (i) Egg production
   (ii) Development of secondary sexual character in females.
5. Acquired Immuno defeciency syndrome **AIDS**.
6. Adrenal are located near the kidney in the Human body.
7. **Zygote :** The nuclei of sperm and the egg fuse to form a single nucleus, which is called a zygote.
   Gametes : Male and female produce specialized sex cells called gametes.
   Fertilization : Fertilization is a process by which male and female gametes fuse to form a zygote.
8. 23 pairs of chromosomes are present in human male and female.

B. Short Answer Questions :

Ans. 1. **Adolescence** : Period of body growth, when the body undergoes changes leading to reproductive maturity.
   Puberty : The time when changes occur in the body to make sex organs mature and capable of reproduction.
2. **Secondary Sexual Characters**
   In males :
   - Body starts becoming muscular.
   - Voice becomes deeper.
   - Facial hairs in the form of beard and moustaches begin appearing.

- Hair under the arm pit, chest and pubic region start growing.
- Shoulders broaden.

In females :

- Development of breasts takes place.
- Lower portion below the waist starts broadening.
- Hair start growing in the arm pits, and pubic region.
- Menstuation starts.

3. **Secondary sexual characters of a female during adolescence—**
   - Development of breasts takes place.
   - Lower portion below the waist starts broadening.
   - Hair start growing in the arm pits, and pubic region.
   - Menstuation starts.
4. **Estrogen** : The female hormone secreted by the ovaries at the beginning of puberty.

   Testosterone : The male hormone which is secreted by the testes at the beginning of puberty.
5. During reproduction the inner lining of the uterus thickness to recieve the fertilized egg. If it does not happen and pregnency does note take place, the Inner wall of the uterus shoot off along with blood and released egg this cycle is repeated every 23 to 30 days and called as **menstruation**. The first menstruation takes place at puberty. It is called as **menarche**. Menstruation continues up to the age of 45 to 50 years. Menstruation does not occur during the pregnancy. At the end of reproductive phase, when the menstruation stops it is called as **menopause**.

C. Long Answer Questions :

Ans. 1. Reproductive health forms a major part of general health. Reproductive health includes all those features that give an individual a safe and satisfying life. Reproductive health includes the following features :

1. Proper understanding about the reproductive organs

Children should have enough understanding of the reproductive organs and their importance in the life of individual. One should not feel ashamed of asking questions about them if he/she has some queries. They are the parts of the body, like any other part.

Children at the beginning of the puberty period should know that the changes they are going to face, feel or observe in the adolescent period are normal and a part of life cycle. Remember it is always good and useful to get enough knowledge about the sexual processes and you should not feel any hesitation about them.

Adolescence period is a normal time of growing up. As children reach the age of puberty, because of many physical, mental and emotional changes, they come under pressure. They start thinking that something abnormal is happening.

2. Observance of personal hygiene and cleanliness

Personal hygiene plays an important role in keeping us fit and healthy. We should maintain proper caution in keeping our body clean. Undergarments must be changed everyday after taking a proper bath. Each part of the body is important for us, so we must take care of it properly.

3. Nutritional needs of adolescence

During adolescence fast growth of body and body parts takes place. It is therefore essential that the diet of adolescent youth is nutritious, adequate and properly balanced in all nutrients. It must essentially has proteins, carbohydrates, fats, vitamins and minerals in required amounts. Balanced diet does not mean a costly diet. Ordinary diet including roti/rice, dal (pulses), milk and seasonal vegetables can form a balanced diet. Seasonal fruits provides necessary vitamins and minerals.

4. Physical exercise

All young people should perform some physical activity or the other. Playing, outdoor games, jogging, cycling, swimming and brisk walks are good for health. It enhances growth, increases blood circulation, keep skin healthy and keeps tensions away.

2. **Determination of Sex of the child**

The body cells of each human individual, whether male or female, have 23 pairs of chromosomes. Of these 23 pairs, 22 pairs of chromosomes are same in all respects. However 23rd pair is different. The chromosomes of 23rd pair are called **sex chromosomes**. In females these chromosomes are 22 + XX pairs of chromosomes and in males they are 22 + XY pairs of chromosomes. When female gametes (eggs) are produced, each egg contains 22 + X and 22 + X chromosomes. The males produce male gametes (sperms) having 22 + X and other having 22 + Y chromosomes.

From the above it is clear that all children will inherit an X chromosome from their mother regardless of whether they are boys or girls. Thus the sex of the youngs will be determined by what they inherit from their father. A baby inheriting an X chromosome from the father will be a girl and the one who inherits Y from the father will be a boy.

3. **Role of Hormones**

Human body is a complex machine made up of cells, tissues, organs and organ systems. To make all these cells and other parts work regularly, at a right time and in a required sequence there has to be some mechanism in the body. This mechanism is provided by two systems—**nervous system** and **endocrine system**.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Testosterone in boys and estrogen in girls.

2. Adrenalin

Fun Time

A. Find out about HIV, AIDS

Ans. Do yourself

B. In the table below—column A indicates the endocrine gland; column B name of the hormone secreted and column C action of the hormone on the body.

Ans. Do yourself

C. In the circles put X or Y to make the schematic representation of sex determination in humans.

Ans. Do yourself

D. Project Work :

Ans. Do yourself

Lesson 10 Force and Pressure

Formative Assessment

A. State whether the following statement are True (T) or False (F) :

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

B. Fill in the blanks :

Ans.
1. The **pull** or a **push** acting on a body is commonly called force.
2. A force can change the **direction** and **speed** of an object.
3. A force can **move** a stationary body.
4. Muscular force is an example of **contact** force.
5. Electric charges exert **electrostatic** force, whereas magnets exert **magnetic** force.
6. If the same force is made to act on a larger area, the pressure **zero**.
7. A **manometer** is used to measure liquid pressure.
8. The pressure exerted by a liquid increases with **depth**.
9. The pressure exerted by the air around is called **atmospheric pressure**.
10. At the given depth, a liquid exerts **equal** pressure in all directions.
11. The pressure of air **decreases** with the increase in height above sea level.

C. Match the following :

Ans.

Column A	Column B
1. Magnetic force	(a) Non-contact force
2. A physical quantity that determines the pressure in liquids	(b) Depth

D. Find the odd one out :

Ans.
1. Gravitational force, Magnetic force, **Muscular force**, Electrostatic force.
2. Pressure, Force, Area, **Friction**.

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Force of gravity
2. Frictional force
3. Pressure is defined as the force acting on a unit area. In other words,

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

4. Newton
5. N/m2
6. Magnetic force
7. Spring balance
8. Muscular force
9. Pointed hells
10. Muscular force
11. Static
12. Manometer

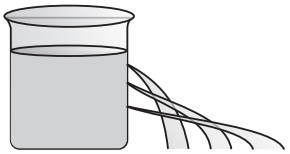
B. Short Answer Questions :

Ans. 1. A push or pull acting on a body which tends to change its state of rest or motion is called a **force**. Force is usually denoted by the letter *F*.
The direction in which the body is pushed or pulled is called direction of the force. The standard unit of force is called *newton*, denoted by the letter *N*.

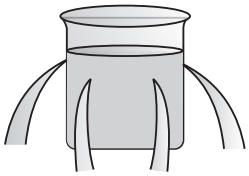
2. The gravitational force exerted by the earth on all other bodies is called the **'force of gravity'**. This gravitational force makes the earth move around the sun and also makes the moon go around the earth.
Every object applies a force on every other object. The magnitude of the force depends on the mass of the objects and also the distance between them. Two pens kept on your table also pull each other, but with a negligible force. (Due to their small masses).
Then why are all the things attracted towards the earth? The answer is simple. Due to the HUGE mass of the earth! The weight of an object on the earth is a measure of the gravitational pull on that object.

3. A blunt knife decrease the pressure. So it is difficult to cut vegetables with the blunt knife.

4. **Liquid pressure increases with depth**
Take two cylindrical cans. In one of them, make 3-4 holes one below the other. Make 3-4 holes in the other can, at the same height all around the walls of the can. Now apply adhesive tape over the row of holes.



A tin can with holes one after other



A tin can with holes around it

Once water is filled in the cans, remove the tape. What do you see?
In the first case we see that, water flows from the lowest hole with great force. It flows from the second hole with less force and from the top hole

with least force. This shows that *liquid pressure increases with depth.*

In the second case you will observe that water comes out from all the holes with equal force. This shows that at any given depth, the pressure is the same in all directions.

5. School bags and shopping bags have broad belts or straps as handles. Narrow handles cause severe pain in the hand because the weight of the bag acts on a small area, so the pressure will be higher.
6. Dams are made thicker and stronger at the base to withstand the high pressure at greater depth.
7. It is for the same reason that at higher hills, some people suffer from nosebleeds. It is because at higher altitude, atmospheric pressure is less, and the pressure of air within their bodies is more. This difference in pressure causes the blood capillaries to burst and cause bleeding.
8. The pressure at the bottom of the sea is much greater than at sea level. Very deep down, the pressure is high enough to crush the human body. That is why deep-sea divers wear specially designed suits to protect their body from such high pressures.
9. The nail with a pointed tip penetrates deeper into the cardboard than the blunt one.
10. The drinking straw, dropper, syringe, etc., all make use of the fact that air exerts pressure. When the air inside them is pushed out, atmospheric pressure forces the drink, ink or medicine up their barrels. When we squeeze the rubber bulb slowly, the liquid comes out of the nozzle drop by drop.
11. Pressure is defined as the force acting on a unit area. In other words,

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

C. Long Answer Questions :

Ans. 1. A push or pull acting on a body which tends to change its state of rest or motion is called a **force**. Force is usually denoted by the letter *F.*

The direction in which the body is pushed or pulled is called direction of the force. The standard unit of force is called *newton*, denoted by the letter *N.*

It must be remembered that a force does not always make an object move. *For example,* you can push a large box without displacing it from its position.

Effect of Force

1. Moves stationary object

When a player kick a stationary ball, it moves. If someone pushes a book lying on a table, it starts moving, i.e., a push makes it move. When someone pulls a chair, it starts moving.

2. Changes the speed of a moving body

If a football player kicks a moving football with force in the direction of motion i.e., in the direction in which it is moving, the football starts

moving faster. When a goalkeeper applies force to stop the ball, he reduces its speed to zero. Similarly, if someone applies brakes to a moving bicycle, it first slows down and then stops.

3. **Changes the direction of motion of a moving body**

When a batsman hits a ball with his bat, he applies force to change the direction of the moving ball. In the same way you change the direction of your moving bicycle by applying force to its handle in the desired direction.

4. **Change the shape or size of an object**

If you squeeze a lump of a sponge, its shape changes. Have you seen your mother making chapattis? She takes a small ball of dough and completely changes its shape and size by rolling it on the board. We can also break things made of glass very easily by applying force to them.

To conclude, a force may change the state of motion of an object or change the shape of an object.

2. **Contact and Non-Contact forces**

Some forces act on objects only when they are in contact with each other. For example, if you want to carry a bucket of water, you apply a force directly to the handle of the bucket. In the same way, if you have to pick up your school bag, you apply a force directly on the handle of the bag.

Forces that act only when there is physical contact between two interacting objects are known as **contact forces**. Muscular force and frictional forces are two examples of contact forces.

However, there are few other forces that can also act on an object even if objects are not in contact. These forces are called **non-contact forces**, *e.g.,* gravitational force, magnetic force and electrostatic force.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. All cutting instruments like knives, blades, axes, etc., are sharpened (thin) at the intersection. This is done so as to increase the pressure applied by these instruments for a given force.

2. To lesson the pressure of tyres.

Fun Time

1. Do yourself
2. Do yourself

Lesson 11 Sound

Formative Assessment

A. Choose the correct answer for each of the following :

Ans. 1. (i) 2. (ii) 3. (iii) 4. (i) 5. (i) 6. (iv)

B. State whether the following statements are True (T) or False (F) :

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

C. Fill in the blanks :

Ans. 1. The frequency of a sound determines its **shrillness or pitch**.
2. Sound above 20000 Hz are called **ultrasonic**. They **cannot** (can/cannot) be heard.
3. All unpleasant and undesirable sounds are known as **noise**.
4. The SI unit of frequency of sound is **Hertz (Hz)**.
5. The more is the frequency, shriller is the **sound**.
6. Sound cannot travel through **vacumn**.

D. Match the two columns :

Ans.

Column A		Column B
1. Vacuum	(a)	A medium through which sound cannot travel
2. Larynx	(b)	Produces sound in humans
3. Frequency	(c)	The number of vibrations produced by a vibrating particle in one second
4. 331 m/sec	(d)	Speed of sound travelling through air
5. Vibration	(e)	To and fro motion of a vibrating body about its mean position
6. Amplitude	(f)	Maximum displacement of a vibrating body from its mean position

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. **Sound** is something that makes the sensation of hearing in our ears. We hear different types of sounds produced by living beings as well as non-living things. We can recognize some of them even without seeing them.
2. Sound can be produced by making the objects move to and fro or back and forth. The to and fro or back and forth motion of an object is called **vibration**.
3. Generally **audible sound** is used to mean the sound which can be perceived by the human ear. Audible and inaudible sounds are relative terms. Audibility of sound depends upon the capability of the ear. The audible range of sound for human beings is from 20 Hz to 20 KHz. The sounds having frequencies above and below this range are inaudible sounds for human beings.
4. Some of harmful effects of noise pollution are :

Deafness	Lack of concentration
Blood pressure	Fatigue

B. Short Answer Questions :

Ans. 1. Sounds of frequency higher than 20 KHz are called ultrasonic sounds. Sounds of frequency lower than 20 Hz are called infrasonic sounds. They

are not audible to the human ear.

2. **Sources of Noise Pollution**

Noise pollution is a by-product of industrialization, urbanization and modern civilization. Mainly, noise pollution has two main sources, i.e., industrial and non-industrial. Industrial sources include noise from various hotels, sirens and machines in industries. Non-industrial sources of noise include the noise made by vehicular traffic and the neighbourhood.

Noise pollution can also be categorized as natural and man-made.

C. Long Answer Questions :

Ans. 1. Sound is a type of energy and is made by a vibrating body through a medium. The vibrating object transfers its energy to the neighbouring molecules in a medium, which in turn passes on the energy to the other molecules. In this way, sound is propagated. When air is completely removed from a container, vacuum is created in it. No sound can be propagated in such a container as there is no medium for sound to travel.

2. All types of sounds that we hear are not the same. We can distinguish between different sounds on the basis of the following features :

(i) Loudness (ii) Pitch

Loudness

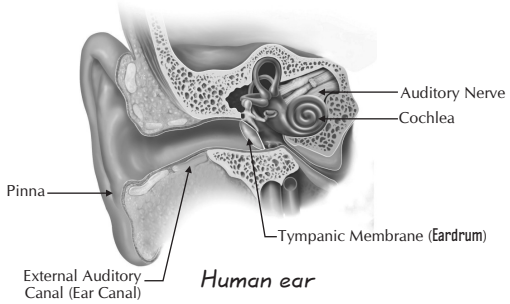
It is the feature of sound which distinguishes a feeble sound from a loud one of the same frequency. Loudness of a sound depends on the amplitude of the oscillation. It is measured in decibels (dB). Oscillation of a large amplitude produces a loud sound.

Pitch

The frequency of vibration determines the shrillness or pitch of a sound. The more is the frequency, the shriller is the sound. Some examples of low pitch sounds are roar of a lion and beating of a drum.

Some examples of high pitch sounds (high frequency) are screaming of a child and buzzing of mosquitoes.

3.

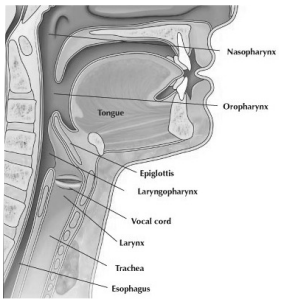


Human ear

4. Sound can be made by vibrating in object. For example, when a drumstick hits a drum, the flexible skin of the drum vibrates up and down and produces sound. Place your fingers against the front of your throat

and and recite a poem or sing a song or speak. You can observe the movement of your throat. From these examples we found that sound is produced by vibrating bodies. *This type of to and fro or back and forth motion of an object is called* **oscillatory motion**.

In human beings sound is made by the voice box (larynx). The two vocal cords are the ligaments that are stretched across the voice box. The voice box leaves a narrow slit between the vocal cords for air to move. When air passes through the slit, the vocal cards vibrate and make sound.



D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Sound can travel through metal. 2. Loud music can become noise.
3. The sound will travel slower.

Fun Time

Project Activities

1. Do yourself 2. Do yourself 3. Do yourself

Lesson 12 Chemical Effects of Electric Current

Formative Assessment

A. Choose the correct answer for each of the following :

Ans. 1. (ii) 2. (i) 3. (ii) 4. (i) 5. (iii)

B. Complete the table for the electrolysis processes given below :

Ans. Do yourself

C. State whether the following statements are True (T) or False (F):

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. **Electrolysis :** A chemical change brought about by the passage of electric current.
2. Gold and Silver 3. Zinc
4. By tarting there 5. Salt

B. Short Answer Questions :

Ans. 1. (i) **Electrolysis :** A chemical change brought about by the passage of electric current.
(ii) **Cation :** Positively charged particles.
(iii) **Anion :** Negatively charged particles.
(iv) **Electrolyte :** A compound which conducts electricity in molten and aqueous form.

(v) **Cathode :** Negative electrode.

(vi) **Anode :** Positive electrode.

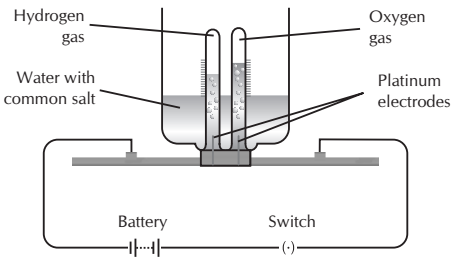
2. (i) Some substances such as water, dilute hydrogen chloride and sodium chloride which conduct electricity in aqueous (solution) or molten form are known as **Electrolytes**. Other substances which do not conduct electricity in aqueous or molten form are known as Non-electrolytes. Petrol, oil, carbon tetrachloride and distilled water are examples of non-electrolytes.

(ii) Electrolysis is an important industrial process which is used to get metals from their oxides and chloride. Sodium metal is extracted by electrolysis of solution of sodium chloride in a container containing a negative and a positive electrode. On passing electricity, sodium metal is deposited at the negative electrode also known as cathode white chlorine gas is liberated at the positive electrode also known as **Anode**.

(iii) In electroplating, the object to be coated is made the negative electrode (anode). Salt solution of the metal to be coated is the electrolyte. Certain metals like copper, zinc and iron are also purified by the method of electrolysis. It is called **Electolytic refining**.

3. **To see the chemical change in water when electricity is passed through it.**

Take a voltameter having two platinum electrodes. Join them to the terminals of a 6 volt battery. Fill up the voltameter about half with water containing dissolved common salt. Take two test tubes, fill them with the same salt solution and invert them over the platinum electrodes. Switch on the circuit. When the electric current starts flowing through the salt solution, you will see bubbles of gas coming out from both the electrodes. But, the gas collected at the negative terminal is twice in volume as compared to the gas collected at the positive terminal.



You know that water is made up of hydrogen and oxygen. The gas collected at the negative terminal is hydrogen while at the positive terminal it is oxygen. They can both be checked by taking a burning matchstick after the test tubes are completely filled with gas and removed. In case of hydrogen, the matchstick will burn out with a pop sound while in case of oxygen, the matchstick will burn brightly, with a flame.

This activity shows that due to the passage of electric current, water is dissociated into its constituents *i.e.* hydrogen and oxygen.

$$\text{Water} \xrightarrow{\text{electric current}} \text{Oxygen} + \text{Hydrogen}$$

The above process is known as **Electrolysis of water**.

4. **Tester Made of LED**

When electric current is passed through the filament of the bulb, it gets heated to such a high temperature that it starts glowing. But sometimes if current flowing through the filament of the bulb is very small then it does not get heated to a high temperature. As a result the bulb does not glow. In this case we should replace the electric bulb with LED (light emitting diode). It glows even when a very small current flows through it. LED has two wires called leads attached to it. The longer lead of LED must be connected to the positive terminal of the battery and the shorter one should be connected to the negative terminal.

Tester Made of Compass Needle

When electric current flows in a wire, magnetic field is made around it. This is called magnetic effect of current. When even a very small current flows in a wire, a compass needle kept, nearby gets deflected.

5. Activity

Aim : To check the conducting properties of distilled water and water containing dissolved salts.

Materials required : Two beakers, distilled water, water containing dissolved salt, a tester.

Take one beaker and fill it half with distilled water. Put free ends of the tester into the distilled water. Do not touch the free ends of tester. What do you see? Take other beaker and fill it half with water containing dissolved salt. What do you see?

Observations : In the case of distilled water, bulb of the testes does not glow even if the circuit is complete. In the second case the bulb starts glowing as soon as the circuit is completed.

Conclusions : Distilled water does not conduct electricity while water containing dissolved salt conductors electricity. Hence it is a good conductor.

C. Long Answer Questions :

Ans. 1. **To see the chemical change in water when electricity is passed through it.**

Take a voltameter having two platinum electrodes. Join them to the terminals of a 6 volt battery. Fill up the voltameter about half with water containing dissolved common salt. Take two test tubes, fill them with the same salt solution and invert them over the platinum electrodes. Switch on the circuit. When the electric current starts flowing through the salt solution, you will see bubbles of gas coming out from both the electrodes. But, the gas collected at the negative terminal is twice in volume as compared to the gas collected at the positive terminal.

You know that water is made up of hydrogen and oxygen. The gas collected at the negative terminal is hydrogen while at the positive terminal it is oxygen. They can both be checked by taking a burning matchstick after the test tubes are completely filled with gas and removed. In case of hydrogen, the matchstick will burn out with a pop sound while in case of oxygen, the matchstick will burn brightly, with a flame.

This activity shows that due to the passage of electric current, water is dissociated into its constituents *i.e.* hydrogen and oxygen.

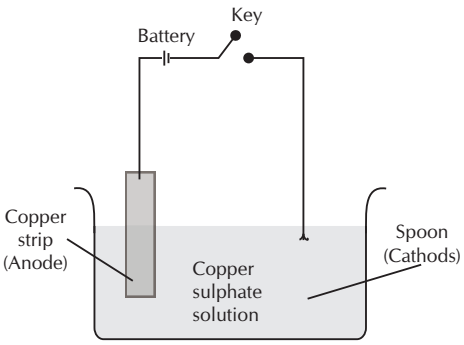
$$\text{Water} \xrightarrow{\text{electric current}} \text{Oxygen} + \text{Hydrogen}$$

The above process is known as **Electrolysis of water**.

2. **Activity**

Electroplating a metal spoon with copper.

Take a glass beaker, a metal spoon strip of copper, a battery, connecting wires and copper sulphate solution. Fill the beaker half with copper sulphate solution. Join the copper strip to the positive terminal of the battery and the spoon to the negative terminal. Dip both of them in the copper sulphate solution such that they do not touch each other. Let the current pass through the electrolyte for about 30 minutes.



You will see that while the copper strip becomes smaller, the metal spoon is plated with a layer of copper.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. The food remains fresh.

2. Do yourself

Fun Time

Activity Worksheet

Ans. 1. Do yourself 2. Do yourself

Activity Worksheet

Ans. 1. Do yourself 2. Do yourself

Formative Assessment 3

A. Tick (✓) the correct option:

Ans. 1. (i) 2. (iv) 3. (i) 4. (i) 5. (iii)

B. Unscramble the following : (Name of the hormones)

Ans. 1. THYROID 2. INSULIN 3. ADRENALIN

4. ESTROGEN 5. PITUITARY

C. Match the two columns :

Ans.

Column A		Column B
1. Vacuum	(i)	A medium through which sound cannot travel
2. Larynx	(ii)	Produces sound in humans
3. Frequency	(iii)	The number of vibrations produced by a vibrating particle in the second
4. 331 m/sec	(iv)	Speed of sound travelling through air
5. Vibration	(v)	To and fro motion of a vibrating body about its mean position
6. Amplitude	(vi)	Maximum displacement of a vibrating body from its mean position

D. Complete the table for the electrolysis processes given below :

Ans. Do yourself

E. Answer the following questions :

Ans.
1. **Endocrine glands :** The glands which secrete hormones directly in the blood stream. They do not have duct to carry their secretions.
2. Frictional Force.
3. Sound is something that makes the sensation of hearing in our ears. We hear different types of sounds produced by living beings as well as non-living things. We can recognize some of them even without seeing them.
4. **Electrolysis :** A chemical change brought about by the passage of electric current.

Lesson 13 Light

Formative Assessment

A. Choose the correct answer for each of the following :

Ans. 1. (iii) 2. (i) 3. (i) 4. (i) 5. (ii)

B. Match the following :

Ans.

Column A		Column B
1. Coloured part of the eye	(a)	Iris
2. Long sightedness	(b)	Hypermetropia
3. Cataract	(c)	Cloudy lens
4. Short sightedness	(d)	Myopia

Summative Assessment

A. Very Short Answer Questions :

Ans.
1. **Regular reflection :** Reflection of light from a highly polished surface is called regular reflection.
   Diffused reflection : Reflection of light from a rough surface is called diffused reflection.

2. The tiny hole in the centre of the eye through which light enters the eye is termed as the **Pupil**.
3. The band of colours produced in dispersion is called a **Spectrum**.

B. Short Answer Questions :

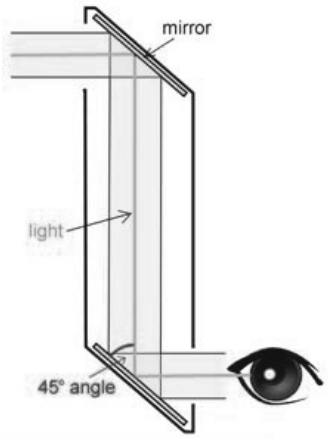
Ans. 1. **Law I :** The first law states that the incident ray, the reflected ray, and the normal at the point of incidence lie on the same plane.

Law II : The second law states that the angle of incidence is equal to the angle of reflection.

2. The characteristics of an image formed by a plane mirror.
   - The distance of the image from the mirror is the same as the distance of the object from the mirror.
   - The size of the image is the same as the size of the object.
   - The image is virtual or not real and can be seen only on a screen such as a mirror.
   - The image is upright or in a vertical position.
   - The image is laterally inverted. In other words, the left side of the image is seen on the right side of the mirror and vice-versa.
3. The phenomenon of splitting of white light into its seven component colours is called **dispersion of light**.

   Rainbow is an example of dispersion of white light by water particles suspended in the air.
4. **Periscope**

   A periscope allows the user to see things which are not in his or her line of sight. It consists of a rectangular tube bent twice at an angle of 90 degrees. Two plane mirrors are placed at each end parallel to each other. Light rays from the object being viewed fall on the first mirror, which reflects them onto the second mirror. The reflected rays from the second mirror are received by the eyes of the viewer.

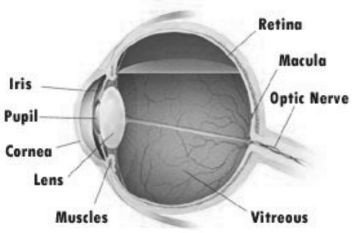


5. These people are those who have reduced vision, cannot see at all from birth or have lost their eyesight due to a disease. Such people need to use artificial aids or devices to help them to things as efficiently as a person with normal vision.

   Various types of aids are available for the visually challenged. Electronic machines such as portable Braille typewriter, talking calculator, talking clock, audio dictionary, etc., are there. Among these devices, the ***Braille system*** helps the blind to read and write. It uses patterns of raised dots to represent letters and numerals.

C. Long Answer Questions :

Ans. 1. **The Human Eye**



Parts of a human eye

Given alongside is a picture of the human eye. The internal parts of the human eye are :

Cornea : It is a thin, transparent membrane that covers the front of the eye.

Pupil : The tiny hole in the centre of the eye through which light enters the eye is termed as the pupil.

Iris : It is the coloured part of the eye. It controls the amount of light that enters through the pupil by increasing or decreasing the size of the pupil.

Lens : It is a transparent jelly-like material found between the pupil and retina. The light which enters through the pupil is brought to focus by the lens. Ciliary muscles hold the lens in place.

Sclera : It is the white part of the eye. It is filled with a clear watery fluid.

Blind Spot : Blind spot is a part on the retina that does not have any rods and cones. So the images falling on this part of the retina cannot be seen.

Optic nerve : It carries impulses from the retina to the brain.

2. **Defects of the Eye**

In people with good eyesight, the rays of light will come to focus on the retina. They can see both near and far things clearly. The correct distance for a human eye to view objects is 25 cm. This is called the ***least distance of distinct vision.*** Many people do not have this vision due to certain eye defects such as short-sightedness or **myopia**, long-sightedness or **hypermetropia**, and **cataract**.

Short Sightedness or Myopia : Short-sighted people can see nearby objects easily but not distant objects. This is because the image is focused in ***front*** of the retina. This defect can be corrected using a *concave lens* of a suitable focal length.

Long Sightedness or Hypermetropia : Long-sighted people can see distant objects easily but not nearby objects. This is because the rays of light come to focus *behind* the retina. Hypermetropia can be corrected using a convex lens of a suitable focal length.

Cataract : Sometimes the eye lens become *cloudy* or *opaque* and causes blurred or dimmed vision leading to an eye disease called *cataract.* Cataract can be corrected by surgery in which the eye lens is replaced by an artificial lens.

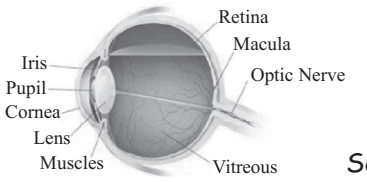
D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Do yourself 2. Do yourself

Fun Time

A. Label the parts of the human eye shown here.

Ans.



B. Make your own kaleidoscope.

Ans. Do yourself

Lesson 14 The Night Sky

Formative Assessment

A. Choose the correct answer for each of the following :

Ans. 1. (iii) 2. (iv) 3. (ii) 4. (iv) 5. (iii) 6. (i)

B. Fill in the blanks :

Ans.
1. **Cassiopeia** is a constellation with a group of five bright stars arranged in the form of a W or an M.
2. The large red spot in the surface of Jupiter is actually a giant **Storm**.
3. The temperature at the centre of a star ranges from **2 to 5** million degree celsius.
4. **Celestial** bodies are also called heavenly bodies.
5. Asteroids can only be seen through a poweful **Telescope**.
6. Neptune has **Eight** known moons revolving around it.

C. Match the two columns :

Ans.

Column A	Column B
1. Pole star	a. Appears to be stationary in the sky
2. Outer planets	b. They are mostly made of gases and have rings around them
3. Uranus	c. The planet with a highly tilted rotational axis
4. Halley's comet	d. Appears after every 76 years
5. Lesser Bear	e. Ursa Minor
6. Ceres	f. The largest asteroid which is also a dwarf planet
7. Orbit	g. The definite path on which the planets revolves around the Sun
8. Mercury	h. The smallet planet

D. State whether the following statements are True (T) or False (F) :

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

Summative Assessment

A. Very Short Answer Questions :

Ans.
1. The sun is a medium-sized star. The diameter of the sun is about 1.4 million kilometers. It is a huge ball of gases. Nearly 90 per cent of the sun is made of hydrogen. This hydrogen is constantly converted into helium by a process called **Nuclear fusion**.
   This makes Sun the main source of heat and light for all the planets.
2. The distance travelled by the light in one year is called **light year**. It is

used to measure large distances.

3. Venus rotates from east to west. This east to west rotation is called **Retrograde motion**. Venus has no satellite of its own.
4. The name of our galaxy is **Milky Way or Akash Ganga**. It is a broad band of light that looks like a trail of milk spread across the sky.
5. Meteoroids move at a very high speed as they enter the earth's atmosphere. As a result, they burn due to friction and can be seen as a streak of light. This streak looks like a falling star and is called a **Meteor** or a **shooting** star.

B. Short Answer Questions :

Ans. 1. Despite being further away from the Sun than Mercury, Venus is hotter. This is because it has a high percentage of carbon dioxide which causes heating due to the greenhouse effect.

2. (a) Stars are luminous heavenly bodies. They give out their own light but planets do not have the light of their own.

   (b) **Meteoroids :** These are solid objects that are smaller than comets and asteroids in size. They keep moving in the solar system. The visible streak that occurs when a meteoroid enters the earth's atmosphere is called **meteor**. The unburnt meteoroids that reach the earth's surface are called **meteorites**.

   (c) **Inner planets :** Some planets are nearer to the Sun than the other planets. They are called **inner planets** or terrestrial planets. They are Mercury, Venus, Earth and Mars. Inner planets do not have rings and are mostly of rocks. Due to this, they are very dense.

   Outer planets : Jupiter, Saturn, Uranus and Neptune are called ***outer planets*** or jovian planets. They are larger and much farther away from the Sun as compared to the inner planets. They are mostly made up of gases, are light and have rings around them.

   (d) **Satellites :** These are small celestial bodies that revolve around the planets. The earth has only one satellite—the **moon**.

   Planets : All planets revolve around the sun in a definite path called orbit.

   (e) **Constellation :** A group of stars that forms a shape in the sky and has a name.

   Galaxy : The system of stars containing the Sun and its planets, seen as a bright band in the sky.

3. **Dwarf planets :** Very small planets are called ***dwarf planets***. Till date three dwarf planets, Pluto, Ceres and Eris have been discovered.

4. (a) Phases of the moon : The shapes of the bright part of the moon as seen from the earth are known **as phases of the moon**. New moon, crescent moon, first quarter, gibbous moon and full moon are the various phases of the moon.

   (b) **Ursa Major (Vrihat Saptarishi)**

Ursa Major consists of seven bright stars arranged in the form resembling a big spoon. There are three stars in the handle of the ladle and four in its bowl.

Ursa Major is also termed as **'Big Dipper** as the word 'dipper' in early days meant a large spoon used for drinking water. Ursa Major is also termed as the Great Bear because along with several other faint stars, it forms the shape of a bear.

(c) **Earth (Prithvi)**

The Earth is the only unique planet in the solar system on which life is known to exist. The three things responsible for sustenance of life on the Earth are :

- right temperature range.
- right distance from the Sun.
- presence of water, a suitable atmosphere and a layer of ozone which protects us from the harmful ultraviolet radiations.

From outer space, the Earth appears blue-green due to the reflection of light from water and landmass on its surface. Earth has one natural satellite the moon. The Earth rotates on its own axis which is tilted at an angle of 23.5°. This tilting always remains in the same direction and is responsible for change in seasons.

(d) **Unique feature of Saturn :** One of the special features of Saturn is the presence of rings around it which are actually small lumps of dust and ice moving around the planet at a high speed. Due to very low temperature life is not possible on Saturn.

Saturn appears yellow in colour. It is the least dense among all planets with density lesser than water.

(e) **Asteroid :** Asteroids are large pieces of rocks or metals revolving around the Sun in between the orbits of Mars and Jupiter. They can only be seen through a powerful telescope. It is believed that there are a large number of asteroids out of which about 4,000 have been discovered so far. Asteroids are of different size. The largest asteroid Ceres is actually a dwarf planet with a diameter of approximately 950 km.

(f) **Orion (Vyadha or Mriga)**

Orion looks like a hunter and is one of the most important constellations in the sky. It also has seven or eight bright stars. The three middle stars represent the belt of the hunter. The four bright stars seems to be arranged in the form of a quadrilateral.

The star Sirius, which is the brightest star in the sky, is situated close to Orion. A straight line passing through the three middle stars of Orion lead to the star Sirius. Orion is visible during winter season in the late evenings.

(g) **Planets :** The word 'planet' is taken from a Greek word which means 'wanderer'. All planets revolve around the sun in a definite path called **orbit**. Planets do not have the light of their own. They reflect the sunlight that falls on them. They do not twinkle like stars and keep changing their positions with respect to the star.

(h) **Comets :** Comets are heavenly bodies that revolve around the Sun in very large orbits. They are lumps of rock, dust and ice.

(i) **Jupiter (Brihaspati)**
The distance of Jupiter from the Sun is more than the sum of the distances of the first four planets from the Sun. Thus it receives much less energy as compared to the first four planets. It is the largest planet of the solar system. It is so large that about 1300 earths can be placed inside it. Life is not possible on this planet as it has very low temperature and very high gravitational pull.

C. Long Answer Questions :

Ans. 1. Although all stars appear to move from east to west, there is one star near the earth's axis that appears stationary. This is the **Pole star or Polaris or Dhruv tara**. Let us perform Activity 2 to learn about this.

Activity

To know why the Pole star appears stationary.

- Take a black umbrella and open it.
- Paste silver stars of different sizes at different places on its inner side and one big star near the rod.
- Now rotate the umbrella and see the stars.
- You will see that all stars appear to move except the star pasted near the rod. This star can be compared to the Pole star and the umbrella's rod can be compared to the earth's axis.

2. **The Earth's Moon**
The earth has only one satellite. It is large enough in comparison to the other satellites. It is about one-fourth the size of the earth. It is made up of rocks and has craters on its surface. These craters were formed when meteorites hit it. The moon is at a distance of about 3,84,000 km from the earth.
The moon has no light of its own. It reflects the light of the Sun. It rotates on its own axis and also revolves around the earth. That is why only one side of the moon is visible to us. You must have observed that you do not see the moon with the same shape every night. This is because the Sun lights up different parts of the moon as it revolves around the earth and we can only see the lit side of the moon. These shapes of the bright part of the moon as seen from the earth are known as **Phases of the moon**.

3. The solar system consists of the Sun and all the other celestial bodies that revolve around it. The planets and their moons, comets, asteroids, and other space objects revolve around the sun in definite orbits.

4. Comets appear like a ball of fire with a long tail. The tail always points away from the Sun. The length of the tail of a comet increases while coming towards the Sun. This is because the heat of the Sun melts some of ice turning it into gas. Some dust also comes out forming a cloud of gas and dust around the comet. As the comet comes nearer to the Sun, more dust and gas are given off making its tail visible.
5. Stars are luminous heavenly bodies we regularly notice in the night sky. They give out their own light and are made of mostly hydrogen. The temperature at the centre of a star ranges from 2 to 5 million degree celsius. This high temperature results in melting and combining of hydrogen atoms to form a heavier gas called **Helium**. During this process huge amount of heat and light energy is released. This makes stars emit heat and light.

D. High Order Thinking Skills (HOTS) Questions :

Ans. 1. Do yourself 2. Because Mercury in the nearest planet to the sun.
3. Do yourself 4. Do yourself
5. Due to the light of the sun.

Fun Time

Project Activities

Ans. 1. Do yourself 2. Do yourself 3. Do yourself

Lesson 15 Some Natural Phenomena

Formative Assessment

A. Choose the correct answer for each of the following :

Ans. 1. (ii) 2. (i) 3. (i) 4. (i) 5. (iv)

B. Fill in the blanks :

Ans. 1. A plastic ruler is **charged** on rubbing against a piece of fur.
2. A glass rod is charged **by rubbing it with silk**.
3. Like charges **repel** while unlike charges **attract** each other.
4. A lightning conductor is usually made of **a flat thick strip of** metal.
5. An **earthquake** is a sudden tremor in the earth's crust.
6. A point on the earth's surface above the seismic focus is called **epicentre**.

C. Correct the following statements :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. The uncharged body will be charged.
2. An earthquake with epicentre on the ocean floor can move the

surrounding sea water violently and destructive waves called **tsunamis**. Tsunamis can rise up to a height of 30 metres and flood coastal areas, thousands of kilometres from their point of origin.

3. (i) Ground Shaking (ii) Fault Slippage
4. (i) Conduction (ii) Induction
5. Benjamin Franklin

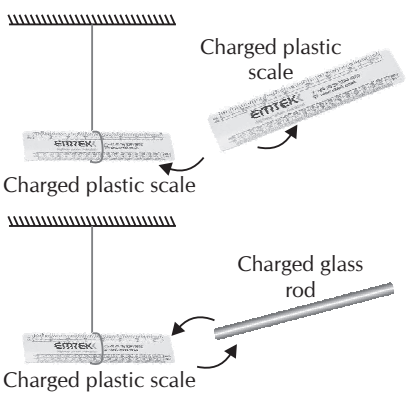
B. Short Answer Questions :

Ans. 1. **Interaction between charged bodies**

Let us perform the following activity.

To observe repulsion and attraction in charged bodies.

(a) Take a plastic scale and hang it from a stand by using a thread. Rub it with a piece of fur. Take another plastic scale charged in similar way. Bring them close. You will see that they move away (repel) from each other.



(b) Take a glass rod and rub it with silk cloth. Bring another glass rod charged similarly near this rod. You will see that they too repel one another.

(c) Bring the positively charged glass rod near the negatively charged plastic scale. They will move towards each other (attract).

What do we conclude from the above activity?

- Similar or like charges repel one another.
- Opposite or unlike charges attract each other.

2. **Conduction** — Charging a neutral body by bringing it in contact with another body.

   Induction — Charging a body by bringing it near another charged body.

3. **How does Earthquake Occur**

Earthquakes generally occur around regions that have a fault or a break in the earth's rocky crust where sections of rock repeatedly move past each other. Most of the fault regions lie deep inside the earth but some are visible on the surface too.

An earthquake mostly begins from a point where the frock first breaks in the earth. This point is called the **Seismic focus**. The point on the surface of the earth directly above the seismic focus is called the **Epicentre** of the quake.

When the earthquake occurs the violent shifting and breaking of rock gives out energy that travels through the earth in the form of vibrations called seismic waves.

4. **Measuring and Recording an Earthquake**

The scientists record the strength and location of an earthquake by an instrument called **Seismograph**. It has sensors that can detect ground movements as small as 1 hundred-millionth of a centimetre.

The scale for recording the magnitude of an earthquake is called a **Richter scale** developed by an American seismologist Charles F. Richter. The scale varies from 1 to 10 but the highest Richter magnitude ever measured is 8.5 for an Alaska (USA) earthquake in 1964. The effect and frequency of earthquakes on the basis of Richter scale are given in the table below.

5. On the basis of earthquake damage risk zones, the country is divided in 5 parts—Zone I, II, III, IV and V. Zone I is the least prone and zone V is the most prone to earthquakes.

Zone I (Very low risk zone) : Areas of south India, Odissa, Andhra Pradesh and Rajasthan fall under this zone.

Zone II (Low risk zone part of Deccan Plateau) : This zone had two major earthquakes, one in 1993 around Killari Village in Latur district (6.4 on the Richter scale), and the second one in Koyna area (6.5 on Richter scale).

Zone III (Moderate risk zone) : 223 out of total 597 districts fall under zone III. Mumbai, Kolkata, Chennai also fall in this zone.

Zone IV (High risk zone) : Delhi, Haryana, Punjab and Jammu & Kashmir areas fall under this zone.

Zone V(Very high risk zone) : The complete north-east and Kuchchh part of Gujarat fall under this zone.

C. Long Answer Questions :

Ans. 1. **Lightning Conductor :** The idea of lightning conductor was first introduced by Benjamin Franklin who suggested that if a building has a number of pointed metal rods connected to the ground, the charge built by a storm will be quietly discharged to the ground.

A lightning conductor specifically consists of a flat thick strip of metal, shaped like a spike at the top. It is ground in such a manner that its top is projected out while the lower end is joined to a metal plate which is buried deep inside the ground.

When lightning strikes, the lightning conductor makes a passage for the entire charge to pass to the ground without damaging the building. The metal used for a good lightning conductor is usually copper. Proper care should be taken to ensure that the lower end is firmly in contact with the earth else both the conductor and the building may suffer damage due to lightning.

2. **Destruction Due to Earthquakes**

Destruction caused by earthquakes is tremendous in terms of both life and property. Earthquake creates vertical and horizontal displacement of

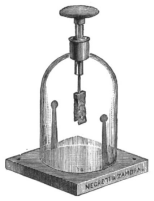
earth's surface. The damage due to earthquakes may be described as follows :

1. **Ground Shaking :** It causes the structures and walls to move sideways violently. Buildings may be shaken from their foundation and collapse.
2. **Fault Slippage :** Shifting of large blocks of earth's crust near the fault is called ***fault slippage***. In a major earthquake of this type the ground may suddenly move up a few metres or more. The buildings or structures close to it will get completely destroyed. It may loosen the soil and rock and trigger a landslide. It may also break down the banks of rivers and cause flooding.
3. **Tsunamis :** An earthquake with epicentre on the ocean floor can move the surrounding sea water violently and destructive waves called ***tsunamis***.
4. **Other Hazards :** Fires may begin if an earthquake reptures gas or power lines. In 1906, San-Fransisco, earthquake turned disastrous due to a fire that broke out for few days and could not be controlled.
   Oil spills, breakdown of sewage lines, shortage of drinking water, disruption in power supply and communication are some serious consequences of an earthquake. Besides huge loss of human life and injuries many communicable and water borne diseases like dysentery, cholera and typhoid too break out.

3. **Measures to minimise loss due to earthquake**
   1. If you are in a building when the tremors occur, shift away from the exterior walls. Stay away from windows, almirahs, hanging things. Hide yourself under a strong table, doorway or a bed. Protect your eyes by pressing your arms over them.
   2. If driving, move the vehicle to the side of the road and stop your vehicle away from trees, boards, bridges and electric poles.
   3. Do not use any electric points.
   4. Do not panic and use your resources to help others if you are safe. Co-operate with government agencies in evacuation and providing healthcare.
   5. Government and local organisations should have an exhaustive programme and machinery which should be put into action immediately to manage the crisis.

4. (a) **Earthquake :** An earthquake is a violent vibration or trembling of the earth's crust. It occurs due to any breaking and shifting of large sections of the earth's rocky outer layer. The tectonic forces that build the land forms, such as, mountains, are also the cause of earthquakes. An earthquake is usually accompanied by evolution of huge amount of energy stored within the earth's interior.
   (b) **Gold Leaf Electroscope :** Look at the figure given along side that

shows the commonly used gold-leaf electroscope. It has two thin leaves of gold mounted in a box or bottle attached on the other end to a metal rod with a metal disc.


Gold leaf electroscope

(c) **Epicentre :** An earthquake mostly begins from a point where the frock first breaks in the earth. This point is called the **seismic focus**. The point on the surface of the earth directly above the seismic focus is called the **epicentre** of the quake.

(d) **Tsunami :** An earthquake with epicentre on the ocean floor can move the surrounding sea water violently and destructive waves called ***tsunamis.*** Tsunamis can rise up to a height of 30 metres and flood coastal areas, thousands of kilometres from their point of origin.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Now think and answer the following :

1. Do yourself 2. Do yourself

Fun Time

1. Do yourself 2. Do yourself 3. Do yourself

Activity Worksheet

1. Crossword Puzzle

Ans. Do yourself

Lesson 16 Pollution of Air

Formative Assessment

A. Choose the correct answer for each of the following :

Ans. 1. (ii) 2. (iii) 3. (ii) 4. (iv) 5. (i)

B. Fill in the blanks by choosing the correct option :

Ans.
1. **CFCs** and plant spores are also causes of air pollution.
2. **Carbon monoxide** causes irritation in the eyes.
3. Acid rain makes water bodies **acidic**.
4. **UV rays** can cause skin cancer and eye problems.
5. The increase in the carbon dioxide level in the air may be responsible for **global warming**.

C. Match the following :

Ans.

Column A	**Column B**
1. UV rays	a. Skin cancer
2. Acid rain	b. Damage to buildings
3. Oil spill	c. Chemical pollution
4. Ozone depletion	d. Global warming
5. Chlorine tablet	e. Disinfecting water

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. **Pollution :** An undesirable change in the physical, chemical, or biological characteristics of the natural environment is called pollution.

2. Air pollution, water pollution and noise pollution.

3. **Air pollution :** The presence of chemicals in the air in quantities harmful to human health and the environment is known as air pollution.

4. **Greenhouse effect :** The phenomenon whereby the Earth's atmosphere traps solar radiation because of the presence of gases such as carbon dioxide, water vapour, and methane is called greenhouse effect.

5. UV rays can cause skin cancer and eye problems.

6. Chemical pollution and biological pollution.

7. **Potable water :** The water that is suitable for human consumption is called potable water.

B. Short Answer Questions :

Ans. 1. The main causes are : Pollutants such as chlorofluorocarbons (CFCs) are released from air conditioners, and refrigerators.

- Burning of fossil fuels releases gases such as the oxides of carbon, nitrogen, sulphur, and solid particulate matter such as soot into the atmosphere.
- Mining activities, factories, volcanoes, blowing of dust storms, and plant spores are also causes of air pollution.

2. **Effects on health**

- It may cause breathing problems, lung infection, and asthma attacks.
- Oxides of nitrogen and sulphur combine with the moisture in the air to forms acids such as nitric acid and sulphuric acid, and cause irritation in the eyes. These acids are responsible for acid rain.

3. **Harmful effects of acid rain**

- Soil becomes acidic making it unsuitable for cultivation.
- Acid rain turns water bodies such as lakes, ponds, and rivers acidic making them unsuitable for acquatic plant and animal life.
- Buildings, monuments, and sculptures (made of bronze or marble) are gradually damaged from the action of the acids. An example is the Taj Mahal in Agra. Acid rain and pollution from nearby industrialized sector has been turning it yellow.

4. Greenhouse effect is a natural phenomenon without which the Earth would be too cold to support life. However, an increase in the amount of greenhouse gases can raise global temperatures. This, in turn, can change the climate of the world, leading to global warming. Global warming may cause frequent floods, droughts, and also lead to the melting of the polar ice caps, thus raising the sea level and drowning low-lying areas near the coasts.

5. CFCs released in the atmosphere caused the damage to the ozone layer.

The ozone layer protects living beings from the harmful ultraviolet (UV) rays, of the sun, which can cause skin cancer and eye problems. Since the late 1970s, the use of CFCs has been reduced drastically. Consequently, the depletion of the ozone layer has been reduced, too.

C. Long Answer Questions :

Ans. 1. **Prevention of Air Pollution**

Air pollution can be prevented by following the measures given below :

Proper maintenance of automobiles : Regular pollution check should be done for all automobiles.

Planting trees : Threes absorb carbon dioxide and also help in reducing the dust particles in air.

Use of proper fuels for automobiles : Addition of lead to petrol makes petrol burn with less smoke and fumes, but it increases the amount of lead in the atmosphere. So, the use of unleaded petrol or less-polluting fuels such as CNG (compressed natural gas) must be encouraged. The exhaust gases in vehicles should be passed through a catalytic converter. It converts harmful carbon monoxide and nitrogen oxides to harmless carbon dioxide, nitrogen dioxide, and water.

Gases released from factories and industries should be processed before being released into the atmosphere.

2. **Prevention of Water Pollution**

Water pollution can be prevented by following the measures given below :

- Sewage should be treated in sewage treatment plants before being discharged into water bodies.
- Bathing and washing near wear bodies should be avoided.
- The use of pesticides and fertilizers should be limited and only eco-friendly products must be used.
- The use of pesticides and fertilizes should be limited and only eco-friendly products must be used
- Industrial wastes should be treated free of toxic chemicals before being discharged into water bodies.

3. **Purification of Water at Home**

Water supplied from municipal water corporation needs to be purified further at home. It can be done by some or all of the following processes :

- **Using water purifiers :** The water is passed through domestic water purifiers available in the market. They have microporous filters and activated charcoal along with a source of ultra violet radiations. Impurities such as sand and dust are removed by the filters and the microorganisms are destroyed by UV radiations. Activated charcoal removes undesired odour and absorbs organic impurities.
- **Boiling and filtering :** The water needs to be boiled for 15 to 20 minutes to kill the microorganisms. This is allowed to stand for some time and then decanted and filtered.

- **Chlorination :** Water taken from wells or water tanks used by masses in rural areas is usually disinfected by adding chlorine tablets. Potassium permanganate is also used to kill germs in water taken from wells.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Because factories cause pollution and it has harmful effects on humans.
2. Do yourself

Fun Time

1. Do yourself 2. Do yourself

Formative Assessment 4

A. Tick (✓) the correct option:

Ans. 1. (i) 2. (ii) 3. (iv) 4. (ii) 5. (ii)

B. Match the two columns :

Ans.

	Column A		Column B
1.	Pole star	(i)	Appears to be stationary in the sky
2.	Outer planets	(ii)	They are mostly made of gases and have rings around them
3.	Uranus	(iii)	The planet with a highly tilted rational axis
4.	Halley's comet	(iv)	Appears after every 76 years
5.	Lesser Bear	(v)	Ursa Minor
6.	Ceres	(vi)	The largest asteroid which is also a dwarf planet
7.	Orbit	(vii)	The definite path on which the planets revolves around the Sun
8.	Mercury	(viii)	The smallest planet

C. Give one-word answers for the following :

Ans. 1. The type of pollution caused by bio-wastes. **Biological Pollution**
2. Nutrient enrichment of aquatic ecosystems and the subsequent overgrowth of plants on the surface of water. **Eutrophication**
3. Process of removal of insoluble impurities by passing impure water through a filter. **Filteration**

D. Define the following :

Ans. Do yourself

E. Answer the following questions :

Ans. 1. The angle between the incident ray and the normal is called the angle of incidence.
2. Orion
3. The ratio electricity developed on objects, when they are rubbed with each other, is called **fractional electricity**.

4. An earthquake with epicentre on the ocean floor can move the surrounding sea water violently and destructive waves called **tsunamis**. Tsunamis can rise up to a height of 30 metres and flood coastal areas, thousands of kilometres from their point of origin.
5. **Pollution :** An undesirable change in the physical, chemical, or biological characteristics of the natural environment is called pollution.

Summative Assessment 2

A. Fill in the blanks:

Ans.
1. The frequency of a sound determines its **pitch**.
2. Asteroids can only be seen through a powerful **telescope**.
3. An **earthquake** is a sudden tremor in the earth's crust.
4. CFCs deplete the **ozone** layer.
5. Acid rain makes water bodies **acidic.**

B. State whether the following statements are True (T) or False (F) :

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

C. Very Short Answer Questions :

Ans.
1. Sound is something that makes the sensation of hearing in our ears. We hear different types of sounds produced by living beings as well as non-living things. We can recognize some of them even without seeing them.
2. The ray of light that falls on a reflecting surface such as mirror is called **Incident ray**.
3. We generally see stars in groups in the sky. These groups are called **Galaxies**. There are about 100 billion galaxies in the universe. Each galaxy contains about 100 billion stars. Hence, the total number of stars in the universe is approximately 10,000 billion. The name of our galaxy is **Milky Way or Akash Ganga**. It is a broad band of light that looks like a trail of milk spread across the sky.
4. An earthquake with epicentre on the ocean floor can move the surrounding sea water violently and destructive waves called **tsunamis**. Tsunamis can rise up to a height of 30 metres and flood coastal areas, thousands of kilometres from their point of origin.
5. The presence of chemical in the air in quantities harmful to human health and the environment is known as air pollution.

D. Short Answer Questions :

Ans.
1. **Law I :** The first law states that the incident ray, the reflected ray, and the normal at the point of incidence lie on the same plane.

   Law II : The second law states that the angle of incidence is equal to the angle of reflection.
2. Because of the rotation of the earth from west to east.
3. **Greenhouse effect :** The phenomenon whereby the Earth's atmosphere

traps solar radiation because of the presence of gases such as carbon dioxide, water vapour, and methane is called greenhouse effect.

4. **Harmful effects of acid rain**
   - Soil becomes acidic making it unsuitable for cultivation.
   - Acid rain turns water bodies such as lakes, ponds, and rivers acidic making them unsuitable for acquatic plant and animal life.
   - Buildings, monuments, and sculptures (made of bronze or marble) are gradually damaged from the action of the acids. An example is the Taj Mahal in Agra. Acid rain and pollution from nearby industrialized sector has been turning it yellow.
5. These people are those who have reduced vision, cannot see at all from birth or have lost their eyesight due to a disease. Such people need to use artificial aids or devices to help them to things as efficiently as a person with normal vision. Various types of aids are available for the visually challenged. Electronic machines such as portable Braille typewriter, talking calculator, talking clock, audio dictionary, etc., are there. Among these devices, the ***Braille system*** helps the blind to read and write. It uses patterns of raised dots to represent letters and numerals.

E. Define the following :

Ans. Do yourself

F. Long Answer Questions :

Ans. 1. **Defects of the Eye**

In people with good eyesight, the rays of light will come to focus on the retina. They can see both near and far things clearly. The correct distance for a human eye to view objects is 25 cm. This is called the *least distance of distinct vision.* Many people do not have this vision due to certain eye defects such as short-sightedness or **Myopia**, long-sightedness or **hypermetropia**, and **cataract**.

Short Sightedness or Myopia : Short-sighted people can see nearby objects easily but not distant objects. This is because the image is focused in *front* of the retina. This defect can be corrected using a *concave lens* of a suitable focal length.

Long Sightedness or Hypermetropia : Long-sighted people can see distant objects easily but not nearby objects. This is because the rays of light come to focus *behind* the retina. Hypermetropia can be corrected using a convex lens of a suitable focal length.

Cataract : Sometimes the eye lens become *cloudy* or *opaque* and causes blurred or dimmed vision leading to an eye disease called *cataract.* Cataract can be corrected by surgery in which the eye lens is replaced by an artificial lens.

2. The solar system consists of the Sun and all the other celestial bodies that revolve around it. The planets and their moons, comets, asteroids, and

other space objects revolve around the sun in definite orbits.

3. **How does Earthquake Occur**

   Earthquakes generally occur around regions that have a fault or a break in the earth's rocky crust where sections of rock repeatedly move past each other. Most of the fault regions lie deep inside the earth but some are visible on the surface too. An earthquake mostly begins from a point where the frock first breaks in the earth. This point is called the **seismic focus**. The point on the surface of the earth directly above the seismic focus is called the **epicentre** of the quake. When the earthquake occurs the violent shifting and breaking of rock gives out energy that travels through the earth in the form of vibrations called seismic waves.

4. **Prevention of Water Pollution**

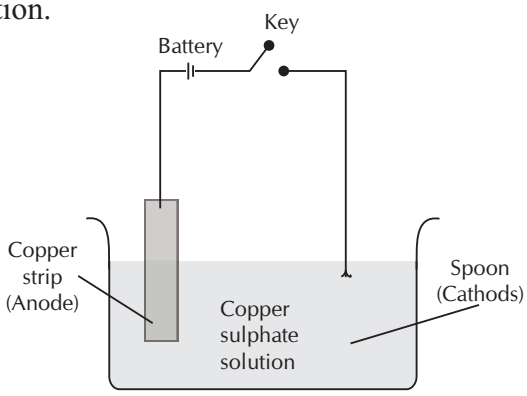
   Water pollution can be prevented by following the measures given below :

   - Sewage should be treated in sewage treatment plants before being discharged into water bodies.
   - Bathing and washing near wear bodies should be avoided.
   - The use of pesticides and fertilizers should be limited and only eco-friendly products must be used.

5. **Electroplating a metal spoon with copper.**

   Take a glass beaker, a metal spoon strip of copper, a battery, connecting wires and copper sulphate solution.

   Fill the beaker half with copper sulphate solution. Join the copper strip to the positive terminal of the battery and the spoon to the negative terminal. Dip both of them in the copper sulphate solution such that they do not touch each other. Let the current pass through the electrolyte for about 30 minutes.



   You will see that while the copper strip becomes smaller, the metal spoon is plated with a layer of copper.

Notes