Lesson 1

Nutrition in Plants

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans. 1. **Stomata** are tiny pores present on the leaf surface to breathe in air.
2. Green plants are **autotrophic** in nature.
3. **Chlorophyll** gives a leaf the ability to convert the sun's energy into food.
4. **Saprophytic plants** depend on dead/decaying organic matter for food.
5. Plants manufacture food in the form of **starch**.
6. **Cuscuta** is a parasitic plant.

C. Write 'T' for true and 'F' for false statements :

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

D. Name these :

Ans.

1. A plant pigment that absorbs sunlight.	**Chlorophyll**
2. A gas needed for photosynthesis.	**Carbon dioxide**
3. Another name for carbohydrates.	**Starch**
4. A by-product of photosynthesis.	**Starch**
5. A plant that eats insects.	**Pitcher plant**

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Stomata
2. Due to the presence of chlorophyll.
3. Chlorophyll
4. Neem
5. Oxygen

B. Short Answer Questions :

Ans. 1. Organisms that are able to make food molecules using external sources such as carbon dioxide, water and sunlight are called autatrophs.
2. The process by which green plants make their own food from carbon dioxide and water by using sunlight energy (in the presence of chlorophyll) is called photosynthesis.
3. Photosynthesis involves the use of the energy in sunlight to change water and carbon dioxide into carbohydrates (starch) and oxygen.
Photosynthesis has two stages: the light reaction and the dark reaction.
Each chloroplast contains grana and stroma. Light reactions take place in the grana while dark reactions occur in the stroma.

4. The trunk of a tree is a two-way passage. Just inside the bark there is a way that the leaves use to send food down to the roots. This is called the phloem.
   Next to the phloem towards the centre of the tree is another way— called xylem—that sends water up from the roots to the leaves.
5. Generally all plants on earth are green plants but there are certain plants which do not contain chlorophyll, neither in their leaves nor in any other part. These plants, called non-green plants, cannot manufacture their own food.

C. Long Answer Questions :

Ans. 1. Lichens are an association between a green algae and a fungus. The fungus obtains nutrients from the algae, and the fungus in turn provides shelter for the algae, allowing it to grow in harsh conditions such as rock surfaces where it would otherwise die.

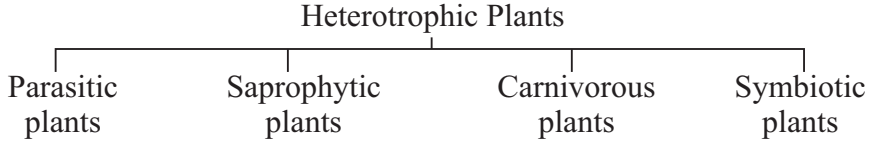
2. The prepared food is generally absorbed from the root or the stem of the host plant. **Cuscuta (Dodder)**, **mistletoe** and **Apodanthes** are common examples of parasitic plants.
   Cuscuta (Dodder) has a short root and a long, thread-like stem. It climbs around the host stem and sends branches around neighbouring stems giving the appearance of a mass of noodles or spaghetti.
   Mistletoe has leathery, green leaves, and so they can make their own food. but they depend on the host for water and minerals.

3. A plant which lives on or inside another ogranish and drives the food from it, is called a parasitic plant. Parasitic plants absorb food from another growing green plant, called the host. Only the parasitic plant benefits from this relationship. **cusucuts**, **mistletoe** and **Apodanthes** are common examples of parasitic plants.
   Saprophytic plants are usually white in colour, but can have brightly coloured flowers. These plants have no green leaves, often they even have no leaves at all. These plants live off rotting substance. The grow in place with lots of rotting dead leaves, generally in deep shade in tropical forests. Some examples are coral root and Indian pipe.

4. In certain places, the soil is deficient in certain minerals and nutrients, especially nitrogen. Hence, plants growing in these places need to obtain these nutrients from other sources. These plants are usually green so they can make their own food.
   Carnivorous plants derive some of its nutrients by trapping and consuming animals, mainly insects. Therefore these plants are also called **insectivorous plants**.
   Some of the carnivorous plants are the pitcher plant, Drosera (sundew), bladderwort, and the Venus fly trap.
   In the pitcher plant, lamina of the leaf is modified to form a tubular pitcher-like structure. The inside of the pitcher is lined with downward-

pointing hair. These hair do not allow any insect to climb back up and escape. The liquid at the bottom of the pitcher contains digestive juices which digest the insect.

5. Generally all plants on earth are green plants but there are certain plants which do not contain chlorophyll, neither in their leaves nor in any other part. These plants, called **non-green plants**, cannot manufacture their own food. Also there are certain plants which can manufacture their own food, but the soil in which they grow do not have all the minerals.
   These types of plants depend on green plants or on other living organisms. This mode of nutrition is called **heterotrophic nutrition**, and such plants are called **heterotrophs**.
   Thus, heterotrophs are organisms that cannot make their own food and have to depend on other plants or living organisms to obtain energy.
   According to the mode of nutrition, heterotrophic plants are of the following types:



D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. If leaves of a green plant are coated with oil, the process of photosynthesis will not take place.

2. We think that with the help of fungi saprophytes help us in keeping the environment clean. Saprophytic plants live off rotting substance. The roots of saprophytes contain fungi that can easily digest dead and decaying matter. When fungi change this matter into sugar they can be used as food as food by these plants, so it is the fungi which are saprophytic and not the plants. The plants are only heterotrophic.

3. Due to the absence of sunlight the process of photosynthesis will not take place and plant can not make their own food. It results lack of nutrition. This is the reason by which a plant shed its leaves if kept inside a closed room for too long.

Fun Time

Ans. 1. Do yourself

2. Do yourself

Lesson 2 Nutrition in Animals

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans. 1. Nutrition in most animals is **holozoic**.
2. The process of converting food into simpler and soluble form is called **digestion**.
3. The largest gland in the human body is **liver**.
4. Food vacuole is formed in **Amoeba**.
5. Chewing of food is a **mechanical** process.

C. D. Match the following :

	Column A	**Column B**
Ans. 1.	Amoeba	(iii) Food vacuole
2.	Mouth cavity	(v) Saliva
3.	Liver	(iv) Bile juice
4.	Stomach	(i) Hydrochloric acid
5.	Large intestine	(ii) Absorption of water

D. Write 'T' for true and 'F' for false statements :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Liver is the largest gland in the body. It secretes bile juice which helps in the digestion of fats.
2. The inner wall of the small intestine has millions of finger like outgrowths called villi. The presence of villi increase the surface area for absorption of the digested food.
3. The mouth has the tongue, teeth and salivary glands. The digestion begins in the mouth itself.
4. Teeth are of four types: incisors, canines, premolars and molars.

B. Short Answer Questions :

Ans. 1. Liver is the largest gland in the body. It is a reddish brown gland located in the upper side of the abdomen on the right side. It secretes bile juice which helps in the digestion of fats. Bile juice is stored in a sac called the gall bladder.
2. The inner wall of the small intestine has millions of finger-like outgrowths called villi (singular villus). The presence of villi increase the surface area for absorption of the digested food.
Each villus has a network of thin and small blood vessels (called blood capillaries). The food substances are absorbed by the villi and then transported through the blood vessels to different parts of the body. In the body, the absorbed food is used for energy, growth and repair. This is called assimilation.
3. Starting from the mouth, food passes through a canal formed by a number of organs in the body. This canal is called the food canal or alimentary canal or digestive tract.

The food canal along with the associated glands is called the digestive system.

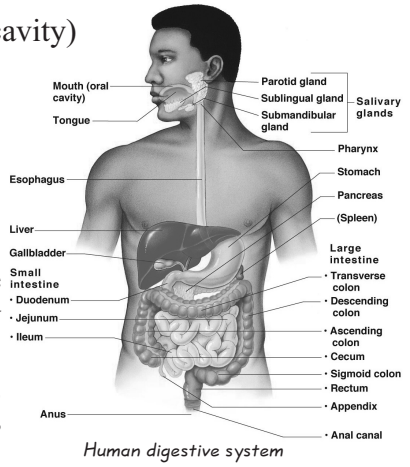
4. The process by which food is taken inside the body of an animal is called ingestion. Mouth and mouth cavity with esophagus are the parts of alimentary canal that are involved in ingestion of food.

C. Long Answer Questions :

Ans. 1. We eat food through our mouth. From the mouth, it goes through a number of parts in the body. All these organs collectively form a food canal called alimentary canal or digestive tract.

The alimentary canal is a long and coiled tube. It has the following seven parts:

(i) Mouth and mouth cavity (buccal cavity)
(ii) Oesophagus or food pipe
(iii) Stomach
(iv) Small intestine
(v) Large intestine
(vi) Rectum
(vii) Anus



Human digestive system

Some glands are associated with the alimentary canal. These are the salivary glands, the liver and the pancreas. These glands secrete digestive juices, which change complex food substances into simpler ones.

The alimentary canal and the related glands collectively constitute the digestive system.

2. The small intestine is a very long tube. It is about 7.5 meters long. Digestion of all types of food is carried out and completed here. Absorption of digested food also takes place in the small intestine. The absorbed food is passed into the blood vessels through which the nutrients reach all parts of the body.

Digestion in small intestine in carried out with the help of:

- liquids secreted from the liver and pancreas.
- digestive juices secreted by the small intestine.

3. The grass-eating animals first quickly swallow the **fodder** and store it in a separate part of the stomach called rumen. In the **rumen**, food is partially digested. The partially digested food is called **cud**.

The cud partially digested food is then brought to the mouth in small lumps and chewed. The process of chewing the cud is called **rumination**, and the related animals are called **ruminants**. During rumination, cud mixes with saliva and becomes semi-liquid paste. After chewing, this food is passed to the rest of the stomach.

In ruminants, stomach has four chambers—rumen, reticulum, omasum and abomasum.

The first chamber of a ruminant stomach is the rumen. It is the biggest chamber. As mentioned earlier, food is stored here and digestion of cellulose also takes place here.

From the rumen, the food goes to the second chamber called the **reticulum**. In fact, the rumen and reticulum are closely associated and their contents mix freely. In these two chambers, the food is partially digested and converted into a semi-liquid paste called the cud.

The semi-liquid paste food is brought back to the mouth when the animal is resting. After chewing, the food from the mouth goes into the third chamber called the **omasum**. It is the smallest chamber. From here, food goes to the fourth chamber called the **abomasum**. This is the true stomach. Digestive juice is secreted here to help in the process of digestion. From the fourth chamber, the food enters the small intestine. Absorption of nutrients takes place here.

4. The stomach is a thick walled bag present on the left side of abdomen. It is the widest part of the alimentary cannal and receives food from the food pipe.

   The inner lining of the stomach secretes mucus, hydrochloric acid and digestive juices which perform the following functions:

   - The mucus protects the inner lining of the stomach.
   - The acid kills any bacteria which enter along with the food, and also makes the medium acidic, so that the digestive juices can act.
   - The **digestive juices** help to breakdown the **proteins** present in our food into simpler substances.
   - The partially digested food from the stomach then goes into the small intestine.

   In ruminants, stomach has four chambers— **rumen**, **reticulum**, **omasum** and **abomasum**.

   The first chamber of a ruminant stomach is the rumen. It is the biggest chamber. As mentioned earlier, food is stored here and digestion of cellulose also takes place here.

   From the rumen, the food goes to the second chamber called the reticulum. In fact, the rumen and reticulum are closely associated and their contents mix freely. In these two chambers, the food is partially digested and converted into a semi-liquid paste called the cud.

   The semi-liquid paste food is brought back to the mouth when the animal is resting. After chewing, the food from the mouth goes into the third chamber called the omasum. It is the smallest chamber. From here, food goes to the fourth chamber called the abomasum. This is the true stomach. Digestive juice is secreted here to help in the process of digestion. From the fourth chamber, the food enters the small intestine. Absorption of nutrients takes place here.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. We will not be able to identify sweet taste if we burn our tongue from the tip.

2. This is a type of survival mechanism. For their food carnivores are on the search for herbivores. The herbivores, to avoid being caught, quickly eat their food and then reach a safe place. Then they chew and digest the food.

Fun Time

Ans. Do yourself

Lesson 3 Materials of Daily Use

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans. 1. The whole process of obtaining silk starting from the silk moth is called **sericulture**.

2. The sleeping period of a silkworm is **twenty-four** hours.
3. The quality and quantity of wool depend upon the **breed** of the sheep.
4. The thinner the fibre, the **better** is the wool.
5. Wool has a **very high** tensile strength.
6. Wool dissolves in **acids** and **alkalis**.

C. Match the columns A and B :

	Columns A	**Columns B**
Ans. 1.	Mulberry	(iii) The best feed for silkworms
2.	Organzine	(iv) The lengthwise thread in silk weaving
3.	Tram	(v) The crosswise thread in silk weaving
4.	Combing	(i) To remove burrs from fleece
5.	Weighting	(ii) To soak silk in solutions of salts

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Wool and silk are two animal fibres which are suitable for making fabrics.

2. The new born of silk moth which emerge from eggs, called larva or silkworms. Silkworm (produce silk) is an example from the sources of animal fibres.
3. The raw silk obtained is twisted to make what is known as thrown silk. The process is called throwing and the employees who throw the silk are called throwsters.

4. The silk filament which is made by a cocoon is too fine and delicate to handle. So, many of them are reeled together to make a stronger thread, called raw silk. Broken cocoons are used to make low quality silk, called spun silk.
5. Different kinds of silk are produced by different kinds of moths. The most common types are eri, moonga, tassar and mulberry.

B. Short Answer Questions :

Ans. 1. A cocoon is a soft covering that the worm spins with silky threads to protect itself. The thread is formed by the hardening of a liquid secreted by the worm. When the silkworm is fully grown, it is placed on some straw or small bushes on which it makes its cocoon.

2. The raw silk obtained is twisted to make what is known as thrown silk. The process is called throwing and the employees who throw the silk are called throwsters.

3. In India, sheep are shorn twice a year. In hot regions, this can be done thrice also. The best seasons for the purpose are spring and autumn. The sheep feels comfortable if shorn in these seasons.

   A few days before shearing, the animals is washed thoroughly with water in order to remove dirt from the wool. The wool obtained from such as animal is called washed wool.

   Shearing is done using a pair of scissors or electrically-driven shears. Bad shearing lowers the price of the wool, so shearing is done by experienced persons only. They shear the fleece as far as possible at one go and not in clumps. Any accidental cuts are treated with an antiseptic like iodine solution. The fleece are tied into bundles.

4. The quantity and quality of wool largely depend upon the breed of the sheep. A sheep may not be of a breed yielding good wool. So they are crossed with better breeds which yield quality wool. The process is called **crossbreeding**. In our country, crossbreeding with some better breeds like Merino, Rambouillet, Somalia, Corriedale, Dorset and Soviet Merino has given better results.

   Only healthy males are selected for breeding. The springs season is the suitable time for mating. The ewe gives birth to its lamb after a pregnancy of five months, at the end of the rainy season.

5. The worm completes its cocoon, of about 4 cm length, in about five days by producing 600-1200 metres of what is called **silk filament**.

C. Long Answer Questions :

Ans. 1. The process of shaving the hair of sheep is called shearing. In India, sheep are shorn twice a year. In hot regions, this can be done thrice also. The best seasons for the purpose are spring and autumn. The sheep feels comfortable if shorn in these seasons.

   A few days before shearing, the animals is washed thoroughly with water in order to remove dirt from the wool. The wool obtained from such as

animal is called washed wool. Shearing is done using a pair of scissors or electrically-driven shears. Bad shearing lowers the price of the wool, so shearing is done by experienced persons only. They shear the fleece as far as possible at one go and not in clumps. Any accidental cuts are treated with an antiseptic like iodine solution. The fleece are tied into bundles. The wool obtained from live sheep is called clipped wool and that from dead sheep, pulled wool.

2. During the feeding period, a silkworm sleeps four times (twenty-four hours each time) at intervals of about six days. While sleeping, its skin breaks and on awaking, the worm sloughs off, i.e., leaves the old skin and comes out in a new one. This process is called **moulting**.
3. The silk filament which is made by a cocoon is too fine and delicate to handle. So, many of them are reeled together to make a stronger thread, called **raw silk**. Broken cocoons are used to make low quality silk, called **spun silk**.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Sericulture is not very popular with people working for animal protection because it kills a number of silkworms during the production of silk. Silk is obtained from the cocoon of silkworm and it is the cruelty against the silkworm.

2. Wild life conservationists object to using 'shahtooth' shawls because these shawls made from the silk. Silk is an animal obtaining fibre and it is produced by the silkworm at the cost of its life. So, to protect the silk worm we should avoid the garments which are made from the silk.

Fun Time

Ans. Do yourself

Lesson 4 Chemicals and Chemical Change

Formative Assessment

A. Tick (✓) the correct option :

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

B. Match the following :

	Column A	Column B
Ans. 1.	Sodium hydroxide	(ii) NaOH
2.	Potassium	(vi) K
3.	Calcium	(iv) Ca
4.	Magnesium	(v) Mg
5.	Sulphuric acid	(i) H_2SO4
6.	Phosphours	(vi) P

C. Fill in the blanks :

Ans. 1. The properties of a compound are entirely **different** to its constituent elements.
2. Atomicity of an element with chemical formula X_8 will be **Sulphur**.
3. An element will have similar kind of **atoms**.
4. The chemical formula of hydrochloric acid is **HCl**.

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. 2O means there is two molecules of oxygen and O_2 means there is two atoms of oxygen.
2. We know that if we leave an iron object such as a trowel (khurpi) or a nail out in the rain a reddish-brown layer is deposited on its surface after some days. This layer is called **rust**. The layer of rust that forms falls off gradually, exposing fresh metal of further rusting. As a result, with the passage of time iron objects become too weak.
3. An element is a substance which cannot be broken down into simpler substances by chemical methods, and is made up of only one kind of atoms.
4.

Chemical elements	Symbols
Bromine	Br
Helium	He
Potassium	K
Sodium	Na
Lead	Pb
Calcium	Ca
Silver	Ag

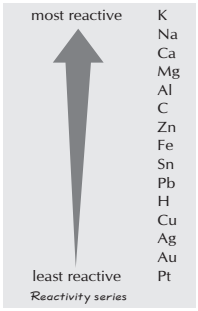
B. Short Answer Questions :

Ans. 1. There are about 114 known elements, out of which 92 occur naturally on earth. The remaining elements have been developed artificially by the scientists. Some elements exist in the form of solids (metals), e.g., silver, gold, iron, etc. Mercury, and bromine are liquids at room temperature. Hydrogen, helium, oxygen, nitrogen, etc. (non-metals) are some examples of gaseous elements.
Copper, gold and silver are metals that occur in the pure form in nature.
2. An element is a substance that cannot be broken down into simpler substances by chemical means. An atom is the smallest particle of an element. A molecule is a larger particle formed by the chemical combination of two or more atoms.
3. Ar is the symbol of argon. It represent that argon is monatomic which means argon exist as single atom.
4. The reactivity series is an arrangement of all the metals is the decreasing order (from highest to lowest) of their capability to participate in a

chemical reaction. A more reactive metal will displace (push out) a less reactive metal from its solution. This is called a displacement reaction.
Consider an example, copper sulphate (CuSO4) is blue and iron sulphate is sea green. During the reaction the blue solution loses its colour and the iron metal is seen to turn reddish-brown as the displaced copper becomes deposited on it.

C. Long Answer Questions :

Ans. 1. When a brinjal is sliced, it damages the plant tissues. This damage to the tissues releases an **enzyme** and the **phenolic compounds** present in the cells. The enzyme starts the reaction between the phenolic compounds present in brijal and oxygen of the air to form a **brown pigment** known as **melanin**.
This type of a reaction is called **enzymatic browning**, and takes place readily at high temperatures. Dipping in plain water can reduce the level of browning by restricting the amount of oxygen in contact with the brinjal tissue.



2. All the metals can be arranged in a series called the **reactivity series**. The reactivity series is an arrangement of all the metals is the decreasing order (from highest to lowest) of their capability to participate in a chemical reaction.
A more reactive metal will displace (push out) a less reactive metal from its solution. This is called a displacement reaction.
3. **Crystals** are the purest solid form of a substance having a definite geometrical shape. The process of separation of pure crystals of a substance from its hot and supersaturated (concentrated) solution on cooling is called crystallisation. Consider the example of common table salt. Table salt is obtained by evaporating sea water. The salt, obtained contains certain impurities such as magnesium chloride, sand, etc, mixed with sodium chloride. These impurities are removed from table salt through the process of **crystallization**.
For this the salt is first added to boiling water. Warmer the solvent, more will be the solute dissolved in it. Dissolve the maximum amount of solute (table salt) that is possible in the given amount of solvent (boiling water). Now filter the solution of remove the insoluble impurities.
Leave the solution undisturbed for some hours. Crystals of table salt will start appearing after some time.
4.

Symbol	Element
Fe	Iron
Cu	Copper
K	Potassium

Al	Aluminium
Pb	Lead

5.

Chemical Compound	Formula
Silver nitrate	$AgNo_3$
Calcium carbonate	$CaCO_3$
Methane	CH_4

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. The formula of ozone is O_3.

Fun Time

Ans. Do yourself

Formative Assessment 1

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans.
1. **Cud :** The grass eating animals first quickly swallow the fodder and store it in a separate part of the stomach called rumen. In the rumen food is partially digested. The partially digested food is called cud.
2. **Ruminants :** The partially digested food (cud) is then brought to the mouth in small lumps and chewed. The process of chewing the cud is called ruminants.
3. **Bile juice :** Bile is a digestive juice. Liver is the largest gland in the body. It secretes bile juice which helps in the digestion of fats.
4. **Digestive system :** The alimentary canal and the related glands collectively constitute the digestive system. It is a complex system.
5. **Alimentary canal :** We eat food thought our mouth. From the mouth, it goes through a number of parts in the body. All these organs collectively form a food canal called alimentary canal or digestive tract.

C. Match the following :

Ans.

	Column A	**Column B**
1.	Deer	(iii) Ruminant
2.	Amoeba	(i) Food vacuole
3.	Mouth cavity	(iv) Saliva
4.	Humans	(ii) Omnivore
5.	Liver	(vi) Bile juice
6.	Stomach	(v) Hydrochloric acid
7.	Small intestine	(viii) Villi
8.	Large intestine	(vii) Absorption of water

D. Name these :

Ans. 1. A gas needed for photosynthesis **Carbon dioxide**

2. The first set of 20 temporary teeth in a body — **Milk teeth**
3. The process of shaving the hair of sheep — **Shearing**
4. A material that is woven from fibres — **Fabric**
5. The smallest particle of an element — **atom**

E. Answer the following questions :

Ans. 1. Neem is an autotrophic plant.
2. The inner wall of the small intestine has million of finger— like outgrowth called villi. The presence of villi increase the surface area for absorption of the digested food.
3. The raw silk obtained is twisted to make what is known as thrown silk. process called throwing and the employees who throw the silk are called throwater.
4. An element is a substance which cannot be broken down into simpler substances by chemical methods, and is made up of only one kind of atoms.
5. We know that if we leave an iron object such as a trowel (khurpi) or a nail out in the rain a reddish-brown layer is deposited on its surface after some days. This layer is called **rust**. The layer of rust that forms falls off gradually, exposing fresh metal of further rusting. As a result, with the passage of time iron objects become too weak.

Lesson 5 Acids, Bases and Salts

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans. 1. The acid found in tamarind is **tartaric acid**.
2. Bases soluble in water are called **Alkali**.
3. Bases turn red litmus solution **blue**.
4. **Sodium chloride** is called table salt.
5. Bases are **soapy** to touch.

C. Write 'T' for true and 'F' for false statements :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Tamarind, lemon, unripe mangeo, grapes, amla, tomato, vinegar, apple etc. are the some natural sources of acids.
2. Soap, shampoo, detergent baking soda etc. are the some sources of bases.
3. Litmus paper and turmeric (haldi) are the name of two natural indicators.

4. When red litmus paper is treated with base, it changes into blue colour. When blue litmus paper is treated with acid, it turns pink/red.

B. Short Answer Questions :

Ans. 1. China rose indicator gives dark-pink colour in acid and green colour in base. Turmeric remains colourless in acidic medium but turns red in basic medium.

2. When an acid is added to a base, a salt and water and formed.
Neutralisation Reaction The reaction between and acid and a base is called a neutralisation reaction. Salt and water are formed in this process with the evolution of heart energy.

3. The term 'acid' has been obtained from the Latin name Acidus which means sour. Acids are substances which are sour in taste. The sour taste of lemon juice is due to the presence of citric acid and sour taste of grapes or tamarind is due to tartaric acid and that of vinegar is due to acetic acid. Vitamin C present in citrus fruit is ascorbic acid. Formic acid is present in the sting of brown ants. The sharp pain caused by the sting of brown ants, nettles, and bees is due to formic acid.

4. (a) Tomato **acid**
(b) Eno **base**
(c) Lemon **acid**
(d) Grapes **acid**
(e) Milk **base**
(f) Apple **acid**
(g) Soap **base**

C. Long Answer Questions :

Ans. 1. Indicators are the substances that are used to test the acidic or basic nature of a substance. These are special chemical substances which change in colour when brought in contact with acids and bases. These indicators can be **natural**, **artificial** or **olfactory**.
Some examples of artificial indicators are phenolphthalein and methyl orange.
Vanilla essence and clove oil are called olfactory indicators as they give different odours in acidic/basic mediums.

Natural Indicators

1. **Litmus :** Litmus is a most commonly used natural indicator made from the extract of lichens. There are two types of litmus:
   (a) **Red litmus paper:** When red litmus paper is treated with base, it changes into blue colour.
   (b) **Blue litmus paper :** When blue litmus paper is treated with acid, it turns pink/red.
2. **Turmeric :** Turmeric (haldi), which is used in the kitchen as food ingredient, is a natural indicator. Turmeric acts as a very good indicator for acids and bases.

Steps to make Turmeric paper

1. Add small amount of turmeric in a little water to make a paste.
2. Now, put this paste on a blotting/filter paper and allow it to dry. Cut thin strips of this yellow paper.
3. Now, use this to differentiate between acids and bases.

When some one washes utensils in kitchen having turmeric on them, the colour immediately changes to red when soap/detergent is applied. This is because bases give a red colour with thrmeric as indicator.

Turmeric paste/stain solution (Yellow-coloured) —Base→ Red colour

China Rose Indicator.

Steps to prepare this indicator.

1. Take some China rose petals and put them in a bowl.
2. Pour some warm water to it and keep it for sometime.
3. On cooling, crush the petals with hand and then filter the mixture. You will get pick-coloured clear solution which can be used as an indicator. Use this indicator and observe the colour change in acidic, basic and neutral solutions.

2. **Neutralisation Reaction**

The reaction between and acid and a base is called a **neutralisation reaction**. Salt and water are formed in this process with the evolution of heart energy.

Acid	+	Base	⟶	Salt	+	Water	+	Heat
HCI	+	NaOH	⟶	NaCI	+	H2O	+	Heart
Hydrochloric acid		sodium hydroxide		sodium chloride		Water		

Importance of Neutralisation Reaction

1. **Indigestion :** When our stomach secretes a lot of hydrochloric acid it causes acidity in our stomach. To relieve indigestion in our stomach, one must take some antacid such as milk of magnesia, which contains magnesium hydroxide. It will neutralise the effect of excessive acid.
2. **Ant-sting :** The sting of an ant contains formic acid which it releases when it bites us. Its effect can be neutralised by rubbing a moist base-like baking soda or calamine lotion or solution of zinc carbonate.
3. **Acid rain :** Acid rain results from the emission of various pollutant gases, in particular sulphur dioxide and various oxides of nitrogen which are released into the atmosphere by burning of fossil fuels. These gases dissolve in atmospheric water to form sulphuric and nitric acids in rain, snow, or hail. Acid rain can damage buildings, historical monuments, plants and animals.
4. **Factory wastes :** A large number of waste products containing acids are released by factories. If these acids flow into water bodies, they will kill

marine animals. These wastes should be treated and neutralised by adding basic substances in waste treatment plants before dumping them into water.

5. **Soil :** Use of fertilizers can make the soil too acidic or basic which may damage the roots of the plants. Use of nitrogenous fertilizers make the soil basic while use of acidic fertilizers make the soil acidic. Thus, the soil has to be checked regularly to know whether it is acidic or basic to allow proper growth of plants. It is corrected by addition of bases of acid salts in soil.
3. Acid rain results from the emission of various pollutant gases, in particular sulphur dioxide and various oxides of nitrogen which are released into the atmosphere by burning of fossil fuels. These gases dissolve in atmospheric water to form sulphuric and nitric acids in rain, snow, or hail. Acid rain can damage buildings, historical monuments, plants and animals

D. Higher Order Thinking Skills (HOTS) Questions :

When China rose indicator/extract is used, find the final colour change.

Ans.

S.N.	Material	Initial	Final colour
1.	Shampoo	Pink	**green**
2.	Vinegar	Pink	**dark-pink**
3.	Sugar	Pink	**no-change**
4.	Soap solution	Pink	**green**
5.	Lemon Juice	Pink	**dark-pink**

Fun Time

Ans. 1. Do yourself
2. Do yourself

Lesson 6 Heat and Temperature

Formative Assessment

A. Tick (✓) the correct option :

Ans. 1. (ii) 2. (ii) 3. (i) 4. (iii) 5. (iii)
6. (i) 7. (iv) 8. (iii) 9. (i)

B. Match the following :

	Column A	Column B
Ans. 1.	Winter	(vii) Woollens
2.	Energy	(iv) Heat
3.	Heat flow	(viii) Conduction, convection and radiation
4.	Fahrenheit	(i) Temperature
5.	Metals	(ii) Good conductors

6.	Alcohol and mercury	(x)	Liquids used in thermometers
7.	Conduction	(ix)	Through contact
8.	Calorie	(iii)	Unit of heat energy
9.	Insulator	(v)	Rubber
10.	Constriction or kink	(vi)	Clinical thermometer

C. Write 'T' for true and 'F' for false statements :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Heat energy is measured in calories or joules.
2. Conduction is the primary mode of heat transfer in a solid. In conduction heat energy is transferred from one particle to its neighbouring particle.
3. Radiation is the only form of heat transfer that does not necessarily need a medium.
4. Radiation is the type of heat transfer that is possible in the absence of a medium. So, it is the mode of heat transfer through vacuum.
5. Materials that conduct heat easily are called conductors. For example, metals are good conductors of heat. Iron, copper, silver etc. are some metals.

B. Short Answer Questions :

Ans. 1. Temperature is the degree of 'hotness' or 'coldness' of a body or a place.
2. We wear woollen clothes in winter because wool is a bad conductor of heat. So, it helps in retaining body warmth. The wool fibre has a series of curls called 'crimps'. These crimps create small air pockets. The greater the number of crimps, the greater is the number of air pockets which can hold and trap air. A thin layer of air is created which insulates us from the cold weather and also avoid body heat from escaping into the surroundings.
3. We feel more comfortable wearing white and light-coloured clothes in summer. This is because white clothes absorb comparatively less amount of heat than dark clothes, and so keep us relatively cooler.
4. The following characteristics make mercury a good material for use in a thermometer:
    1. It does not stick to glass.
    2. Mercury remains in the liquid state for a wide range in temperature. It melts at –38.87°C and boils at only 356.58°C.
    3. It has a fairly uniform rate of expansion for a wide range of temperatures.
    4. It is relatively easy to see because of its silvery grey colour.
    5. Celsius scale, Fahrenheit scale and the Kelvin scale are the common scales in which temperatures are usually measured.

C. Long Answer Questions :

Ans. 1. Laboratory thermometers are used in laboratories. In laboratory

thermometers, we just read the number on the scale at the end of the red or silvery grey line in the thermometers. The thermometers used to measure our body temperature is called a clinical thermometer. It is mostly a mercury thermometer.

2. Both good and bad conductors are useful to us. We use good conductors (metals) for making cooking utensils, and heat resistant plastic for making the handles for these utensil
3. Convection plays a great role in maintaining a moderate temperature in coastal areas. Land masses heat up much faster than water bodies during daytime, and cool down much faster during the night. This difference in temperature sets up a wind current.
   During the day, the air above land rises since it is warm and cooler air from over the sea flows in to take its place. This gives rise to a **sea breeze** which cools the land. In the night, since land cools down much faster than the sea, the cooler air over land flows out to take the place of warmer air over the sea which rises, setting up a **land breeze**.
4. There are two main features in a mercury clinical thermometer:
   1. There is a little arrow (at 98.4 or 98.6°F) showing the normal body temperature.
   2. There is a 'Kink' in the tube near the bulb. This kink has been made to ensure that the mercury in the thermometer does not contract before the temperature has been read.

D. Higher Order Thinking Skills (HOTS) Questions :

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

Fun Time

Ans. 1. Do yourself
2. Do yourself

Lesson 7 Weather, Climate and Adaptations of Animals

Formative Assessment

A. Tick (✓) the correct option :

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

B. Write 'T' for true and 'F' for false statements :

Ans. 1. True 2. True 3. True 4. True

C. Fill in the blanks :

Ans. 1. The average weather pattern taken over a long period of time is called **climate** of that place.
2. **Sun** cause all the changes in the weather.
3. Rainfall is measured by **rain gauge** in **millimeters**.

4. The air can hold different amount of **humidity** at different temperatures.
5. The two regions of the earth with extreme climatic conditions are **polar regions** and **tropical regions**.

D. Match the following :

Ans.

Column A	Column B	Column C
1. Camel	(i) Polar region	(a) Feet with sticky pads
2. Monkey	(ii) Desert	(b) Flat and broad paw
3. Polar bear	(iii) Tropical forests	(c) Well-padded wide feet
4. Penguin		(d) Thin with long tail
5. Red-eyed frog		(e) Webbed feet

Summative Assessment

A. Very Short Answer Questions :

Ans.
1. Rainfall is measured by an instrument called rain gauge as shown in the given figure. A rain gauge is a graduated cylinder with a funnel at the top. Rainfall is generally measured in millimeters.
2. Rajasthan is the state in India which has a typical desert climate.
3. Polar bear and Penguin are the two animals which line in the polar regions of the earth.
4. Migration is a means to escape the extreme climatic conditions at home environment.

B. Short Answer Questions :

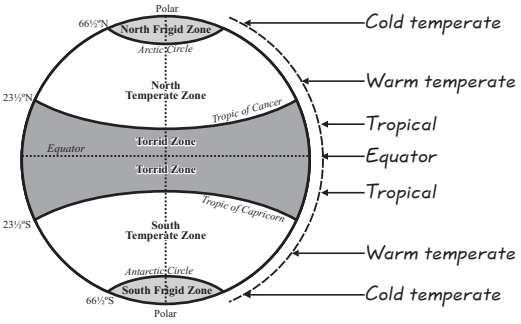
Ans.
1. The day-to-day conditions of the atmosphere at a particular place with respect to temperature, wind speed, humidity, rainfall, sunshine or clouds, etc., is called the weather at that place. The temperature, wind speed, humidity, rainfall, etc., are termed as elements of weather.
2. The climate of region is actually the average weather pattern of that region. The meteorological department maintains the record of day-to-day weather conditions. The average of these weather patterns taken over 25-30 years is termed as climate of that region. If the temperature of a particular region is high whole of the year and it receives good rainfall, the climate of such as place is termed as hot and wet.
3. Polar regions are situated near the poles–north pole and south pole. These regions remain covered with snow and the climate is too cold for most part of the year. The temperature in winter may be as low as –37°C. The sun does not set for six months in a year and for the other six months, it does not rise.
4. The ability to adjust to one's surroundings is termed as adaptation.

C. Long Answer Questions :

Ans.
1. The climate of a region is mainly determined by its latitude. There are mainly three temperature zones of the world based on the difference in their climates:

(i) The hot or **torrid** zone is the area around the equator which is heated by the direct rays of the sun.

(ii) The cold or **frigid** zone is the area around the north and the south poles which receives slanting rays of the sun.



Different temperature zones

(iii) The **temperate** zone is the area between the torrid and the frigid zone.

The climate of India is warm and tropical by and large but the mountains have a much colder climate whole of the year. Mostly the temperature falls by 1°C with every 300 feet rise (above the sea level) in the altitude.

Another important factor that determines the climate of a region is its **proximity to the sea**. Regions close to the sea have a moderate climate whereas those away from the sea face extreme climatic conditions. It is a characteristic of land to absorb and radiate the heat of the sun much faster than the sea water, which accounts for the difference in the climate of these regions.

The climate of a region is also influenced by **rainfall** it receives which in turn depends on factors such as, wind, proximity to the sea and presence of mountains. Mostly winds coming from the sea bring rainfall while the winds coming from the land are dry. The winds coming from the Indian Ocean or Bay of Bengal in monsoon season bring rainfall, while the winter winds coming from the northern mountains are cold and dry.

2. (a) Polar Bear

Adaptations in a Polar Bear

The body has a white fur. This blends with the white background of snow. This adaptation protects the polar bear from predators. It also helps in catching the prey.

- The fur has two layers. These two thick layers of fur protect the polar bear from the extremely cold surroundings.
- Other than fur, a thick layer of fat is present under the skin. This layer of fat also helps to keep the body warm.
- It has a strong sense of smell which helps in searching the prey from a distance.
- It can close its nostrils. This special feature helps the animal during swimming. By closing its nostrils, it can remain under water for long period.
- It has small ears that help it to retain as much heat as possible.
- It paws are flat and broad which help it to walk on ice easily.

- It has long curved and sharp claws. This provides good grip and helps it to walk on ice.

(b) Penguin

Adaptation in a Penguin

- Penguin is white coloured from the underside and blends well with the white background of snow.
- The body is streamlined and the feet have webs. Both these features help in swimming. Penguins are extremely good swimmers.
- Like polar bears, penguins also have very small ears which help the animal to retain as much heat as possible.
- It has thick skin and a thick layer of fat under the skin. These features protect it from extreme cold.

(c) Birds in cold climate

Adaptations in Birds

The bodies of birds are covered with feathers to protect from the cold. For survival, birds must remain warm. They fly to warmer regions when winter sets in. They come back after the winter is over.

(d) Camel

The adaptation in camel are described here.

- It has a brown-coloured skin which blends well with the surroundings.
- The hump of a camel stores fats and supports the animal to survive without food for some months.
- It has long eyelashes which covers the eyes during sand storms.
- It can close its nostrils to block sand from entering the nasal cavity.
- The animals can drink over 40 litres of water at a time and this water is stored for future use.
- It has well-padded wide feet which enable it to walk on hot sand.
- It has thick lips which help it to eat prickly desert plants such as, cacti without hurting itself.

3. The climatic conditions in tropical rainforests are suitable for supporting a variety of plants and animals. The animals include lions, gorillas, monkeys, apes, tigers, elephants, leopards, birds, snakes, lizards, and insects.
Since the number of animals living in rainforests is very large, there is intense competition between animals for food and shelter.
Adaptations for food: As there is intense competition for food, some animals have developed special adaptations to get food which is not easily available to all animals. For example, the bird **toucan** possesses a long, large beak. This type of beak helps the bird to reach the fruits on branches which are too weak to support the weight of the bird.
Adaptations for shelter: As the living area is quite less in comparison to a number of animals, some animals are adapted to living on trees. For example, the **red-eyed frog** has developed sticky pads on its feet. These help to climb tree on which it lives. **Monkeys** have long tails for grasping

branches.

Other Types of Adaptations

Other adaptations may include sensitive hearing, sharp eyesight, thick skin and a skin colour that blends with the backgrounds **(camouflage)**. Camouflaging provides mainly protection from predators. For example, lions and tigers have sensitive hearing and thick skins. The **beard ape** found in the rainforests of Western Ghats in India lives on trees. It has a silvery-white mane which covers the head from the cheeks down to its chin. As it lives on trees, it is good climber. It feeds on seeds, fruits, young leaves, stems and flowers. It also looks for insects under the bark of trees. Since it is able to get sufficient food on the trees, it rarely comes down to the ground.

Elephant is found in the Indian tropical rainforests. It has many types of adaptations to live in the rainforests.

4. Mountains get rainfall from moisture laden winds. When these winds hit the mountains, they move up. They rise up and the water vapour condenses to form water droplets. These droplets fall down in the form of rainfall of snowfall. The side of the mountain which receives rainfall is called **windward side**. These winds then rise further and reach the other side of the mountains. Since there is not much moisture left, so they do not bring enough rainfall here. This side of the mountain is called the **leeward side**. For example, Mumbai present at the windward side of the Western Ghats gets enough rainfall, while Pune, on the leeward side does not get much rain.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Delhi would have moderate climate if it was near the sea.

Fun Time

Ans. Do yourself

Lesson 8 Soil

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans. 1. The decaying organic matter present in soil is called **humus**.

2. The breaking down of rocks into small particles is called **weathering** of rocks.

3. Water seeps **easily** through sandy soil than through clayey soil.
4. Black soil is good for the cultivation of **cotton**.
5. Lateritic soil is found in the **tropical countries**.

C. Write 'T' for true and 'F' for false statements :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. The oxygen present in air reacts with certain minerals in rocks and makes the rocks crumble. This is somewhat the way iron crumbles when it rusts in the presence of moist air. Like rainwater, wind too carries away loose pieces of rock.

2. The daily and seasonal changes in temperature play a big role in the formation of soil. When rocks get heated, they expand. When they cool, they contract. This regular expansion and contraction weakens them and makes them break.

3. We can say that soil contains minerals (soil particles), air water and humus. It also has bacteria, algae, fungi and tiny organisms called protozoans (amoeba is a protozoan). These organisms help improve the fertility of soil by breaking down organic matter and changing the nitrogen of the air into nitrogenous compounds that can be used by plants.

4. Alluvial soil
   This is the most fertile type of soil and best suited for the cultivation of crops like wheat, sugar cane and rice. It is mostly loamy in texture and has enough humus. This type of soil is formed by the deposition of pieces of rock called **alluvium**, by rivers. As rivers flow down from the mountains to the plains, they generally slow down and are unable to carry the load of rock particles, which ultimately they deposit over the plains. Alluvial soil is found in the plains of Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal, Assam and the coastal plains.

B. Short Answer Questions :

Ans. 1. Soil is formed by the weathering, or breaking down of rocks, others factors like changes in temperature, rain and winds help to break down rocks and form soil. The process takes millions of years. Also the same factors can also erode, or destroy, soil.
   Rainwater loosens small pieces of rock and carries them with it. As the pieces tumble and knock against each other, they divide into smaller pieces. The flowing water carries these pieces and deposits them over land when it slows down. Rainwater also enters cracks in rocks and freezes there in winter. When water freezes, it expands. This makes the rocks crack further or break.

2. Soil is formed by weathering of rocks. Changes in temperature, rain and wind are some factors that help in the weathering of rocks.

The organisms living in the soil are referred to as biota. They improve the fertility of the soil by breaking down organic matter, converting atmospheric nitrogen into nitrogenous compounds and aerating the soil.

Soil contains minerals derived from rocks, humus formed by the decomposition of organic matter, water and air.

Soil has different layers. The topsoil is the most fertile since it contains a lot of humus. The subsoil contains a little humus and minerals deposited by rain. The substratum is charged with water that seeps through the soil. The bedrock is the bottom layer of hard rocks. These are the characteristics of the soil.

3. **A horizon**

This is the uppermost layer of soil, often refered to as to 'topsoil'. It is dark due to the presence of 'humus'. The particles of this layer are the finest and the action of decomposers makes this layer porous. This layer support most plants. The roots of only very big trees manage to reach the next layer.

4. **C horizon**

This layer has large pieces of rock and coarse soil particles called gravel. It is also called **substratum** and is derived from the layer of hard rock that lies beneath. The topsoil is not always derived from this layer. It can be carried from distant places and deposited over this layer. Soil that forms from the substratum is called **residual soil**. The soil that is deposited over the substratum is called **transported soil**.

C. Long Answer Questions :

Ans. 1. Sandy soils are light and easy to plough. The large particles are packed loosely. They have a lot of air space between them. This type of soil does not hold water. It lets the water percolate out easily. So the soil dries out in a short period of time after the rain and plants are deprived of water. The dry soil also gets blown away easily.

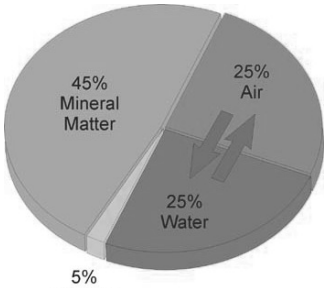
In clayey soils, the fine particles are packed more closely. Water clings to these types of soil and does not seep through easily. The disadvantage of this type of soil is that there is not enough space between the particles for air. This deprives roots of air, mainly when it rains a lot and the soil gets waterlogged. This type of soil is heavy and difficult to plough. When it dries it becomes much hard.

The following activity will help you compare the capacity of different soils to hold water and the ease with which they allow water to percolate. One advantage of sandy soils, which allow water to seep through, is that they help to recharge groundwater.

Sandy and clayey soils are not considered suitable for the growth of crops, yet they can be improved by the addition of humus. Besides, some plants actually prefer these types of soils. Groundnut and potato, for example, grow well in sandy soils, while cotton and some pulses grow

well in clayey soils. Many other factors such as the kind of minerals present in the soil, the acidity or alkalinity of the soil and the amount of humus present in the soil also come into play.

2. We can say that soil contains minerals (soil particles), air water and humus. It also has bacteria, algae, fungi and tiny organisms called protozoans (amoeba is a protozoan). These organisms help improve the fertility of soil by breaking down organic matter and changing the nitrogen of the air into nitrogenous compounds that can be used by plants.



Components of the soil

Worms and insects also live in the soil. These also help to improve the fertility of the soil. One of the most useful of these worms is the earthworm. It ingests soil, digests the organic matter present in the soil and excretes soil full of nutrients useful for plants. The excreted soil looks like small piles of coiled earth and is called **worm casts**. Earthworms and other worms and insects also help by burrowing into the soil, and thus, 'tilling' or aerating it. All the organisms living in the soil are often referred to as biota.

3. The uppermost layer of the earth's crust is called soil. Soil is one of the most important natural resources, because it supports the growth of plants. The daily and seasonal changes in temperature play a big role in the formation of soil. When rocks get heated, they expand. When they cool, they contract. This regular expansion and contraction weakens them and makes them break. Soil is formed by the weathering, or breaking down of rocks, others factors like changes in temperature, rain and winds help to break down rocks and form soil. The process takes millions of years. Also the same factors can also erode, or destroy, soil.

   Rainwater loosens small pieces of rock and carries them with it. As the pieces tumble and knock against each other, they divide into smaller pieces. The flowing water carries these pieces and deposits them over land when it slows down. Rainwater also enters cracks in rocks and freezes there in winter. When water freezes, it expands. This makes the rocks crack further or break.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself

Fun Time

Ans. Do yourself

Formative Assessment 2

A. Tick (✓) the correct option :

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

B. Mention the adaptations found in the following animals.

Ans.
1. Polar bear **Flat and broad paws**
2. Penguin **Streamlined body and webbed feet**
3. Camel **Well-padded wide feet**
4. Elephant **Big trunk, long tusk and big ears**
5. Beard ape **Lives on trees and eats plant products as well as insects and has a silvery-white more**.

C. Identify the following :

Ans.
1. **Acids**
2. **Indicator**
3. **Thermometers**
4. **Humus**
5. **Humidity**

D. Answer the following questions :

Ans.
1. Litmus paper and turmeric (haldi) are the name of two natural indicators.
2. Litmus is a most commonly used natural indicator made from the extract of lichens.
3. Radiation is the type of heat transfer that is possible in the absence of a medium. So, it is the mode of heat transfer through vacuum.
4. Migration is a means to escape the extreme climatic conditions at home environment.
5. We can say that soil contains minerals (soil particles), air water and humus. It also has bacteria, algae, fungi and tiny organisms called protozoans (amoeba is a protozoan). These organisms help improve the fertility of soil by breaking down organic matter and changing the nitrogen of the air into nitrogenous compounds that can be used by plants.

Summative Assessment 1

A. Fill in the blanks :

Ans.
1. **Cuscuta** is a parasitic plant.
2. In Amoeba, **vacuoles** are used for processing food.
3. Wool has a **very high** tensile strength.
4. The chemical formula for hydrochloric acid is **HCl**.
5. The acid found in tamarind is **tartaric acid**.

B. Short Answer Questions :

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

C. Very Short Answer Questions :

Ans.
1. Neem is an autotrophic plant.
2. The inner wall of the small intestine has millions of finger like outgrowths called villi. The presence of villi increase the surface area for absorption of the digested food.

3. The new born of silk moth which emerge from eggs, called larva or silkworms. Silkworm (produce silk) is an example from the sources of animal fibres.
4. An element is a substance which cannot be broken down into simpler substances by chemical methods, and is made up of only one kind of atoms.
5. We can say that soil contains minerals (soil particles), air water and humus. It also has bacteria, algae, fungi and tiny organisms called protozoans (amoeba is a protozoan). These organisms help improve the fertility of soil by breaking down organic matter and changing the nitrogen of the air into nitrogenous compounds that can be used by plants.

D. Short Answer Questions :

Ans. 1. Plants do not have blood for carrying things around. Instead most plants have a white liquid called sap, which acts are the medium for transporting substances inside a plant body.

A connective tissue of plant called xylem takes water and up the stem to the leaves. Absorption of water and nutrients is a continuous process. This is because water is being continuously lost from the leaves by the process of transpiration. As a result a low pressure is created and a pulling force results which pulls up the water and nutrients. This process of pulling up water and nutrients is also known as the ascent of sap.

Food is made by the leaves. Once the food is prepared it need to be sent to all parts of the plant body. The method by which by which it takes place is called translocation.

Special types of tissues of plants called phloem act as pipelines, and carry the prepared food to all parts of the body.

2. An element is a substance that cannot be broken down into simpler substances by chemical means.

An atom is the smallest particle of an element.

A molecule is a larger particle formed by the chemical combination of two or more atoms.

3. We wear woollen clothes in winter because wool is a bad conductor of heat. So, it helps in retaining body warmth. The wool fibre has a series of curls called 'crimps'. These crimps create small air pockets. The greater the number of crimps, the greater is the number of air pockets which can hold and trap air. A thin layer of air is created which insulates us from the cold weather and also avoid body heat from escaping into the surroundings.
4. Polar regions are situated near the poles–north pole and south pole. These regions remain covered with snow and the climate is too cold for most part of the year. The temperature in winter may be as low as –37°C. The sun does not set for six months in a year and for the other six months, it does not rise.

E. Differentiate between the following :

Ans. Do yourself

F. Long Answer Questions :

Ans. 1. During the feeding period, a silkworm sleeps four times (twenty-four hours each time) at intervals of about six days. While sleeping, its skin breaks and on awaking, the worm sloughs off, i.e., leaves the old skin and comes out in a new one. This process is called moulting.

2. Indicators are the substances that are used to test the acidic or basic nature of a substance. These are special chemical substances which change in colour when brought in contact with acids and bases. These indicators can be natural, artificial or olfactory.

Some examples of artificial indicators are phenolphthalein and methyl orange.

Vanilla essence and clove oil are called olfactory indicators as they give different odours in acidic/basic mediums.

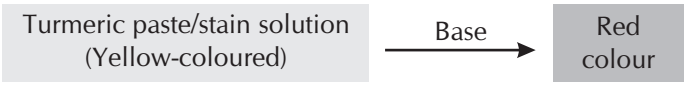
Natural Indicators

1. Litmus : Litmus is a most commonly used natural indicator made from the extract of lichens. There are two types of litmus:
   (a) Red litmus paper: When red litmus paper is treated with base, it changes into blue colour.
   (b) Blue litmus paper : When blue litmus paper is treated with acid, it turns pink/red.
2. Turmeric : Turmeric (haldi), which is used in the kitchen as food ingredient, is a natural indicator. Turmeric acts as a very good indicator for acids and bases.

Steps to make Turmeric paper

1. Add small amount of turmeric in a little water to make a paste.
2. Now, put this paste on a blotting/filter paper and allow it to dry. Cut thin strips of this yellow paper.
3. Now, use this to differentiate between acids and bases.

When some one washes utensils in kitchen having turmeric on them, the colour immediately changes to red when soap/detergent is applied. This is because bases give a red colour with thrmeric as indicator.



3. Convection plays a great role in maintaining a moderate temperature in coastal areas. Land masses heat up much faster than water bodies during daytime, and cool down much faster during the night. This difference in temperature sets up a wind current.

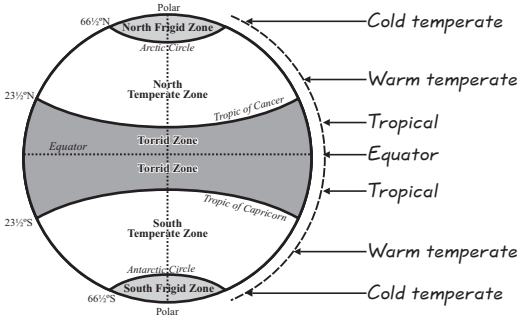
During the day, the air above land rises since it is warm and cooler air from over the sea flows in to take its place. This gives rise to a sea breeze which cools the land. In the night, since land cools down much faster than

the sea, the cooler air over land flows out to take the place of warmer air over the sea which rises, setting up a land breeze.

4. The climate of a region is mainly determined by its latitude. There are mainly three temperature zones of the world based on the difference in their climates:

   (i) The hot or torrid zone is the area around the equator which is heated by the direct rays of the sun.

   (ii) The cold or frigid zone is the area around the north and the south poles which receives slanting rays of the sun.



Different temperature zones

   (iii) The temperate zone is the area between the torrid and the frigid zone.

   The climate of India is warm and tropical by and large but the mountains have a much colder climate whole of the year. Mostly the temperature falls by 1°C with every 300 feet rise (above the sea level) in the altitude.

   Another important factor that determines the climate of a region is its proximity to the sea. Regions close to the sea have a moderate climate whereas those away from the sea face extreme climatic conditions. It is a characteristic of land to absorb and radiate the heat of the sun much faster than the sea water, which accounts for the difference in the climate of these regions.

   The climate of a region is also influenced by rainfall it receives which in turn depends on factors such as, wind, proximity to the sea and presence of mountains. Mostly winds coming from the sea bring rainfall while the winds coming from the land are dry. The winds coming from the Indian Ocean or Bay of Bengal in monsoon season bring rainfall, while the winter winds coming from the northern mountains are cold and dry.

5. The uppermost layer of the earth's crust is called soil. Soil is one of the most important natural resources, because it supports the growth of plants. The daily and seasonal changes in temperature play a big role in the formation of soil. When rocks get heated, they expand. When they cool, they contract. This regular expansion and contraction weakens them and makes them break. Soil is formed by the **weathering**, or breaking down of rocks, others factors like changes in temperature, rain and winds help to break down rocks and form soil. The process takes millions of years. Also the same factors can also erode, or destroy, soil.

   Rainwater loosens small pieces of rock and carries them with it. As the pieces tumble and knock against each other, they divide into smaller

pieces. The flowing water carries these pieces and deposits them over land when it slows down. Rainwater also enters cracks in rocks and freezes there in winter. When water freezes, it expands. This makes the rocks crack further or break.

Lesson 9 Respiration, Circulation and Exeretion

Formative Assessment

A. Tick (✓) the correct option :

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

B. Write the correct organs for the following organ systems :

Ans. 1. Human respiratory system **lungs**.
2. Plant respiratory system: **stomata**.
3. Human circulatory system: **Heart**.
4. Plant circulatory system: **xylem and phloem**.

C. Write 'T' for true and 'F' for false statements :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. The process of inhalation and exhalation is known as breathing.
2. The walls of the capillaries are so thin that diffusion of gases and chemical substances takes very easily.
3. Blood consists of many types of cells suspended in liquid called plasma. these include Red blood cells, white blood cells and blood platelets.
4. Sap is a white liquid that acts as a medium for transporting materials inside a plant body.

B. Short Answer Questions :

Ans. 1. **Aerobic :** Process of respiration that takes place in the presence of oxygen
Anaerobic : Process of respiration that takes place in the absence of oxygen
2. The series of chemical reactions that result in the release of energy by the oxidation of food particles is known as respiration or cellular respiration.
3. Respiration in cells is a physiological process. It is the characteristic features of living beings. In this process no external source of energy is required and there is no need of oxygen. But without oxygen burning or combustion can not be possible. External source of energy is required for burning or combustion.
4. Most plants have a white liquid called sap, which acts are the medium for transporting substances inside a plant body. a connective tissue of plant called xylem takes water and up the stem to the leaves. Absorption of

water and nutrients is a continuous process. This is because water is being continuously lost from the leaves by the process of transpiration. As a result a low pressure is created and a pulling force results which pulls up the water and nutrients. This process of pulling up water and nutrients is also known as the ascent of sap.

Food is made by the leaves. Once the food is prepared it need to be sent to all parts of the plant body. The method by which by which it takes place is called translocation. Special types of tissues of plants called phloem act as pipelines, and carry the prepared food to all parts of the body.

5. These are thin-walled tubes and form a network of extremely small blood vessels between arteries and veins. The walls of the capillaries are so thin that diffusion of gases and chemical substances takes very easily.

C. Long Answer Questions :

Ans. 1. Blood is a connective tissue that flows through the entire body. It forms a medium through which nutrients, important gases, water and body waste products are transported inside the body. The blood flows in blood tubes, namely, arteries, veins and capillaries. Blood constitutes about 8% of the body weight. An average male body has about 5 to 6 litres of blood. Blood consists of many types of cells suspended in liquid called plasma, which is a straw-coloured liquid.

2. The Heart :– The heart is a four-chambered muscular organ that pumps blood to all parts of the body. It is able to do so by the rhythmic contractions and relaxations of its muscles. These are termed as the heart beats. Generally a normal heart beats about 60 to 80 times a minute. We can hear out heart beat with the help of stethoscope.

As your heart beats and forces blood through your body, you would feel a throbbing sensation at any place where an artery comes close to the surface of your skin, such as your neck, wrist, or upper arm. This throbbing sensation is called the pulse.

The four chambers of the heart are:

(i) The right auricle (ii) The left auricle

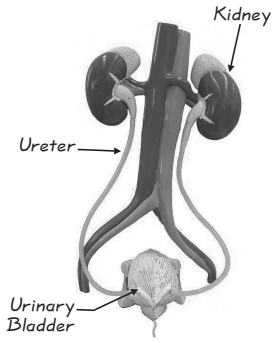
(iii) The right ventricle (iv) The left ventricle

The right auricle opens into the right ventricle and the left auricle into the left ventricle. The walls of the ventricles are thicker, since they have to push to blood to reach the farthest parts of the body. The walls of the auricles are thinner than those of the ventricles, because the auricles have to pump blood into the ventricles, which is very near. The blood in the right side of the heart remains completely separated from the left side with the help of valves. Valves separate the two chambers which allow blood to flow only in one direction. Thus, there is no mixing of oxygenated (oxygen-rich) and deoxygenated (carbon dioxide-rich) blood.

The veins bring deoxygenated blood to the right auricle from all parts of the body. This blood is pumped into the right ventricle, which in turn pumps it

into the pulmonary artery that sends it to the lungs for oxygenation.
The left ventricle then sends the oxygenated blood to all parts of the body.

3. Blood groups play an important part in blood transfusions. Blood transfusion involves a donor, whose blood is given to another person, the recipient.
There are four types of blood groups in human beings: A, B, AB, and O. Group O is called a universal donor, Which means a person with blood group O can donate blood to any of the blood groups, i.e., A, B, AB or O. Group AB is called a universal recipient, which means that a person with the blood group AB can receive blood from any of the four groups. It is very important to match the blood groups correctly before transfusion. A mismatch can lead to clotting of the blood and the death of the recipient.
4. The excretory system



The excretory system

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. It is very important to match the blood groups correctly before transfusion. A mismatch can lead to eluting of the blood and the death of the recipient. So, we need to know our blood group while donating it.
2. Low white blood cell count indicate the weak immune system, white blood cells protect the body against disease-causing microorganisms, hence these are the necessary part of our immune system.

Fun Time

Ans. Do yourself

Lesson 10 Reproduction in Plants

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans. 1. The fission in which **two** cells are formed is binary fission.
2. In **asexual** reproduction, no sex cells are involved.
3. Spirogyra reproduces by **fragmentation** method.
4. Potato is a **stem (tuber)**.
5. Vegetative propagation is the process of producing **new plants** by use of parts of plant.

C. Write 'T' for true and 'F' for false statements :

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

D. Match the following :

	Column A	**Column B**
Ans. 1.	Yeast	(iv) Budding
2.	Plasmodium	(i) Spore formation
3.	Amoeba	(ii) Binary fission
4.	Mucor	(v) Multiple fission
5.	Potato	(iii) Vegetative propagation

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. In organisms reproduction is of two types : asexual and sexual.
2. The transfer of pollen grains from an anther to a stigma, either of the same flower or of different flowers of the same species is called pollination.
3. Fertilisation is the process of fusion of male nucleus with female nucleus.
4. The male gametes are released inside the ovule and they fuse with female gamete and a nucleus. Thus, fertilisation has taken place. The fertilised ovule is called zygote.

B. Short Answer Questions :

Ans. 1. The production of new organisms from the existing organisms of the same species is called reproduction. In most simple words we can say that the creation of new living things from the existing living things is called reproduction. The most important characteristic of living organisms (plants and animals) is their ability to produce more members of their species. For example, human beings reproduce by giving birth to babies (sons and daughters). And dogs reproduce by giving birth to puppies. Plants also reproduce to form new plants either from their body parts or from seeds. Thus, all types of organisms (plants as well as animals) produce new organisms of their own kind.
2. (a) Amoeba (b) Spirogyra (c) Bacteria (d) Yeast
3. (a) Tubers (b) Subaerialstem (c) Rhizome (d) Leaves
4. **Grafting :** This is very common method in hard woody plants. In this method the stem of a desired plant with good characters (such as flowers, leaves and fruits) is joined on the stem of other plant with good root system.
Cutting : Plant a part of a stem in moist soil. After sometime it grows into

a plant. This method is called stem cutting method. The stem used mush have some buds. The basal side of the stem in soil produces roots from the buds and the apical side of stem above soil produces leaves.

C. Long Answer Questions :

Ans. 1. There are many methods by which parents produce their young ones :

Asexual Reproduction : The process of reproduction in which only one parent is involved and no sex cells are invlved is known as asexual reproduction. Different types of asexual reproductions are

(i) Budding : Yeast, Hydra etc.
(ii) Fragmentation : Spirogyra etc.
(iii) Spore formation Bacteria, ferns, algal etc.
(iv) Vegetative propagation : It can be done by the following methods.

(A) Natural Methods :

1. By roots : Guava, mint, dohlia etc.
2. By stem : Potato, garlic, onion etc.
3. By leaves : Bryophyllum etc.

(B) Artificial Methods

1. Grafting : Mango, guava etc.
2. Cutting : Sugarcane, rose, cactus etc.
3. Layering : grapes, jasmine, bougainvillea etc.
4. Tissue culture : Orchids, asparagus etc.

Sexual Reproduction : The process of reproduction in which both parents and sex cells are involved is known as sexual reproduction. In this process, new plants are produced from seeds. It is the most common method of reproduction in plants.

2. Vegetative propagation is the process of producing new individual plants by the use of vegetative parts of a plant such as, root, stem, leaves etc.

Advantages of Vegetative Propagation

1. Plants grown by vegetative propagation methods need less attention in their early stages of growth than the plants grown from seeds.
2. Plants produced by the methods of vegetative propagation mature earlier than those plants which are produced by seeds. So they bear flowers and fruits earlier such as in fruit bearing trees.
3. Vegetative propagation methods are used to produce plants faster and in large number.
4. The plants produced by vegetative propagation are identical if grown under same condition and method.
5. Vegetative propagation is used to grow plants that do not produce seeds in their fruits. Seedless fruits are liked by man such as banana, pineapple, seedless grapes, jasmine, oranges, sugar cane, etc.

3. **Fertilisation** is the process of fusion of male nucleus with female nucleus.

The stages of fertilisation in a flower are following :

1. **Growth of pollen tube :** After reaching the stigma of a flower, the pollen grains absorb the nutrients secreted by the stigma. The pollen tube grows through germ pore of pollen grain.

2. **Male gametes :** The pollen tube has two male gametes.
3. **Entry of pollen tube into ovule :** The pollen tube with two male gametes enters the ovule through a small opening called micropyle. Finally, is goes near the egg cell.
4. **Release and fusion of gametes :** The male gametes are released inside the ovule and they fuse with female gamete and a nucleus. Thus, fertilisation has taken place. The fertilised ovule is called zygote.
5. **Development :** The zygote grows into an embryo.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. Do yourself

Fun Time

Do yourself

Lesson 11 Motion and Time

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans.
1. When an object covers equal distances in unequal intervals of time, its speed is **uniform**.
2. One thousand year is equal to one **millennium**.
3. **Motion** and **rest** are relative terms.
4. One solar year is equal to **365** days.
5. A clock which use pendulum as timing device is a **modern** clock.
6. One leap year is equal to **366** days.
7. A **simple** pendulum has a period of 2 seconds.
8. Displacement can be **positive or negative** whereas distance travelled can never be **negative**.
9. SI unit of speed is **miter/second**.

C. Write 'T' for true and 'F' for false statements :

Ans. 1. False 2. False 3. True 4. False
5. False 6. True 7. True 8. False

Summative Assessment

A. Very Short Answer Questions :

Ans.
1. **Time :** Time is the interval between two events.
2. The only draw pack of sundial is that it does not work on a cloudy day or after sunset.

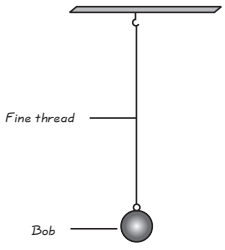
3. Simple pendulum is an instrument having a metallic heavy point called bob suspended by a thread.
4. **Ancient clocks are :** Sundial, sand clock, candle clock and water clock.
5. **Distance :** Distance is the actual distance travelled by an object.
6. **Uniform motion :** When a moving object covers equal distances in equal intervals of time, it is said to be having uniform motion.
7. Under uniform motion, distance and displacement are equal.
8. Distance travelled by a moving object in unit time is called speed.
   SI unit of speed is metre per second or ms^{-1} and kilometer per hour or kmh^{-1}.

B. Short Answer Questions :

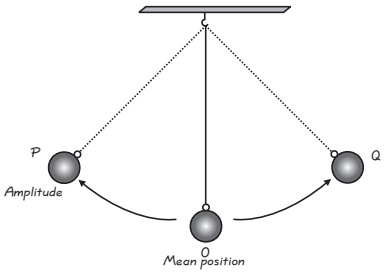
Ans. 1. **Non-uniform Motion :** When an object covers unequal distances in equal intervals of time, the object is said to be having a non-uniform motion.
A cycle moving on a busy road describes non-uniform motion. It moves slow or fast, so it do not cover equal distances in equal intervals of time. All moving objects generally perform non-uniform motion.

2. We have realised the importance of time. For special things, we need to measure the time accurately. For scientific calculation and rocket launcher, another type of clocks named atomic clocks are used. Atomic clocks are very accurate. They have an error of one second in million years.

3. **Simple Pendulum**. It is an instrument having a metallic heavy point called bob suspended by a thread.
If we take the bob at one end say P as shown in [Fig (b)] given on the next page, and release it, it begins to move to and fro. It is a type of motion which repeats after regular intervals. This kind of a motion is an example of periodic motion which is also known as oscillatory motion.
The pendulum completes one oscillation when bob starts from one extreme position, goes to other end and then comes back again at that point.
The period of oscillation: Time taken to complete one oscillation is called the period of oscillation. Time period does not depend on mass of bob.



(a) A simple pendulum



(b) Different positions of the bob of an oscillating simple pendulum

C. Long Answer Questions :

Ans. 1. A continuous change in the position of an object relative to other object is called mechanical motion. A man sitting in a train is moving relative to railway tracks, farms, mountains, railways, etc., but he is at rest with respect to other persons sitting in the same coach.

For a man moving in a bus, trees, buildings, etc., appear to be moving in backward direction. For those people who are standing on the road, the bus is moving in forward direction. And at the same time, people sitting in the bus are not changing their position with respect to each other, so they appear at rest. So, rest and motion are relative terms. A body that does not change its position with respect to others is said to be at rest, i.e., it is stationary.

2. **1. Uniform Motion**

When a moving object covers equal distances in equal intervals of time, it is said to be having uniform motion.

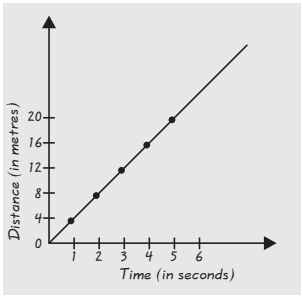
Let us make an observation table showing the distances covered by an object in equal intervals of time.

Time (in seconds)	0	1	2	3	4	5
Distance covered (in metres)	0	4	8	12	16	20

The distance covered in first second is 4 m. The distance covered in 2nd second is 4 m, i.e., is (8-4) = 4 m and so on. So, we can say that object covers equal distances in equal intervals of time.

Let us perform a simple activity to know the position of an object graphically not moving in straight line.

The graph given here shows the distance covered by an object in equal time intervals. The graph is a straight line. Such a graph represents **uniform motion**.



Distance-time graph showing uniform motion

2. Non-uniform Motion

When an object covers unequal distances in equal intervals of time, the object is said to be having a **non-uniform motion**.

A cycle moving on a busy road describes non-uniform motion. It moves slow or fast, so it do not cover equal distances in equal intervals of time. All moving objects generally perform non-uniform motion.

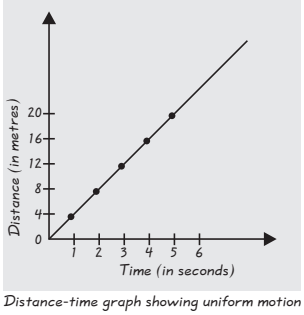
3.

Time (in seconds)	0	1	2	3	4	5
Distance covered (in metres)	0	4	8	12	16	20

The distance covered in first second is 4 m. The distance covered in 2nd second is 4 m, i.e., is (8-4) = 4 m and so on. So, we can say that object covers equal distances in equal intervals of time.

Let us perform a simple activity to know the position of an object graphically not moving in straight line.

The graph given here shows the distance covered by an object in equal time intervals. The graph is a straight line. Such a graph represents uniform motion.



Distance-time graph showing uniform motion

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. $108 \times \frac{5}{18} = 30$ m/s

2. Speed of athlete = 10m/s

Speed of cyclist $= 24 \times \frac{5}{18} = 6.6$ m/s

So, Athlete is faster

3. $40 \times \frac{18}{5} = 144$ km/h

4. Average speed $= \frac{\text{Total distance}}{\text{Total hours}}$

$= \frac{40 + 20 + 30}{1 + 1 + 1}$

$= \frac{180}{20} = 30$ km/hr

5. Speed $= \frac{\text{Distance}}{\text{Time}}$

$= \frac{180}{20} = 9$ m/r

E. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Do yourself

2. Do yourself

Fun Time

Ans. Do yourself

Lesson 12 Electric Current and Circuits

Formative Assessment

A. Tick (✓) the correct option :

Ans. 1. (iii) 2. (i) 3. (i) 4. (i) 5. (iv)
6. (i) 7. (ii) 8. (iii) 9. (iii) 10. (i)

B. Fill in the blanks :

Ans. 1. A drawing of an electrical circuit with standard symbols is called a/an **circuit**. (circuit diagram/electric diagram)

2. Hot plates, electric toasters, and electric irons get hot when switched on because of the **heating** effect of current. (magnetic/heating)

3. A fuse is a **safety** device. (safety/heating)

4. A wire twisted in the form of a circle is called a/an **coil**. (coil/electromagnet)

5. An **electromagnet** consists of a soft iron core with an insulated wire wound around it. (electromagnet/electric magnet)

C. Write 'T' for true and 'F' for false statements :

Ans. 1. True 2. False 3. True 4. True 5. True 6. False
7. False 8. False 9. True 10. False 11. False

Summative Assessment

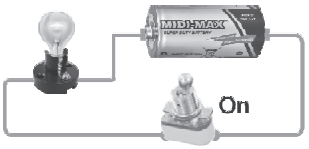
A. Very Short Answer Questions :

Ans. 1. Electric toasters, electric irons and electric ovens.

2. The power of an electromagnet depends on the number of turns of the wire around the core and the quantity of current passing through it. More the number of turns more will be the magnetic effect.
3. Switch
4. Magnetic effect
5. Miniature circuit Breaker

B. Short Answer Questions :

Ans. 1. **Electric Circuit :** A path along which an electric current can flow is called an electric circuit. When you connect a bulb to a cell with wires, you create a closed path, or a circuit, through which current can flow. The cell, the bulb and the connecting wires are all part of the circuit. You can say that a circuit includes a source of electricity (e.g., cell), conductors (e.g., wires) and a device that uses electricity (e.g., a bulb).

2. 

3. An electric bulb gets hot if it is kept 'ON' for a little while. This is because when an electric current passes through a wire, the wire gets heated up.
4. Electric fuse is a safety device which prevents excessive current from flowing in circuit.
5. **Principle of an Electric Fuse :** A wire gets heated up if an electric current passes through it. The amount of heating up caused depends on the amount of current flowing through the wire. The more the current the more is the heating caused. The fuse works on the principle of heating effect of current.

   A fuse consists of a thin wire generally placed inside a glass or ceramic cartridge. The wire is made of a metal that melts easily when heated. It is designed such that only a certain maximum amount of current can flow through it. If the current exceeds this valve, the heating in the wire causes it to melt. We say that the fuse 'blows'. This breaks the circuit and stops the flow of current in the circuit.

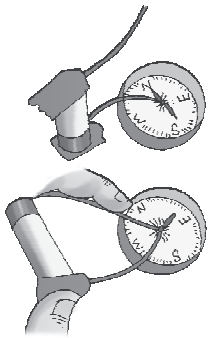
C. Long Answer Questions :

Ans. 1. Electricity and magnetism are closely related. Perform the following experiment to understand this.

   Aim: To observe the magnetic effect of current passing through a wire.

   Materials required: 1.5 V cell, two pieces of insulated wire, a small magnetic compass, and insulation tape.

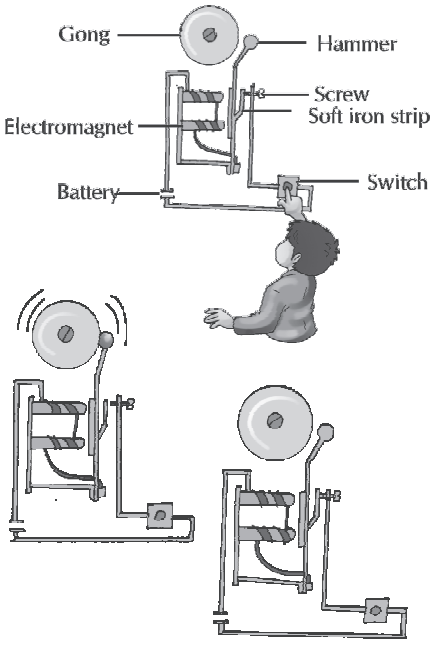
Procedure:



1. Remove the insulation from the two ends of both the wires.
2. Connect one end of one of the wires to the negative terminal of the cell. Secure the connection with the insulation tape.
3. Connect one end of the other wire to the positive terminal of the cell. Secure the connection with the insulation tape.
4. Keep the magnetic compass near the wire.
5. Keep an eye on the needle of the magnetic compass and touch the free ends of the wires connected to the positive and negative terminals of the cell.

What do you notice? You will notice that when you touch the wire to the positive terminal of the cell, the needle of the magnetic compass gets deflected. This is because when a current passes through the wire, it behaves like a magnet and therefore deflects the magnetic needle of the compass.

2. **Electromagnet :** Wrap a wire around a soft iron piece. When an electric current is passed through the wire, the iron piece behaves like a magnet. A magnet made using this type of arrangement is called an **electromagnet**.
3. **Electric Bell**



Step 1 : When you press the switch of the bell, the electric current flows to the electromagnet.

Step 2 : The electromagnet attracts the soft iron strip. The hammer attached to the strip then hits the gong, causing a ring.

Step 3 : When the soft iron strip gets attracted, it no longer touches the screw and hence the circuit is broken. This turns off the electromagnet and it can no longer attract the soft iron strip. The soft iron strip returns to its initial position, touching the screw. This results in the circuit being complete, and current flows again.

4. **Heating Effect of Electric Current**–Try to touch two torch bulbs, one

which is glowing and the other that is not. Be careful when you touch the glowing bulb. Do you feel that this bulb is hot to touch? Can you say why? This is because when an electric current passes through a wire, the wire gets heated up. You may see many appliances at your home in which electric current causes heating. Think of some appliances that get heated up just like a bulb when electric current passes through them. Electric toasters, electric irons, hot plates, electric hairdryers, and electric ovens are some appliances that get hot when electric current passes through them.

This kind of heating is called Ohmic heating or Joule heating.

5. If a large amount of current is given to an appliance, it causes the wires to get overheated, and the appliance gets burned. This situation arises due to some fault in the circuit and can be very dangerous as it can lead to a fire.

To avoid electric appliances from getting damaged as a result of excessive passage of current through them, we use a safety device called a **fuse**.

A fuse is a safety device that opens an electric circuit when excessive current flows through it. A fuse prevents a large amount of current from flowing into any appliance or device, as it cuts off the supply of electric current, thus preventing further damage.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Do yourself
2. It will increase
3. No

Fun Time

Ans. Do yourself

Formative Assessment 3

A. Tick (✓) the correct option :

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

B. Match the columns :

	Column A	**Column B**
Ans. 1.	Yeast	(iv) Budding
2.	Plasmodium	(i) Spore formation
3.	Amoeba	(ii) Binary fission
4.	Mucor	(v) Multiple fission
5.	Potato	(iii) Vegetative propagation

C. Write the correct organs for the following organs systems :

Ans. 1. Human respiratory system **lungs**.
2. Plant respiratory system: **stomata**.
3. Human circulatory system: **Heart**.
4. Plant circulatory system: **xylem and phloem**.
5. Human excretory system : **Kidney**

D. Answer the following questions :

Ans. 1. The process of inhalation and exhalation is known as breathing.
2. Fertilisation is the process of fusion of male nucleus with female ovule.
3. Simple pendulum is an instrument having a metallic heavy point called bob suspended by a thread.
4. Ancient clocks are : Sundial, sand clock, candle clock and water clock.
5. Miniature circuit Breaker.

Lesson 13 Winds, Storms and Cyclones

Formative Assessment

A. Tick (✓) the correct option :

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

B. Write 'T' for true and 'F' for false statements :

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

C. Fill in the blanks :

Ans. 1. Moving air is called **wind**.
2. Air pressure **decreases** when wind speed increases.
3. Air moves from the region of **high** air pressure to the region of **low** air pressure.
4. Wind is generated due to **uneven** heating of land and water.
5. Warm air is **lighter** than cold air and **goes** up.
6. Thunderstorm is accompanied by high speed wind, **lightning** and **heavy rainfall**.
7. An anemometer measures **the speed of wind**.

D. Match the following :

	Column A	Column B
Ans. 1.	An instrument to find the direction of the wind	(v) Wind vane
2.	The name of a storm in western Pacific	(iii) Typhoon
3.	Multipurpose satellite	(i) INSAT
4.	Low pressure region in the centre of the storm	(ii) Eye
5.	An instrument to measure wind speed	(iv) Anemometer

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Anemameter 2. Wind vane 3. Warm air
4. The east coast 5. Cyclones

B. Short Answer Questions :

Ans. 1. When air moves it is called wind or in other words moving air is called wind. Air moves from the region of high air pressure to the region of low

air pressure. The greater the difference in the pressure, greater is the speed of the wind.

2. The regions around the equator are heated by the direct rays of the sun. The air in these regions gets heated and rises and the cooler air from the surrounding regions moves in. These winds blow from north and south towards the equator.

   The regions around the north and south poles are colder as the sun rays are slant the most in these regions. As a result, cold wind moves northwards from the south pole and southwards from the north pole to fill the gap generated by the rising warm air at latitudes of about 60°. The flow of winds is not exactly vertically north to south or from south to north. A change in the direction of wind is seen due to rotation of the earth.

3. To demonstrate that air exerts pressure.
   - Take a tin can with a lid and fill in two-thirds with water.
   - Boil the water on a burner.
   - Now put off the burner, cover the mouth of the can with its lid tightly and pour cold water on the hot can.
   - You will see that the tin loses its shape.
   - When the water in the can is heated, it changes into vapour form. When cold water runs over the tin can containing hot water, some of the steam in the can turns back to liquid state, reducing the quantity of air inside. This reduces the air pressure inside the can compared to the air pressure outside. So, the can gets compressed.

4. The upward movement of warm air and downward movement of cold air leads to stormy winds along with rainfall, lightning and thunder. These events together are called thunderstorm. A thunderstorm fades away when the rising column of hot air cuts off due to decreased precipitation.

5. **Thunderstorm :** The upward movement of warm air and downward movement of cold air leads to stormy winds along with rainfall, lighting and thunder. These events together are called thunderstorm.

   Tornadoes : A tornado is another type of storm and has a dark funnel shaped cloud that reaches to the ground form the sky. It is formed when a rising column of hot air meets a horizontal current of cold air.

C. Long Answer Questions :

Ans. 1. Cyclones generally develop over tropical seas. The air, after becoming hot by sun rays, rises creating a region of low pressure. Cold air from surroundings comes in and rises up as a result of the heat of the sun. This process continues developing a current of air. The rotation of earth takes this air current around the region of low pressure. The centre of cyclone which is also called the 'eye' is a calm area with a diameter of about 10 to 30 km. It is a region of low intensity winds and is free from clouds.

The space around the eye is the region of thick clouds with heavy rains

and high speed winds of 150-250 km/h. This cloudy space is about 150 km in size. Cyclones are common phenomenon and are given different names in different places. Cyclones developing over the western pacific region are called **typhoons** whereas those developing over Indian Ocean or Bay of Bengal are called **cyclones**. The whole coastline of India is vulnerable to cyclones, particularly the east coast. The frequency and intensity of cyclones along the west coast is much less as compared to the east coast. Cyclones produce giant waves in the sea along with torrential rains.

IMPACT OF CYCLONES

We know the fact that natural disasters kill more and more people year after year. Cyclones are very destructive as they travel over seas at 15-30 km/h and the violent winds push water towards the shore even when the storm is hundreds of kilometers away. This is actually the first indication of a coming cyclone. The central low pressure area lifts the water surface in the centre to a height of 3–12 metres and it appears like a water wall going towards the shore. As a result seawater enters and floods the low lying coastal regions causing loss of life and property. This reduces the fertility of the soil also. Since cyclones are accompanied by heavy rainfall, it further worsens the flood situation. In addition, the communication system, bridges, livestock, buildings, trees and many other man-made structures are also destroyed by high speed winds and rainfall.

2. Do yourself
3. The precautions to be followed by the people living in cyclone prone regions are:
   - People living in cyclone prone regions should make arrangements to shift necessary household goods, domestic animals and vehicles to safer places.
   - Warnings issued by meteorological department through TV, radio or newspapers should not be ignored.
   - Phone numbers of all emergency services like hospital, fire brigade and police should be kept handy all the times.
   - While staying in a cyclone hit area, people should take more precautions to safeguard their interests like:
   - Never touch wet electric switches or wet electric wires.
   - Drinking water should be purified before use as it may get contaminated.
   - Cooperate and help your friends and neighbours.
   - Avoid driving as the road may get damaged by the flood water.
4. thunderstorms occur in hot humid, tropical areas. The air over the land gets heated, becomes light and rises. The upward movement of warm air and downward movement of cold air leads to stormy winds along with rainfall,

lightning and thunder. These events together are called thunderstorm.

Cyclone is a type of storm which develops on the sea and has high speed winds swirling around a low pressure centre called the eye of the storm. Cyclones generally develop over tropical seas. The air, after becoming hot by sun rays, rises creating a region of low pressure. Cold air from surroundings comes in and rises up as a result of the heat of the sun. This process continues developing a current of air.

5. **Thunderstorm**

Thunderstorms occur in hot humid, tropical areas such as India most frequently. The air over the land gets heated, becomes light and rises. In doing so, the water vapour condenses fast to form tiny droplets of water which freeze forming ice particles. During the condensation of water vapour and freezing of droplets, a large amount of heat is given out which further pushes the air up at a higher speed. The water droplets and ice particles rub against each other in fastly rising air. This develops an electric charge which is released by a stroke of lightning. The **lightning** heats up the surroundings and makes the air expand very fast. In doing so it produces a **thunderous sound**. The upward movement of warm air and downward movement of cold air leads to stormy winds along with rainfall, lightning and thunder. These events together are called **thunderstorm**. A thunderstorm fades away when the rising column of hot air cuts off due to decreased precipitation.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Do yourself
2. Do yourself

Fun Time

Ans. Do yourself

Lesson 14 Light

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans. 1. An image formed by a plane mirror **can not** be seen on a screen.
2. A **real** image can be formed on a screen.
3. A convex mirror is one in which the reflecting surface bulges **inwards**.
4. After parallel rays of light pass through a **convex** lens, they seem to come from a point.

5. A magnifying glass is a **convex** lens.

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Light travels in straight lines. It cannot curve or flow around a body. This mode of travelling is called rectilinear propagation.
2. The incident ray and the reflected ray make equal angles with a plane mirror.
3. The image formed by a plane mirror is virtual, erect and of the same size as the object.
4. Concave mirrors are used as compact and shaving mirrors.
5. A magnifying glass and reading glasses have convex lenses. Glass used to see distant objects have concave lenses.
6. Colourless light is called white light. It is actually made up of seven colour. The colour separate out when white light bends sharply. The set of colours formed on the splitting of white light is called the spectrum of white light.

B. Short Answer Questions :

Ans. 1. Plane mirrors are not the only things that form images. You might have seen images formed on curved metal surfaces, on the screens in cinemas, and so on. You might have observed that all images are not like those formed by a plane mirror. For example, the image formed by a pinhole is inverted and smaller in size than the object.
2. **Images Formed by Reflection from Curved Surfaces**
Take a spoon observe it carefully. The back of the spoon curves outwards, while the front is hollow and curves inwards A surface that curves outwards is called a **convex** surface. And a surface that curves inwards is called a **concave** surface.
If you see at the concave side see of a polished soon, you will see an inverted image. If you look at the convex side, you will see an erect image. Move the spoon away from you and then towards you. You will see that the size of the image changes. Experiment with other polished curved surfaces, like a doorknob, a steel pan, and so on. All these curved surfaces from images by reflecting light.
3. A rainbow is produced by the refraction of light. Lights of different colours bend by different angles. So they separate out on refraction. When sunlight passes through raindrops at certain angles, it bends very sharply. This makes the separated colours visible.
4. A rainbow has seven colours, which gradually change from one to another. The set of seven colours formed on splitting of white light is called the spectrum of white light. These colours have the order violet, indigo, blue, green, yellow, orange and red. You can remember this as VIBGYOR.

If white light has lights of seven colours, we should be able to get white light by mixing these coloured lights. The way light mixes was first explained by the famous English physicist Isaac Newton. He proved that on rotating a rainbow-coloured disc, it appears white. Let us make a Newton's disc and see.

Newton's disc

Draw a circle on a thick piece of white paper. Divide the circle into equal sections by drawing light lines. The circle can be divided into one, two or three groups of 7 equal sections. Fill the 7 sections in each group with the colours of the spectrum in the order VIBGYOR. For best results, use pale shades of the colours.

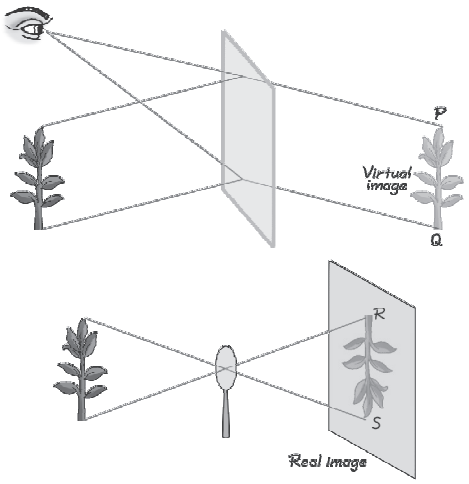
Cut out the circle to make a disc. Insert a toothpick through the centre of the disc and use gum to hold it in place. Use the toothpick to spin the disc like a top. The spinning disc will look whitish.

C. Long Answer Questions :

Ans. 1. **REAL AND VIRTUAL IMAGES**

When you look into a plane mirror, your reflection of image seems to be somewhere behind it. However, if you try to find such an image by keeping a screen behind the mirror, no image will be formed on the screen. An image that cannot be formed on a screen is termed as virtual image. Rays of light do not actually pass through a **virtual image**. To us, the rays of light, after reflection, seem to come from a certain point. We see an image at that point because we see things in the direction of the rays entering our eyes.

If you put a magnifying glass between a screen and a window, you will see that image of the window on the screen. A pinhole also forms an image on a screen. An image that can be formed on a screen is termed as **real image**. The image is formed by rays of light actually meeting at a point. Remember that you can see a real image even without a screen, if your eyes are in line with the rays coming from the image. The screen only helps you see the image from many angles. Projectors and cameras form real images.



We see a virtual image when rays of light seem to come from points such as P and Q. We see a real image when rays of light actually come from points such as R and S.

2. Two types of lenses are shown in the given figure. In the common **convex lens** both surfaces bulge out. These lenses are thick in the middle and thin at the edges. In the common **concave lens** both surfaces curve inwards. Such lenses are thinner at the middle then at the edges.
Glasses used by people who cannot see distant objects clearly have concave lenses. A magnifying glass and the glasses used for reading or seeing objects close to the eye have convex lenses.
Parallel rays of light actually meet at a point after passing through a convex lens. And they seem to come from a point after passing through a concave lens. The point where parallel rays of light actually meet or seem to come from after passing through a lens is called the **focus of the lens**.
You will need a convex lens. With the lens turned towards the sun, slowly move it away from the ground. When the lens is at a certain distance from the ground, you will see a sharp image of the sun at a point. This is the point at which the parallel rays of the sun converge after passing through the lens. This point is the focus of the lens, and the distance between the lens and the focus is the focal length of the lens. If you place a sheet of paper at the focus of the lens for, it will start burning.

3. **Images Formed by Refraction**
The bending of light when it travels from one medium to another is called refraction of light. When you put a spoon in a glass of water, the part of the spoon in water looks bent. This happens because light bends, at the surface separating two mediums like water and air. When a refracted ray reaches our eyes, we see an image in the direction of the ray. The position and size of this image are usually different from those of the object.

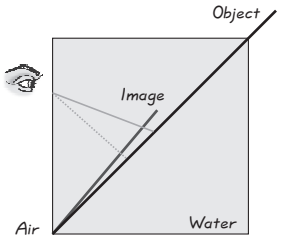


Image formed by refraction

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Yes
2. It is regular reflection.

Fun Time

Ans. Do yourself

Lesson 15 Water : A precious Resource

Formative Assessment

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

Ans. 1. Groundwater gets collected in the spaces between **permeable** rocks.

2. About 50% of our agricultural needs are met by **groundwater**.
3. The area from which water drains into a river or stream is its **mouth** area.
4. A **percolation** tank allows water to seep into the soil and recharge groundwater.
5. When surface water bodies get polluted, people turn to **underground water** to meet their needs.
6. Tanks are a very important source of water in **the north** in India.

C. Write 'T' for true and 'F' for false statements :

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

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Rivers, lakes, ponds and tanks are surface water sources.
2. In parts of Rajasthan, Madhya Pradesh and Bihar.
3. Generally groundwater has been utilised by digging wells. The modern way of getting groundwater is to pump it out with the help of power-operated tubewells. Such tubewells are used widely for irrigation. Manually operated tubewells are also used for domestic purposes.
4. It leads to scarcity of water.
5. Some other causes of water scarcity are too much runoff due to deforestation, overuse, and pollution of rivers.

B. Short Answer Questions :

Ans. 1. A big part of the rain that falls over land enters the soil and fills up the spaces between the soils particles. This is what we say **soil moisture**. It sustains the plants growing on the soil. The roots of plants absorb this water and send it up to the leaves for photosynthesis. Plants would die without soil moisture.
2. On an average, about 18% of our country is drought-prone. But, lack of rainfall is not the only causes for the scarcity or water. The other causes is:
Pattern of Rainfall
Though we get a lot of rainfall, it is generally concentrated in the rainy season. This leads to a shortage of water after the monsoon. Also, rainfall is not even every year. Some years, the rainfall is far less than the average rainfall, this leads to a water shortage, mainly in areas which do not get much rainfall anyway.
3. There is a very old tradition of tapping groundwater of agricultural and domestic needs. Wells and stepwells provided water for drinking and agriculture in Gujarat, Rajasthan, Madhya Pradesh, Maharashtra and Tamil Nadu. In fact, wells were a common sight in almost every part of India, except the Himalayan region.
Now a days, tubewells and hand-pumps have replaced wells. Now groundwater meets about 50% of our agricultural needs. It is also the main source of drinking water (about 85%) in villages and an important source (about 30%) in urban areas.

4. Rain is our main source of water. It would be more correct to use the term **precipitation**, which includes rain and snow. It is rain that replenishes or sources of surface water and groundwater. The scarcity of water in a place depends more on the way the people make use of rainwater than on how much rainfall the place gets. Thus, which has among the highest amount of rainfall in the world, faces a shortage of water because rain runs off fast down the deforested mountain slopes.

C. Long Answer Questions :

Ans. 1. It started in 1972, when western Maharashtra had a severe drought. Vilasrao Salunkhe, an engineer and chairman of the Western Maharashtra Development Corporation, saw a village where farmers still had enough water to grow crops. These farmers had constructed check dams across a stream the year before and had used the runoff to recharge their wells. So the drought had not affected them.

Salunkhe borrowed this idea. He took 16 hectares of uncultivable land on a hillside on lease from the temple trust of Naigaon, a drought-prone region. He and his family shifted from Pune to live in a hut on this land. With the help of engineering students and retired engineers, he raised bunds along the hillside to collect rainwater and stop soil erosion. He also constructed a percolation tank at the base of the hill and a well for drawing water further down. A percolation tank allows rainwater to go into the soil and recharge groundwater. Water was pumped out of the well to irrigate the farm area on the hill slope.

2. Do yourself

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Due to low rain-full.
2. Trapping Rainwater.

Fun Time

Ans. Do yourself

Lesson 16 Waste Management

Formative Assessment

A. Tick (✓) the correct option :

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

B. Write 'T' for true and 'F' for false statements :

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

C. Fill in the blanks :

Ans. 1. **Inorganic impurities** are the dissolved and suspended impurities present in sewage.

2. In order to improve **sanitation** low cost on site sewage disposal systems are encouraged.
3. Food containing **materials** and **bags** block the drains.
4. **Chlorine** is a water disinfectant.
5. The cleaning of water is a process of removing **impurities** from it.

D. Match the two columns :

Column A	Column B
1. Water-borne disease	(iii) Cholera
2. Sludge	(v) Solid material generated from sewage treatment
3. Wastewater	(i) Used water
4. Septic tank	(ii) On site sewage disposal system
5. Bar screens	(iv) Remove large objects like rags, sticks and plastic bags

Summative Assessment

A. Very Short Answer Questions :

Ans. 1. Oid and pesticides.
2. Nitrates and phosphates.
3. Chlorine and ozone.
4. Dysentery
5. Cholera and typhoid.

B. Short Answer Questions :

Ans. 1. Wastewater released from houses, offices, industries, field and other human activities is called sewage.
2. Soaps and detergents contain phosphates. When wastes containing soaps and detergents are released into rivers and ponds, they favour algal growth. Growing algae consume a lot of oxygen and thus oxygen level in water decreases. The algae compete with water plants and animals for oxygen and affect the water life.
3. **Table 1- Impurities present in sewage**

S.No.	Impurities	Examples
1.	Bacteria	Causing water-related diseases such as cholera (Vibrio cholerae) and typhoid (Salmonella typhi)
2.	Organic impurities	Human and animal waste, oil, pesticides and herbicides used in agricultural activities, fruit and vegetable waters
3.	Inorganic impurities	Various metals, nitrates and phosphates
4.	Nutrients	Nitrogen and phosphorus
5.	Other microbes	Causing diseases like dysentery (Amoeba)

4. In some places such as, slums, there many not be a proper drainage system to dispose sewage. In these these cases, sewage gets collected in pits and depressions, and stagnates. These places are breeding grounds for flies and mosquitoes that spread diseases like malaria, dengue, etc. Also decay of the wastes present in wastewater gives out an unpleasant smell.
5. Soaps and detergents contain phosphates. When wastes containing soaps and detergents are released into rivers and ponds, they favour algal growth. Growing algae consume a lot of oxygen and thus oxygen level in water decreases. The algae compete with water plants and animals for oxygen and affect the water life.

C. Long Answer Questions :

Ans. 1. Given below is a step description of processes carried out at wastewater treatment plants.

- First of all sewage is passed through parallel bar screens. This removes big materials like cans, sticks, rags, plastic packets, etc. from it.
- It is then passed through a grinder where the solid matter is reduced in size so that is does not clog up the plant.
- It is then allowed to enter a grit and sand removal tank. Here, the speed of wastewater is reduced in order to allow sand, grit and pebbles to settle down.
- The wastewater then goes to a large tank called water clarifier.
- The sludge is sent to a separate tank where anaerobic bacteria work on it and change it into methane, carbon-dioxide and humus like materials. This method is called digestion.
- Air is then pumped through clarified water. Now aerobic bacteria develop in the presence of air and consume the remaining wastes.

This process is carried out for many hours. The suspended microbes settle at the bottom of the tank as activated sludge. Nearly 97% of the activated sludge is water. The water is removed from the top by sand drying beds or machines. The sludge is dried and used as manure.

Before water is sent into the distribution system, it is disinfected with chemicals like chlorine and ozone.

2. A few ways to dispose waste properly are given below:

- Solid wastes like used tea leaves, food leftovers, plastic bags, soft toys, cotton and sanitary towels should not be thrown down the drains. They reduce free flow of oxygen and thus, slow down the process of degradation.
- Food contains lot of oil and fats. The leftover food material should not be thrown down the drain because they can choke the pipes when

they harden. These when thrown in open drains block the soil pores, thereby decreasing its effectiveness to filter water. Therefore, those waste should be thrown in dustbins only.

- Various chemical products such as grease medicines, motor oils, paints, machine oils and insecticides may destroy water-purifying micro organisms and hamper the degradation process. These should not be thrown down the drain.

3. Food contains lot of oil and fats. The leftover food material should not be thrown down the drain because they can choke the pipes when they harden. These when thrown in open drains block the soil pores, thereby decreasing its effectiveness to filter water. Therefore, those waste should be thrown in dustbins only.
4. The sludge is sent to a separate tank where anaerobic bacteria work on it and change it into methane, carbon dioxide and humus like materials. This method is called digestion. The digested sludge is dried by spreading on sand beds and used as fertilizer. Biogas is also produced in this process, which is used as a fuel or to produce electricity.
5. At places where there is no sewage system, low cost on site sewage disposal systems such as septic tanks, chemical toilets and composting pits should be used.

   Septic tanks can be built for hospitals, for small groups of houses and other such isolated buildings. Using new human waste disposal technology, excreta from the toilet seats can directly be sent to a biogas plant through covered drains. The biogas so produced can be used as fuel.
6. **Harmful effects of untreated sewage:**

   Stagnant wastewater from leaking sewer pipes sometimes enters the drinking water pipes and pollutes it. Untreated wastewater is a major source of groundwater and surface water pollution. Soaps and detergents contain phosphates. When wastes containing soaps and detergents are released into rivers and ponds, they favour algal growth. Growing algae consume a lot of oxygen and thus oxygen level in water decreases. The algae compete with water plants and animals for oxygen and affect the water life.

   It acts as a breeding ground for various disease-causing organisms such as mosquitoes and flies, which spread diseases like cholera, diarrhoea, jaundice and dysentery.

D. Higher Order Thinking Skills (HOTS) Questions :

Ans. 1. Do yourself
2. Do yourself

Fun Time

Ans. Do yourself

Formative Assessment 4

A. Tick (✓) the correct option :

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

B. Match the two columns :

	Column A	Column B
Ans. 1.	Water-borne disease	(iii) Cholera
2.	Sludge	(v) Solid material generated from sewage treatment
3.	Wastewater	(i) Used water
4.	Septic tank	(ii) On site sewage disposal system
5.	Bar screens	(iv) Remove large objects like rags, sticks and plastic bags

C. Name these :

Ans. 1. Cyclones developing over the western pacific region. **Typhoons**
2. The set of seven colours formed on splitting of white light. **Newton's disc**
3. The dissolved and suspended solid impurities present in sewage. **Inorganic impurities**
4. The clean water that can be consumed. **Potable water**
5. Bacteria that do not use oxygen from the air. **Nitrogenous bacteria**

D. Answer the following questions :

Ans. 1. Anemometer
2. Wind Vane
3. Concave mirrors are used as compact and shaving mirrors.
4. Rivers, lakes, ponds and tanks are surface water sources.
5. Aid and pesticides

Summative Assessment 2

A. Fill in the blanks :

Ans. 1. Transfer of pollen grains to **stigma** is called pollination.
2. **Fruit** is a ripened ovary.
3. One leap year is equal to **366** days.
4. A **Simple** pendulum has a period of 2 seconds.
5. Air pressure **decreases** when wind speed increases.

B. Write true or false :

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

C. Very Short Answer Questions :

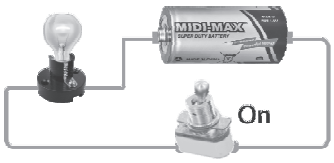
Ans. 1. Blood consists of many types of cells suspended in liquid called plasma. These include Red blood cells, white blood cells and blood platelets.
2. Gum, resin, latex, carbon dioxide etc. are some waste exerted by plants.
3. Distance travelled by a moving object in unit time is called speed.

SI unit of speed is metre per second or ms^{-1} and kilometer per hour or kmh^{-1}.

4. No
5. When air moves it is called wind or in other words moving air is called wind. Air moves from the region of high air pressure to the region of low air pressure. The greater the difference in the pressure, greater is the speed of the wind.

D. Short Answer Questions :

Ans. 1. **Electric Circuit :** A path along which an electric current can flow is called an electric circuit. When you connect a bulb to a cell with wires, you create a closed path, or a circuit, through which current can flow. The cell, the bulb and the connecting wires are all part of the circuit. You can say that a circuit includes a source of electricity (e.g., cell), conductors (e.g., wires) and a device that uses electricity (e.g., a bulb).

2. 

3. A rainbow has seven colours, which gradually change from one to another. The set of seven colours formed on splitting of white light is called the spectrum of white light.
4. A rainbow has seven colours, which gradually change from one to another. The set of seven colours formed on splitting of white light is called the spectrum of white light. These colours have the order violet, indigo, blue, green, yellow, orange and red. You can remember this as **VIBGYOR**.

   If white light has lights of seven colours, we should be able to get white light by mixing these coloured lights. The way light mixes was first explained by the famous English physicist Isaac Newton. He proved that on rotating a rainbow-coloured disc, it appears white. Let us make a Newton's disc and see.

   Draw a circle on a thick piece of white paper. Divide the circle into equal sections by drawing light lines. The circle can be divided into one, two or three groups of 7 equal sections. Fill the 7 sections in each group with the colours of the spectrum in the order VIBGYOR. For best results, use pale shades of the colours.

   Cut out the circle to make a disc. Insert a toothpick through the centre of the disc and use gum to hold it in place. Use the toothpick to spin the disc like a top. The spinning disc will look whitish.


Newton's disc

5. A big part of the rain that falls over land enters the soil and fills up the

spaces between the soils particles. This is what we say soil moisture. It sustains the plants growing on the soil. The roots of plants absorb this water and send it up to the leaves for photosynthesis. Plants would die without soil moisture.

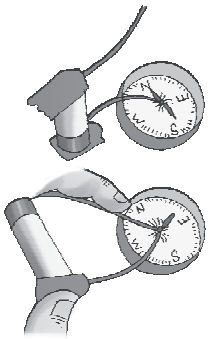
E. Long Answer Questions :

Ans. 1. Electricity and magnetism are closely related. Perform the following experiment to understand this.

Aim: To observe the magnetic effect of current passing through a wire.

Materials required: 1.5 V cell, two pieces of insulated wire, a small magnetic compass, and insulation tape.

Procedure:



1. Remove the insulation from the two ends of both the wires.
2. Connect one end of one of the wires to the negative terminal of the cell. Secure the connection with the insulation tape.
3. Connect one end of the other wire to the positive terminal of the cell. Secure the connection with the insulation tape.
4. Keep the magnetic compass near the wire.
5. Keep an eye on the needle of the magnetic compass and touch the free ends of the wires connected to the positive and negative terminals of the cell.

What do you notice? You will notice that when you touch the wire to the positive terminal of the cell, the needle of the magnetic compass gets deflected. This is because when a current passes through the wire, it behaves like a magnet and therefore deflects the magnetic needle of the compass.

2. Wrap a wire around a soft iron piece. When an electric current is passed through the wire, the iron piece behaves like a magnet. A magnet made using this type of arrangement is called an electromagnet.
3. Two types of lenses are shown in the given figure. In the common convex lens both surfaces bulge out. These lenses are thick in the middle and thin at the edges. In the common concave lens both surfaces curve inwards. Such lenses are thinner at the middle then at the edges.

   Glasses used by people who cannot see distant objects clearly have concave lenses. A magnifying glass and the glasses used for reading or seeing objects close to the eye have convex lenses.

   Parallel rays of light actually meet at a point after passing through a convex lens. And they seem to come from a point after passing through a concave lens. The point where parallel rays of light actually meet or seem to come from after passing through a lens is called the **focus of the lens**.

   You will need a convex lens. With the lens turned towards the sun, slowly

move it away from the ground. When the lens is at a certain distance from the ground, you will see a sharp image of the sun at a point. This is the point at which the parallel rays of the sun converge after passing through the lens. This point is the focus of the lens, and the distance between the lens and the focus is the focal length of the lens. If you place a sheet of paper at the focus of the lens for, it will start burning.

4. **Images Formed by Refraction :** The bending of light when it travels from one medium to another is called **refraction of light**. When you put a spoon in a glass of water, the part of the spoon in water looks bent. This happens because light bends, at the surface separating two mediums like water and air. When a refracted ray reaches our eyes, we see an image in the direction of the ray. The position and size of this image are usually different from those of the object.

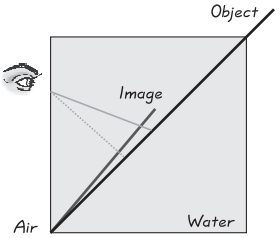


Image formed by refraction

5. Do yourself
6. A few ways to dispose waste properly are given below:
   - Solid wastes like used tea leaves, food leftovers, plastic bags, soft toys, cotton and sanitary towels should not be thrown down the drains. They reduce free flow of oxygen and thus, slow down the process of degradation.
   - Food contains lot of oil and fats. The leftover food material should not be thrown down the drain because they can choke the pipes when they harden. These when thrown in open drains block the soil pores, thereby decreasing its effectiveness to filter water. Therefore, those waste should be thrown in dustbins only.
   - Various chemical products such as grease medicines, motor oils, paints, machine oils and insecticides may destroy water-purifying micro organisms and hamper the degradation process. These should not be thrown down the drain.