

# Crop Production

## Exercise

### Section 1 : Formative Assessment (CCE Pattern)

#### A. Answer the following questions orally :

- Ans.**
1. Coffee and tea are plantation crops.
  2. Pests are tiny living organisms which cause harm to crops.
  3. The two things that have to be controlled in a cold store :
    - (i) The cold store has to be kept clean and the doors must not be opened too often.
    - (ii) The humidity is kept pretty high.

#### B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

- Ans.** 1. (a)                      2. (c)                      3. (a)                      4. (d)

#### C. Fill in the blanks :

- Ans.**
1. **Kharif** crops are grown in the rainy season between **June** and **October**.
  2. Scattering the seeds by hand in the field is called **broadcasting**.
  3. The sowing of seeds in nurseries and then transferring seedlings into main field is known as **transplantation**.
  4. Organisms which damage the crop are known as **pests**.

#### D. Write True or False for the following statements :

- Ans.** 1. False                      2. True                      3. True                      4. False

#### E. Tick odd-one out giving reason :

- Ans.**
1. Mustard, Maize, Groundnut, Soyabean
  2. Silos, Gunny bags, Granaries, Fertilisers.
  3. Harvester, Thresher, Combine, Winnowing.
  4. Manure, Fertiliser, Compost, Weedicide.

### Section 2 : Summative Assessment (CCE Pattern)

#### F. Define the following :

- Ans.**
1. Agriculture : The branch of science that deal with growing plants and raising livestock for human use is called agriculture.
  2. Pesticides : Pesticides are spreaded to keep the pests away from the crop.
  3. Winnowing : After threshing, seeds are separated from the chaff. This process is known as winnowing.
  4. Transplantation : In plants like rice, farmers first germinate the seeds in a

nursery and their seedlings are then transplanted to the prepared field. This is known as transplantation.

5. Fertilisers : Fertilisers are the chemicals which increase the fertility of the soil.

**G. Answer the following questions in short :**

- Ans.**
1. Plants grown by the farmers in the fields are called cultivated plants, as these are grown or cultivated in fields and looked after by humans. This is in contrast to wild plants which grow in nature, unattended by humans.
  2. Vegetables and fruits are essential items of our diet and their growth and production are studied under a branch of agriculture called horticulture. Horticulture is derived from two Latin words hortus which means 'garden' and colere which means 'cultivate'.
  3. Farmers grow different crops in a field to maintain the fertility of the soil.
  4. The rearing of honeybees on a large-scale is called apiculture.

**H. Answer these questions in detail :**

- Ans.**
1. Agriculture involves systematic use of some basic practices called agricultural practices that fulfil the needs of the plants grown in a field. Some of the agricultural practices that help to produce a good crop yield are listed below.
    1. The crop fields should be open so that sunlight and air are abundantly available.
    2. The fields should be protected from animals and trespassers.
    3. The soil should be loosened and ploughed before sowing. This allows easy penetration of roots to hold the plants firmly as well as helps the roots to breathe.
    4. The right amount of water should be available for the proper growth of plants.
    5. The soil should contain sufficient nutrients for the healthy growth of plants.
    6. Unwanted plants, such as weeds, should be uprooted from the soil. These weeds compete with the main crops for nutrients and deprive them of their nourishment.

**2. (a) Preparation of Soil**

Ploughing : Aeration of soil is very necessary for germination of seeds and growth of plants. Ploughing helps in loosening the soil and mixing the top soil with the soil below. The implement used for ploughing is called plough. Plough is made of wood or metal. Today tractors are used to drag a plough across the field. Ploughing helps in :

- (a) Aerating the soil
- (b) Penetration of roots of seedling
- (c) Improving soil drainage
- (d) Exposing soil pests to predators

(e) Uprooting weeds

Levelling : The ploughed soil may have large mud pieces called crumps. These are broken down with the help of soil leveler. Later using wooden levelers, soil is pressed to prevent erosion.

**(b) Sowing of Seeds**

When soil is ready, the farmers sow the seeds. Care is to be taken in the selection of seeds. Healthy and good quality seeds which are free from fungal spores are selected for sowing.

There are two methods employed in sowing :

- (i) Broadcasting : Scattering the seeds by hand in the field is called broadcasting. In sowing rice and wheat this method is employed.
- (ii) Using seed drill : Farmers use seed drill for sowing seeds (e.g. wheat). A seed drill is a metal tube with a funnel at the top attached to the plough. Seeds are introduced into the funnel and then released into the soil furrows made by a plough. The advantages of seed drill are

**(c) Weeding**

Unwanted plants growing along with the cultivated plants are known as weeds. Weeds compete with the cultivated plants for water and nutrients. They grow faster and block sunlight from reaching the crop plants. Hence it is very essential to remove the weeds to protect the crop plants. The process of removing the weeds is called weeding.

**(d) Threshing**

The process of separating the grains from the harvested plant is called threshing. This is done manually by walking over the harvested stalks of plants. After the grains are separated, the rest of the plant parts are cut and dried. This is called hay and is used as fodder.

**(e) Irrigation**

Water is an essential requirement for any plant. Providing water to plants is called irrigation.

3. The various agricultural tasks a farmer performs to cultivate a crop are the following.

(i) Preparation of soil

Ploughing

Levelling

(ii) Sowing of seeds

(iii) Manuring

(iv) Irrigation

(v) Weeding

(vi) Crop protection

(vii) Harvesting

(viii) Threshing and winnowing

(ix) Storage

4. Here are a few examples of animals that provide us with food.

Milch Animals

The animals that provide us with milk, a rich source of proteins, vitamins and minerals are called milch animals. For example, cow, buffalo, goat and sheep. Milch animals are reared on a large-scale in dairy farms.

Poultry Birds

Poultry birds are the domesticated birds raised for food: chickens, turkeys, ducks, and geese, and some minor species such as squab (young pigeons) and ostrich. The rearing of these birds is referred to as poultry. Birds that are especially reared for meat are called broilers.

**Fishes**

Another major source of food in our country is fish. Fish is a rich source of animal protein. Fish proteins are highly digestible and growth promoting. Some fishes like cod and shark (liver oil) are rich sources of vitamin D. The breeding, rearing, and transplantation of fish by artificial means is called pisciculture or fish farming. It involves raising fish commercially in tanks or enclosures, usually for food.

**Honeybees**

Honeybees are small insects from which a nutritious substance, called honey, is obtained. It contains water, minerals, sugar and enzymes. It is easily digestible and even used in medicines. The rearing of honeybees on a large-scale is called apiculture.

Beekeeping is one of the oldest forms of animal husbandry.

### Section III : Activities Assessment (CCE Pattern)

Do yourself

Do yourself



# Microorganisms



2

## Exercise

### Section 1 : Formative Assessment (CCE Pattern)

**A. Answer the following questions orally :**

**Ans.** 1. Bacteria occur in four shapes :

(i) Rod shaped or Bacilli

(ii) Spherical shaped or cocci

(iii) Spiral shaped or spirilla

(iv) Vibrios

2. Bacteria are helpful to us. They are used to make antibiotics. They are also useful in the formations of compost and manures.

3. Euglena can photosynthesise.

4. Sleeping sickness is caused by a protozoan.

**B. Multiple Choice Questions (MCQs) :**

**Tick (✓) the correct answers :**

**Ans.** 1. (d)

2. (a)

3. (d)

4. (b)

**C. Fill in the blanks :**

- Ans.**
1. Curd contains bacterium **Lactobacillus**.
  2. Bacteria like salmonella and staphylococci cause **food poisoning**.
  3. The **protozoans** are the most primitive and simplest animal.
  4. The **Azotobacter** bacteria increases soil fertility by the process of nitrogen fixation.
  5. Diseases like dysentery and malaria are caused by **plasmodium**.

**D. Tick (✓) the odd-one out giving season :**

- Ans.**
1. Streptomycin, Erythromycin, Bacitracin, Fermentation.
  2. Rhizobium, Clostridium, Azotobacter, Lactobacillus.
  3. Diplococci, Streptococci, Staphylococci, Anabaena.
  4. Ammonification, Nitrification, Deammonification, Denitrification.

**Section 2 : Summative Assessment (CCE Pattern)**

**E. Define the following :**

- Ans.**
1. Microorganisms : Tiny organisms which can be seen only through a microscope.
  2. Microscope : A compound microscope enables us to view minute organisms.
  3. Nucleus : A large dense organelle in a cell that contains the genetic material.
  4. Fermentation : The breakdown of sugar molecules with the help of microorganisms to produce an acid or alcohol.
  5. Putrefaction : Do yourself.

**F. Answer the following questions in short :**

- Ans.**
1. Protoza, fungi, algae, virus and bacteria are not visible to the naked eye. Some are helpful, while some cause dangerous diseases.
  2. Some medicins are obtained from microorganisms which either kill or prevent the growth of disease causing microorganisms. These medicines are known as antibiotics. In 1796, English physician Edward Jenner was the first to discover the vaccine for small pox.
  3. Microorganisms may find entry into human body through air, water or food. They can also get transmitted through vectors (animal carriers) or by direct contact with an infected person. Such microbial diseases that can spread from an infected person to a healthy person through food, water, air or by physical contact are called communicable diseases. e.g., common cold, influenza (eye flu), chicken pox, cholera, tuberculosis, etc; are some of the communicable diseases.
  4. Most bacteria are beneficial to other living organisms :  
Bacteria promote the formation of curd and cheese by the process of fermentation in which the milk sugar (lactose) is converted into lactic acid by the action of bacteria.  
Bacteria act upon fruit juices to produce vinegar and wines. (Ethyl alcohol is converted into acetic acid by the action of aerobic bacteria like

Acetobacter aceti).

Bacteria act as natural scavengers since they decompose the organic waste rapidly. They are useful in the formation of compost and manures. Fibres from certain plants are obtained by submerging stems in water for variable period. The fibres are acted upon by the bacteria growing in water, and the fibres are set free from the stem. They also help in tanning of leather.

Methane gas (biogas) can be produced from agricultural as well as domestic waste and animal excreta with the help of bacteria. Methane gas is a valuable fuel. The waste left behind in the biogas plants is used as a manure in the agricultural fields.

**G. Answer the following questions in detail :**

**Ans.** 1. The world is full of different organisms. Organisms differ in shape, size and colour. We can see most of them with our naked eye. But there are many organisms which are so tiny that they are nearly invisible. In fact, there are millions of organisms in our world which are not visible to the naked eye. We need a microscope to view them. The organisms which are visible only through a microscope are known as microorganisms. Antony Van Leeuwenhoek was the first scientist to observe microorganisms with the help of a microscope. The study of microorganisms is known as microbiology.

2. There are five major groups of microorganisms bacteria, algae, fungi, protozoa and viruses.

Character of Algae : Their body is called thallus, which is not differentiated into true roots, stems and leaves. There are plantlike organisms containing chlorophyll. There may be unicellular or multicellular.

Character of Bacteria : There have been consider to be plants for a long time because of some reasons. Their body is surrounded by a firm cell wall. Some of them could synthesize organic food from inorganic material.

Character of Viruses : Viruses have a variety of shapes. They may be hexagonal, spherical or rod shaped, polygonal, cubical, etc. Their structure is very simple. They do not have cytoplasm, nucleus or cell membrane. There is just a central core of RNA or DNA surrounded by a sheath of protein coat.

Characteristic of Fungi : Fungi are non-green plants and include moulds, rusts and puff balls. They may be parasitic and saprophytic.

Characteristic of Protozoa : Protozoa are unicellular animals and are rarely found in colonial form. A typical cell of a protozoan contains membrane bound protoplasm and cell organelles like nucleus and mitochondria. The single cell carries all its essential processes like, feeding, locomotion, respiration, excretion and reproduction.

### 3. Uses of Bacteria :

- (i) Bacteria promote the formation of curd and cheese by the process of fermentation in which the milk sugar is converted into lactic acid by the action of bacteria.
- (ii) Bacteria act upon fruit juices to produce vinegar and wines.
- (iii) Bacteria act as natural scavengers since they decompose the organic waste rapidly.

#### Use of Algae :

- (i) Algae produce food for aquatic animals.
- (ii) Blue-green algae are able to fix nitrogen in the form of nitrates and thus increase the fertility of the soil.
- (iii) Kelps are the sources of iodine and potassium.

#### Uses of Fungi :

- (i) Yeast is used in making bread, cakes, idli and dosa, etc. Yeast is rich in vitamin B.
- (ii) Yeast is also used for commercial production of alcohol and wine by growing them on natural sugars present in grains like barley, wheat, rice and crusted fruit juices, etc.

#### Use of Protozoa :

- (i) Protozoa help in the treatment of waste and sewage because they feed on fungi and bacteria which decompose organic matter.
- (ii) Being simplest animal they are used as laboratory animals for research.

### 4. There are many ways of preserving food. Most of these involve steps to create conditions in which it is difficult for harmful organisms (especially microorganisms) to grow. These organisms require a moist environment and a range of temperature close to room temperature.

#### Some common methods of preserving food.

**Freezing** Another way of discouraging the growth of bacteria and fungi is to store food at a low temperature. This method, called cold storage, is suitable for perishable food items. You know that fresh fruit and vegetables, as well as cooked food, can be preserved longer in the refrigerator. Frozen food, like peas, meat and fish, can be stored in deep freezers for weeks. The temperature in freezers is kept below  $-18^{\circ}\text{C}$ .

**Adding preservatives** Preservatives, like salt, sugar and vinegar, are often added to food to prevent the growth of microorganisms. For centuries, people have preserved fish and meat by salting. Rubbing salt over fish or meat, or soaking them in a salt solution draws out water from the food. Fruit and vegetables are often pickled in vinegar, oil, salt, and so on. Oil and vinegar prevent the growth of microorganisms. In jams, the sugar syrup prevents the growth of bacteria. However, if moisture gets into a jar of pickle or jam, fungi may grow.

Citric acid is a preservative added to soft drinks. Chemicals like sodium benzoate and potassium metabisulphite, are added to squashes and fruit

juices to prevent the growth of microorganisms.

Heating, Drying, freezing or storing food in airtight containers prevents microorganisms from growing, but does not kill them. Heating does. That is why we boil milk.

Pasteurisation Louis Pasteur, a French chemist, came up with a technique of heating wine to about 60°C for a short time in order to kill bacteria, and then cooling and storing it. The process is now used to pasteurise milk, which means heating it to about 62°C for 30 minutes, cooling it quickly, and storing it in sterile bottles and packets.

### Section III : Activities Assessment (CCE Pattern)

Do yourself

## Unit – 2 Materials

# Materials in Daily Life : Synthetic Fibres and Plastics

3

### Exercise

#### Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.
1. A fibre is a strand of a substance. Many fibres are twisted to form yarn which in turn is twisted to form thread. Fabrics are made by using either yarns or threads.
  2. The carbon has the unique property of self-linking called catenation, which provides an opportunity to synthesize new molecules of desired shape, size and properties. Synthetic fibres and plastics are examples of such compounds.
  3. Ropes of nylon are used in elevators and cranes because nylon is light weight, flexible with lustre. It has high tenacity and durability. It has good clarity.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

- Ans. 1. (a)                      2. (c)                      3. (c)                      4. (d)

C. Fill in the blanks :

- Ans.
1. **Rayon** and **nylon** are synthetic fibres whereas **cotton** and **wool** are natural fibres.
  2. **Rayon** is a synthetic fibre obtained from a naturally occurring polymer called cellulose.



3. **Acrylic** is a synthetic fibre having wool-like feel.
4. **Polythene** is a thermoplastic whereas **bakelite** is a thermosetting plastic.
5. PVC is used for making **bags and toys**.

**D. Match the following :**

- |   |   |
|---|---|
| <p><b>Ans.</b></p> <ol style="list-style-type: none"> <li>1. Synthetic fibre</li> <li>2. Bakelite</li> <li>3. PVC</li> <li>4. Nylon</li> <li>5. Rayon</li> <li>6. Catenation</li> </ol> | <ol style="list-style-type: none"> <li>(i) Unique property of carbon</li> <li>(ii) Thermoplastic</li> <li>(iii) Acrylic</li> <li>(iv) Thermosetting plastic</li> <li>(v) Prepared from coal, water and air</li> <li>(vi) Artificial silk</li> </ol> |
|---|---|

**E. Tick the odd-one out giving reason :**

- Ans.**
1. Polythene, PVC, Plastic toys, Bakelite.
  2. Nylon, Polyester, Wool, Acrylic.

**Section 2 : Summative Assessment (CCE Pattern)**

**F. Define the following terms :**

- Ans.**
1. Fabric : Fabrics are the clothes, made by using either yarns or threads.
  2. Synthetic Fibres : The fibres which are manufactured through chemical process by man are called synthetic or man-made fibres.
  3. Thermoplastic : Thermoplastics plastics are the plastics which melt or become soft on heating.
  4. Thermosetting : Thermosetting plastics are the plastics which when moulded once cannot be softened on heating.
  5. Polymer : A giant molecule which is made up of many repeating units called monomers.

**G. Answer the following questions in short :**

- Ans.**
1. Polymerization : Polymerization is the process in which small unit of fibres make a large single unit. Cellulose is a natural polymer which is formed by the linking of several hundred glucose molecules.
  2. Rayon and nylon are the synthetic fibres which resemble silk and wool.
  3. Uses of Rayon :
    - (i) It is used for making clothes.
    - (ii) It is used in home furnishings.
  - Use of Nylon :
    - (i) Nylon fibres are used in making carpets and nylon stockings.
    - (ii) They are used for seat belts, tire cords, ballistic cloth, musical strings, rope, etc.
  - Use of Bakelite :
    - (i) Bakelite is used to make electrical switches.
    - (ii) It is used to make handles of various Utensils.
  4. Do yourself

**H. Answer the following questions in detail :**

**Ans.** 1. Aim : To show that plastics are bad conductors of heat.

Procedure :

Take a pan containing boiling hot water.

Now place a metal spoon and a plastic spoon into it. You can use a plastic scale also in place of a plastic spoon.

Keep them in boiling hot water for some time.

Touch the other ends of the spoons, which are not dipped in water.

What do you observe? Has the other end of the metal spoon become hot?

Is the other end of the plastic spoon also equally hot? No, but why?

Metals are good conductors whereas plastics are bad conductors of heat.

2. Thermoplastics or thermoplasts are the plastics which melt or become soft on heating and harden when cooled. They retain their plasticity even after repeated heating and cooling. Polythene and PVC are examples of thermoplastics. They are used to make bags, toys, etc.

Thermosetting plastics or thermosets, on the other hand, are the plastics which when moulded once, cannot be softened on heating. The two most popular examples of thermosets are bakelite and melamine. Bakelite is an insulator and is used to make electrical switches and handles of various utensils. Melamine has fire and heat resistant properties and is used to make floor tiles, kitchenware and fire resistant fabrics.

3. Rayon, nylon, polyester and acrylic are the examples of synthetic fibres. Rayon is used for making clothes and furnishings. Nylon is used in making carpets, seat belts, tire cords, ballistic cloth, musical strings, rope and nylon stockings. Polyester fabrics are used in consumer apparel and home furnishings.

4. General Properties of Plastics

Some important properties of plastics which make them popular are summarized below :

Plastics are Non-Reactive

Since plastics are insoluble in water and are not attacked by chemicals under normal conditions, they are ideal substitutes for metals, glass and wood. Unlike metals, they do not corrode easily, but are heat sensitive and melt upon heating.

Plastics are Strong, Light Weight and Durable

Since plastics are strong, light weight, durable and can be moulded into various shapes and sizes, they are used to make different household articles and industrial products. They are also used to make car, aircraft and spacecraft parts. They are cheaper and weight lesser than their metallic counterparts.

Plastics Do Not

Show Thermal Conductivity

Plastics and other synthetic polymers are generally bad conductors of heat. They allow very little or no heat to pass through them. That is why

they are used to make handles of electric irons, heating pans and many other things.

5. (a) Electrical wires have plastic coating because plastics are generally insulators or bad conductors of electric current.  
(b) Cooking pans have handles made of plastics because heat does not affect the plastic handles and they remain cool.

### Section III : Activities Assessment (CCE Pattern)

Do yourself

# Metals and Non-Metals

4

## Exercise

### Section 1 : Formative Assessment (CCE Pattern)

#### A. Answer the following questions orally :

- Ans.** 1. Malleability : Malleability is the quality of being malleable.  
Ductility : Ductility is the quality of being ductile. Metals are ductile, i.e. they can be drawn into thin wires.
2. Copper is a good conductor of electricity and is ductile. Therefore, copper is used in electrical cables.
3. Sodium can be cut by a knife.
4. Uses of carbon :
- (i) Carbon as coke is used in the extraction of various elements from their ores.  
(ii) Carbon as graphite rod is used as electrodes in electrolysis.
- Use of Iron :
- (i) Iron is used to make pipes.  
(ii) It is also used in making automobiles.
- Use of Silver :
- (i) Silver is used in making ornaments.  
(ii) It is also used to make utensils.

#### B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

- Ans.** 1. (a)                      2. (a)                      3. (d)                      4. (c)                      5. (c)

#### C. Fill in the blanks :

- Ans.** 1. The elements whose atoms lose electrons to form positively charged ions are called **metals**.
2. A metal can replace another metal placed **above** it in the reactivity series.
3. The space occupied by an object is called **volume**.

- Magnesium burns with a dazzling **white** light on heating.
- Helium, neon and argon are called **noble** or **inert** gases.

**D. Write True or False for the following statements :**

- Ans.** 1. False            2. False            3. False            4. False            5. True

**F. Tick the odd-one out giving reason :**

- Ans.** 1. Malleability, Ductility, Sonorous, Brittle ✓  
 2. Sodium, Magnesium, Sulphur, Aluminium ✓  
 3. MgO, Na<sub>2</sub>O, CaO, CO<sub>2</sub> ✓  
 4. Phosphorus, Carbon, Oxygen, Calcium ✓

**Section 2 : Summative Assessment (CCE Pattern)**

**G. Define the following terms :**

- Ans.** 1. Malleability : Malleability are generally malleable, i.e. they can be beaten into sheets.  
 2. Ductility : Metals are ductile, i.e. they can brawn into thin wires.  
 3. Reactivity Series : Some metals are highly reactive and some are less reactive. Metals are arranged in a series called reactivity series.  
 4. Noble metals : Metals like silver, gold and platinum do not react with steam and are also called noble metals.  
 5. Metalloid : The element which have properties of both metals and non-metals.

**H. Answer the following questions in short :**

- Ans.** 1. Metals are good conductors of heat and electricity. While Non-metals are bad conductors of heat and electricity.  
 2. Gold and silver are suitable for making jewellery because they do not react with stream and water. They are noble metals.  
 3. Mercury is a metal but is liquid at room temperature Bromine is a non-metal which is liquid.  
 4. Metals are generally malleable, i.e. they can be beaten into sheets. However, zinc, antimony and arsenic are exceptions as they are not malleable.  
 5. Metals are ductile, i.e. they can be drawn into thin wires. Gold is a highly ductile metal. Zinc, arsenic and antimony do not possess this property.  
 6. Reactive metals are mostly found in compound forms because more reactive metal replace a less reactive metal.  
 7. Gold is the least reactive metal and potassium is the most reactive metal.

**I. Answer the following questions in detail :**

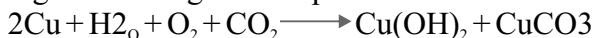
- Ans.** 1. To show that metals conduct electricity.  
 Procedure : Set up a simple electric circuit with the help of an electric cell, bulb and some materials like a key or iron rod, a copper wire, a piece of coal, a rubber, etc.

Now observe in which case the bulb glows.

The bulb glows when the connecting wires are attached to metallic key, copper wire and iron rod, whereas it does not glow when the wires are connected to coal or rubber.

Things made of metals are good conductors of electricity whereas coal and rubber do not conduct electricity.

2. Metals like copper react with oxygen when they are strongly heated, but silver and gold do not react. Metals like iron, magnesium, aluminium, zinc and copper rust by prolonged exposure to moist air. Copper acquires a dull green coating when exposed to moist air for a long time.



Iron rusts slowly in moist air as iron react with oxygen in the air to form iron oxide and water.



During the process of corrosion, the metals are eaten away.

The chemical reaction between a material, usually a metal and its environment is called corrosion. It produces a deterioration of the material and its properties. Corrosion of iron is commonly called rusting.

### 3. USES OF NON-METALS

Uses of Sulphur

1. Sulphur is used in making medicines called sulphur drugs.
2. It is used in making skin ointments as it has special anti-fungal properties.
3. It is used in making chemicals like sulphuric acid.
4. It is used in vulcanisation of rubber, which makes natural rubber hard and tough.
5. It is used to make insecticides.
6. Sulphites, derived from burning sulphur, are heavily used to bleach paper. They are also used as preservatives in dried fruit.
7. It is used in photography to fix negatives.

Uses of Phosphorous

1. It is used in making phosphoric acid and superphosphate fertilizers.
2. It makes an alloy with bronze which can resist corrosion.
3. It is used in the preparation of matches, fireworks and smoke screens.

Uses of Nitrogen

1. Nitrogen gas is widely used as an inert replacement for air where oxidation is undesirable.
2. It is used to preserve the freshness of packaged or bulk foods (by delaying rancidity and other forms of oxidative damage).
3. It is used in ordinary incandescent light bulbs as an inexpensive alternative to argon.
4. It is used in the manufacturing of stainless steel.

Uses of Silicon

1. Silicon is used to make silicon-steel alloy and in the preparation of

silicones, which have a wide variety of uses.

2. Silicon is used in making semiconductor devices such as transistors.
3. Silicones are ingredients in many hair conditioners, shampoos and hair gel products.
4. Silicone is used to create a variety of toys.
5. The gel form of silicone is used in bandages and dressings.

Uses of Carbon

1. Carbon as coke is used in the extraction of various elements from their ores.
2. Graphite (carbon) fibre is used in carbon fibre-reinforced plastics. Products made from carbon fibre-reinforced plastic include fishing rods, golf clubs, bicycle frames and pool sticks.
3. Carbon as graphite rod is used as electrodes in electrolysis.
4. Carbon as graphite is used in making pencils.

Uses of Chlorine

1. It is used as a bleaching agent in paper and textile industries.
2. It is used in the preparation of bleaching powder.
3. It is used in the preparation of gammaxene, a pesticide.
4. It is used to disinfect water in municipal water treatment plants.

#### 4. Displacement Reactions

Generally, metals are reactive and that is why they mostly occur in the combined state in nature as minerals. Metals in general react with air and water. Sodium if left in open immediately combines with oxygen; magnesium reacts with oxygen when ignited but iron and copper do not, even on heating for a long time. This is because metals have different reactivity. Some metals are highly reactive and some are less reactive. Metals are arranged in a series called reactivity series according to their decreasing reactivity from highest to lowest the reactivity series.

Notice that a more reactive metal can replace a less reactive metal from its salt solution. Such a reaction in which one metal replaces another from its salt solution is known as a displacement reaction.

Some displacement reactions are shown below :



A less reactive metal, on the other hand, cannot displace more reactive element from its salt solution as shown below. As a result, there is no reaction between iron and zinc sulphate, copper and magnesium sulphate, etc.



5. (a) Metals react with water to form metal oxide or metal hydroxide and

hydrogen gas is also formed. In general, non-metals do not react with water.

(b) When a metal reacts with an acid, effervescence or bubbles of hydrogen gas are formed with the evolution of heat energy.

Non-metals generally do not react with acids.

(c) Metals do not react with oxygen non-metals react with oxygen to form acidic oxides which dissolve in water to form acids.

6. (a) Metals are found in free and combined state in the Earth's crust. Highly unreactive metals like gold are found in free state, whereas those which are highly reactive, are found as bauxite and iron as haematite in the Earth's crust.

(b) Sodium reacts vigorously with cold water and forms soluble hydroxides and hydrogen gas that burns with a pop sound.



Red hot iron reacts with steam to form its oxide and hydrogen.



(c) Copper cannot replace iron from its salt solution because copper is less reactive than iron.

(d) Copper is used for making electrical wire because it is a good conductor of electricity.

(e) Cooking utensils are made of metals because metals are good conductors of heat which help in making food while their handles are wooden because wood is a bad conductor of heat which helps to hold.

### Section III : Activities Assessment (CCE Pattern)

Do yourself

## Formative Assessment-1

A. Answer the following questions orally :

2

Ans. 1. Sodium can be cut by a knife.

2. A fibre is a strand of a substance. Many fibres are twisted to form yarn which in turn is twisted to form thread. Fabrics are made by using either yarns or threads.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

Ans. 1. (d)

2. (b)

3. (a)

4. (c)

C. Fill in the blanks :

Ans. 1. Bacteria like Salmonella and staphylococci cause **food poisoning**.

2. **Acrylic** is a synthetic fibre having wool-like feel.

3. Organisms which damage the crop are known as **pests**.

4. **Iodine** is used in table salt to prevent goitre.

5. Magnesium burns with a dazzling **white** light on heating.

**D. Write True or False :**

**Ans.** 1. False                      2. True                      3. True                      4. True                      5. True

**E. Match the following :**

**Ans.** 1. Macronutrients (i) Winter season (a) wheat, gram, mustard, etc  
2. Micronutrients (ii) Rainy season (b) C, N, O, H, P, S, K, Mg, Ca  
3. Kharif crops (iii) 7 in number (c) Paddy, maize, cotton  
4. Rabi crops (iv) 9 in number (d) Fe, Cu, Zu, Mo, Mn, Cl, B

**F. Tick the odd-one giving reason :**

**Ans.** 1. Nylon, Polyester, Wool, Acrylic ✓  
2. Cotton, Jute, Flax, Rayon ✓  
3. Polythene, PVC, Plastic toys, Bake lite, ✓  
4. Tin, Aluminium, Plastic bags, Wood ✓  
5. Rhizobium, Clostridium, Azotobacter, Lactobacillus ✓

# Combustion and Flame

5

## Exercise

### Section 1 : Formative Assessment (CCE Pattern)

**A. Answer the following questions orally :**

**Ans.** 1. Combustion needs three conditions to take place: attainment of ignition temperature, presence of a combustible substance and a supporter of combustion.  
2. Fuels are classified on the basis of physical state :  
(i) Solid fuels                      (ii) Gaseous fuels                      (iii) Natural fuels  
3. The minimum temperature at which a substance spontaneously ignites in a normal atmosphere is called the ignition temperature.  
4. Water can not be used to extinguish fire caused by burning of oil because water does not cut off the supply of the fuel for the fire.

**B. Multiple Choice Questions (MCQs) :**

**Tick (✓) the correct answers :**

**Ans.** 1. (b)                      2. (b)                      3. (a)                      4. (a)

**C. Fill in the blanks :**

**Ans.** 1. **Carbon monoxide** gas is formed due to incomplete combustion.  
2. The hottest part of the candle flame is **the outer** zone.



3. In rapid combustion, large amounts of **heat** and **light** are produced in a short span of time.
4. An ideal fuel should have **high** calorific value.
5. A non-luminous flame is **blue** in colour whereas a luminous flame is **yellowish** in colour.

**D. Write True or False for the following statements :**

**Ans.** 1. False      2. True      3. True      4. False      5. True

**Section 2 : Summative Assessment (CCE Pattern)**

**E. Define the following terms :**

- Ans.**
1. Combustion : Combustion is the process of burning of a substance in the presence of air with the evolution of heat and light.
  2. Ignition temperature : The minimum temperature at which a substance spontaneously ignites in a normal atmosphere is called the ignition temperature.
  3. Fuel : The substances that undergo combustion are called combustible substances or fuels.
  4. Calorific value : The quantity of heat produced by unit mass of a fuel on complete combustion.
  5. Fire extinguisher : Fire extinguisher is used to extinguish the fire.

**F. Answer the following questions in short :**

- Ans.**
1. Combustion needs three conditions to take place: attainment of ignition temperature, presence of a combustible substance and a supporter of combustion.
  2. Fuels can be categorised into three major types on the basis of their physical state.
 

Solid fuels : The fuels which occur in solid state at room temperature are called solid fuels, for example coal, wood, coke, charcoal, animal dung, bagasse, etc.

Liquid fuels : The fuels which occur in liquid state at room temperature are called liquid fuels, for example, petrol, LPG, diesel, kerosene, spirit, etc.

Gaseous fuels : The fuels which occur in gaseous state at room temperature are called gaseous fuels, for example, natural gas, biogas, coal gas, water gas, producer gas, etc.

Fuels can also be classified into categories on the basis of their source origin.

Natural fuels : They are also called primary fuels. These are the fuels which occur in nature and are used as such in the same form, for example, wood, coal, natural gas, animal dung cake, crop residue (bagasse), etc.

Processed fuels : They are also called secondary fuels. These are the fuels which are obtained from primary fuels after certain processing, for example, charcoal, coke, petrol, diesel, kerosene, etc.

3. Luminous zone is the zone where the wax vapour start burning. Here the flame is yellowish as the oxygen is not available in plenty in this region. Wax vapours burn completely as oxygen is available in plenty in nonluminous zone. The flame is blue in colour.
4. The minimum temperature at which a substance spontaneously ignites in a normal atmosphere is called the ignition temperature or kindling point of a substance.
5. Combustion of fuels cause global warming because it increase carbon dioxide and heat in the atmosphere.

**G. Answer the following questions in detail :**

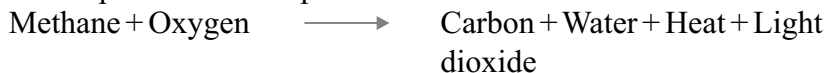
- Ans.** 1. In incomplete combustion, combustion of hydrocarbon fuels takes place in the presence of insufficient supply of air or oxygen. In other words, incomplete combustion occurs when there is not enough oxygen to allow the fuel (usually a hydro-carbon) to react completely with the oxygen.



Soot, water, carbon monoxide, heat and light are some end products of incomplete combustion.

**Complete Combustion**

Where there is an adequate supply of air or oxygen, complete combustion of hydrocarbon fuels takes place. Carbon dioxide, water, heat and light are the end products of complete combustion.



In the above example, methane gas burns in sufficient supply of oxygen. As a result, carbon dioxide and water along with heat and light are formed.

2. Various Zones Of A Candle Flame

There are three zones of a candle flame (see figure below).

1. the outer zone
2. the middle zone
3. the innermost zone

The innermost zone (Dark zone) : This zone is dark black in colour. This zone consists of unburnt wax vapours. This zone of the candle flame is least hot. It has a temperature of about 800-1000°C.

The middle zone (Luminous zone) : This is the zone where the wax vapour start burning. Here the flame is yellowish as the oxygen is not available in plenty in this region. The wax vapours do not burn completely. The temperature here is about 1200°C.

The outer zone (Nonluminous zone) : Wax vapours burn completely as oxygen is available in plenty in this region. The flame is blue in colour and appears nonluminous. the temperature here is very high about 1400°C.

3. Fuels can be categorised into three major types on the basis of their physical state.

Solid fuels : The fuels which occur in solid state at room temperature are called solid fuels, for example coal, wood, coke, charcoal, animal dung, bagasse, etc.

Liquid fuels : The fuels which occur in liquid state at room temperature are called liquid fuels, for example, petrol, LPG, diesel, kerosene, spirit, etc.

Gaseous fuels : The fuels which occur in gaseous state at room temperature are called gaseous fuels, for example, natural gas, biogas, coal gas, water gas, producer gas, etc.

Fuels can also be classified into categories on the basis of their source origin.

Natural fuels : They are also called primary fuels. These are the fuels which occur in nature and are used as such in the same form, for example, wood, coal, natural gas, animal dung cake, crop residue (bagasse), etc.

Processed fuels : They are also called secondary fuels. These are the fuels which are obtained from primary fuels after certain processing, for example, charcoal, coke, petrol, diesel, kerosene, etc.

4. the three conditions necessary for combustion are (i) presence of a fuel, (ii) supporter of combustion, and (iii) attainment of ignition temperature of that fuel.

Theoretically, a fire may be extinguished by :

- (i) removing all the combustible substance from the site of the fire.
- (ii) cutting off the supply of supporter of combustion, i.e. air.
- (iii) bringing down the temperature of the burning substances below their ignition temperature.

Fire may be controlled by removing one or more of these conditions. Since it is not possible to remove all the combustible substances from the place of fire, the fire extinguishers are based on the principle of either bringing down the temperature below ignition temperature or cutting the supply of air or both together.

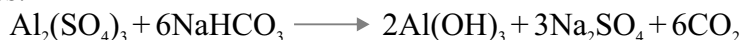
5. It uses a concentrated solution of sodium hydrogen carbonate in a small cylinder with a glass bottle filled with sulphuric acid. When fire breaks out, the cylinder is hit to a hard surface to break the bottle. Once bottle breaks, the acid reacts with sodium hydrogen carbonate to evolve carbon dioxide, which being a non-supporter of combustion, extinguishes the fire and water with its cooling effect help to bring down the temperature below the ignition temperature.



Foam Type Fire Extinguisher

It is like soda-acid fire extinguisher except that it contains aluminium

sulphate instead of sulphuric acid in the glass bottle and has a substance called saporin mixed with sodium hydrogen carbonate. The saporin helps to produce the foam of carbon dioxide. It is used for extinguishing the oil fires.



Carbon Tetrachloride Fire Extinguisher

The carbon tetrachloride ( $\text{CCl}_4$ ) produced from methane is heavy and a non-supporter of combustion. It is used to extinguish the electrical fires but one needs to be careful when using it because its usage produces a toxic gas. Hence, one should always keep his nose and mouth covered with a wet cloth when using it.

### Section III : Activities Assessment (CCE Pattern)

Do yourself

## Unit - 3 The World of the Living

# The Study of Biodiversity

6

### Exercise

#### Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.
1. The Wildlife Act 1972.
  2. International Union for the Conservation of Nature and Natural Resources.
  3. Deforestation results in soil erosion. Deforestation destroys the habitats of many living organisms.

B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

- Ans.
- |        |        |        |        |
|--------|--------|--------|--------|
| 1. (a) | 2. (d) | 3. (a) | 4. (c) |
| 5. (a) | 6. (d) | 7. (a) |        |

C. Fill in the blanks :

- Ans.
1. Biodiversity includes **plants, animals** and **microorganisms**.
  2. The species of plants taken together are known as **flora**.
  3. The endangered species are listed in the **Red** book.
  4. Other than the wildlife sanctuaries and national parks, there are also 17 **Biosphere** in India.
  5. Illegal hunting of animals is called **poaching**.
  6. **Poaching** is a prime reason for the extinction of hundreds of animals



species of animals. Given below is a table containing some endangered species of animals in India.

5. Protected areas : To protect the flora and fauna and their habitats, our government under the Wildlife (protection) Act, 1972 created protected areas.

Protected areas are the areas dedicated to the protection and maintenance of biodiversity along with natural and cultural resources. Protected areas include national parks, wildlife sanctuaries and biosphere reserves.

**H. Identify the name of each animal based on the given clues :**

- Ans.**
1. My tail resembles that of a lion's tail. I am endemic to the tropical evergreen forests in southwest India. I am the **Lion-tailed macaque**.
  2. I am endemic to Siberia. But during winter, I come to India to escape from the extreme cold. I am the **Sibarian crane**.
  3. You have seen me in the movie Jurassic Park. I was once found on the Earth resembled a lizard. I am the **Dianosour**.
  4. I am a single-horned animal. My horn is believed to have medicinal value. I am **rhinoceros**.
  5. I have small ears, small tusks and an arched back. I am a threatened species of India. I am the **Asian elephant**.

**I. Answer the following questions in short :**

- Ans.**
1. Biodiversity is the variety of life on Earth. It includes the variability of species in different habitats, the diversity of microorganisms, plants and animals. It is an essential component of nature and it ensures the survival of human species by providing food, fuel, shelter, medicines and other resources to mankind.
  2. Deforestation : The process of cutting the trees in the forest is called deforestation. Deforestation naturally occurs due to forest fires, earthquakes, severe droughts and floods.
  3. Wildlife is important to conserve our natural heritage. It can be preserved by making zoological parks and conserving the forests.
  4. National Parks and Wildlife Sanctuaries of India

Bandhavgarh National Park	Madhya Pradesh
Bandipur National Park	Karnataka
Bhitarkanika National Park	Odisha
Buxa Tiger Reserve	West Bengal
Corbett National Park	Uttarakhand
Dudhwa National Park	Uttar Pradesh
Gir National Park	Gujarat
Guindy National Park	Tamil Nadu
Indira Gandhi National Park	Tamil Nadu
Kanha National Park	Madhya Pradesh
Kaziranga National Park	Assam

Neora Valley National Park	West Bengal
Pench National Park	Madhya Pradesh
Rajiv Gandhi National Park	Rajasthan
Kumarakom Bird Sanctuary	Kerala
Thattekad Bird Sanctuary	Kerala
Kaundinya Bird Sanctuary	Andhra Pradesh
Kawal Sanctuary	Andhra Pradesh
Nalsarovar Bird Sanctuary	Gujarat
Overa wildlife Sanctuary	Jammu & Kashmir
Ranganthittu Bird Sanctuary	Karnataka
Nawabganj Bird Sanctuary	Uttar Pradesh

- Poaching is done for animal's fur and hides. The body parts of some animals are used for making medicine and ornaments.
- Ariatic lion and the great Indian bustard are endangered in India. They are endangered due to the destruction of its habital and poaching.
- RED DATA BOOK

The IUCN (International Union for the Conservation of Nature and Natural Resources) maintains an international list published as the Red Data Book. It is a group of organisations and scientific experts that work for the protection of sustainable living resources. It is considered to be the best authority about the status of living on the planet.

The Red Data Book is the state document established for documenting rare and endangered species of plants and animals that exist within the territory of the state or country. This book provides central information for studies and monitoring programs on rare and endangered species and their habits.

**J. Answer the following questions in detail :**

- Ans.**
- The judicious use of natural resources to preserve and protect the living and non-living resources is called conservation. Conservation of biodiversity essentially implies conservation of forests and wildlife. India is a land of varied and abundant flora and fauna. But, in the last few decades, a steady decrease has been registered in the number of flora and fauna.  
Even the biodiversity of the Earth has declined remarkably. The conservation of biodiversity is of paramount importance for any country. To fulfil this purpose, it is necessary to follow certain conservation strategies.  
It is very essential to discontinue, and finally prevent, the activities which are causing decline in the biodiversity.
  - THREATS TO BIODIVERSITY  
Several species of plants and animals have either become extinct or are on the verge of extinction. Let us study about some of the reasons responsible for their extinction.

### Increase in Human Population

With the tremendous increase in the human population, human beings have accelerated the transformation of the Earth to meet their various requirements. About half of the world's forests have been transformed, degraded or destroyed for agricultural and urban development. The transformation is still going on, which has led to a severe loss of habitat.

### Hunting

Hunting has led to the extinction of hundreds of animal species and the endangerment of many more. Animals are hunted for their fur, tusks, skin, etc. During the period from 1970 to 1992, the percentage of the black rhino reduced to 96 percent due to over hunting. Fish and other aquatic organisms are threatened because of the use of trawlers, a kind of boat, that uses large nets to catch fishes in large numbers. Consequently, the fish population has reduced drastically.

### Deforestation

All species have specific food and habitat requirements. The more specific the requirements and localised the habitat, the greater is the vulnerability of the species. With the ever increasing worldwide deforestation, the possibility of habitat loss has increased manifold.

It is alarming that even the tropical forests, which harbour almost 50 per cent of the world's biodiversity, are declining. The original extent of these forests was 15 million square kilometres. But now, only half of the tropical forests survive.

### Pollution

Pollution of air, water and soil adversely affects the environment. As a result, all plants and animals living in polluted surroundings suffer. Chemical pollutants pose a threat to different species and ecosystems. When harmful chemical pollutants get accumulated in the water bodies, they are consumed by fishes and other aquatic animals, directly or indirectly. Thus, these chemicals enter the food chain and reach higher organisms. Even human beings get affected when they consume such fishes and other aquatic animals.

### Climate Change

A changing climate also poses a threat to the different species and ecosystems since the distribution of species and ecosystems is largely determined by climate. For a number of reasons, plants and animals may not be able to adjust to new climate changes and this may ultimately lead to the extinction of the species.

### Natural Disasters

Natural disasters such as earthquakes, volcanic eruptions, floods, droughts, cyclones and hurricanes lead to the destruction of the habitats of various species. Thus, their existence is threatened.

## 3. CAUSES OF DEFORESTATION



Having learnt about the causes for the loss of biodiversity, you can easily understand the causes of deforestation.

Forests are an important natural resource. They are essential for the well-being and survival of mankind. However, due to various human needs, forests are under great threat of being cut (deforestation).

Various man-made causes of deforestation are :

Construction for houses and industries

Clearing land for agricultural purposes

Using wood as fuel

Using wood to make paper, furniture and other things

Deforestation also occurs naturally due to forest fires, earthquakes, severe droughts and floods.

### CONSEQUENCES OF DEFORESTATION

Deforestation has an adverse effect on biodiversity and needs to be checked immediately. The result of deforestation.

We already know that plants and animals depend on each other. A number of species of birds and other animals live in forests. It is their habitat. They depend on each other for food and other things. Destruction of forests has affected the food chain and destroyed the habitats of many living organisms. Animals like lions and tigers have become much reduced in number because the forests in which they live have been destroyed. Remember, this is not the only reason for the reduction in number of these animals. Another reason is their hunting by humans.

The level of carbon dioxide in the atmosphere increases on account of deforestation. You know that plants need carbon dioxide for photosynthesis. Reduced number of trees require lesser carbon dioxide. So the level of this gas has gone up in the atmosphere, resulting in global warming.

Deforestation leads to increase in temperature and pollution level on the earth. This disturbs the water cycle and reduces rainfall. The outcome is the drought.

Deforestation results in soil erosion. Trees prevent soil erosion. Roots of trees bind the soil particles together, preventing them from blowing away by wind or water. Soil erosion removes the top layer of the soil that contains the fertile humus. Removal of top layer, thus makes the soil less fertile, as the lower layers of soil contain less humus. If this goes on, the fertile land gets converted into a desert. The process of conversion of fertile land into a desert is called desertification.

4. Deforestation results in soil erosion. Trees prevent soil erosion. Roots of trees bind the soil particles together, preventing them from blowing away by wind or water. Soil erosion removes the top layer of the soil that contains the fertile humus. Removal of top layer, thus makes the soil less fertile, as the lower layers of soil contain less humus. If this goes on, the

fertile land gets converted into a desert. The process of conversion of fertile land into a desert is called desertification.

5. (a) The process of planting areas of land with trees in order to renew a forest.

(b) Protection Tiger

In 1973, the World Wide Fund, with the help of the Indian Government, launched Project Tiger to protect tigers. This project has been very successful in preserving the tiger population at the tiger reserve of Bandhavgarh, Pench, Panna, Corbett, Kanha, Ranthambhore, Bandipur, Dudhwa and the Sunderbans.

(c) RED DATA BOOK

The IUCN (International Union for the Conservation of Nature and Natural Resources) maintains an international list published as the Red Data Book. It is a group of organisations and scientific experts that work for the protection of sustainable living resources. It is considered to be the best authority about the status of living on the planet.

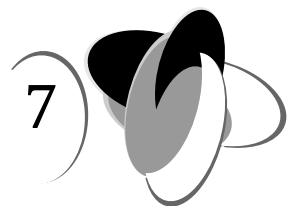
The Red Data Book is the state document established for documenting rare and endangered species of plants and animals that exist within the territory of the state or country. This book provides central information for studies and monitoring programs on rare and endangered species and their habits.

### Section III : Activities Assessment (CCE Pattern)

Do yourself



## The Cell



### Exercise

#### Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

- Ans.
- The three main functional parts of a cell are :  
(i) Mitochondria                      (ii) Ribosome                      (iii) Cytoplasm
  - Two multicellular organisms are :  
(i) Cat                      (ii) Elephant
  - The components of the nucleus are nuclear membrane, nucleoplasm, nucleolus and chromosomes.
  - Cytoplasm : A jelly-like fluid which occupies the space between the cell membrane and the nucleus.

**B. Multiple Choice Questions (MCQs) :**

Tick (✓) the correct answers :

- Ans. 1. (b)                      2. (a)                      3. (a)                      4. (c)                      5. (a)

**C. Fill in the blanks :**

- Ans. 1. Chloroplast contain the pigment **chlorophyll**.  
2. **Cell membrane** has a property called semipermeability.  
3. **Robert Hooke** coined the term cell in 1665.  
4. The cell wall is made of **cellulose**.  
5. The main chemical present in chromosome is **histone protein**.

**D. Match the following :**

- Ans. 1. Amoeba — (i) Powerhouse of the cell  
2. Chromosomes — (ii) Unicellular organism  
3. Mitochondrion — (iii) Carry genes  
4. Bacteria — (iv) Living substance of the cell  
5. Organ — (v) Prokaryotic centre of the cell  
6. Protoplasm — (vi) Green plastids  
7. Chloroplasts — (vii) Control centre of the cell  
8. Nucleus — (viii) Contains more than one type of tissues

**E. Tick the odd-one giving reason :**

- Ans. 1. Cell, Tissue, Organ, Prokaryotes. ✓  
2. Nucleus, Nucleolus, Nuclear membrane, Plastids. ✓  
3. Cell, Robert Hooke, Pseudopodia, Magnifying device. ✓  
4. Plastids, Chlorophyll, Chloroplasts, Nucleolus. ✓  
5. Organ, Organ system, Organism, Vacuole ✓

**Section 2 : Summative Assessment (CCE Pattern)**

**F. Define the following terms :**

- Ans. 1. Cell : Cell is the basic unit of structure and function of an organism.  
2. Protoplasm : Protoplasm is the living substance of a cell.  
3. Cytoplasm : It is a jelly-like fluid which occupies the  
4. Organelles : The parts of a cell is called organelles.  
5. Nucleus : Every cell is a nucleus which controls its activities. It is a spherical structure present in the centre of the cell and is surrounded by the cytoplasm.

**G. Differentiate between the following :**

- Ans. 1. Plant cell have cell wall but there is absence of cell wall in animal cells. Chloroplasts are found in plant cells but not in animal alls.  
2. Cytoplasm is a jelly like fluid which occupies the space between the cell membrane and the nucleus. Protoplasm is the living substance of a cell.  
3. Cytoplasm is a jelly like fluid which occupies the space between the cell

membrane and the nucleus.

Nucleoplasm is a jelly like fluid similar to cytoplasm but slightly denser than it.

4. A tissue is a group of cells of the same size, shape and function. An organ is a structure that contains more than one type of tissues.
5. Cell membrane is a thin outer covering of a cell. Nuclear membrane is a thin porous membrane that separates the nucleus from the cytoplasm.
6. The organisms composed of eukaryotic cells are called eukaryotes.  
The organisms possessing the prokaryotic cells are called prokaryotes.

#### **H. Answer the following questions in short :**

**Ans.**

1. Mitochondria : This is known as the 'powerhouse' of the cell. They are rod shaped structure and are the sites of release of energy from food during respiration.
2. A cell is the basic unit of structure and function of an organism. In other words, it is the smallest subdivision of an organism which has a definite structure and performs functions of life. A cell shows all the characteristics of a living thing, i.e., respiration, nutrition, reproduction, response to stimulus. All living organisms are made up of one or more cells.
3. Unicellular and Multicellular Organism  
Based on the number of cells, the organisms may be divided into two types :
  1. Organisms consisting of a single cell—These are called unicellular (uni = one; cellular = cell) organisms. For example, yeast, amoeba, bacteria (singular bacterium), paramecium and euglena.  
The single cell in a unicellular organism performs all the necessary functions like respiration, nutrition, movement, growth and reproduction.
  2. Organisms consisting of more than one cell— These are called multicellular (multi = many; cellular = cell) organisms. Larger living things are made of millions or trillions of cells.  
Examples : All large organisms like cat, dog, fish, frog, elephant, human beings, mango tree, sunflower plant, and so on.  
Different organs perform various necessary functions in the body.
4. Cell wall : Cell wall is found only in plant cells. It is a rigid wall which is non-living. Chemically it is made of a carbohydrate called cellulose. Cell walls give strength and shape to the plant cells.
5. Vacuoles : In plant cells usually the vacuole will be very large while in animal cells, they are small and few. Vacuoles have minerals, waste materials and water and this fluid mixture is named cell sap.

#### **I. Answer the following questions in detail :**

**Ans.**

1. Figure
2. Nerve cells are very long and branches shape with thin thread-like

- projection help it to send messages over long distances in the body.
- A cell is the basic unit of structure and function of an organism. In other words, it is the smallest subdivision of an organism which has a definite structure and performs functions of life. A cell shows all the characteristics of a living thing, i.e., respiration, nutrition, reproduction, response to stimulus. All living organisms are made up of one or more cells.
  - COMPARISON OF PLANT AND ANIMAL CELLS**  
Table gives a comparison of cells found in plants and animals (see figures below).

**Table : Plant and animal cells—a comparison**

Structure	Plant cell	Animal cell
Cell membrane	✓	✓
Cell wall	✓	X
Cytoplasm	✓	✓
Nucleus	✓	✓
Mitochondria	✓	✓
Chloroplasts	✓	X
Golgi body	✓	✓
Endoplasmic reticulum	✓	✓
Ribosome	✓	✓
Vacuole	A large vacuole present	Absent, smaller in size if present

'X' indicates absence of the structure

- Chloroplasts are found only in plant cells because it help in photosynthesis. In the process of photosynthesis the plants make their own food. Chloroplasts are green in colour because they contain a green pigment called chlorophyll.

### Section III : Activities Assessment (CCE Pattern)

Do yourself

# Reproduction, Growth and Development

8

## Exercise

### Section 1 : Formative Assessment (CCE Pattern)

A. Answer the following questions orally :

Ans. 1. Animals reproduce to multiply and produce their own kind.

- The male gamete and the female gamete fuse to form a structure called the zygote. After fertilization, the zygote divides repeatedly and undergoes growth in size. This is called a foetus.
- Testes are the male reproductive system and ovaries are the female reproductive system.
- Animals undergoing external fertilization lay large number of eggs and sperms because external fertilization takes place outside the body of the female.

**B. Multiple Choice Questions (MCQs) :**

Tick (✓) the correct answers :

- Ans. 1. (b)                      2. (c)                      3. (a)                      4. (b)                      5. (a)

**C. Fill in the blanks :**

- Ans. 1. The organisms reproduce to ensure the continuous existence of their **species**.
2. In plants, the growth is **continious**, but in animals, it is **fix**.
3. The thread-like structures that contain the genes are called **chromosomes**.
4. **Sperm** are the male gametes in sexually reproducing animals.
5. Reproduction in human beings takes place through **internal** fertilisation.

**D. Write True or False for the following statements:**

- Ans. 1. False                      2. True                      3. False                      4. True                      5. False

**E. Match the following :**

COLUMN I	COLUMN II	COLUMN III
1. Ovary	(i) Carries both urine and sperms	(a) Female reproductive system
2. Testis	(ii) Part where development of the baby takes place	(b) Male reproductive system
3. Urethra	(iii) Female gamete	(c) Sperm
4. Uterus	(iv) Male gamete	(d) Ova

**F. Tick the odd-one out giving reason :**

- Ans. 1. Gamete, Sperm, Ovum, Yeast
2. Embryo, Zygote, Foetus, Larva
3. Fertilization, Internal fertilization, External fertilization, Viviparous animals
4. Ovary, Uterus, Fallopian tube, Sperm duct

**Section 2 : Summative Assessment (CCE Pattern)**

**G. Define the following :**

- Ans. 1. **Hormone** : Harmonies are the chemicals produced by the body that affect various bodily processes.
2. **Genes** : Chromosomes have units called genes. A gene is the basic unit of inheritance.

3. **Reproduction** : Reproduction is the life process used by an organism to produce its own kind to maintain its species.
4. **Puberty** : Puberty is the period in life at which sexually immature boy or girl becomes sexually mature and capable of reproduction.
5. **Foetus** : After fertilization the zygote becomes foetus.

**H. Answer the following questions in short :**

**Ans.** 1. **Asexual reproduction**: A mode of reproduction in which only one individual is involved in reproduction such that the offspring is identical to the parent.

**Sexual reproduction**: A mode of reproduction in which male and female are involved in the process of reproduction such that the offspring is similar but not identical to the parents.

2. **Amoeba**, a unicellular organism, reproduces asexually by the method of binary fission.

In Hydra, new individuals develop from buds, which are small projections formed on the body. This method is called budding.

3. **Fertilization in Human Beings**

The activities of reproductive systems in males and females are controlled by specialised proteins or hormones (chemicals produced by the body that affect various bodily processes). In males, the testes produce male sex hormones called androgens. Testosterone is the most important of these. Testosterone is produced in the male foetus to stimulate the formation of the male duct system and accessory organs. Its production then declines and does not increase until puberty. At puberty (usually occurring between the ages of 12 and 16 in boys), it spurs the growth of the male reproductive organs and the production of sperm. In addition, testosterone brings about the male secondary sex characteristics: deepening of the voice; appearance of hair under the arms, on the face, and in the genital area; and increased growth of muscles and heavy bones.

In women, the ovaries secrete two groups of steroid hormones, estrogens and progesterone. The ovaries do not begin to function until puberty (usually occurring between the ages of 11 and 14 in girls). At puberty, the hormones spur the development of the female secondary sex characteristics: enlargement of the breasts, appearance of hair under the arms and in the genital area, and the accumulation of fat in the hips and thighs.

During copulation, millions of sperms are released inside the vagina. Some of these travel towards into the uterus and gradually reach the oviduct. When the ovary releases an ovum, it reaches the oviduct and fuses with the sperm, leading to fertilisation. Only the sperm is capable of fertilising an ovum, the fertilisation results in the formation of zygote (fertilised egg).

The sperm and ovum each carry the genetic material that is necessary to

generate and maintain human life. The thread-like structures that carry that genetic material (or genes) are called chromosomes. When the genetic material or a sperm combines with that of an ovum, fertilisation or conception occurs (see figure below). Each of the parents contributes equally to the formation of a zygote. Thus, the new individual that develops from the zygote inherits characteristic features of both the parents.

The zygote once formed travels down the fallopian tube and enters the uterus. By the time it has reached the uterus, the zygote now called an embryo, is a tiny ball of cells that are continually growing and dividing. It divides repeatedly to form a ball of cells. These cells begin to form tissues and organs.

4. The changes that occur in a boy and girl after the onset of puberty :
  - (i) Increase in height
  - (ii) Changes in body shape
  - (iii) Changes in voice box and voice
  - (iv) Increased activity of sweat and sebaceous glands
  - (v) Maturation of sex organ
  - (vi) Secondary sexual characteristics
  - (vii) Mental, intellectual and emotional maturity
5. A pair of testes (Singular testis) located outside the abdominal cavity in scrotal sac are the male reproductive organs. The male gametes, i.e. the sperms are produced in large number in testes are stored in epididymis. The sperm duct called vas deferens from each testis carries the sperms to urethra in penis. The penis with erectile tissue is responsible for transferring the sperms into vagina of the female body. In sperm duct, three different glands pour their secretions to neutralize the acidity of urine in urethra and provide a medium for the sperms to swim. The mixture of these fluids from different glands and sperms is called semen.
6. The sex of an individual child is determined at the time of fertilization on the basis of which male gamete has fused with the female gamete.
7. Maintaining Good Health during Adolescence  
Good health is very essential during adolescence. To maintain good health, one should  
have proper diet (balanced diet).  
maintain personal hygiene.  
Keep domestic hygiene.  
Undertake physical exercise  
take proper rest and sleep.  
keep away from smoking, alcohol and drugs.

**I. Answer the following questions in detail :**

- Ans.** 1. All living organisms grow, multiply and produce their own kind by the process of reproduction. Reproduction is one of the characteristic features of living organisms. Life would not exist on the Earth if plants and



animals did not reproduce to produce their offspring. By reproducing, a living organism can be sure that there is another individual to its kind to take its place when it dies. In this way a species guarantees its survival. A species which cannot reproduce offsprings will disappear forever from the face of the Earth, i.e. it will become extinct. The best known example of animals that have become extinct is the dinosaurs.

### REPRODUCTION IN ANIMALS

Living organisms reproduce to form individuals of their species by many ways. These are grouped into two categories :

1. Asexual reproduction
2. Sexual reproduction

#### Asexual Reproduction

Asexual reproduction is a common method of reproduction in microscopic and small animals. This is a means of reproduction involving a single individual or a single parent. The offspring produced is identical to the parent. Asexual reproduction can take place by various methods like binary fission, multiple fission, budding, spore formation and fragmentation.

**Binary fission :** It is the simplest and fastest method of asexual reproduction. First, the nucleus of the cell divides into two. This is followed by the division of cytoplasm and then the cell splits into two. Each daughter cell receives one nucleus. These daughter cells gradually grow and develop into adult individuals. Binary fission is the most common type of asexual reproduction in protozoans such as Amoeba, Euglena and Paramecium.

When a cell gives rise to several daughter cells it is termed as multiple fission. This type of reproduction is seen in Plasmodium.

**Budding :** A few animals, such as sponges and Hydra, reproduce by budding. During budding, the body develops some protuberances called buds. These are the developing new individuals which arise from the parent body. These buds may remain attached to the parent and grow as adults. This results in the formation of a colony. Alternatively, after a certain period of growth, these buds detach from the parent and develop into new individual.

**Spore formation :** These are simply specialised cells that are released from the parent (usually in large numbers) to be dispersed. Each spore can grow into a new individual. This kind of reproduction is seen in bread mould, Rhizopus.

### SEXUAL REPRODUCTION IN ANIMALS

This is the most common method of reproduction in animals. As mentioned earlier, two parents one male and the other female take part in sexual reproduction (see figure below). Two types of reproductive cells (sex cells) called gametes are produced from reproductive organs of the

two parents. Male parent produces the male gamete called sperm. Female parent produces the female gamete called ovum (plural ova) or egg.

A male gamete is usually small with a nucleus and little cytoplasm. In humans, the male gamete has a long tail which helps it in movement.

The female gamete is larger with a nucleus and more cytoplasm. This cytoplasm provides nutrition to the growing embryo.

The male gamete and the female gamete fuse (join) to form a structure called the zygote. The process of fusion of male and female gametes is called fertilization. After fertilization, the zygote divides repeatedly and undergoes growth in size. This is called the embryo. Ultimately, a new individual is formed.

## 2. Female Reproductive System

The female reproductive system is more complex than the male reproductive system because both the fertilization of ovum with sperm and the development of the embryo occurs in the female. The female reproductive organs include a pair of ovaries (Singular ovary) that are located in the lower abdominal cavity. Once a female reaches puberty, the ovary starts producing the egg or ova (singular ovum). The ova produced are brought to uterus by oviduct (also called fallopian tube). However, the fertilization occurs only in the fallopian tube. If the ovum is fertilized, then the zygote comes in the uterus. The uterus (called womb) is a muscular organ where the development of embryo occurs until child birth in gestation period of 9 months. It opens into a muscular tube called vagina. If an ovum fails to get fertilized by a sperm, it becomes dead after a certain period of time, i.e. 24 hour. The dead ovum is expelled from the uterus along with some uterine tissue. The expulsion of dead ovum with uterine tissue is called menstruation that occurs monthly after the onset of puberty in females up to an age of 45 years or so.

## 3. The Endocrine System

The endocrine system in our body consists of a set of glands which are located in different parts of the body. These glands are of two types (1) Exocrine glands (2) Endocrine glands. The exocrine glands are also known as ducted glands as their secretions are carried by the ducts. (Eg. salivary gland, tear gland). The endocrine glands or ductless glands do not have ducts and their secretions called hormones and are released in the blood stream.

The hormones are informational molecules and are secreted in response to changes in the environment inside and outside the body. Hormones can bring about drastic changes in the body. While nervous system co-ordinates the activities of the organs by passing nerve impulses, endocrine system co-ordinates the functioning of the body by using chemicals.

The major endocrine glands of our body are pituitary gland, pineal gland,

thyroid gland, parathyroid gland, thymus gland, islet of Langerhans of pancreas, adrenal gland, gonads (Testis in males and Ovaries in females).

4. Puberty is the period in life at which sexually immature boy or girl becomes sexually mature and capable of reproduction. It happens to be at the age of 11 or 12 years in girls and 14 to 18 years in boys. Puberty ends when an adolescent reaches the reproductive maturity. At puberty in the males, the testes start producing sperms and in the female ovaries start releasing eggs.

**Changes at Puberty**

Certain changes are common in both boys and girls.

**Increase in height**

During puberty, there is sudden increase in height due to the growth of long bones of legs and arms. Initially girls grow faster than boys, but by the age of 18, both boys and girls reach their maximum height. The rate of growth varies in different sexes (i.e., in boys and girls) and also in different individuals.

**Changes in body shape**

During puberty, boys and girls start looking different due to certain changes.

In boys, the muscles of the body grow and become more prominent. Their shoulders become broad and chest wide.

In girls, the region below the waist becomes wider. The muscles of the body grow to provide an hour-glass appearance.

**Change in voice box and voice**

At puberty, the voice box or larynx begins to grow. In boys, it protrudes out in the throat region as Adam's apple. Appearance of Adam's apple marks the end of adolescence. The larynx is smaller in girls than in boys and is hardly visible from outside.

Boys develop deep voice (hoarse voice) while girls develop high pitched sweet voice.

**Increased activity of sweat and sebaceous glands**

At puberty, both sweat glands and sebaceous glands become more active specially on the face. This leads to appearance of acne and pimples on the face. This problem can be avoided by reducing intake of fatty food and also keeping the face clean by washing it properly and repeatedly.

**Maturation of sex organs**

At puberty, the male sex organs like tests, testicles and penis become fully developed in boys. In girls, the ovaries enlarge, and maturation and release of eggs begin. This leads to onset of menstruation cycle.

**Secondary sexual characteristics**

During the pubertal period, sex hormones bring about changes in the body. These changes help to distinguish male from female or a boy from a girl. The external features in which boys and girls differ from each other

are called secondary sexual characteristics.

In boys, secondary sexual characteristics include

Growth of beard, moustaches and pubic hair along with hair on the chest and thighs.

Elongation of hands and feet.

Voice becoming deep and hoarse.

Growth of reproductive organs.

In girls, secondary sexual characteristics include

Development of breasts and the widening of region below the abdomen.

Voice becoming shrill.

Growth of pubic hair.

There is change of behaviour and attitude both in boys and girls.

Mental, intellectual and emotional maturity

Adolescence brings a change in a person's way of thinking.

Adolescents want to be independent.

Mental and physical changes taking place during adolescence cause mood changes.

He/she finds a way to recognise and manage his/her emotion.

Intellectual development takes place and they spend considerable time in thinking.

Maturity in adolescents makes boys and girls interested in the opposite sex.

Sometimes, an adolescent may feel insecure while trying to adjust to the changes in the body and mind.

### Section III : Activities Assessment (CCE Pattern)

Do yourself

## Formative Assessment-2

### A. Answer the following questions orally :

- Ans.**
1. The minimum temperature at which a substance spontaneously ignites in anormal atmosphere is called the ignition temperature.
  2. The Wildlife Act 1972.
  3. The components of the nucleus are nuclear membrane, nucleoplasm, nucleoplasm and chromosomes.
  4. Animals reproduce to multiple and produce their own kind.

### B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answer :

- Ans.** 1. (a)                      2. (a)                      3. (c)                      4. (d)

### C. Fill in the blanks :

- Ans.** 1. The thread-like structures that contain the genes are called **chromosomes**.

2. The endangered species are listed in the **Red** book.
3. The gel-like fluid inside the nucleus is **cytoplasm**.
4. An ideal fuel should have **high** calorific value.

**D. Write True or False for the following statements :**

- Ans.** 1. True                      2. False                      3. False                      4. False

**E. Match the following :**

COLUMN-I	COLUMN-II	COLUMN-III
1. Progesterone	(i) Male hormone	(a) Release their secretions into the blood stream
2. Testosterone	(ii) Ductless glands	(b) Causes the growth of breasts.
3. Estrogen	(iii) Ovaries	(c) Causes the growth of facial hair.
4. Endocrine	(iv) Female hormone	(d) Maintenance of the pregnancy.

**F. Tick (✓) the odd-one out giving reason :**

- Ans.** 1. Cell, Tissue, Organ, Prokaryotes. ✓  
 2. Nucleus, Nucleolus, Nuclear membrane, Plastids. ✓  
 3. Cell, Robert Hooke, Pseudopodia, Magnifying device. ✓  
 4. Plastids, Chlorophyll, Chloroplasts, Nucleolus. ✓

## Summative Assessment-1

**A. Name the following :**

- Ans.** 1. Irrigation                      2. Microorganism  
 3. Thermoplastics                      4. Ores  
 5. Inflammable substances                      6. Deforestation

**B. Define the following terms :**

- Ans.** 1. **Reproduction :** Reproduction is the life process used by an organism to produce its own kind to maintain its species.
2. **Cell organelles :** The parts of a cell is called organelles.
3. **Endangered Species :** A species that is in danger of extinction due to the destruction of its habitat, poaching or some other reason is called an endangered species. Such species will be unable to survive in the near future if the causes of their destruction continue to prevail. The Asiatic lion, the great Indian bustard and the blue whale are some endangered species of animals. Given below is a table containing some endangered species of animals in India.
4. **Ignition temperature :** The minimum temperature at which a substance spontaneously ignites in a normal atmosphere is called the ignition

temperature.

5. Displacement reaction : Do yourself

6. Nitrogen assimilation : Do yourself

**C. Differentiate between the following :**

**Ans.** 1. Thermoplastics and Thermosetting plastics : Thermoplastics or thermoplasts are the plastics which melt or become soft on heating and harden when cooled. They retain their plasticity even after repeated heating and cooling. Polythene and PVC are examples of thermoplastics. They are used to make bags, toys, etc.

Thermosetting plastics or thermosets, on the other hand, are the plastics which when moulded once, cannot be softened on heating. The two most popular examples of thermosets are bakelite and melamine. Bakelite is an insulator and is used to make electrical switches and handles of various utensils. Melamine has fire and heat resistant properties and is used to make floor tiles, kitchenware and fire resistant fabrics.

2. Physical properties of Metals and Non-metals : Do yourself

3. Rapid and Spontaneous combustion : Do yourself

**D. Give reasons for the following :**

**Ans.** 1. Farmers use manure and fertilizers to increase the production of crop.

2. We should not throw away plastics carelessly on roads because it cause pollution.

3. Deforestation leads to depletion of wildlife because forest in the habitat of many species.

4. Balanced diet and physical exercise are essential during adolescence because this is the growing time period of body and mind.

**E. Answer the following questions in short :**

**Ans.** 1. Do yourself

2. The materials which are decomposed by nature easily are called biodegradable materials.

3. Combustion of fuels increase the quantity carbon dioxide in the air which causes global warming.

4. Do yourself

5. Puberty is the period in life at which sexually immature boy or girl becomes sexually mature and capable of reproduction. It happens to be at the age of 11 or 12 years in girls and 14 to 18 years in boys. Puberty ends when an adolescent reaches the reproductive maturity. At puberty in the males, the testes start producing sperms and in the female ovaries start releasing eggs.

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 Intellectual development takes place and they spend considerable time in thinking.  
 Maturity in adolescents makes boys and girls interested in the opposite sex.  
 Sometimes, an adolescent may feel insecure while trying to adjust to the changes in the body and mind.

**F. Answer the following questions in detail :**

- Ans.**
1. Do yourself
  2. Uses of Bacteria :
    - (i) Bacteria promote the formation of curd and cheese by the process of fermentation in which the milk sugar is converted into lactic acid by the action of bacteria.
    - (ii) Bacteria act upon fruit juices to produce vinegar and wines.
    - (iii) Bacteria act as natural scavengers since they decompose the organic waste rapidly.
  - Use of Algae :
    - (i) Algae produce food for aquatic animals.
    - (ii) Blue-green algae are able to fix nitrogen in the form of nitrates and thus increase the fertility of the soil.
    - (iii) Kelps are the sources of iodine and potassium.
  - Uses of Fungi :
    - (i) Yeast is used in making bread, cakes, idli and dosa, etc. Yeast is rich in vitamin B.
    - (ii) Yeast is also used for commercial production of alcohol and wine by growing them on natural sugars present in grains like barley, wheat, rice and crushed fruit juices, etc.
  - Use of Protozoa :
    - (i) Protozoa help in the treatment of waste and sewage because they feed on fungi and bacteria which decompose organic matter.
    - (ii) Being simplest animal they are used as laboratory animals for research.
  3. Do yourself
  4. Do yourself
  5. Do yourself
  6. Do yourself
  7. COMPARISON OF PLANT AND ANIMAL CELLS  
 Table gives a comparison of cells found in plants and animals (see figures below)..



**Table : Plant and animal cells—a comparison**

<b>Structure</b>	<b>Plant cell</b>	<b>Animal cell</b>
Cell membrane	✓	✓
Cell wall	✓	X
Cytoplasm	✓	✓
Nucleus	✓	✓
Mitochondria	✓	✓
Chloroplasts	✓	X
Golgi body	✓	✓
Endoplasmic reticulum	✓	✓
Ribosome	✓	✓
Vacuole	A large vacuole present	Absent, smaller in size if present

'X' indicates absence of the structure

#### 8. CAUSES OF DEFORESTATION

Having learnt about the causes for the loss of biodiversity, you can easily understand the causes of deforestation.

Forests are an important natural resource. They are essential for the well-being and survival of mankind. However, due to various human needs, forests are under great threat of being cut (deforestation).

Various man-made causes of deforestation are :

Construction for houses and industries

Clearing land for agricultural purposes

Using wood as fuel

Using wood to make paper, furniture and other things

Deforestation also occurs naturally due to forest fires, earthquakes, severe droughts and floods.

#### CONSEQUENCES OF DEFORESTATION

Deforestation has an adverse effect on biodiversity and needs to be checked immediately. The result of deforestation.

We already know that plants and animals depend on each other. A number of species of birds and other animals live in forests. It is their habitat. They depend on each other for food and other things. Destruction of forests has affected the food chain and destroyed the habitats of many living organisms. Animals like lions and tigers have become much reduced in number because the forests in which they live have been destroyed. Remember, this is not the only reason for the reduction in number of these animals. Another reason is their hunting by humans.

The level of carbon dioxide in the atmosphere increases on account of deforestation. You know that plants need carbon dioxide for photosynthesis. Reduced number of trees require lesser carbon dioxide.

So the level of this gas has gone up in the atmosphere, resulting in global warming.

Deforestation leads to increase in temperature and pollution level on the earth. This disturbs the water cycle and reduces rainfall. The outcome is the drought.

Deforestation results in soil erosion. Trees prevent soil erosion. Roots of trees bind the soil particles together, preventing them from blowing away by wind or water. Soil erosion removes the top layer of the soil that contains the fertile humus. Removal of top layer, thus makes the soil less fertile, as the lower layers of soil contain less humus. If this goes on, the fertile land gets converted into a desert. The process of conversion of fertile land into a desert is called desertification.

## Moving Things People and Ideas

# Force and Pressure

9

### Exercise

#### A. Answer the following questions orally :

- Ans.** 1. Force : A push or pull is called force.                      2. To save energy.  
3. Two  
4. Friction : Force acting when one body tends to move over another body.

#### B. Multiple Choice Questions (MCQs) :

Tick (✓) the correct answers :

- Ans.** 1. (d)    2. (b)    3. (d)  
4. (d)    5. (c)    6. (c)

#### C. Fill in the blanks :

- Ans.** 1. The north pole of a magnet **in the south of** the north pole of another magnet.  
2. To draw water from a well we have to **apply force** at the rope.  
3. To stretch the bow, the archer applies a force that causes a change in its **speed and direction**.  
4. To move a loaded trolley we have to **roll** it.  
5. The thick layer of air present around the Earth is called the **atmosphere**.  
6. The force exerted by the Earth's atmosphere per unit area of the Earth's surface is called **atmospheric pressure**.

#### D. Write True or False for the following statements :

- Ans.** 1. True                      2. False                      3. False                      4. True                      5. True                      6. False

**E. Match the following :**

- Ans.**
- |                         |   |
|-------------------------|---|
| 1. Atmospheric pressure | (i) The standard unit of force                      |
| 2. Newton               | (ii) The force with which the Earth attracts things |
| 3. Pascal               | (iii) A piece of rope                               |
| 4. Connector            | (iv) SI unit of pressure                            |
| 5. Magnetic force       | (v) The pressure exerted by the weight of the air   |
| 6. Gravity              | (vi) The force exerted by a magnet on an iron nail  |

**F. Tick (✓) the odd-one out giving reason :**

- Ans.**
1. Muscular force, Friction, Magnetic force.
  2. Electrostatic force, Gravitational force, Friction.
  3. Rubber sucker, Pulling, Pushing.

**Section 2 : Summative Assessment (CCE Pattern)**

**G. Define the following terms :**

- Ans.**
1. Push : A force applied to move a body away from us.
  2. Muscular force : The force applied by the muscles of a body is called muscular force.
  3. Friction : Friction is the force acting when one body tends to move over another body.
  4. Magnetic force : Force between two magnetic poles is called magnetic fore.
  5. Atmospheric pressure : The force exerted by the Earth's atmosphere per unit area of the Earth's surface is called atmospheric pressure.

**H. Answer the following questions in short :**

- Ans.**
1. Two contact forces : (i) Muscular force (ii) Mechanical force  
Two non-contact forces : (i) Gravitational force (ii) Magnetic force
  2. A change in speed or direction of motion or both of an object implies a change in its state of motion.
  3. Pushing a ball and rocket launching are the change of the state of motion of objects.
  4. Beating the shape of iron by hammer and applying force on the wet clay cause in the shape of an object.
  5. If two forces of iron by hammer and applying force on the wet clay cause a change in the shape of an object.
  6. If two forces are applied on a body in the opposite direction and the capacity of both forces are equal, the body will remain constant.
  7. To know whether liquids too exert pressure.

Procedure : Take a glass tube open at both ends. To one end tie a thin rubber membrane (a blown off piece of a balloon) as shown below. Initially when there is no water in the tube what do you observe? Now,

start filling water in the tube and note the bulge in the membrane as water is filled. Can you explain your observation?

This is due to the fact that the water filled in the tube begins to apply pressure on the thin rubber membrane due to which it begins to bulge. As more and more water is filled in the tube the bulge becomes greater. This means that the pressure exerted by the liquid depends upon its height. More the height of the liquid in the tube greater is the pressure it exerts.

**I. Answer the following questions in detail :**

**Ans.** 1. Forces change the direction and speed of motion of objects. Consider a ball at rest. When you apply force on it in the form of a kick, the ball starts to move. The ball can be brought back to the state of rest by applying force on it again. You can also kick the ball to change the direction.

2. **Electrostatic Force**

Another force acting from a distance, apart from the magnetic force, is the electrostatic force. Electrostatic force is the force between the electric charges. You can observe this force at home by using your comb and small bits of paper. Just carry out the following experiment.

Rub a comb on your dry hair for some time. Now, bring the comb near the bits of paper. The bits of paper cling to the comb. This happens because the comb acquired an electrostatic charge when it was rubbed against your hair and hence exerts an electric force on the pieces of paper.

3. **Contact Forces**

As mentioned earlier, contact forces are the forces that act when the objects are in physical contact with the agents producing them. They are of two types.

**Muscular Force**

Muscular force is the force exerted by the muscles of a living body. The muscles contract and relax to bring about movement. The muscular force can set things in motion. When a living being, for example a horse or a person, pulls a cart, its (his) muscles exert a force which moves the cart forward. We use muscular force to slow down or stop a moving object and even to increase the speed of a moving object. We use muscular force for doing all our work. We use muscular force for doing all our work like lifting a load, pulling a table or playing football.

**Mechanical Force**

Human beings have invented various machines to make their work easier. The force exerted by a machine to perform some work is known as mechanical force. Do you know how a car moves? All cars have engines. Engines need petrol or diesel to work. A car engine burns petrol or diesel to generate mechanical force. This mechanical force sets the wheels of the car in motion. Turbines in a hydroelectricity plant move due to the mechanical force generated by water falling from a great height.

4. The force acting on a bucket containing water held above ground level in



4. (b)

5. (a)

6. (c)

**C. Fill in the blanks :**

- Ans.**
1. A frictional force always tends to **oppose** the motion of a body.
  2. Friction is caused by the **interaction** on the surfaces in contact.
  3. You can reduce air resistance by giving objects a **ring** shape.
  4. Sole of the shoe is usually grooved to **reduce** the friction.

**D. Write True or False for the following statements :**

- Ans.** 1.            2.            3.            4.            5.

**E. Tick (✓) the odd-one out giving reason :**

- Ans.**
1. Oil, Grease, Sand, Graphite.
  2. Sliding, Friction, Static friction, Rolling friction, Fluid friction.
  3. Roller bearing, Ball bearing, Wheels, Wooden block.

**Section 2 : Summative Assessment (CCE Pattern)**

**F. Define the following terms :**

- Ans.**
1. Friction : A resistance that opposes the motion of one surface over the other is called friction.
  2. Static friction : Friction that resists the initial motion of a stationary object is called static friction.
  3. Sliding friction : Friction that resists the sliding motion of an object over a surface is called sliding friction.
  4. Rolling friction : Friction that resists rolling motion of an object over a surface is called rolling friction.
  5. Wear and tear : The friction between two surfaces changes their surface conditions or shapes. This is called wear and tear of a surface. Machine parts also suffer from wear and tear due to friction and may need to be replaced with new parts when used repeatedly.

**G. Answer the following questions in short :**

- Ans.**
1. Friction is a kind of resistance that opposes motion of one surface over the other as it happens when a mat is dragged over the floor.
  2. We fall down when we step on a banana peel because it reduces the friction.

**3. Static Friction**

When force is applied on a body, the frictional force resists its movement. As the applied force is increased, the frictional force too increase and the body is unable to move. This force of friction is known as static friction. The body starts moving only when the applied force is greater than the frictional force.

**Sliding Friction**

The frictional force between two surfaces in contact, when they slide upon each other with a uniform speed, is known as sliding friction. It is also known as kinetic friction.

#### 4. FACTORS AFFECTING FRICTION

Friction is caused by the irregularities on the two surfaces in contact. If you observe the surfaces of various objects through magnifying lens, they will appear to have tiny hills and grooves like irregularities. When the surfaces of any two objects are in contact, these tiny hills and grooves entangle or interlock with each other opposing motion. When we attempt to move any one object, we have to apply force to overcome interlocking. On applying sufficient force, the interlocking breaks and the body begins to move.

5. The fixing of irregularities of two surfaces into each other is called an interlocking or irregularities.

#### **H. Answer the following questions in detail :**

**Ans.**

1. Do yourself
2. Friction is a force that arises when two surfaces come in contact. To know the cause of friction, we need to look closely at the interacting surfaces. A magnified image of a smooth surface is shown. It is clear from the magnified image that even smooth surfaces have large number of irregularities on their surfaces, i.e. all surfaces at microscopic (very small) level have an uneven rough surface. Thus, all surfaces look like mountains with trenches in between.

#### **Irregularities on a Surface cause Friction**

When two surfaces touch each other, the small sized irregularities of two surfaces fix into each other. The fixing of irregularities of two surfaces into each other is called an interlocking or irregularities.

To move one surface over the other (or to have a relative motion between two surfaces) one has to overcome the interlocking. The interlocking of irregularities of two surfaces causes the friction between these surfaces. The force required to overcome interlocking is called friction force. Interlocking is much more between rough surfaces than smooth surfaces. Thus, rough surfaces offer more resistance to relative motion between two objects than smooth surfaces.

Further, note that interlocking between two surfaces increases when they are pressed harder against each other. A strong interlocking between two hard-pressed surfaces is shown in the figure below.

You must have experienced that it is easier to pull a thick dry jute mat than water sprinkled wet mat. It is because wet mat is heavier and it causes strong interlocking between mat and ground.

We can now conclude that friction between two surfaces depends upon following factors :

1. nature of the surfaces in contact

2. pressure on the surface in contact
3. Advantages of friction

Friction enables us to walk : You must have noticed that we slip when we walk on a smooth and oily or greasy surface. However, it is easier and comfortable to walk on a rough surface such as ground or road. It is the friction between the ground and our feet (or our footwear), which enables us to walk comfortably.

Friction enables us to write : We can write using a pen, a pencil or a chalk only because of friction between these objects and the surface on which we write. Due to friction, ink spreads and sticks on paper. Similarly, chalk particles breakdown and stick on the blackboard due to friction with the blackboard surface. However, one finds it difficult to write on a gloosy paper because it offers much less friction to the ink.

Friction enables us to drive (move and stop) vehicles: The friction between tyre and road provides a grip to vehicle on road. This enables us to drive vehicles on the roads.

Friction enables us to light a matchstick: Did you notice that the side surface of a matchbox is made dotted? It is because a matchstick is lit only when we rub it on a rough surface. It is the friction provided by the rough surface which enables us to light a matchstick.

Friction enables machines to perform motions: It is the friction between different parts of machines, which allows them to perform and control their motions. In fact, all motions of body parts of human beings, animals, vehicles, machines, etc., are possible because of friction.

Friction enables us to change direction of moving objects: An object moving in a straight-line path will continue to move in the same direction if there is not friction provided by the surface on which it is moving. Friction is necessary if we need to change the direction of a moving object. On rotating the steering wheel of a vehicle, we can change the direction of its motion because there exist a friction between tyres and road.

Friction enables us to hold objects : Put oil on outer surface of a stainless steel glass full of water and try to hold it in your hand. It will slip from your hand because oil reduces friction between the glass surface and your hand. Hence, it is the friction between our hand and other objects that enables us to hold them

Friction enables us to construct buildings : When we put one brick over the other joining them by cement, the irregularities between their rough surfaces interlock each other to hold them tightly because of force of friction. This is how friction enables us to construct buildings. Can you



imagine how difficult it would have been for a tall building to stand without friction?

#### Disadvantages of Friction

Friction produces unnecessary heat : When two surfaces rub against each other, they generate heat because of friction. For example, if you rub the palm of your hands they become warm. Similarly, various parts of machines produce heat due to friction. This is unwanted heat. The amount of unwanted heat produced sometimes increases so much that it can damage the machine. You must have noticed that when operated for a long time, the outer surfaces of washing machines, fans, refrigerators, mixer and grinders become warm. The unnecessary heating of machine parts by friction puts a limitation on continuous use of a machine.

Friction wears out footwear : Soles of shoes and sandals wear out because of friction.

Friction changes the shape of some objects: You must have seen the iron wheel used as a pulley in a well to pull the bucket using a rope, develops a ring shaped carter on its surface. It is caused because of friction between the rope and iron wheel. Similarly, the edges of metal steps marked on foot over bridges become rounded because of friction by users' feet.

Friction increases power consumption : We use electric power to run machines. The large friction between machine parts increases their power consumption. It thus increases the cost of running a machine.

Friction fades away the marks on roads : The traffic marks like zebra crossing lines, stop signs, parking signs, bus stand signs, etc., painted on road fade way with time because of friction by tyre wheels.

#### 4. We use different techniques to increase friction.

Roughen the surface : Treaded tyres of vehicles have designs and patterns with grooves on their surface to increase resistance with the road. This prevents skidding. The soles of shoes are also made with grooves to give a good grip on the ground.

Dry the surface : Sand and gravel is thrown on slippery ground during rainy season to increase friction.

Use brake pads : We increase friction by using brake pads in the brake system.

#### 5. To reduce friction 'ball bearings' are used in all machines. In ball bearings, the axle rotates on the balls and there is no sliding. Ball bearings change the sliding friction into rolling friction.

### Section III : Activities Assessment (CCE Pattern)

Do yourself