केन्द्रीय विद्यालय संगठन
KENDRIYA VIDYALAYA SANGATHAN

शिक्षा एवं प्रशिक्षण का आंचलिक संस्थान, चंडीगढ़
ZONAL INSTITUTE OF EDUCATION AND TRAINING, CHANDIGARH

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ZONAL INSTITUTE OF EDUCATION AND TRAINING, CHANDIGARH
सेक्टर-33 सी, चंडीगढ़ / **SECTOR-33C, CHANDIGARH**

वेबसाइट / Website : zietchandigarh.kvs.gov.in

ई-मेल / e-mail :kvszietchd@gmail.com दूरभाष / Phone : 0172-2921841, 2921994

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निदेशक महोदय का संदेश

विद्यार्थियों की शैक्षिक प्रगति को ध्यान में रखते हुए उपयोगी अध्ययन सामग्री उपलब्ध कराना हमारा महत्वपूर्ण उद्देश्य है। इससे न केवल उन्हें अपने लक्ष्य को प्राप्त करने में सरलता एवं सुविधा होगी बल्कि वे अपने आंतरिक गुणों एवं अभिरुचियों को पहचानने में सक्षम होंगे। परीक्षाओं में अधिकतम अंक प्राप्त करना हर एक विद्यार्थी का सपना होता है। इस संबंध में तीन प्रमुख आधार स्तंभों को एक कड़ी के रूप में देखा जाना चाहिए- अवधारणात्मक स्पष्टता, प्रासंगिक परिचितता एवं आनुप्रयोगिक विशेषज्ञता।

राष्ट्रीय शिक्षा नीति 2020 के उद्देश्यों की मूलभूत बातों को गौर करने पर यह तथ्य स्पष्ट है कि विद्यार्थियों की सोच को सकारात्मक दिशा देने के लिए उन्हें तकनीकी आधारित समेकित शिक्षा के समान अवसर उपलब्ध कराया जाए। परीक्षाओं के तनाव और दबाव को कम करने के उद्देश्य को प्रमुखता देना अति आवश्यक है।

यह सर्वमान्य है कि छात्र-छात्राओं का भविष्य उनके द्वारा वर्तमान कक्षा में किए गए प्रदर्शन पर ही निर्भर करता है। इस तथ्य को समझते हुए यह अध्ययन सामग्री तैयार की गई है। उम्मीद है कि प्रस्तुत अध्ययन सामग्री के माध्यम से वे अपनी विषय संबंधी जानकारी को समृद्ध करने में अवश्य सफल होंगे।

शुभकामनाओं सहित।

मुकेश कुमार
उपायुक्त एवं निदेशक

अनुक्रमणिका / INDEX

STUDY MATERIAL CLASS 6-SCIENCE 2023-24

CHAPTER – 1
COMPONENTS OF FOOD

. **Nutrients:** Food substances that provide nourishment to the body.

• The major nutrients in our food are carbohydrates, proteins, fats, vitamins and minerals. In addition, food also contains dietary fibres and water.

• Carbohydrates and fats mainly provide energy to our body.

• **Carbohydrates**: These are energy-giving compounds. There may be simple carbohydrates or complex carbohydrates.

• **Fats:** These are very high energy-giving compounds compounds. They produce greater amount of energy than carbohydrates.

• **Minerals:** These are elements required by the body in small amounts. It is essential for growth and development of bones, teeth and red blood cells.

• **Proteins**: These are body-building foods. They help in the growth of the body.

• **Vitamins**: These are organic substances that protect the body from diseases.

• **Roughage**: It is the dietary fibre present in the food. It facilitates regular movement of the bowels and prevents constipation.

• **Balanced diet**: It provides all the nutrients that our body needs, in right quantities, along with adequate amount of roughage and water.

• **Deficiency Diseases**: These are the diseases cause due to the lack of required nutrients for a long period in the diet.

• Some Nutrients Deficiency Diseases are:

Vitamins	Deficiency Diseases	Symptoms

and Minerals		
Vitamin-A	Night blindness	Poor vision or complete loss of vision in darkness
Vitamin-B1	Beri-beri	Weight loss and weak muscle
Vitamin-C	Scurvy	Bleeding gums
Vitamin-D	Rickets	Soft, tender and weak bones
Vitamin E	Crohn's disease	Pale skin and Rapid aging
Vitamin-K	Haemorrhage	Excessive bleeding with delay in clotting
Calcium	Osteomalacia and osteoporosis	Brittle bones
Phosphorus	Bad teeth, and Rickets	Twisted limbs, unformed teeth
Iron	Anaemia	Low red blood cell count
Iodine	Goitre	Enlarged thyroid gland

Food Sources

Vitamins

- Vitamins are the essential nutrients that help us in maintaining normal body functions and also to fight off infections.
- Fruits and vegetables are the major sources of vitamins.
- Vitamins also keep our eyes, bones, teeth, gums and skin healthy.

- A, B complex, C, D, E and K are the vitamins we get from different foods.

Vitamin	Functions of Vitamin
Vitamin-A	Keeps eyes and skin healthy
Vitamin-B1	Helps the body use energy from the food we eat
Vitamin-C	Help heal wounds, maintains healthy gums and blood vessels, fights infections
Vitamin-D	Keeps teeth and bones healthy
Vitamin E	Maintains healthy skin and hair, slows down aging, a powerful antioxidant
Vitamin-K	An important factor in blood clotting, bone healing and body repair

Minerals

- Minerals are important substances that help your body's form and function on many different levels.
- Minerals are essential for various metabolic functions including growth and organ functioning.
- Important minerals required for our body are sodium, potassium, calcium, zinc, iron, phosphorus, magnesium etc.

Some Important Questions-

1. Do all meals consist of the same food items?
Ans: No, all meals do not have the same food items.

2. Why should a meal have different food items?
Ans: A meal should have different food items because our body needs different kinds of nutrients for proper functioning.

3. Do all foods contain all the required nutrients?
Ans: No, all foods do not contain sill the nutrients required by our body.

4. Name two main types of carbohydrates found in our food.
Ans:
(i) Starch (ii) Sugar

5. What are carbohydrates?
Ans: The compounds of carbon, hydrogen and oxygen which provide energy for our body are called carbohydrates.

6. What happens when two or more drops of iodine solution fall on starch substance?
Ans: The colour of the substance becomes blue-black.

7. If any food item gives blue-black colour with iodine then which nutrient is present in the food?
Ans: Starch.

8. Name two substances which provide carbohydrates.
Ans: (i) Potato (ii) Rice/wheat/maize/sugar

9. Name the food nutrient indicated by an oily patch on paper.
Ans: An oily patch on paper shows the presence of fat.

10. Name two energy-providing nutrients.
Ans: (i) Carbohydrates (ii) Fats

11. Name a nutrient which helps in repairing the damaged body cells.
Ans: Proteins.

12. Name two nutrients which protect the body from diseases.
Ans: (i) Vitamins (ii) Minerals

13. Name two plant food items which provide proteins.Ans:
(i) Dal (pulses) (ii) Soyabean

14. Name two sources of proteins provided by animals.
Ans: (i) Milk (ii) Eggs

15. Which type of food is called body-building food?
Ans: The food containing proteins is called body-building food.

16. Name two food items which provide fats.Ans:
(i) Oils (ii) Ghee

17. Name various types of vitamins.
Ans: Various types of vitamins are:

1. Vitamin A, 2.Vitamin B-complex, 3.Vitamin C, 4. Vitamin D, 5. Vitamin E, 6.Vitamin K.

18. Name a vitamin which represents a group of vitamins.
Ans: Vitamin B-complex.

19. Name two sources of Vitamin A.
Ans:(i) Fish-oil (ii) Milk
20. Write two sources of Vitamin B.
Ans:(i) Liver (ii) Beans
21. Write two sources of Vitamin C.
Ans:(i) Orange/lime (ii) Amla
22. Write two sources of Vitamin D.
Ans:(i) Fish (ii) Butter
23. What is roughage?
Ans. The food containing plant fibres which sure also known as dietary fibres is called roughage.
24. What is the main Function of roughage?
Ans: The main function of roughage is to help our body get rid of undigested food.

25. Name some food items which provide roughage.
Ans: Whole grains, fresh fruits and vegetables are the main sources of roughage.

26. Write test for detecting the presence of starch.
Ans: Take a piece of the food item. Put 2-3 drops of dilute iodine solution on it. If the colour of the food item becomes blue-black, then it indicates the presence of starch in the food item.
(i) Food + Iodine — Blue-black colour (starch present)
(ii) Food + Iodine — No blue-black colour (no starch present)

27. How can you test presence of proteins in a given food item?
Ans: Take a small quantity of the food item. If the sample is solid, grind it. Put some part of this in a clean test tube, add 10 drops of water to it and shake the test tube. Now, with the help of a dropper, add two drops of solution of copper sulphate and 10 drops of solution of caustic soda to the test tube. Shake well and place the test tube in test tube stand for a few minutes.
Observe colour of the contents of test tube. If colour of the contents turns violet, the food item contains protein.
Note: Copper sulphate and caustic soda solutions are harmful. Handle them with care.
Food + water + copper sulphate + caustic soda → violet colour → protein is present.

28. Write test for detecting, presence of fat ?
Ans: Take small quantity of the food item. Rub it on a piece of white paper. Observe carefully, you will find that the piece of white paper shows an oily patch on it which indicates that the food item contains fat.

CHAPTER – 2
Sorting Material into Groups

• Objects around us are made up of a large variety of materials.

• A given material could be used to make a large number of objects. It is also possible that an object could be made of a single material or of many different types of materials.

Classification

Materials can be classified based on several properties:

- Transparency
- Hardness
- Soluble and Insoluble
- Float and Sink

• Different types of materials have different properties.

• Some materials are shiny in appearance while others are not. Some are rough, some smooth. Similarly, some materials are hard, whereas some others are soft.

• Some materials are soluble in water whereas some others are insoluble.

• Some materials such as glass, are transparent and some others such as wood and metals are opaque. Some materials are translucent.

• Materials are grouped together on the basis of similarities and differences in their properties.

• Things are grouped together for convenience and to study their properties.

• Materials are classified based on their properties like: appearance, hardness, solubility, float/ sink, transparency, conduction of heat, states of matter, conduction of electricity, attraction towards magnets, combustibility.

• Advantages of classification:

(a) Helps in identification of objects.

(b) Helps in sorting of objects.

(c) Helps in locating things.

(d) Makes study of different objects easy and more meaningful rather than studying each

other separately.

(e) Helps to understanding similarities and dissimilarities among objects.

Polishing

- Metal polishing acts as a protective shield to metal surfaces because it stops oxidation.
- It is a method of improving the durability and texture of metal surfaces as they are much less likely to wear or corrode.

Lustre

- Some like diamond and gold are shiny and is termed as lustrous materials.

Non- Lustre

- Some other materials like graphite and wood do not appear shiny and are generally known as non-lustrous materials

Soft Substance

- Materials that can be compressed or deformed easily are referred to as soft substances.

Hard Substance

- Materials that are difficult to bend or compress and are termed as hard substances

Soluble Substance

- Some substances completely disappear or dissolve in water. These substances are soluble in water.

Non-soluble Substance

- Some substances do not mix with water and do not disappear even after we stir for a long time. These substances are insoluble in water.

Buoyancy

- The upward force applied by the fluid on the object or the body when an object is put in or submerged in the fluid is termed as Buoyancy.

Density

Density is defined as mass per volume. You can think of it as the amounts of particles of a substance are packed into a certain amount of space.

Transparent Object

- An object, which allows visible light to pass through it is called a transparent object. We can clearly see through a transparent object. E.g.:- glass, fish tank.

Translucent Object

- An object, which allows partial passage to light is called a translucent object. E.g.:-plastic bottle, paper cup.

Some Important Questions-

1. Why do we need to group materials? Give one reason.
Ans: We often group materials for our convenience. It helps to describe their properties.

2. Suggest two bases on which we can group objects.
Ans:
(i) Material used in making the object, e.g. wood or metal/plastic.
(ii) Material of the object is soft or hard, or substance is soluble or insoluble in water.

3. Is a substance which can be compressed soft or hard?
Ans: Soft.

4. Select a lustrous material out of the following substances:
Ans: Aluminium.

5. Which material is generally used for making pens? Wood, aluminium, plastic, cotton
Ans: Plastic or metal.

6. Is oil soluble in water?
Ans: Oil does not dissolve in water so it is insoluble in water but floats on the surface of water.

7. Name two objects which are made from opaque materials.
Ans: Wooden doors, blackboard/steel plate.

8. What is common between salt and sand?
Ans: Both have mass and are in solid state.

9. List three liquids which are transparent.
Ans. Water, alcohol and Acetone/Benzene.

10. Write two substances which are made from leather.
Ans: Belt and shoes.

11. Name some substances which are made from plastics.
Ans: Toys, plates, cups, buckets, baskets.

12. Which is harder, sponge or iron?
Ans: Iron is harder than sponge.

13. Write two gases which are soluble in water.
Ans: Oxygen, Carbon dioxide.

14. Name two gases which are insoluble in water.
Ans: Hydrogen and Nitrogen.

SHORT ANSWER TYPE QUESTIONS

1. Write any four properties of materials.
Ans: (a) Appearance (b) Hardness (c) Solubility (d) Float or sink in water (e) Transparency

2. Why is a tumbler not made with a piece of cloth?
Ans: We use tumblers made of glass, plastic and metal to keep a liquid. These substances can hold a liquid.
A tumbler made of cloth cannot hold a liquid because:
(i) Cloth piece is not hard enough to hold liquids and
(ii) Cloth piece has very minute pores through which the'liquid oozes out.
3. What are the similarities between iron, copper and aluminium?
Ans: (a) They all have lustre (b) They are all metals (c) They are hard.
4. Mention some materials which are made up of paper.
Ans: Books, notebooks, newspapers, toys, calendars, etc.
5. Why is water important for our body?
Ans: Water can dissolve a large number of substances, so it is needed by the body. It is also major part of our body cells.
6. What is the basis for sorting materials?
Ans: Materials are grouped on the basis of similarities or dissimilarities in their properties.

7. What is the reason for grouping materials?
Ans: Materials are grouped for our convenience to study their properties and also observe any patterns in these properties.
8. Metals have lustre (shine). Give reason why some metal articles become dull and loose their shine.
Ans: Metals when exposed to air react with moisture and gases present in it, thereby forming a dull layer of some other compound on it.

9. Kerosene, coconut oil, mustard oil do not dissolve in water, even on shaking. They separate after sometime forming two different layer. Explain why.
Ans: The molecules of water do not intermingle (mix) with the molecules of oil. The space between the molecules of water is not taken by oil, so they are immiscible in water.

10. Name a non-metal that has lustre.
Ans: Iodine.
11. Metals generally occur in solid state and are hard. Name a metal that exists in liquid state and a metal that is soft and can be cut with knife.
Ans: Mercury is a metal that exists in liquid state. Sodium and Potassium are soft metals and can be cut with knife.
12. Name the naturally occurring hardest substance known.
Ans: Diamond, it is made up of carbon (non-metal).

13. Why is water called a universal solvent?
Ans: Water dissolves a large number of substances in it. So it is called universal solvent.

CHAPTER-3

SEPARATION OF SUBSTANCES

Handpicking, winnowing, sieving, sedimentation, decantation and filtration are some of the methods of separating substances from their mixtures.

Mixtures

A mixture is a material made up of two or more different substances, which are mixed but are not combined chemically.

Separation

Separation is the process of separating one or more components from a mixture. Example: distillation, sedimentation, filtration etc.

Handpicking

Handpicking is a method of separation used to separate large sized impurities like pieces of dirt, stone, and husk from wheat, rice or pulses.

Threshing

Threshing is the process of beating stalks to separate the grains from the harvested crop.

- It is done manually by farmers, or by threshing machines.

Winnowing

- Method of separation used to separate heavier and lighter components of a mixture by wind or by blowing air.
- Normally, this is used to separate husk from grains.

Sieving

Sieving is a method of separation in which the mixture is passed through a filter or a sieve.

- The larger particles, usually the impurities, do not pass through the filter, and hence collect on the sieve.
- The finer particles flow past the sieve and can be collected below.

Filtration

Filtration is the process of passing the mixture through a filter to remove the solid particles from the fluid components of the mixture.

- For instance, if we pass muddy water through a fine filter, we can notice that the mud gets filtered and the water passes through.

Sedimentation

When the heavier component in the mixture settles when water is added to it, the process is called sedimentation.

- This method is used in separating grains from dust and soil.

Decantation

Decantation is the process after sedimentation that involves removing the water, along with the impurities.

Condensation

The process of conversion of water vapour into its liquid form due to contact with a cooler surface is called condensation.

- Example: Formation of water droplets on a metallic lid, while boiling water.

Evaporation

The process of conversion of water into its vapour is called evaporation.

- The process of evaporation takes place continuously wherever water is present.

To know more about "Methods of Separation", visit the link below;

Solution

A solution is a homogeneous mixture composed of two or more substances.

- In such a mixture, a solute is a substance dissolved in another substance, known as a solvent.

Saturated solution

A saturated solution is a chemical solution containing the maximum concentration of a solute dissolved in the solvent.

- For example, a saturated solution of salt in water is that in which no more salt can be dissolved.
- This added salt wills just sediment down to the bottom of the vessel.

Churning

Churning is the process of shaking up cream or whole milk to make butter.

Some Important Questions-

1. What is strainer?
Ans. Strainer is a kind of sieve which is used to separate a liquid from solid.
2. Name the method used to separate cream from curd?
Ans. Centrifugation.
3. How will you separate mango from a mixture of mango and apple?
Ans. By picking.
4. You are given a mixture of salt and sand. Can you separate them by picking?
Ans. No, we cannot separate them by picking.
5. Name the method used to separate the pieces of stone from grain?
Ans. Handpicking.
6. How can you separate grains from stalk?
Ans. We separate grains from stalk by threshing.
7. What types of material can we separate by using handpicking?
Ans. The materials having different size and colour can be separated by handpicking.
8. Name the other methods used to separate solid materials of different size?
Ans. Sieving.
9. Name the process used to separate heavier and lighter components of a mixture?
Ans. Winnowing.
10. Can the above stated method be used if both the components have same weight?
Ans. No, this method cannot be used.
11. What is evaporation?
Ans. The process of conversion of water into vapour is called evaporation.
12. Name the method by which we get salt from ocean water?
Ans. Evaporation.
13. What is mixture?
Ans. When two or more than two substances are mixed together in any ratio then it is called a mixture.
14. Write various methods of separation of components from their mixture?
Ans.

1-Handpicking 2. Threshing 3. Winnowing 4. Sedimentation 5. Decantation

6-Filtration 7. Evaporation 8. Condensation

15. What is decantation?

Ans. Decantation is a process, of separation of insoluble solids from liquid. The suspension of solid particles in liquid is allowed to stand for some time. The solid particles then settle down at the bottom of the container and clean water goes up. Without disturbing the settled particles the clean water is transferred into other container.

16. Where is decantation used? Give two examples.

Ans.

(i) Decantation is used to separate insoluble solids or liquid from liquid. Rain water is a mixture of mud and water. It is purified by decantation.

(ii) Oil and water also get separated by this method because oil floats up.

17. Explain the method that can be used for separating the following mixture:

(i) Sand and husk

(ii) Wheat, sugar and stalk

(iii) Water and petrol

(iv) Rice and salt

(v) Sand and salt

Ans.

(i) Mixture of sand and husk: Sand and husk can be separated by the method of winnowing.

(ii) Mixture of wheat, sugar and stalk: For separating stalk from the mixture we should follow the winnowing method because milk is lighter than other two components and get separated. Wheat and sugar can be separated by sieving because they are in different sizes.

(iii) Mixture of water and petrol: Water does not dissolve in petrol. So, it can be separated by the use of separating funnel.

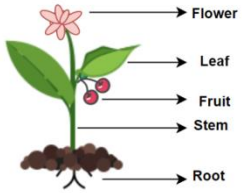
(iv) Mixture of rice and salt: Rice and salt can be separated by sieving.

(v) Mixture of sand and salt: Sand and salt is mixed with water, salt dissolves in water and sand can be separated solution by sedimentation and decantation followed by filtration. After that using evaporation common salt is separated.

CHAPTER-4

GETTING TO KNOW PLANTS

A variety of plants are seen everywhere. Some of them are small or tall, with thick stems or tender stems, and with different types and colours of leaves, flowers, and fruits. But all these plants have the same common parts, which are root, stem, leaves, buds, flowers, and fruits, though they may be different in colour, size, or shape.



Classification of Plants:

- As the plants are different in their sizes or type of stems the similar type of plants can be classified into some groups based on these characteristics. They can be classified as follows:

1) Based on Size of the Plant and The Type of Stem:

The plants have different sizes and have different types of stems; it can be hard, tender, or soft. The different types are as follows:

a) Herbs:

- These are the plants that have green tender stems and are usually short in size.
- These are mostly the plants that provide us with herbs that are used in cooking and as medicines.
- Examples - Tulsi, mint, mustard, wheat, etc.

b) Shrubs:

- These plants have a hard stem and have small branches starting from the base of the plant.
- They do not grow very big, but are bigger than herbs.
- Example - Rose, sunflower, tea, etc.

c) Trees:

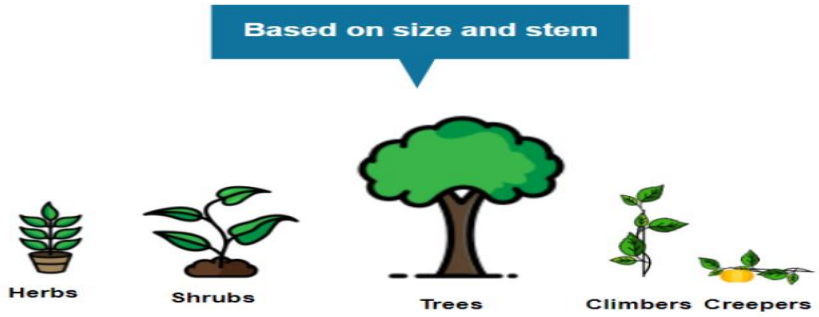
- These are the biggest plants that have woody, hard stems with a lot of branches.
- Their wood is often used to make houses and furniture.
- Example - Mango, Neem, Teak, etc.

d) Creepers:

- These types of plants have very weak stems and are not able to stand up, so they spread and grow on the ground.
- Example - Pumpkin, cucumber, etc.

e) Climbers:

- These are again plants with weak stems but they climb onto something like a tree for support to grow.
- Example - Money-plant, pea plant, etc.



2) Based on the Life Cycle of Plants:

The plants can be grouped on the basis of the time taken by them to complete their life cycle.

a) Annuals:

- These are the plants that take one season to complete their life cycle.
- Example - Wheat, rice, corn, etc.

b) Biennials:

- These plants take two seasons for the completion of their life cycle.
- Example - Carrots, onion, banana, etc.

c) Perennials:

- These plants take more than two years to complete their life cycle and usually have a long lifespan.
- Examples - Mango, apple, etc.

3) Based on Flowers:

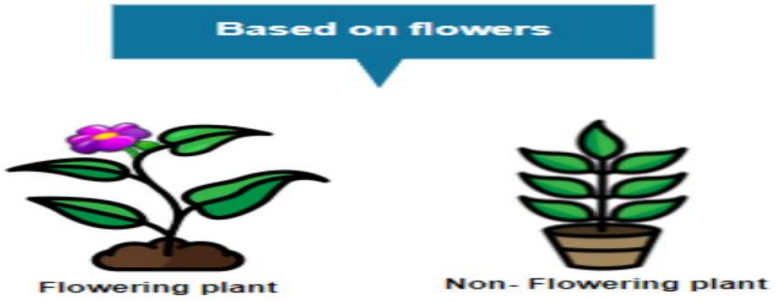
The plants may have flowers or may not have them. So, they can be broadly grouped as:

a) Flowering Flants:

- These are the plants that bear flowers.
- Example - rose, jasmine, papaya, etc.

b) Non-Flowering Plants:

- These plants do not bear flowers.
- Example - Ferns, moss.



Parts of a Plant:

- A plant has mainly two parts, one that stays above the ground or soil, which is called the shoot system and the portion below the soil called the root system.
- Many parts of the plants are edible, that is it can be eaten. Example - Leaves; spinach, cabbage, onion. Stem; celery. Flower; cauliflower, broccoli. Fruits; mango, banana. Seeds; pulses. Roots; carrots, radish.

Shoot System:

This contains all the portions above the soil like stem, leaves, buds, flower, fruit.

Stem

1) Stem:

- The main part of the plant on which all the other parts are borne is called the stem. It bears the branches, leaves, buds, flowers, and fruit.
- It keeps the plant in an upright position and provides support to the plant.
- The main function of the stems is to transport the water and the minerals from the soil to different parts of the plant.
- A simple experiment can be used to observe this. When a freshly cut stem of a plant is kept in a red coloured solution of water, and then it is seen that the red colour is seen in the stem, if it is cut and also in the leaves after some time.
- Sometimes the stem is also modified to store food as in potato (underground) or to threadlike structures called tendrils for climbing.

Leaf

2) Leaf: -

- The leaf is a structure that is attached to the stem of the plant and is generally green in colour. It may be of other colours too as in some ornamental plants.
- The point by which the leaf is attached to the stem is called the petiole of the leaf.
- The broader flat part of the leaf is called the lamina.
- There are some lines on the leaf which are called veins. A central main line that is visible in the leaf is called the midrib.
- The design made by the veins of the leaf are termed as leaf venation. This venation can be of two types:

  a) Reticulate venation: This is a net like design formed by the veins on both the sides of the midrib. Example - mango leaf.

  b) Parallel venation: In this type of venation the design of the veins are parallel to each other. Example - grass.

Reticulate venation Parallel venation

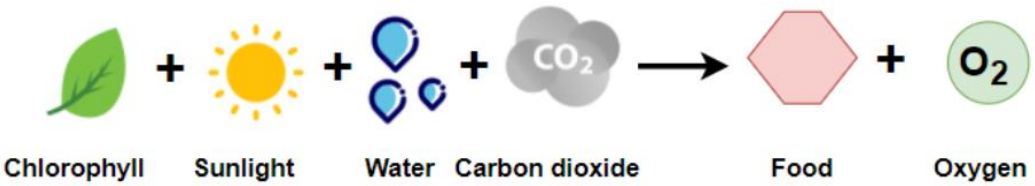
The leaf has two main functions:

a) Transpiration:

- This is the process by which the leaves lose water in the form of water droplets from the leaves, by evaporation.
- This maintains the balance of water in the plant for its survival.
- This can be easily observed by tying a polythene cover on a leaf of a plant. Water droplets appear inside it after some time which shows that leaves lose water.

b) Photosynthesis:

- The other main function of the leaves is to make food for the plant. The green pigment in the leaves called chlorophyll in the presence of sunlight, carbon dioxide, and water, prepares food for the plant.
- The oxygen is released in this process and the food is used and stored in the plant.



3) Buds:

The buds are basically a shoot that is in the stage of development. It appears as a small projection from the stem.

4) Flowers:

- The flowers are the colourful part of the plant which are beautiful to look at. They may be scented also. It makes it easy to identify the plants by the colour and shape of the flowers, like roses and marigolds.
- The main parts of a flower are as follows:

a) Sepals:

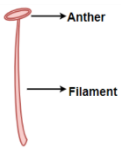
- They are the outermost layer of small leaf-like structures of a flower.
- They are mostly green in colour and their function is to protect the flower and give support to the petals.

b) Petals:

- These are the coloured layer after sepals. They could be of various colours and shapes. Like roses and sunflowers possess distinct shapes and colours.
- These are brightly coloured to attract insects and birds for pollination. They also protect the inner layers of the flower.

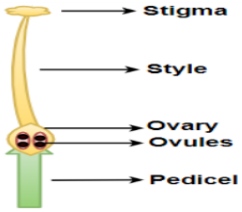
c) Stamen:

- These are the male parts of the flowers. They are long thread-like in shape with a swollen portion at the end. These are also of different sizes and numbers.
- Each stamen is made of a long thin tube called filament.
- The swollen portion at the end of the filament is called another which carries the pollen grains.



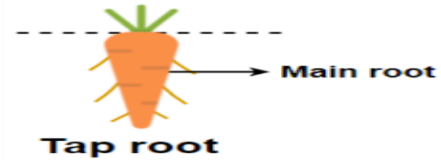
d) Pistil:

- It is the female part of the flower. They are usually present in the middle of the flower. It consists of three parts namely, stigma, style and ovary. It is attached to the plant by the pedicel.
- The sticky part at the top end of the pistil that receives the pollen grains is the stigma.
- It is connected to a long thin tube called the style which carries the pollen grains to the ovary.
- The ovary is a swollen part at the end of the pistil that contains the ovules or the developing seeds.



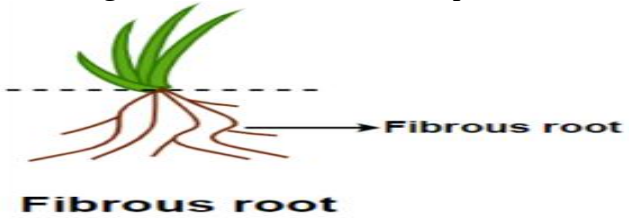
Root System:

- It consists of the parts of the plants that are below the soil, that is roots.
- The roots are very important for the plants as they absorb water and minerals from the soil. This is then transported to the different parts of the plants by the stem for preparing food and so it helps in the growth of the plant.
- The roots also function as an anchor for the plant as it holds the plant firmly to the ground and lets it stand straight.
- The roots also store food and these are edible.
- The roots can be of two different types:



1) Tap Roots:

- This type of root has one main or primary root that grows down into the ground. It has many small roots coming from it.
- This root is firmer and more difficult to pull out as it holds strongly in the ground and goes deep into the soil.
- They often store food in them and so are beneficial to humans. They can be of different shapes.
- Example - roots of trees like mango, etc and others like turnips, carrots, etc.



2) Fibrous Roots:

- This type of root does not have a main root and it has many roots that are almost of the same size.

- They spread like a thread-like structure in the soil and so they don't go deep into the soil. These can be easily pulled out.
- Examples - onion, grass, etc.

SOME IMPORTANT QUESTIONS

1. List few plants found around your house.
Answer: Mango, Neem, Grass, Chilli, Palak and Banyan tree.
2. Are all the plants same in size?
Answer: No, all plants are of different sizes.
3. What are the major parts of plants?
Answer: Stem, root, leaves and flowers.
4. How many kinds of plants are there?
Answer: There are three kinds of plants:
(i) Herbs (ii) Shrubs (iii) Trees
5. Name two plants that belong to herbs.
Answer: (i) Tomato (ii) Potato
6. Give two examples of shrubs.
Answer: (i) Lemon (ii) Orange
7. Give two examples of trees.
Answer: (i) Mango (ii) Neem
8. Define petiole.
Answer: The part (stalk) of a leaf by which it is attached to the stem is called petiole.
9. What is lamina?
Answer: The broad green flat part of leaf is called lamina.
10. What are veins?
Answer: The lines on the leaf are called veins.
11. What is midrib?
Answer: A thick vein in the middle of the leaf is called midrib.
12. What is leaf venation?
Answer: The design made by veins in a leaf is called leaf venation.
13. How many types of leaf venation are there?
Answer: There are two types of leaf venation:
(i) Reticulate venation (ii) Parallel venation
14. What is transpiration?
Answer: The process by which water comes out from the leaves in the form of vapour is called transpiration.
15. Name the process by which leaves can prepare their food.
Answer: This process is called photosynthesis.
16. What are the raw materials for photosynthesis?
Answer: (i) Sunlight (ii) Water (iii) Carbon dioxide (iv) Chlorophyll
17. Where does the photosynthesis take place in plants?
Answer: It takes place in the leaves.
18. Name the part of plant which helps in holding the plant in the soil.
Answer: Roots.

19. What are tap roots?
Answer: The roots in which one root is main root and other lateral roots grow on it are called tap roots.
20. Give names of two plants which have tap root.
Answer: Gram and mustard.
21. Name two plants which have fibrous root.
Answer: (i) Wheat plant (ii) Maize plant
22. What are lateral roots?
Answer: The smaller roots that grow on the main tap root are called lateral roots.
23. What are fibrous roots?
Answer: The roots which do not have any main root but all the roots are similar are called fibrous root.
24. Does the stem prepare food for any plant?
Answer: Yes, there are some plants whose stem prepares food, e.g. cactus.
25. Name the prominent parts of a flower.
Answer: The prominent parts of a flower are petals, sepals, stamens and pistil.
26. What are sepals? What are their functions?
Answer: The small green coloured leaf-life structures are called sepals. It protects flower when it is in stage of bud.
27. What are petals? Why they are generally coloured?
Answer: The coloured big leaf-life structures present in flower are called petals. Petals are coloured so as to attract insects for pollination.
28. What are stamens?
Answer: When we remove sepals and petals from the flower then we see some filaments in the flower which are called stamens. These, are the male part of the flower.
29. Name various parts of stamen.
Answer: There are two parts of a stamen:
(i) Anther (ii) Filament. These are the male part of the flowers.
30. What is pistil?
Answer: The innermost part of a flower is called pistil. These are the female part of the flowers.
31. Name the various parts of pistil.
Answer: There are three parts of pistil:
(i) Stigma (ii) Style (iii) Ovary
32. What are ovules?
Answer: These are small bead-like structures inside the ovary.
33. Define photosynthesis.
Answer: The process by which leaves make food for plants is called photosynthesis.
34. What is pollination?
Answer: The transfer of pollen from anther to stigma is called pollination.
35. Where do we find ovules in a flower?
Answer: Ovules are present inside the ovary of flower.
36. What are weeds?
Answer: Unwanted plants that grow in a field are called weeds.
37. Which part of the plant absorbs water and mineral from the soil?
Answer: Root

38. What is leaf venation?
Answer: The design made by vein in leaf is called leaf venation.
39. Define transpiration.
Answer: The loss of water in the form of vapour from plant parts is termed as transpiration.
40. What are parts of stamen?
Answer: Anther and filament are the two parts of stamen.
41. What is the innermost swollen called part of pistil?
Answer: Ovary is the innermost swollen part of pistil.
42. Where is food stored in plant?
Answer: Food is stored leaves and in some plants in roots in the form of starch.

Short Questions and Answers

1: What types of plants are called tress?
Answer: Plants which are tall and have hard, thick brown stem are called trees. The stem has branches in the upper part, much above the ground.
2: What is the difference between stem of shrubs and trees?
Answer: Stem in shrubs is hard but not very thick whereas trees have hard, thick brown stem.
3: What are creepers?
Answer: The plants with weak stem that cannot stand upright and spread on ground are called creepers.
4: What is the difference between creepers and climbers?
Answer: The plants with weak stem that cannot stand upright and spread on ground are called creepers. Whereas plants take support on neighbouring structures and climb up are called climbers.
5: Write the difference between reticulate and parallel venation. Give examples.
Answer: If the design made by veins in the leaf is net like on both side of mid rib, the venation is reticulate. E.g. rose. If the veins are parallel to each other, the venation is parallel. E.g. wheat.
6: What is photosynthesis?
Answer: Leaves prepare their food in presence of sunlight by using water and CO2.This is called photosynthesis.
7: Write any two functions of root?
Answer: a) Roots help in holding plant firmly in the soil.
b) Roots help in absorption of water and minerals from the soil.
8: Where is food stored in plant and in what form?
Answer: Food is stored in plant in leaves and in some plants in roots. Food is stored in plants in the form of starch.
9: What are the different types of root found in plant?
Answer: Some plants have a main root called tap root and smaller roots called lateral roots. Whereas other plants have fibrous roots.
10: How are leaf venation and types of roots in a plant related?
Answer: Plants having the reticulate venation have tap roots while plants having the leaves with parallel venation have fibrous roots.
11: What is the function of stem in plant?
Answer: The stem conducts water from roots to the leaves (and other parts of plant) and food from leaves to other plant parts.
12: By which process plants prepare its food? And where it takes place?
Answer: Plants prepare its food by photosynthesis. It takes place in the leaves of plant.

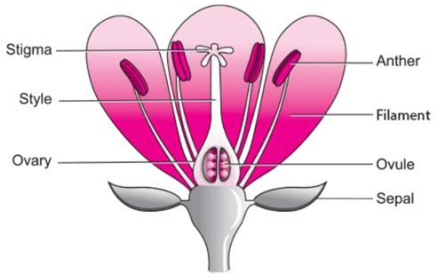
13: In which part of flower ovary is found? What can be seen in innermost part of an ovary?
Answer: Ovary is found in pistil. Ovules can be seen in innermost part of an ovary.
14: Photosynthesis takes place in leaves. What do plants use for photosynthesis?
Answer: Plants use carbon dioxide and water for photosynthesis. It takes place in presence of sunlight and chlorophyll.
15: From where plant gets water?
Answer: Plants get water from soil through roots. It is conducted to all plant parts by stem.
16: Which are two gases involved in photosynthesis? How?
Answer: Carbon dioxide and oxygen are involved in photosynthesis. Carbon dioxide is used whereas oxygen is released in photosynthesis.
17: What is the function of ovary?
Answer: Fertilization takes place in ovary.
18. What are weeds?
Answer: The unwanted plants that grow in the fields with the main crops or in their surroundings are called weeds. Weeds are the plants which are not grown by the farmers. For example, grass.
19. Classify plants and give an example of each.
Answer: On the basis of various characteristics most of the plants can be classified into three categories:
(i) Herbs, e.g. tomato (ii) Shrubs, e.g. lemon (iii) Trees, e.g. mango
20. What are herbs? Give two examples.
Answer: The plants with green and tender stems are called herbs. They are usually short and may have no or less branches. For example, tomato, potato.
21. What are shrubs? Give two examples.
Answer: The plants which have a hard but not a very thick stem are called shrubs. Such plants have the stem branching out near the base. For example, lemon, rose plants.
22. What are trees? Give two examples.
Answer: The plants which are very tall and have hard and thick brown stem are called trees. The stems have branches in upper part and much above the ground. For example, mango, neem.
23. What are creepers? Write an example.
Answer: The plants with weak stem that cannot stand upright and spread on the ground are called creepers. Various types of grasses are the examples of creepers.
24. What are climbers?
Answer: The plants that take support of neighbouring structures and climb up are called climbers. They have weak stem. For example, grapes, money plant, beans.
25. Explain an activity to show that stem conducts water and other substances.
Answer: Take some water in a glass. Add few drops of red ink to the water. Cut the stem of a herb plant from its base. Put it in the glass as shown in figure. We will see that some parts of the stem become red. This activity shows that stem conducts water.
26. What are unisexual and bisexual flowers?
Answer: Unisexual flower has either male (stamen) or female (pistil) parts.
Bisexual flowers have both male and female whorl in the flowers, i.e., they have both stamen and pistil.
27. Name a plant that eats insect.
Answer: Pitcher plant.

28. Pitcher plant has green leaves which can prepare food by photosynthesis then why does it eat insects?
Answer: To get nitrogenous compounds which it cannot absorb from the soil.
29. Name a plant that has underground as well as aerial (above the ground) root system.
Answer: Banyan tree.
30. Why do we see dew drops on leaves in the early morning?
Answer: At night the water lost by leaves does not get evaporated and gets collected on the leaves in the form of dew drops.
31. Why are petals colourful?
Answer: The colourful petals attract insects for pollination.
32. Why does white flowers bloom at night?
Answer: White colour attracts night insects for pollination.
33. What do you mean by a complete and incomplete flower?
Answer: The flower with all whorls, i.e., sepals, petals, stamen and carpel in it is a complete flower. If any one of this is absent in a flower it is called an incomplete flower.
34. Leaves need oxygen and carbon-dioxide (for photosynthesis). How do they get these gases?
Answer: Leaves take in these gases from atmosphere through small pores present on them called stomata.
35. How can one destarch the leaves of potted plant without plucking, them?
Answer: By keeping it in dark for 2-3 days.
36. What is the relation between leaf venation and the type of roots?
Answer: The plants having tap root have reticulate venation. The plants having fibrous roots have parallel venation.
37. Name the male part of a flower.
Answer: The male part of a flower is called stamen. It has two parts: (i) Filament and (ii) Anther.
38. Name the female part of a flower.
Answer: The female part of a flower is called pistil. It has three parts: (i) Stigma, (ii) Style, and (iii) Ovary.

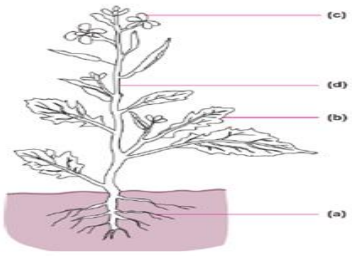
Long Answer Type Questions

1. What do you mean by leaf venation? Explain various types of leaf venation with example.
Answer: Leaf venation: The design made by veins in a leaf is called leaf venation. There are the following two types of leaf venation:
(i) Reticulate venation: If the design of veins makes a net-like structure on both the sides of midrib then it is called reticulate venation. For example, mango leaf, gram leaf.
(ii) Parallel venation: If the veins are parallel to each other or to midrib then such type of venation is called parallel venation. For example, wheat leaf, barley leaf.
2. Explain the structure of a typical flower.
Answer: A typical flower contains the following parts:
Stalk: The part by which a flower is attached to the branch is called stalk.
Sepals: The small green leaf-like structures of the flower are called sepals,
Petals: The big coloured leaf-like structures are called petals. Different flowers have petals of different colours.
Stamen: It is the male part of the flower. It has two parts: (a) Filament and (b) Anther.

Pistil: The innermost part of a flower is called pistil. It has three parts: (a) Stigma, (b) Style and (c) Ovary. It is the female part of the flower.



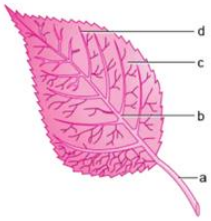
3. Explain an activity to test the presence of starch in a leaf.
Answer: Take a leaf in a test tube and pour spirit till it completely covers the leaf. Now put the test tube in a beaker having water. Heat the beaker till all the green colour from the leaf comes out into the spirit in the test tube. Take out the leaf and wash it with water. Put it on a plate and pour some iodine solution over it. The iodine solution is brown in colour but when it comes in contact with starch it turns blue-black. The iodine solution will turn blue-black when dropped on the leaf, this confirms the presence of starch in the leaf.
4. Explain that sunlight is essential for photosynthesis.
Answer: Take a potted plant having green leaves. Place it in a dark room for a day or two so that all the starch present in leaves is used by the plant. Now cover a portion of leaf with black paper and keep the plant in the sun for a day. Pluck the leaf, remove the black paper and test it for the starch. We see that only that part of the leaf becomes blue-black which was open to sun. The covered part does not become blue-black. This shows that no starch is formed because it gets no sunlight.
5. Explain the important functions of root.
Answer: The following are the functions of root:
(i) They help to absorb water from the soil.
(ii) The roots help in holding the plants firmly in the soil.
(iii) They are said to anchor the plant to the soil.
6. Explain various kinds of roots with the help of an example.
Answer: There are following two types of roots:
(i) **Tap roots:** The roots which have one main root and other smaller lateral roots are called tap roots. For example, mustard plant, gram.
(ii) **Fibrous roots:** The roots which have no main root but all the roots appear similar are called fibrous roots. For example, maize, wheat.
7. Read the function of parts of a plant given here:
(a) Fixes plant to the soil
(b) Prepares starch
(c) Takes part in reproduction
(d) Supports branches and bears flowers
In the given diagram, write the names of the parts whose functions you have just read at the appropriate space.



Answer: (a) Root **(b)** Leaf **(c)** Flower **(d)** Stem

8. Observe the figure given below and attempt the questions that follow it.

(i) Label the parts (a), (b), (c) and (d) in the diagram.



Answer: (a) Petiole, **(b)** Midrib, **(c)** Lamina, **(d)** Vein

9. Explain the structure of a leaf.

Answer: There are two main parts of leaf:

(i) **Petiole:** The part of the leaf by which it is attached to the stem is called petiole.

(ii) **Lamina**: The broad, green part of the leaf is called lamina.

The lamina contains following parts:

(i) **Veins:** There are various types of lines on the leaf. These lines are called veins

(ii) **Midrib:** There is a thick vein in the middle of the leaf. This vein is called midrib.

10. Explain the main functions of leaf.

Answer: There are following two main functions of leaf:

(i) **Transpiration:** The extra water comes out of the leaves in the form of vapour. This process is called transpiration.

(ii) **Photosynthesis:** the process, by which leaves prepare their food from water and carbon dioxide, in the presence of sunlight and a green-coloured substance, is called photosynthesis.

CHAPTER-5
BODY MOVEMENT

Movements

The ability of organisms to change position, by using their body parts, is called movement.

To know more about Movements, visit the link below;

- Human Body and Its Movements
- Types of Movements

Skeletal System

Skeleton

- Skeleton is the internal structure in organisms, which helps in bringing about movement.
- It forms a framework that gives the shape of the body and provides support to organisms.
- The skeleton is made up of bones.
- Different kinds of bones are joined to each other in a particular manner.

- These joints facilitate various types of movements.
- In higher animals, bones, muscles and cartilage together make the movement possible.

Muscles

- Muscles are parts of the body that help in bringing about movement.
- Muscles may be attached to bones, (humans) or may work alone (earthworm).

Cartilage

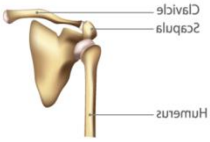
- Part of the skeleton that is not hard as bones and can be bent, is cartilage.
- They are found in the upper part of the ear, the tip of the nose and at the tips of long bones.

Joints

- Joints are the points where two parts of the skeleton are fitted together to make movement possible.
- Examples are hip joint, elbow joint, knee joint, etc

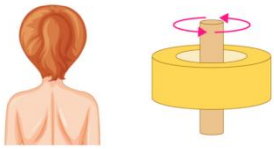
Ball and Socket Joint

- Ball and socket joint, where the rounded end of one bone fits into the cavity of the other bone.
- It brings in movement in all directions.
- It is seen in the hips and shoulders of the human body.



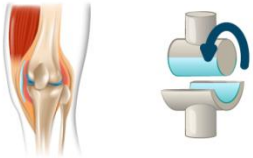
Pivot Joint

- A pivotal joint is where a cylindrical bone rotates in a ring.
- It joins the neck to the head.
- It allows to bend the head forward and backwards and turn the head to our left or right.



Hinge Joints

- Hinge joints bring about movement in only back and forth direction.
- The knees and elbows have hinge joints.
- The following image is a hinge joint in the elbow.



Fixed Joints

- Fixed joints are immovable joints because the bones are joined together.
- Such joints are found in the skull.

Gaits of Animals

The different patterns of movement of animals due to the differences in their skeletal structure are called gaits of animals.

Earthworm

- The earthworm does not have any internal skeleton.
- The body is made up of many rings joined end to end and muscles attached to these rings help to extend and shorten the body.
- The skin of earthworm also has a large number of tiny bristles that help it get a good grip on the ground.
- Repeated extension and contraction of the body muscles, enable the earthworm to move through the soil.

Snail

- Snails move with the help of their muscular, flat foot.
- They glide along a solid surface which is lubricated with mucus.
- This motion is powered by succeeding waves of muscular contractions of the foot.

Cockroach

- The body of a cockroach is covered with a hard outer skeleton that is made of different units joined together.
- It has three pairs of legs for walking and two pairs of wings attached to the breast for flying.
- It has distinct muscles that are used for movement.
- The muscles attached to the legs help in walking.
- The breast muscles attached to the wings help in flying, although they are not good flyers.

Birds

- Birds have special skeletal and muscular structures that help them to fly.
- The forelimbs are modified to become wings and the bones inside are hollow to suit flying.
- The bones of the hind limbs are used for perching and walking.
- The shoulder bones and breastbones are strong and support muscles of flight, which move the wings up and down.

Fish

- Fishes have a streamlined body that helps them swim with least resistance.
- They use tail fin for small jerks through water and other fins assist swimming.
- The tail fin is also used for changing directions.

Snakes

- Snakes do not have legs for movement but use their long backbone along with muscles for movement.
- Their body curves into many loops, which gives it a forward push by pressing against the ground.

SOME IMPORTANT QUESTIONS

1. Fill in the blanks.

(a) Joints of the bones help in the ——————— of the body.

(b) A combination of bones and cartilages forms the _____ of the body.

(c) The bones at the elbow are joined by a _____ joint.

(d) The contraction of the _____ pulls the bones during movement.

Solution:

(a) **Movement** (b) skeleton (c) hinge (d) **muscles**.

2. Indicate true (T) and false (F) among the following sentences.

(a) The movement and locomotion of all animals are exactly the same. ( )

(b) The cartilages are harder than bones. ( )

(c) The finger bones do not have joints. ( )

(d) The forearm has two bones. ( )

(e) Cockroaches have an outer skeleton. ( )

Solution:

a) False b) False c) False d) True e) True

3. Match the items in Column I with one or more items of Column II.

Solution:

Column I	Column II
Upper jaw	**Have fins on the body**
Fish	**Has an outer skeleton**
Ribs	**Can fly in the air**
Snail	**Is an immovable joint**
Cockroach	**Shows very slow movement**

Solution:

CHEPTAR -6

THE LIVING ORGANISMS CHARACTERSTICS AND HABITATS

Introduction

We all are surrounded by plants, trees, animals, birds, microbes, and other living and non-living things based on certain parameters, Scientists were able to differentiate between living and non-living things.

Organisms

An organism is simply defined as any living thing, ranging from microscopic bacteria to large elephants and everything in between.

- Different types of plants and animals are found in different areas.
- E.g. deserts have camel and cacti as plants.
- Beaches show coconut trees and crabs.
- Fishes and other marine animals inhabit the sea.

Characteristics of Living Organisms

1. Living beings are made of cells. 2. Living beings obtain and use energy. 3. Living beings grow and develop. 4. Living beings reproduce. 5. Living beings adapt to their environment
   5. Living beings respond to their environment or stimuli.

Nutrition

- The process by which animals obtain food and utilize it for all the activities is called as nutrition.
- Every organism requires nutrition for obtaining energy.

Growth

- All living organisms grow and exhibit growth in different ways.
- Their body cells divide and grow and thus overall growth is attained.

Respiration

- Respiration is necessary for all living organisms.
- It is through respiration that the body finally obtains energy from the food it takes.
- Some animals may have different mechanisms for the exchange of gases, which is a part of the respiration process.
- E.g., earthworms breathe through their skin and fish have gills for using oxygen dissolved in water.
- In humans, we respire by breathing in oxygen breathing out the carbon dioxide.

Response to Stimulus

- Changes in our surroundings that make us respond to them are called stimuli.
- All living beings react to changes in their surroundings.
- E.g., In response to increased temperature in summer, we use fans to cool our homes.

Excretion

- All living things take food.
- Not all the food that is eaten is really used, only a part of it is utilized by the body.
- Unused/remaining food becomes waste and needs to be excreted.

- Our body also produces some wastes, like urea, in other life processes.
- Living organisms **get rid of all this waste material** and the process is known as excretion.

Reproduction

- All living organisms give rise to a new organism of their own kind, by a process called reproduction.
- The mode of reproduction may be different, in different animals and plants.
- Some animals produce their young ones through eggs.
- Some animals give birth to the young ones.
- Plants produce seeds which germinate into new plants.
- Some plants also reproduce through parts other than seeds.
- E.g.: a part of a potato with a bud, grows into a new plant

Movement

- Animals move from one place to another and also show other body movements.
- Plants are generally anchored in the soil so they do not move from one place to another.
- However, various substances like water, minerals and the food synthesised by the plants move from one part to other.
- Plants also show other kinds of movement like the opening and closing of flower buds.

Adaptation

The presence of specific features or certain habits, which enable a plant or an animal to live in its surroundings, is called adaptation.

- Different animals are adapted to their surroundings in different ways.
- Eg: Fish have slippery scales on their bodies.
- These scales protect the fish and also help in easy movement through water.

Surroundings

- The different surroundings or areas have different organisms that live in.
- E.g.: The deserts have camels, the mountains have goats and yak.

Habitat

The surrounding where living organisms survive is known as habitat.

- The organisms depend on their habitat for their food, water, air, shelter and other needs.
- Habitat means a dwelling place (a home).
- Several kinds of plants and animals may share the same habitat.

Environment: Everything that we see surrounding us; living, non-living, physical, chemical etc. is called as environment

Biotic Components: These are the living components of the ecosystem. e.g. flora and fauna

Abiotic Components: The non-living components of the ecosystem like soil, water ,air etc. are called abiotic components.

Habitat and Adaptation

The region or place where an organism lives is termed as its habitat. Habitat provides an organism everything it needs to survive like food, shelter, proper weather conditions such as rainfall, heat etc to breed and flourish.

Camel:

- It has long legs which provide protection from the heat of sand
- Excrete small quantity of urine
- They do not sweat and their dung is dry
- Can live without water for many days as their bodies lose little water.

Fish:

- Their streamline shape helps to move easily in water
- Presence of slippery scales
- Gills help in utilizing dissolved oxygen
- Flat fins and tail help in changing direction in the water

Both the organisms discussed above have specific features or characteristics that enable them to survive in their habitat. These features are termed as adaptations.

Terrestrial Habitat	**Aquatic Habitat**
Plants and Animals that thrive on land said to live in terrestrial habitat.	Plants and Animals that thrive in water said to live in aquatic habitat.
E.g.: forests, deserts, mountain regions	E.g.: rivers, lakes

Terrestrial Habitat:

(a) Deserts:

The following adaptations of various organisms are enlisted below:

- Snakes and rats dig burrows to escape intense heat as they dont have long legs such as a camel. These animals come out only during the night, when it is cooler
- In desert plants leaves are reduced to spines and lose little water through transpiration
- The stems of desert plants have a waxy coating on them and in most of them photosynthesis is carried out by the stem
- Their roots go deep into the soil so as to absorb water.
- The leaves in desert plants are absent to prevent loss of water due to transpiration.
- Some of the animals are camels, kangaroo rats etc

(b) Mountain Regions:

- The trees are cone shaped with slope like branches, also needle-like leaves are present so that rain and snow slide off them easily.
- Animals have thick fur which provides protection from cold. e.g. Snow Leopard
- Presence of strong hooves help the mountain goat to run on the rocky slopes.
- Eg are Pines, mountain goats, yaks, sheep etc. Yaks have long hair to keep them warm.

(c) Grasslands:

- The light brown colour of the lion helps it to hide in dry grasslands and the presence of long claws help to capture the prey.

- Deer has strong teeth to eat plant stems also its long ears help to listen to predator movement. They have eyes on its sides of the head which help them to look in all directions to lookout for danger.
- Some of the animals living in these habitats are elephants, giraffes, lions .

(d) Rainforest:

- This habitat receives a lot of rain and hence its rich in animal life.
- Mammals, Amphibians, Reptiles all sorts of animals are found here.
- The climate is hot and humid and animals have to learn to adapt to survive.

(e) Polar Habitat:

- These habitats are very cold and windy.
- The animals are mostly carnivores and have thick fur to survive in cold.
- Some blend in ice and some may hibernate in the coldest months.
- Examples of animals are polar bears, reindeers, penguins etc.

Aquatic Habitat

(a) Marine Habitat

1. Marine Habitat comprises of oceans and seas, and both have saltwater.
2. They are home to a wide variety of creatures like the most part of fish population is found here.
3. Marine creatures are found in Estuaries – where rivers and oceans meet and the water is salty.
4. Marine Mammals like whales migrate to long distances in order to cope up with the temperature changes.

(b) Oceans

- Most organisms have streamlined bodies and gills
- Octopuses do not have streamlined bodies so they stay deep in ocean, but when moving they make a streamline motion.
- Whales have blowholes instead of gills This enables them to breathe easily when they swim near the surface of water.

(c) Freshwater Habitat:

1. Rivers, lakes, ponds etc comprise the freshwater habitats.
2. Three percent of world's water is accounted as freshwater but still a wide variety of species are found here.
3. Snails, worms, mollusks etc are found in this habitat

(d) Ponds and Lakes:

- Plants: Water plants can be completely submerged in water (like Hydrilla) or floating on the surface of water(like Water Lily, Lotus, Water Hyacinth). Roots are much reduced in size, since their main function is to hold the plant in place. Stems of aquatic plants are long, hollow and light so that these can bend in along with water movement. e.g Water Lily. The stems grow up to surface of water, while the leaves and flowers float on surface of water.
- Totally submerged plants have narrow and ribbon like leaves (e.g tape grass). These can bend in flowing water.

- Stems have air spaces to enable the plant to float. Floating plants are large and flat. They have waxy upper surfaces that makes them waterproof. They have stomata on the upper surfaces which are exposed to air.
- Frogs are adapted to live both on land and water, they have strong back and legs and webbed feet which allows them to swim in water.

(e) Coastal Habitat:

- Habitats where the land meets the sea.
- Beaches, special type of trees called mangroves are found in this habitat
- Coastal plants like seaweed attach to the rocks firmly so that they are not swayed by the waves,

Acclimatisation: Due to certain changes in the surroundings, organisms adapt through them by making small changes in the body over short periods of time.

For e.g: The changes which take place in the body when we travel from plains to mountains. The adjustment which the body makes is called Acclimatisation

SOME IMPORTANT QUESTIONS

1. What is a habitat?

Solution: The place where organisms live is called the habitat. Habitat means a dwelling place (a home). The habitat provides food, water, air, shelter and other needs to organisms.

2. How is a cactus adapted to survive in a desert?

Solution: Adaptations of a cactus are as follows:

- The leaf is replaced by the spine to reduce transpiration
- Stems carry out photosynthesis
- A thick waxy layer surrounds the leaf to retain water
- The roots of a cactus are deeply rooted inside the soil to absorb water

3. Fill in the blanks

(a) The presence of specific features, which enable a plant or an animal to live in a particular habitat, is called ————.

(b) The habitats of the plants and animals that live on land are called ———— habitat.

(c) The habitats of plants and animals that live in water are called ————habitats.

(d) Soil, water and air are the ———— factors of a habitat.

(e) Changes in our surroundings that make us respond to them are called ————.

Solution:

(a) **Adaptation**. (b) **Terrestrial** (c) A**quatic** (d) A**biotic** (e) S**timuli**

4. Which of the things in the following list are non-living?

Plough, mushroom, sewing machine, radio, boat, water hyacinth, earthworm

Solution: Plough, sewing machine, radio and boat are non-living things

5. Give an example of a non-living thing which shows any two characteristics of living things.

Solution: Example: car

Features

- It can move like living beings
- It needs energy to do work

6. Which of the non-living things listed below were once part of a living thing?
Butter, Leather, soil, wool, electric bulb, cooking oil, salt, apple, rubber
Solution:
Butter, Leather, wool, cooking oil, apple and rubber were once part of a living thing.
7. List the common characteristics of living things.
Solution:
Common characteristics of living things are as follows:

i) Respiration ii) Food intake iii) Respond to stimuli iv) Excretion v) Movement
ii) vi) Reproduction vii) Grow and die

8. Explain why speed is important for survival in the grasslands for animals that live there. (Hint: There are few trees or places for animals to hide in grassland habitats.)
Solution:
Speed is important for survival in the grasslands for animals to avoid predation from their predators. For example, a tiger eats deer; to survive, the deer has to run faster than the tiger.

CHAPTER -7
MOTION AND MEASURMENT OF DISTANCES

With the changing times, transport also has gone through various modifications i.e. from animals to the invention of wheels. The evolution of transport is evident when we observe the fast cars, bullet trains etc. Even today new modes of transport are being researched upon.

- **Distance:** How far an object travels constitutes distance!! The GPS system introduced these days accurately measures the distance from one place to another.
- Arbitrary ways to measure the length or width:
  - Measuring using handspan and measurement by a string were used in ancient times but these methods are not so reliable and hence some standard units of measurement have been introduced.

The Hand span Method

Standard Units of Measurement

Earlier the ‘cubit’ was accepted as a standard unit in Egypt. A cubit meant the length between fingertips and elbow. Owing to the differences in the length of body parts of

each person these arbitrary systems became obsolete. Other units used earlier were ‘foot’, end of outstretched arm and chin, fist, etc.

Nowadays, the International System of units or the SI units have been accepted all over the world as a standard unit of measurement.

1 m = 100 cm

1 kg = 1000 g

1s = 1/60 min

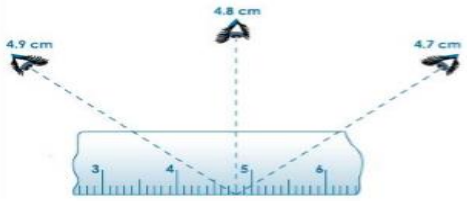
The MKS system i.e. the metre-kilogram-second system is called the **SI System**.

Correct Way to Use a Mater Scale

Step 1: Keep the scale in contact with the object to be measured.

Step 2: Start measuring from the 0 mark of the scale.

Step 3: To avoid taking incorrect measurements the eye position should be correct. Consider the following figure:

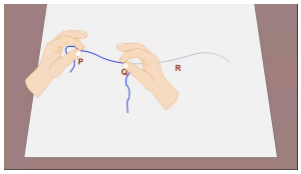


The eye position in the centre is correct to get an accurate measurement, while the ones in the left and right direction will give some error in measurement.

Measurement along Curved Line

Is it possible to measure a curved line with a metre scale? Well, it is not so. Hence to measure a curved line the following steps can be taken into account:

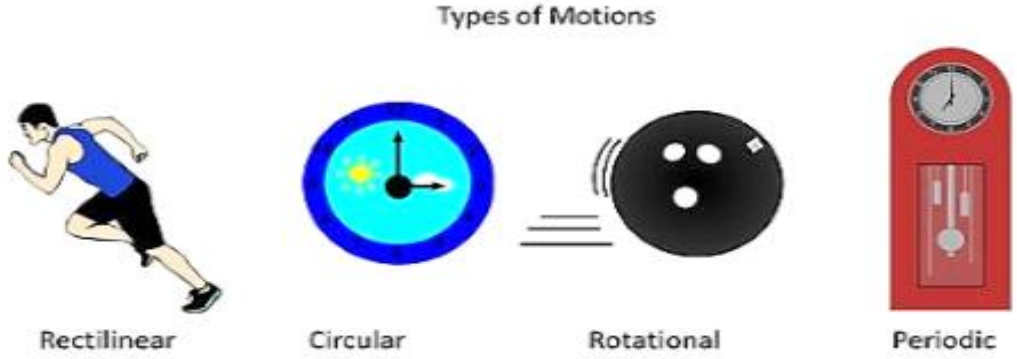
- Take a thread and tie a knot at one end.
- From this end measure a small portion of the curved line which is somewhat straight and put the thumb.
- Now again start from the thumb marked position and measure another small portion of the line.
- Repeat this process until you reach the end of the line. Tie a knot on the thread on reaching the end. Now measure the two knots using a metre scale.



Measuring a Curved Line

Types of Motion

- **Rectilinear Motion:** When an object moves along a straight line, it is said to be undergoing rectilinear motion. **For Example**, A train moving along a railway track.
- **Circular Motion:** Have you seen the hands of a clock? The motion exhibited by the hands of a clock is called **Circular Motion**.
- **Periodic Motion:** When an object repeats its motion after a fixed interval of time it is said to be undergoing periodic motion. **For Example**, Pendulum
- Rotational Motion: This motion can be easily understood by imagining Earth's rotation. When the Earth spins on its own axis it is said to be undergoing rotational motion.
- Motion is defined as the change in position of an object.



Shows the examples of types of motion

SOMET IMPORTANT QUESTIONS

1. Define measurement.

Answer: It is the comparison of an unknown quantity with some known quantity of the same kind.

2. Define metre.

Answer: Metre is the standard unit for measuring length.

3. If you are sitting in a moving car, are you at rest or in motion? Explain.

Answer: You are at rest because you are not moving with respect to the car.

4. Which invention lead to the development of railroads?

Ans. Steam engine.

5. Write one multiple and submultiple units of lengths.

Answer: One multiple unit of length is kilometre (km). One submultiple unit of length is centimetre (cm).

6. What is the full form of S.I. unit.

Answer: International system of units.

7. Are senses reliable for accurate measurement?
Answer: Our senses are not reliable for accurate measurement.
8. Why can hand span and arm length not be used as standard units of length?
Answer: because these vary from person to person.
9. How many centimetres are there in 1 m?
Answer: 100 cm.
10. Name the measuring device which can be used for measuring the girth of a tree.
Answer: Measuring tape.
11. Give one example of linear motion.
Answer: Motion of stone falling from a certain height.
12. Give an example of circular motion.
Answer: Motion of arms of watch.
13. Name the types of motion in which a body moves along a straight path
Answer: Rectilinear or linear motion.
14.Give the unit for measuring the following:
(a) Distance between Delhi and Jaipur.
(b) Thickness of a coin.
(c) Length of your eraser.
(d) Length of your shoe lace.
Answer:
(a) Kilometre
(b) Millimetre
(c) Centimetre
(d) Centimetre
15. Name the device used to measure the following:
(a) Size of your shoulder.
(b) Size of your wrist.
(c) Your height.
(d) Your weight.
(e) Cloth for curtain.
(f) Circumference of round table.
Answer:
(a) Measuring tape
(b) Measuring tape
(c) Measuring tape
(d) Weighing balance
(e) Metre scale or measuring tape
(f) A long thread or measuring tape.

Short Questions and Answers

1: What is rectilinear motion? Give an example.

Answer: When objects move along a straight line such motion is called rectilinear motion. A sprinter in 100m race move along a straight track. This is an example of rectilinear motion.

2: Why can't we use an angul (finger) or mutthi (fist) as standard unit of measurement of length?

Answer: We cannot use an angul (finger) or mutthi (fist) as standard unit of measurement of length because the sizes of body parts of different people are different. So it can create confusion.

3: What is the system of unit of measurement used all over the world now? What is that for length?

Answer: International system of units (SI Units) is the system of unit of measurement used all over the world now.SI unit for length is metre.

4: The height of a girl is 1.50 m. Express it into cm and mm.

Answer: The height of a girl in cm is 150 cm and in mm is 1500 mm.

5: What is the difference between motion of ceiling fan and motion of a pendulum?

Answer: Motion of ceiling fan is circular motion and motion of a pendulum is periodic motion.

6: What is circular motion? Give example.

Answer: When an object moves in a circular path, such motion is called circular motion. For example- Motion of a point marked on the blade of an electric fan is a circular motion.

7: Why can't we use elastic tape to measure distances?

Answer: We can't use elastic tape to measure distances because we will not know how much we stretched the tape during measurement. It will cause error.

8: What is periodic motion? Give example.

Answer: An object repeats its motion after some time; this type of motion is called periodic motion. For example- Motion of a pendulum is a periodic motion.

9: Arrange the following in increasing order:
1 km, 5 cm, 10 mm

Answer: 10 mm, 5 cm, 1 km

10: The distance between ram's house and Ravi's house is 3000 m. Express it in km.

Answer: 1000 m =1km.Therefore 3000 m = 3km.

11: What is the difference between motion of a falling stone and motion of a stone tied to a tread and whirled with hand?

Answer: The motion of a falling stone is rectilinear motion and motion of a stone tied to a tread and whirled with hand is circular motion.

12: A thread is 2 m long. Express its length in cm and mm.

Answer: 200 cm and 2000 mm

13: How can we measure a curved line?

Answer: We can measure the length of a curved line by using a thread. Measure the length between the beginning and final mark on the thread.

14: Reena is 10 cm taller than shikha. Height of shikha is 160 cm. What is height of Reena?

Answer: Height of Reena is 170 cm.

15: Arrange the following in decreasing order:

1 km, 1 mm, 1 cm, 1 m

Answer: 1 km, 1 m, 1 cm, 1 mm.

16: What is the difference between rectilinear and circular motion?

Answer: When objects move along a straight line such motion is called rectilinear motion. Whereas when an object moves in a circular path, such motion is called circular motion.

17: Name some units of length?

Answer: Units of length are kilometres, metres, centimetres, millimetres etc.

18: What is the difference between kilometres and kilogram?

Answer: Kilogram is the unit of weight whereas a kilometre is unit of length.

19: Fill in the blanks:

1. Motion of wheel of car is _____ motion.

2. Motion of strings of guitar is _____ motion.

3. 3 km is equal to _____m.

4. Motion of a pendulum is _____ motion.

Answer:

1. circular
2. Periodic
3. 3000
4. Periodic.

20. State two precautions to be observed while measuring length with the help of a metre scale.

Answer: Two precautions are:

(i) The initial point of distance must coincide with the zero reading of metre scale.

(ii) The eye should be kept in line with the point of measurement.

21. Define rest and motion.

Answer: The objects which do not change their positions with time are said to be at rest. The objects which change their positions with time are said to be in motion.

22. How can a measured length be expressed?

Answer: Each measurement has:

(i) A number describing the numerical value.

(ii) The unit in which that quantity is measured.

23. What kind of motions does a screw that is turned undergo?

Answer: A screw undergoes circular (rotation) and periodic motions.

24. Why do we say that the distance of the stone (held with a string) from you hand is the same when we whirl it around?

Answer: The distance of the stone from one's hand is the same when we whirl it around, as it moves circular motion.

25. Correct the following.

(i) The motion of a swing is an example of rectilinear motion.

Answer: The motion of a swing is an example of periodic motion.

(ii) 1 m = 1000 cm

Answer: 1 m = 100 cm

26. Write one example for each of the following types of motion. [*NCERT Exemplar*]

(i) Rectilinear

Answer: Falling stone

(ii) Circular

Answer: Tips of the hands of a clock

(iii) Periodic

Answer: Motion of pendulum

(iv) Circular and periodic

Answer: Hands of a clock

27. How can the thickness of a coin be measured?

Answer: Take ten coins and put them one above the other. Measure the thickness of the coins with a scale and divide the total thickness with number of coins

Long Answers Type Questions

1: What are different types of motion? Explain with example.

Answer: When objects move along a straight line such motion is called rectilinear motion. A sprinter in 100m race move along a straight track. This is an example of rectilinear motion. When an object moves in a circular path, such motion is called circular motion. For example- Motion of a point marked on the blade of an electric fan is a circular motion. An object repeats its motion after some time; this type of motion is called periodic motion. For example- Motion of a pendulum is a periodic motion

2. Why do we need standard unit for measurement?

Answer: We need standard unit for measurement to make our judgement more reliable and accurate. For proper dealing, measurement should be same for everybody. Thus there should be uniformity in measurement. For the sake of uniformity we need a common set of units of measurement, which are called standard units. Nowadays SI units are used in science and technology almost universally.

3. What type of motion do the following objects have?

(a) the galloping of a horse

(b) the needle of a sewing machine

(c) the movements of a mosquito

(d) the blades of an electric fan

(e) the smoke from a lighted dhoopbatti

(f) wheels of moving car.

Answer:

(a) The galloping of a horse: Linear motion.

(b) The needle of a sewing machine: Periodic motion.

(c) Movement of a mosquito: Random motion.

(d) Blade of an electric fan: Circular motion.

(e) The smoke from a lighted dhoopbatti: Random motion.

(f) Wheels of moving car: Linear motion and Rotational motion.

4. Give two examples for each of the following motions:

(i) Linear motion

(ii) Spinning motion

(iii) Oscillatory motion

(iv) Periodic motion

(v) Vibrational motion

(vi) Circular motion

(vii) Random motion

Answer:

(i) Linear motion: (a) Rolling of ball on ground, (b) Moving of bicycle on road,

(ii) Spinning motion: (a) Rotating fan, (b) Wheel of sewing machine.

(iii) Oscillatory motion: (a) Pendulum of clock, (b) Motion of a child on a swing,

(iv) Periodic motion: (a) Pendulum of clock, (b) Motion of a swing, heartbeat.

(v) Vibrational motion: (a) String of a guitar, (b) Surface of drums.

(vi) Circular motion: (a) Rotation of fan, (b) Bicycle wheel.

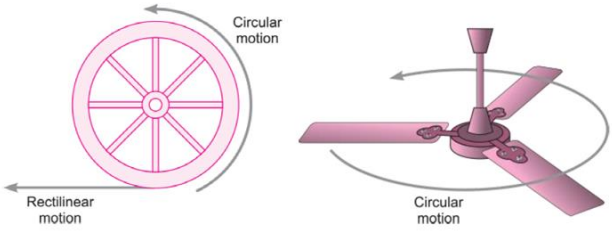
(vii) Random motion: (a) Motion of football players, (b) Movement of mosquito.

5. While travelling in a train, it appears that the trees near the track are moving whereas co-passengers appear to be stationary. Explain the reason.

Answer: When we see the trees from a moving train, their position is changing with respect to us. Hence, they appear to be moving. On the other hand, the position of co-passengers is not changing with respect to us, hence they appear to be stationary.

6. How are the motions of a wheel of a moving bicycle and a mark on the blade of a moving electric fan different? Explain.

Answer: The wheel of a moving bicycle depicts circular as well as rectilinear motion whereas a blade of a moving electric fan shows only circular motion.



7. Three students measured the length of a corridor and reported their measurements. The values of their measurements were different. What could be the reason for difference in their measurements? (Mention any three.)

Answer: Some of the reasons for difference in their measurements could be:

- Different measuring devices were used.
- The smallest length that could be measured by different devices may be different.
- Measurement may not be along the shortest length in all three cases.
- The end of the corridor may not be easily accessible.
- The measuring devices may be faulty (not standardised).

8. Boojho was riding in his bicycle along a straight road. He classified the motion of various parts of the bicycle as (i) rectilinear motion, (ii) circular motion and (iii) both rectilinear as well as circular motion. Can you list one part of the bicycle for each type of motion? Support your answer with reason.

Answer: (i) Handle bar or seat because handle or seat is moving along a straight road, not rolling.

(ii) Pedal because it is rolling around a fixed centre by the foot.

(iii) Wheel because it is rolling and also moving along a straight road.

9. Distinguish between the following.

(i) Rectilinear motion and Circular motion

Answer:

Rectilinear motion	**Circular motion**
Movement along a straight line from one position to another.	Movement in a circular manner in relation to its own axis or around a fixed centre.
For example, a bus moving on a straight highway	For example, a spinning top.

(ii) Rotational motion and Periodic motion

Answer:

Rotational motion	**Periodic motion**
Movement in a circular path in relation to its own fixed axis.	Oscillatory movement along the same path again and again with same speed.
For example, blades of a moving fan.	For example, pendulum of a clock.

(iii) Rest and Motion

Answer:

Rest	**Motion**
The state in which an object does not change its position with time and with respect to its surroundings.	The state in which an object keeps on changing with time and with respect to its surroundings.
For example, book placed on table.	For example, butterfly flying in garden.

10. How can you measure the length of a curved line?

Answer: The length of a curved line is measured using a thread or a divider. Take a long thread. Let one end of the thread be placed at one end of the branch of the plant. Run the thread at straight distances on the branch from A to B, then from B to C and so on till the length of thread runs on full length of the branch. Shifting your hand from the previous to the next position, mark on the thread when it reaches the end of the branch. The length of the thread you have run is equal to length of the branch. Place this thread on the scale with its one end at '0'. Take the reading on the other end. You will get the length of the curved branch of the plant.

11. Four children measured the length of a table which was about 2 m. Each of them used different ways to measure it.

i. Sam measured it with a half metre long thread.

ii. Gurmeet measured it with a 15 cm scale.

iii. Reena measured it using her handspan.

iv. Salim measured it using a 5 m long measuring tape.

Which one of them would get the most accurate length? Give reason for your answer.

Answer: Salim would get the most accurate length. The reason is that in this case the length of the table can be measured in one go because the measuring tape is longer than the table. In the other cases the chance of making an error is higher due to multiple measurements. In case of Sam, he can only measure the lengths which are exact multiples of a half metre.

CHAPTER -8
LIGHT, SHADOWS AND REFLECTIONS

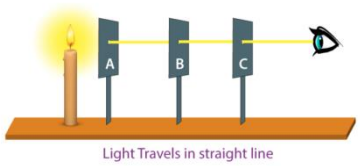
Light as a form of energy

- Light is the energy that enables us to see.
- Light is emitted from a source such as the Sun.

Is Light a Traveler?

Rectilinear propagation of light

Light takes the quickest path between any two points. Therefore, light travels in a straight line. This is known as a rectilinear propagation of light.



Light Travels in straight line

Luminous & Non-luminous objects

- Objects that emit light and heat are known as luminous objects. E.g.: Sun and other stars
- Objects that do not produce their own light but reflect the light emitted by luminous objects are known as non-luminous objects. E.g.: Earth, trees

Transparent, opaque and translucent objects

Objects can be classified based on their interaction with light.

- Transparent objects allow light to pass through them without getting scattered. E.g.: glass
- Translucent objects allow light to pass through them partially. E.g.: Butter paper
- Opaque objects do not allow any light to pass through them. E.g.: a table, a book, etc

To know more about "Transparent, Opaque and Translucent Objects", visit the link below;

What Are Shadows?

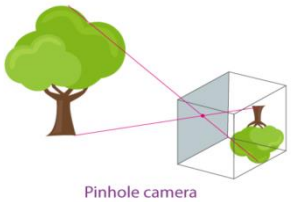
Shadow formation

- A shadow is formed when an opaque object comes in the path of light.
- A shadow needs a screen where it is formed, for example, the ground, or walls of a room or even the surfaces of buildings.
- Shadows give us an idea about the shapes of different objects. Or, it can even mislead us about the shape of different objects. E.g. the shadow of a cone appears to be a triangle on the screen.

The Pinhole Camera

Formation of image by pinhole camera

- A pinhole camera is a simple camera that consists of a light-proof box, a thin film for a screen and a small aperture or hole to allow the passage of light rays.
- The light from outside enters through the small hole and forms an image on the screen that is inverted.


Pinhole camera

Mirrors and Reflection

Mirrors

A mirror is a surface usually consisting of a glass that reflects light incident on it to form clear erect images.

Reflection

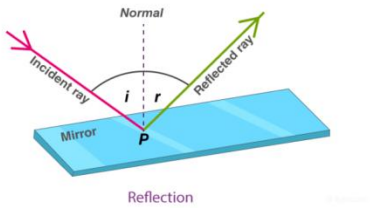
When light is incident on a surface, it gets reflected or it bounces back. Any surface that is really well polished or shiny acts like a mirror. The phenomenon of light bouncing off surfaces is called reflection.

Characteristics of images

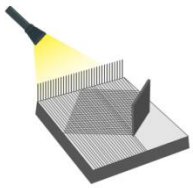
- Images have colour, unlike shadows. They are formed due to the converging rays of light that comes after reflecting from objects.
- A real image is formed by actual convergence of light rays. Real images always form on a screen.
- A virtual image is the apparent convergence of diverging light rays. Virtual images cannot be obtained on a screen.

Plane mirrors and images formed by them

A plane mirror changes the direction of light that falls on it.



This enables us to see images. Take the example of a comb placed in front of a mirror over a dark coloured paper. Let a beam of light pass through the comb on the mirror using a torch. Then an image is observed similar to the one given :



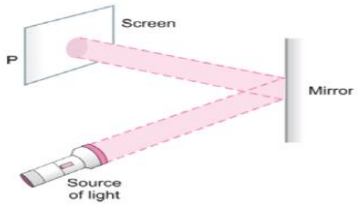
We observe that the light gets reflected from this mirror and it travels in straight lines.

SOME IMPORTANT QUESTIONS

1. You have 3 opaque strips with very small holes of different shapes as shown in figure. If you obtain an image of the sun on a wall through these holes, will the image formed by these holes be the same or different?

Answer: The image obtained will be the same in all the three cases.

2. Observe the picture given in figure. A sheet of some material is placed at position 'P', still the patch of light is obtained on the screen. What is the type of material of this sheet?



Answer: A sheet of transparent material is placed at 'P'.

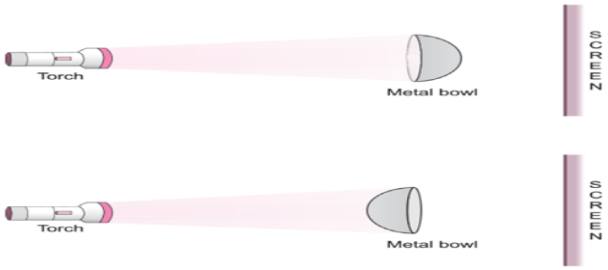
3.**Three torches A, B and C shown in figure given below are switched on one by one. The light from which of the torches will not form a shadow of the ball on the screen?**

Answer: The light of torch at position C will not form a shadow of the ball on the screen.

4. Define eclipse.

Answer: Eclipse is a shadow formed in space that makes the sun or the moon invisible for some time.

5. Look at the figure.



Will there be any difference in the shadow formed on the screen in A and B?

Answer: No

6. How can a transparent sheet be converted into a translucent sheet?

Answer: By greasing the paper with oil or fat.

7. What are the three things required for the formation of shadows?

Answer: Light, space and opaque object.

8. Moon is a non-luminous object. How does it shine at night?

Answer: Moon reflects the light of the sun at night.

9. Whether the moon is luminous or non-luminous body?

Answer: Moon is non-luminous body.

10. What is umbra?

Answer: Umbra is the dark region behind object facing light which does not receive light at all.

11. How does a light ray travel?

Answer: Light ray travels in a straight line.

12. Give one natural source of light.
Answer: Sun is a natural source of light.
13. What is shadow?
Answer: Shadow is the dark space behind an opaque object where light does not reach.

Short Answer Type Questions

1: What is the difference between transparent and translucent object?
Answer: If we are able to see clearly through an object, it is said to be transparent. Whereas there are some objects through which we can see but not clearly. Such objects are known as translucent objects. Transparent objects allow light to pass through them completely whereas translucent objects doesn't allow light to pass through them completely.
2: What materials can be used to make a pinhole camera? How can it be used?
Answer: Pinhole camera can be made with simple material like cardboard, tracing paper etc. It can be used to image the sun and brightly lit objects.
3: Why is shadow formed when an opaque object comes in path of light?
Answer: Light travels in a straight line and when opaque object obstructs it, shadow is formed.
4: What is reflection?
Answer: When any surface reflects light without absorbing it, it is known as reflection.
5: Classify the objects as opaque, transparent and translucent-
Fog, glass, wood, plastic box, smoke, water
Answer: Transparent-glass and water.
Opaque-wood and plastic box
Translucent- fog and smoke
6: Why we cannot see our image in the mirror in complete dark room?
Answer: We cannot see our image in the mirror in complete dark room because there is no light to reflect.
7: Classify the following as luminous and non luminous object:
Sun, moon, table, chair, stars
Answer: Luminous –sun, stars
Non luminous-moon, table, chair
8: What is the difference between luminous and non-luminous objects?
Answer: Objects that give out or emit light of their own are known as luminous objects. For example candle, sun etc. Objects that cannot give out or emit light of their own are known as non- luminous objects. Such as chair, book etc.
9: Why we cannot see objects through T shaped or N shaped pipe?
Answer: We cannot see objects through T shaped or N shaped pipe because light travels through straight line.
10: What do we need to see an object?
Answer: To see an object, we need source of light, eyes and object. When light emitted by luminous body falls on an object, it is reflected back and received by our eyes. Then we see that object.
11: Give example of an object which is a) opaque and luminous b) translucent and luminous.
Answer: A) Sun b) flame of gas burner.
12: If moon is non luminous, how it appears bright in night?
Answer: Moon appears bright in night because it reflects sun light that falls on it.

13: What type of objects does not cast shadow and why is that?
Answer: Transparent and some translucent objects do not cast shadow because light passes through them.
14: Why polished surface cause glares in our eyes?
Answer: Polished surface cause glares in our eyes because they produce regular reflection of light.
15: Give two examples of each:
a) Transparent and non-luminous object
b) Translucent and non-luminous object.
Answer: a) Air and water b) polythene and smoke.
16: Which of these objects can cast shadow:
Paper, air, rock, glass, sun
Answer: Paper, rock and sun.
17: How is shadow formed?
Answer: When an object is placed in path of light, a dark portion is formed on the opposite side of object. This dark portion is shadow.
18: What is periscope?
Answer: Optical object by which we can see objects located above our line of sight.
19. Suggest a situation where we obtain more than one shadow of an object at a time.
Answer: We can obtain more than one shadow of an object if light from more than one source falls on it. For example, during a match being played in a stadium, multiple shadows of players are seen.
20. On a sunny day, does a bird or an aeroplane flying high in the sky cast its shadow on the ground? Under what circumstances can we see their shadow on the ground?
Answer: No. Shadow of the bird can only be seen when the bird is flying very low, close to the ground.
21. You are given a transparent glass sheet. Suggest any two ways to make it translucent without breaking it.
Answer: i. By applying oil, grease, butter on it or pasting a butter paper on it.
ii. Grinding (rubbing) the surface of the glass by any abrasive material.
22. A student covered a torch with red cellophane sheet to obtain red light. Using the red light she obtains a shadow of an opaque object. She repeats this activity with green and blue light. Will the colour of the light affect the shadow? Explain.
Answer: The colour of light will not affect the shadow, because shadow is the dark patch formed when an object obstructs the path of light and hence no light reaches in the shadow region.
23. Is air around us always transparent? Discuss.
Answer: Air around us is transparent but when thick smoke, thick clouds, etc. are present in the air it does not remain transparent.
24. Three identical towels of red, blue and green colour are hanging on a clothes line in the sun. What would be the colour of shadows of these towels?
Answer: The colour of shadows of all three towels will be the same. This is because shadows are always black in colour.
25. Using a pin hole camera a student observes the image of two of his friends, standing in sunlight, wearing yellow and red shirt respectively. What will be the colours of the shirts in the image?

Answer: The colours of the image of the shirts will be the same as the colour of the shirt. This is because a pin hole camera has only a small aperture through which light passes and forms the image.

26. In the figure given below, a flower made of thick coloured paper has been pasted on the transparent glass sheet. What will be the shape and colour of shadow seen on the screen?

Answer: The shadow formed will be dark or black in colour and of the shape of the flower along with the stalk.

27. How is a shadow formed?

Answer: When a beam of light shines on an opaque object, some light rays are stopped and some pass by the edges. The region without light formed behind the object is called shadow.

28. State difference between a luminous and a non-luminous body.

Answer: The bodies which emit light are called luminous bodies. Example: sun, stars, burning candle etc. The bodies which does not emit light are called non-luminous bodies. Example: moon, earth, blackboard.

29. Why is the moon not considered as a luminous body?

Answer: Moon is non-luminous body because it shines by reflecting the sunlight falling on it.

30. What is an incandescent body? Give example.

Answer: The bodies which emit light when heated to a very high temperature are called incandescent bodies. Example: electric bulb.

31. When does a shadow form?

Answer: Shadow is formed when light does not reach behind the opaque object kept in the path of light

32. What are the essential conditions for the formation of shadow?

Answer: (i) There should be an opaque material.
(ii) There should be a source of light and screen.
The object must be placed in the path of light. Then shadow is formed on the screen.

33. Define reflection of light.

Answer: When light rays after striking the smooth and shiny surface return to same medium, this phenomenon is called reflection of light.

34. How will you convert a glass sheet into a translucent sheet?

Answer: There are following two methods to convert glass sheet into a translucent sheet:
(i) By smearing a thin layer of oil on glass sheet.
(ii) By covering a side of sheet by butter paper.

36. What is shadow? How does the colour of an opaque object affects the colour of the shadow?

Answer: A dark outline or patch formed by an opaque object that blocks light coming from a source of light is called shadow. The colour of an opaque object does not affect the colour of the shadow.

37. What do we need in order to see a shadow?

Answer: We need: (i) A source of light (ii) a screen (in) an opaque object.

38. What do you mean by scattering of light?

Answer: When a beam of light falls on a rough surface it is turned back in different directions. It is called scattering of light.

CHAPTER- 9

ELECTRICITY AND CIRCUITS

Definition of Electricity:

Electricity is the flow of electrical power or the charges (electrons) through a proper medium commonly the wires we see in our homes.

Electric Circuit:

Electric circuit is a closed path that provides a continuous flow of electrons or electric current from a voltage or current source to the equipment being used. This path of current flow or a circuit can be represented using various symbols and notation for different components and is called a circuit diagram.

Open and Closed Circuits:

The path travelled by the electric current from one terminal to its other terminal when it is unbroken and continuous then it is called a closed circuit and if the same path is broken somewhere along the path that stops current to flow continuously is called an open circuit.

Electrical Components:

1. Wires: These are the electrical conductors used to connect two or more electrical components and allow the flow of current. The wires are generally made of metals that are good conductors of electricity and based on the usage, the type of metal and the dimension of wire is selected.

2. Bulb: It is a glass case composed of a filament inside it connected to the two terminals and which gets heated up upon the passage of electric current and emits light. The filament wire is generally made up of coiled tungsten wire. The electricity is supplied through the two terminals between which the filament is present.

3. Electric Cell or Dry Cell: It is a kind of device that stores chemical energy and converts it into electrical energy that can be used for different purposes. It has two terminals namely positive and negative. Inside a cell, the charges flow from the negative terminal to positive terminal while the reverse happens outside the cell.

4. Battery: This is made up of a combination of two or more cells combined in a series configuration.

5. Switch: It is a simple device used in an electrical circuit to allow or restrict the continuous flow of current. It is placed between a gap in a circuit and when turned on, it fills the gap with a conducting medium making the circuit work and when off breaks the circuit by removing the conducting medium from the gap.

The above components together can be seen in an electric torch that consists of connecting wires, battery and an LED (Light Emitting Diode) bulb.

Electrical Conductors and Insulators:

Electrical conductors are the materials that allow the flow of electricity through it. All the metals come under the category of good conductors of electricity. Among non-metals only carbon can conduct electricity which can be experimented by connecting wires across the two ends of a pencil.

On the contrary, the materials that do not allow electric currents to flow through it are called the bad conductors or the insulators. Some examples of insulators are plastic, rubber, dry wood, PVC etc.

Effects of Electricity:

The flow of electric current through a material is accompanied with some other effects which sometimes are used for other purposes or causes energy losses. Some of the effects are as follows;

- **Heating Effect:** This effect is used in electric heaters, ovens, etc.
- **Lighting Effect:** The primary example is an electric bulb.
- **Magnetic Effect:** Used in electromagnets.

SOME IMPORTANT QUESTIONS

1. What is the direction of flow of current in a dry cell?

Ans: . The current flows in closed circuit from +ve to -ve terminal of cell.

2. Name the +ve terminal of dry cell.

Ans:. Carbon rod with a metal cap on it.

3. Name the -ve terminal of a dry cell.

Ans: Zinc metal plate.

4. What is dry cell?

Ans: It is a device which converts chemical energy into electrical energy.

5. What is solar cell?

Ans: A device which converts solar energy into electrical energy.

6. What is open circuit?

Ans: An electric circuit in which electrical contact at any point is broken is called open circuit.

7. Write one use of insulators.

Ans: Insulators are used in making switchboard, handles of testers, screw drivers.

8. What is the name of thin wire in the electric bulb?

Ans: Filament.

SOME OTHER IMPORTANT QUESTIONS

Question 1: Fill in the blanks :

(a) An electric cell has _____ terminals.

(b)A device that is used to break an electric circuit is called _____.

Answer 1:

(a) two terminals. (b) a switch.

Question 2: Choose the incorrect statement.

(a) A switch is the source of electric current in a circuit.

(b) A switch helps us to use electricity as per our requirement.

(c)A switch helps to complete or break the circuit.

(d) When the switch is open, an air gap between its terminals is present.

Answer 2: (a) A switch is the source of electric current in a circuit.

Batteries are the source of electric current in a circuit. Batteries create a difference in electric potential due to which current flows.

Question 3: Determine 'True' or 'False' for the following statements:

(a) Electricity can flow through metals.
(b) Electric current can pass through a sheet of thermocol. .
(c) Instead of metal wires, a jute string can be used to make a circuit.
Answer 3:
(a) True
Metals have a conductivity property which allows the electric current to pass through them.
(b)False
it does not have the property of electric conductivity
(c) False
A jute does not allow electricity or electric current to pass through it.
Question 4: Which of the following is performed by an electric cell

1. **a) Uses electricity**
2. **b) Uses light**
3. **c) Produces electricity**
4. **d) None of the above**

Answer 4: c) Produces electricity
An electric circuit produces electricity and acts as a source of electricity in an electric circuit.
Question 5: What is the purpose of using an electric switch? Name some of the electrical gadgets that have switches built into them.
Answer 5: The function of a key in an electric circuit is to complete the circuit or break the circuit. All the electric gadgets have switches built into them like television, oven, fan etc.
Question 6: The filament of a torch bulb is
(a) A metal case.
(b) Two thick wires.
(c) Metal tip at the centre of the base.
(d) A thin wire.
Answer 6: (d) a thin wire. The filament of the bulb is made of a thin wire from a metal called tungsten, as it has a very high melting point.
Question 7: Define

1. **i) Electric cell**
2. **ii) Battery**

Answer 7:

1. **i)** Electric cell is the source of energy in an electric circuit. It produces electricity through chemical reactions present inside the cell.
2. **ii)** Battery is formed when two or more cells are joined together in a circuit.

Question 8: Why should an electrician use rubber gloves while repairing an electric switch at your home? Explain.
Answer 8: An electrician uses rubber gloves while repairing an electric switch at your home as rubber is an insulator and hence will not allow electricity to pass through it. Hence using rubber gloves protects the electrician from electric shock.
Question 9: What are the reasons why the bulb in an electric circuit does not light up?
Answer 9: Given below are some of the reasons why a bulb does not light up in an electric circuit:

1. Only one of the wires is connected properly to the electric cell, while the other is poorly connected or not connected at all.
2. Two different wires are not connected or soldered properly.

3. One wire is connected properly to the bulb, while the other is not connected or is poorly connected.

Question 10: What is an electric circuit?

Answer 10: Electric circuit consists of a wire, battery, switch, and appliance. An electric circuit is defined as a closed path through which electricity passes. through the positive terminal of the battery to the negative terminal. The switch is used to break or start the flow of electricity in a circuit made from a conductive substance.

Question 11: How does the bulb function, and what causes the bulb to fuse?

Answer 11: A bulb is an electric appliance which emits light by converting electric energy into light energy.

A bulb consists of a thin wire-like structure known as a filament. When the circuit is switched on, electricity passes through the electric current. This causes the filament present in the bulb to heat up, and the bulb is lit up.

The filament is usually made by substances having high melting points, as when electricity passes the filament, it lights up and gets heated. But sometimes, when there is a surge of electricity in the circuit, more amount of electricity passes through the filament causing the filament to heat up more hence increasing its temperature. This causes the filament to melt due to excessive heat. This results in the fusing of the bulb.

Question 12:Paheli wanted to glow a torch bulb using a cell. She could not get connecting wires; instead, she got two strips of aluminium foil. Will she succeed? Explain how?

Answer 12: Paheli will succeed in glowing a torch bulb using aluminium foil as aluminium is a metal; hence it conducts electricity. By attaching one strip of aluminium to the positive terminal of the bulb and the other to the negative terminal of the bulb, the circuit will be completed, and electricity will pass through, resulting in the torch bulb glowing.

Question 13: choose the correct option

(i) Cell is a device which

(a) converts chemical energy in electrical energy

(b) electrical energy into magnetic energy

(c) electrical energy into light energy

(d) None of the above

Answer: a)converts chemical energy in electrical energy

In a cell, various chemicals are used to produce a potential difference.

(ii) A bulb has

(a) two terminals and one filament

(b) two terminals and two filaments

(c) multiple terminals and single filament

(d) single terminal and single filament

Answer:

(a) two terminals and one filament

A bulb has a filament which glows and two terminals which are joined by two terminals of the battery.

(iii) Filament present inside the bulb is made up of

(a) aluminium (b) chromium (c) platinum (d) tungsten

Answer:

(d) Tungsten

As tungsten metal has a very high melting point and high resistance.

(iv) Bulb glows only in
(a) closed circuit (b) open circuit (c) in both circuits (d) open circuit if the bulb is not fused
Answer: a) closed circuit
As only a closed circuit is a complete circuit.
(v) A battery consists of
(a) a single cell a combination of cells in which cells are joined (+) to (+)
(b) a combination of cells in which cells are joined (+) to (-)
(c) a combination of cells in which cells are joined (+) to (+)
(d) None of the above
Answer: b) a combination of cells in which cells are joined (+) to (-)
Two or more cells are combined in such a way that the (+) terminal of one cell is joined to the (-) terminal of the other is called battery.
(vi) Substances which allow electricity to pass through it are called
(a) an insulator (b) a conductor (c) superconductor d)semiconductor
Answer: b) a conductor
Substances allow an electric current to pass through them.
(vii) Which is an example of an insulator
(a) Bakelite (b) aluminium (c) tap water (d) All of these
Answer: a) bakelite
Aluminium and tap water are conductors of electricity.
(viii) An example of a conductor is
(a) tap water (b) salt solution (c) metal wire (d) all of these
Answer: (d) all of these
Tap water, salt solution and metal wire are examples of conductors.
(ix) How many terminals are present in a dry cell?
(a) One (b) Two (c) Three (d) Four
Answer: (b) Two
A dry cell has two terminals (+ve) and (-ve).
(x) To prevent electric shocks, the metallic electrical wires are insulated with
(a) paper (b) aluminium (c) cotton (d) plastic
Answer: (d) plastic
Plastic is an insulator of electricity.

CHAPTER -10
FUN WITH MAGENET

What is Magnet?
Objects, which attract magnetic materials like cobalt, nickel and iron are called as a magnet.
Magnetic Materials: Cobalt, nickel and iron are some examples of Magnetic Materials. These materials easily attract a magnet.
Non-magnetic Materials: Aluminium, zinc, wood, and rubber are called the Non-magnetic Materials, as these materials are not attracted towards the magnet even when they are brought closer to the magnets.

Types of Magnets

There are different types of magnets and are classified based on their shapes. The different types of magnets include – bar magnet, dumb-bell shaped magnet, horseshoe magnet, cylindrical magnet, etc.

Magnetic compass

The magnetic compass is a simple device, which has been used from the ancient times by the sailors and other travellers to find directions. A magnetic compass is composed of a small box with a glass top and a magnetic needle, which moves and indicates the directions.

Introduction Magnet and magnetite

- Substances that attract materials like iron, nickel etc.
- Magnets occur naturally as a particular type of rock.
- This rock is called magnetite.

Discovery of Magnets

Greeks used the term magnet in six hundred B.C. for the mysterious stone that seemed to attract iron and other materials. It was first discovered by a Greek shepherd named Magnes (hence the terminology), when his stick that had an iron end got stuck to a rock.

Magnetic and non-magnetic materials

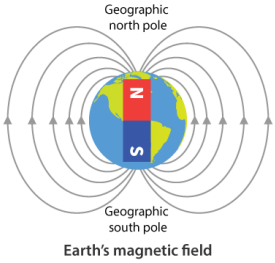
- Materials that get attracted towards a magnet are called magnetic materials. E.g. iron, cobalt or nickel.
- Materials that do not get attracted by a magnet are nonmagnetic materials. E.g. wood, plastic etc.

Poles of a Magnet

Every magnet is bipolar, i.e. they have 2 poles at the extremities. This can be seen by spreading iron filings around a magnet. These filings arrange themselves in a pattern which is mostly dense towards the two ends of a magnet. These poles are called North and South poles of a magnet.

Magnetic poles of the Earth

- Earth has 2 geographic poles, north and south poles.
- They are the Arctic (South pole of the earth's magnet) and Antarctica (North Pole of the earth's magnet).
- Earth's magnetic poles are near but not exactly in the same place as the geographic poles.
- A magnetic compass aligns itself towards the magnetic north pole of the earth.



Earth's magnetic field

Using magnets to find directions

- When a bar magnet is suspended freely by a thread, it aligns itself to the direction of North.
- Travellers have used this property of magnets for ages to find directions.
- A compass is a device with a magnetized needle pivoted inside a box covered by glass, which points to the direction of north and is a useful tool for finding directions.

Making a magnet

- The magnetic material can be made into a magnet by rubbing a magnet on the surface of the magnetic material.
- This creates an influence, where the particles inside the material align themselves like the poles of a magnet.

Microscopic cause of magnetism

- Each particle in a magnetic material behaves somewhat like a bar magnet.
- They are normally aligned randomly within the material.
- But under the influence of a stronger magnet, they realign themselves according to the stronger magnet's field.

Loss of magnetic property

The magnetic property of a magnet is lost on:

- Heating
- Hammering or hitting
- Dropping

Attraction and Repulsion between Magnets

Like poles repel each other, while unlike poles attract each other.

Inseparable Poles

- Magnetic poles always exist in pairs.
- If you cut a bar magnet in half, it forms 4 poles, each half having a north and a south pole.

Poles exists in pairs

SOME IMPORTANT QUESTIONS

Question 1: Fill in the blanks in the following

(i) Artificial magnets are made in different shapes such as _____, _____ and _____.

(ii) The materials which are attracted towards a magnet are called_____.

(iii) In olden days sailors used _____ to find direction by suspending a

(iv) A magnet always has _____ poles.

(v) Paper is not a _____ material.

Answer 1:

(i) bar magnets, horseshoes and cylindrical magnets. (ii) called magnetic. (iii) to suspend a piece of magnet. (iv) two poles. (v) magnetic material.

Question 2: North pole of a magnet can be determined by

(a) Another magnet has its poles marked as the North pole and South pole.

(b) Using iron filings.

(c) Another magnet, no matter whether the poles are marked or not.

(d) Using an iron bar.

Answer 2: (a) Another magnet has its poles marked as the north and south poles.

If another magnet with marked poles with the north pole repelling the pole of the unmarked magnet repels, then the pole is north.

Question 3: A bar magnet is immersed in a heap of iron filings and pulled out. The amount of iron filling clinging to the magnets

(a) The North Pole is almost equal to the South Pole.

(b) the North Pole is much more than the South Pole.

(c) The North Pole is much less than the South Pole.

(d) Magnet will be the same all along its length.

Answer 3: (a) the North Pole is almost equal to the South Pole.

A magnet has equal strength on both poles.

Question 4: Write any two properties of a magnet.

Answer 4: Two properties of magnets are:

1. The magnet attracts metals, for example, nickel, cobalt, iron etc.
2. There are two poles of a magnet where, like poles of a magnet, repel each other, and unlike poles, attracts each other.

Question 5: Fill in the given blanks

(i) When a bar magnet is broken then each of the broken parts will have ……. poles.

(ii) In a bar magnet, magnetic attraction is …… near its ends.

Answer 5:

(i) two poles. (ii) In a bar magnet, magnetic attraction is the maximum near its ends.

Question 6: Choose the correct option in the following questions:

(i) Which is an example of a magnetic substance?

(a) Iron (b) Cobalt (c) Nickel (d) All of these

Answer: (d) All of these (All of these are attracted towards a magnet as all of them are metals.)

(ii) Magnets have a shape

(a) cylindrical (b) horseshoe (c) ball ended (d) all of these

Answer: (d) all of these (Magnets come in various shapes, including bar magnets.)

(iii) When a bar magnet is brought near iron dust, most of the dust sticks

(a) at the middle and ends (b) equally everywhere (c) near two ends (d) near the middle

Answer: (c) near two ends (Magnetic field intensity is maximum at the poles of a bar magnet; hence most of the iron dust sticks to the poles.)

(iv) A freely suspended bar magnet rests in

(a) East-west directions (b) North-south directions (c) Any direction by chance (d) Upside down

Answer: (b) north-south directions

A bar magnet will always rest in the N-S direction when it's suspended freely.

(v) Attraction is observed between the poles of two bar magnets in the case of :

(a) S-pole of one magnet with S-pole of other

(b) N-pole of one magnet with S-pole of other

(c) N-pole of one magnet with N-pole of other

(d) All of these cases will show attraction

Answer: (b) N-pole of one magnet with S-pole of other

In a magnet, unlike poles attract and like poles repel each other.

(vi) Which is a natural magnet?

(a) Magnetite (b) Hematite (c) Bakelite (d) Copper

Answer: (a) Magnetite (Magnetite is a natural magnet discovered around 800 B.C.)

(vii) Choose the wrong statement

(a) Heat can destroy the magnetic properties of magnets.

(b) Different magnets are made up of different materials and come in different shapes.

(c) There is a maximum attraction in the middle area of a magnet.

(d) Magnetite does not show any magnetic properties.

Answer: (d) Magnetite does not show magnetic properties. (Magnetite does not show magnetic properties.)

(viii) The magnetic properties of a magnet cannot be destroyed by

(a) heating (b) dropping on a hard surface (c) hammering (d) boiling

Answer: (d) boiling (Magnetic properties cannot be destroyed by boiling because magnetic properties are destroyed by hammering, dropping on a hard surface and heating.)

(ix) Which ends of a magnet are called magnetic poles?

(a) only North pole (b) North and south pole (c) South pole (d) Self demagnetization

Answer: (b) North and south pole (Magnetic poles are called the North pole and the South pole.)

(x) Magnets attract

(a) plastic (b) wood (c) paper (d) iron

Answer: (d) iron (Iron is attracted by a magnet.)

Question 7: How is a compass used to find directions?

Answer 7: A compass always points in the north-south direction. The compass has a red arrow present in the compass, indicating the north direction. If we get to know the north direction, then we can easily find out the other direction.

Question 8: Which arrangement is beneficial to store a U-shaped magnet? How is this different from storing a pair of bar magnets?

Answer 8: For storing a U-shaped magnet, a soft iron bar is placed on the tip of a U-magnet. To divide the bar magnets, which are placed in the same direction, a wooden block is placed between them. It is then stored in a wooden box. By following this method, the magnetic properties and strength of the magnet can be prolonged for a longer time.

Question 9: What do you mean by magnetization?

Answer 9: Magnetisation is defined as the process of creating an artificial magnet with the help of a magnet. To transform a non-magnetic material into a magnet, firstly, we must place the non-magnetic material, for example, an iron nail, on a table. Then move a strong magnet along the lengths of the iron nail without any disruptions. We must move the magnet in the same direction around 40-50 times until the iron nail becomes magnetised.

Question 10: What are the precautions to be taken care of while handling magnets?

Answer 10: Precautions to be taken while handling magnets for ensuring their magnetic strength for a longer time duration are:

1. Magnets are advised to be always stored in pairs with opposite poles facing each other.
2. Magnets must never be fired, hammered or thrown from a great height. This will cause the magnetic property to weaken.
3. A piece of the magnet must be kept across from horseshoe magnets to avoid weakening of its magnetism.
4. Magnets must be kept away from television, mobiles, CDs, laptops etc.

Question 11: State whether true or false. If false, correct the statement.

1. **Magnet can be used to magnetise a non-magnetic material.**

Answer: False.

A magnet can be used to magnetise other magnetic materials.

2. **Unlike poles of a magnet, they always repel each other.**

Answer: False.

Unlike the poles of a magnet, they always attract each other.

3. **Like poles of a magnet always repel each other.**

Answer: True

4. **A bar magnet has equal magnetism all around its surface.**

Answer: False.

A bar magnet has maximum magnetism at the poles and least on the centre of the body.

5. **Magnetite is a rock with magnetic properties.**

Answer: True

Question 12: Boojho dipped a bar magnet in a heap of iron filings and pulled it out. He found that iron filings got stuck to the magnet.

(i) Which regions of the magnet have more iron filings sticking to it?
(ii) What are these regions called?
Answer 12: (i) A magnet's strength is concentrated in its ends. Hence its ends will contain more iron fillings concentration attached to them.
(ii) The ends of the magnet are called the North pole and the South pole, respectively.
Question 13: How do we determine the magnetic poles of the earth?
Answer 13: We can determine the magnetic poles of the earth in the following ways:

1. Earth consists of 2 geographical poles, the north pole and the south pole.
2. The North pole of the earth is Antarctica, and the south pole is named the arctic circle.
3. Earth's magnetic poles are located near each other but not exactly in the same place as geographical poles.
4. A magnetic compass will always align its needle to the earth's north pole.

Question 14: What are magnets frequently used for?
Answer 14: Uses of magnets are listed below:

1. Magnets are helpful in sorting out magnetic materials from heterogeneous mixtures
2. Magnets are also used in electromagnetic devices for medical purposes like MRI scan machines.
3. Electromagnets are also used in electric canes and speakers etc.
4. Permanent magnets are used in permanent magnets like generators, electric vehicles and in the making of a mariner's compass.

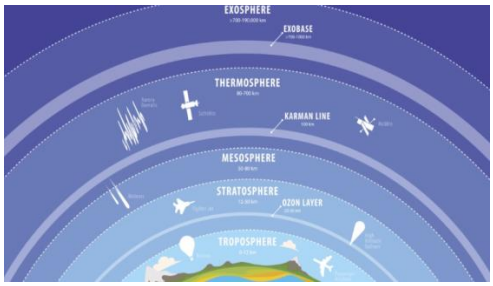
CHAPTER -10
AIR AROUND US

Atmosphere: The thin blanket of air surrounding the surface of the Earth is called the atmosphere.

The atmosphere is divided into five distinct layers on the basis of variations in temperature that changes due to increasing altitude. Air gets scant as we move up in the atmosphere. These are as follows:

- **Troposphere:** This is the first layer to the atmosphere which is nearest to the surface and is responsible for weather conditions. The troposphere itself is said to contain about more than 75% of the atmosphere!
- **Stratosphere:** This is the layer just above the troposphere which contains the ozone layer and where the aeroplanes fly and is also home to most of the clouds!
- **Mesosphere:** This is the third and the coldest layer of our atmosphere and extends to a good 80 km above the surface of the Earth.

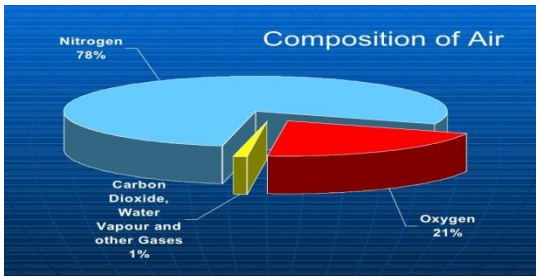
- **Thermosphere:** This is the fourth and one of the hottest layers of Earth where temperatures go to a **1500^{o}** this is where the space shuttles go to study Earth from space! The air in this layer is very thin and about 99.9% of the atmosphere is said to lie below this particular layer.
- **Exosphere:** This is the outermost layer of the atmosphere where molecules and atoms escape into space. Beginning at 480 km above the Earth, this layer then extends into the space.



Constituents of Air

Air is a mixture of a number of gases and some other particles such as:

1. **Water Vapour:** Air contains water vapour which helps maintain the water cycle. When air comes in contact with cold surfaces, it is these vapours that turn into or condense into droplets of water. **The amount of water vapours in the air from place to place and time to time.** At a normal 30°C for instance can contain say up to 4% of water vapour.
2. **Oxygen:** It is the oxygen in the air that helps humans and animals carry out the respiration process. Oxygen is also required for fire to keep burning. If we were to keep an inverted tumbler covering a burning candle, the candle will go off in a few seconds because of the lack of oxygen-containing air due to the tumbler. Dry air is said contain about **21%** of oxygen.
3. **Nitrogen:** Dry air is said to contain about **78%** of nitrogen. This component of air helps plants in their growth process.
4. **Carbon dioxide:** Carbon dioxide is a very small (only **0.04%**) component of air and is a byproduct of respiration by humans and animals. Fire also uses up oxygen to burn and then produces carbon dioxide and a few other gases upon burning. This is why we feel suffocated if there is something burning inside a room. This happens due to an excess of carbon dioxide as the fire continues to burn in the room, choking out oxygen in the air.
5. **Dust and Smoke:** Smoke is another component given out when fire burns. It is very harmful and adds fine dust particles and a few other gases to the air.

6. 

The composition of the components of air

As we can see from the Figure above, Oxygen and nitrogen together make up 99% of air while the other components come up to a mere 1% of all air in our environment.

Availability of Oxygen in Water and Soil

It is often asked how animals under the soil and in water are able to breathe. The answer is that both soil and water have air dissolved in them.

- When we heat or boil water, we often notice that bubbles start to form. These bubbles are in fact, an indication that air molecules are present in the water. When water is heated, the air dissolved in it escapes first followed by water itself getting converted into vapour. This is how animals living underwater are able to respire.

Air bubbles can be seen when water is heated

- To see the presence of water in the soil, we take a small lump of it in a beaker and add water to it. We see bubbles coming out of it which as we discussed, is proof of the existence of air molecules in the soil. As water is added, it displaces the water molecules in the soil which we see in the form of bubbles. Animals make use of this air to breathe under the soil. Some animals make holes and burrows in the soil to help make pathways for air to enter the soil. When it rains heavily, earthworms and other animals come out of the soil because these pathways get blocked by the water and they need to come outside to find the air to breathe.

Air particles present in soil

Balance of Oxygen in the Atmosphere

It is common knowledge that humans and animals can't survive without plants because they produce oxygen via photosynthesis. The balance of oxygen in the environment is thus maintained through the respiratory processes of plants and animals.

The importance of Air

Air has a number of uses:

- The air which is in motion is known as wind. The wind is important for the rotation of windmills which help in drawing water from tube wells.
- They also help in running flour mills.
- Windmills are also used to produce electricity.
- Insects and birds are only able to fly because of the presence of air
- Boats, yachts, aeroplanes and parachutes also need air to sail and glide
- Air has a very important role to play in the water cycle as well.
- It also helps in distributing the pollen and seeds from flowers of various plants.

SOME IMPORTANT QUESTIONS

1. Fill in the Blanks-

i.) Plants absorb ____ to make their own food.

ii.) Oxygen is returned to the atmosphere by the process of ____.

iii.) Combustion cannot take place without ____ gas.

iv.) ____ gas maintains the temperature of the earth.

v.) Carbon dioxide is ____ than air.

Answer.
i.) Carbon dioxide ii.) Photosynthesis. iii.) Oxygen gas. iv.) Carbon dioxide v.) Carbon dioxide

State True or False

i.) Plants use oxygen during photosynthesis.

ii.) The only elements in the air are nitrogen and oxygen.

iii.) Water vapour is present in the air.

iv.) Air exerts pressure.

v.) The composition of air is constant in the atmosphere.

Answer.

i.) True ii.) False iii.) True iv.) True v.) False

Match the Following-

Column A	Column B
a.) Respiration	i.) Process of preparing food by plants.
b.) Air	ii.) It is moving air.
c.) Photosynthesis	iii.) Process of burning food to get energy.
d.) Nitrogen	iv.) It is a gaseous mixture
e.) Wind	v.) The major component of air.

Answer.

Column A	Column B
a.) Respiration	iii.) Process of burning food to get energy.
b.) Air	iv.) It is a gaseous mixture
c.) Photosynthesis	i.) Process of preparing food by plants.
d.) Nitrogen	v.) The major component of air.
e.) Wind	ii.) It is moving air.

Very Short Answer Questions-

Q1. Name the main component of air.

Answer. Nitrogen.

Q2. What is the percentage of oxygen in the air?

Answer. 20.9%

Q3. What is the source of carbon dioxide in the atmosphere?

Answer. Animal and plant respiration, as well as fuel combustion.

Q4. Which gas in the air is necessary for combustion?

Answer. Oxygen.

Q5. Define humidity.

Answer. The amount of water vapour present in the air is humidity.

Q6. Which gas is given out during respiration by humans?
Answer. Carbon dioxide.
Q7. Can you see the air?
Answer. No, we cannot see air. We can only feel it.
Q8. Name some musical instruments in which air plays an important role.
Answer. Flute, saxophone, trumpet, horn, etc.
Q9. Which gas in the air is essential for breathing?
Answer. Oxygen.
Q10. Which gases in the air are not a supporter of combustion?
Answer. Nitrogen and carbon dioxide.

Short Answer Questions-

Q1. Why is air considered a mixture?
Answer. Air is made up primarily of oxygen and nitrogen, as well as carbon dioxide and other gases. In the air, these gases retain their properties. As a result, the air is referred to as a mixture.
Q2. Why do you think mountaineers bring oxygen cylinders when climbing high mountains?
Answer. The amount of air decreases as we ascend higher into the atmosphere. The air at the summits of extremely high mountains is so thin that people cannot breathe properly. Mountaineers, or people who climb mountains, carry "oxygen gas" cylinders with them. They breathe in oxygen from these cylinders to survive on high mountains.

Q3. List the properties of air.
Answer. The following are the properties of air:

- It is colourless
- It is transparent
- It can be compressed.
- It occupies space
- It has mass

Q4. Define atmosphere.

Answer. The atmosphere is a gaseous blanket that surrounds the earth and contains the air we breathe. The planet's gravitational attraction keeps it close to the planet's surface.

Q5. Why do you feel suffocation in a closed room, where some material is burning?

Answer. In a closed room where some material is burning, we feel suffocated because the smoke contains few gases and harmful fine dust particles.

Q6. How does oxygen reach animals living in soil and water?

Answer. Air fills the space between the soil particles. The air between soil particles supplies oxygen to the animals that live there.

Aquatic animals and plants use dissolved oxygen in the water.

Q7. Why does the transparent glass of windows become hazy if it is not cleaned regularly?

Answer. Dust particles in the air adhere to the clear glass of windows. These particles also attract other elements, such as pollen, which collects on glass. As a result, if the windows' transparent glass is not wiped regularly, it appears hazy.

Q8. What are the functions of long chimneys in factories?

Answer. When fuel is burned, smoke is produced. Frequent smoke is harmful because it contains a few gases and fine dust particles. Long chimneys in factories keep harmful gases and smoke away from the people living near the factory.

Q9. Why do our nostrils have fine hair and mucus? Why is it not recommended to breathe in through the mouth?

Answer. The air contains dust particles. Inside the nose, fine hair and mucus prevent dust particles from entering the respiratory system.

Dust particles may enter our respiratory tract if we breathe through our mouth because it lacks these dust barriers (fine hair and mucus). Hence, breathing through the mouth is not advised.

Q10. Why do animals that live deep in the soil come to the surface during heavy rains?

Answer. Animals that live in the soil obtain oxygen for breathing (or respiration) from the air that exists between the soil particles. When it rains heavily, water fills the spaces in the soil occupied by the air. In this situation, the animals living within the soil must emerge from the soil to breathe. Earthworms, for example, emerge from the soil only during heavy rains.

Long Answer Questions

Q1. Why do animals that live deep within the soil come to the surface during heavy rains? How can you say that animals and plants are mutually dependent?

Answer. Plants and animals are mutually dependent on survival. Plants cannot survive for long without animals because they require CO_2 for photosynthesis, which is exhaled by animals. Similarly, animals will have no oxygen to breathe if plants do not exist. As a result, we can say that both are required to keep the balance of oxygen and carbon dioxide in the atmosphere.

Q2. Are breathing and respiration the same thing?

Answer. No, breathing and respiration are not the same things.
Breathing is a biophysical process in which oxygen is inhaled, and carbon dioxide is exhaled. In contrast, energy is produced during respiration by breaking down glucose, either in the presence of oxygen (aerobic respiration) or in the absence of oxygen (anaerobic respiration) (anaerobic respiration).
Thus, breathing is a physical process, whereas respiration is a chemical process.

Q3. Breathing through your mouth could be dangerous." How?
Answer. The amount of dust particles in the air varies according to time and location. We inhale air when we breathe through our nostrils. Fine hair and mucus are found inside the nose to keep dust particles out of the respiratory system. Breathing through our mouths can be harmful because it allows dust from the air to enter our respiratory system (lungs, etc.) and harm our health.
Q4. How is oxygen replaced in the atmosphere or air?

Answer. The oxygen in the air is used by animals (and plants) through respiration and is constantly replaced by plants through photosynthesis.

Plants produce their own food while simultaneously producing oxygen. Plants also use oxygen for respiration, but they produce more than they consume. Because of this, plants are said to produce oxygen.

Animals cannot survive without plants. Similarly, plants cannot survive without animals. They would consume the entire amount of CO_2 in the atmosphere. As a result, both are required to maintain the balance of oxygen and carbon dioxide in the atmosphere.
Q5. What will happen if atmospheric CO_2 levels rise?
Answer. Carbon dioxide has the ability to absorb infrared rays, which are heat rays. Nature maintains a carbon dioxide balance in the atmosphere, which provides optimal warmth. Increased carbon dioxide concentration in the atmosphere would raise the earth's temperature, causing glaciers to melt and flood, and so on. This is referred to as Global Warming.

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