

## **CHAPTER – 1**

### **Food: Where Does it Come From?**

- Food: Nutritious substance that people or animals eat or drink, or that plants absorb. In order to maintain life and growth.
- There is a lot of variation in the food eaten in different regions of India.
- The main sources of our food are plants and animals.
- Food sources from plants:- vegetables, pulses, spices, cereals, fruits, oils, etc.
- Food sources from animals:- milk, egg, honey, meat, fish, etc.
- Other sources of food are salt and water.
- Animals which eat only plants are called herbivores. Example: cow, goat, sheep etc.
- Animals which eat only animals are called carnivores. Example: tiger, lion, etc.
- Animals which eat both plants as well as other animals are called omnivores. Example: bears, foxes, dogs, etc.
- Animals that live on dead and decayin food is called scavengers. Example: hyenas, vulture, etc.

**CHAPTER – 2**  
**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. 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 caused due to the lack of required nutrients for a long period in the diet.
- **Some Nutrients Deficiency Diseases are:**
  - (a) **Protein:** Kwashiorkor - Stunted growth, thinning of legs, protruding belly.
  - (b) **Protein and Carbohydrates – Marasmus –** Complete/partial arrest of growth, lack of energy.
  - (c) **Vitamin D:** Rickets – Bowed legs, bent spine, deformed bones and joints.
  - (d) **Vitamin C:** Scurvy – Bleeding and swelling of gums, weakness.
  - (e) **Iodine:** Goitre – Enlargement of thyroid gland, retarded growth.
  - (f) **Iron – Anaemia –** Fatigue, loss of appetite, pale skin.

**CHAPTER – 3**  
**FIBRE TO FABRIC**

- Fibres: There are two types of fibres:
  - (a) **Natural Fibres:** The fibres which are obtained from plants and animals. Example: cotton, jute, silk and wool.
  - (b) **Synthetic Fibres:** Man-made fibres which are not obtained from plant and animals sources. Examples: rayon, nylon, polyester, etc.
- Fibres from plant sources:
  - (a) **Cotton:** cotton is grown in black soil and warm climate.
  - (b) **Jute:** jute is obtained from stem of jute plant.
- Fibres from animal sources:
  - (a) **Wool:** wool cloth is spun from yarn made from the fibres of the thick fleece of sheep.
  - (b) **Silk:** silk thread is obtained from the saliva of an insect called silkworm.
- Processing of wool: It involves four steps:
  - (a) **Shearing:** The process of removal of wool from the sheep's skin.
  - (b) **Grading:** The process of separating fleece from damaged wool.
  - (c) **Carding:** The process after the wool has been washed and dried, it is passed through the rollers (that have teeth).
  - (d) **Spinning:** The process by which fibres are gathered together and drawn into a long rope and then twisted to make yarn.
- Fabrics are made from yarns, which in turn are made from fibres.
- Making Fabric from Yarn: It is done by two processes:
  - (a) **Weaving:** The process by two sets of yarns are arranged together to form fabric. It is done on looms.
  - (b) **Knitting:** The process by which a single yarn is used to make fabric. It is done by hand or machines.

## **CHAPTER – 4**

### **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.
- 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 in understanding similarities and dissimilarities among objects.

**CHAPTER – 5**  
**SEPARATION OF SUBSTANCES**

- Handpicking, winnowing, sieving, sedimentation, decantation and filtration are some of the methods of separating substances from their mixtures.
- Methods of separation:
  - (i) Separation of solid from other solids:
    - (a) **Threshing**: Process by which the grains are released from the chaff.
    - (b) **Winnowing**: The process of separation of heavier and lighter components of a mixture by wind or blowing air.
    - (c) **Hand-picking**: The process by which undesirable components are just picked up by hand.
    - (d) **Sieving**: The process by which separate solid constituents of a mixture which differ in their sizes.
    - (e) **Magnetic separation**: Process by which magnet is moved over such a mixture, the magnetic material sticks to it and is removed.
  - (ii) Separation of water soluble solids:
    - (a) **Evaporation**: Process by which the conversion of liquid state into gaseous state on heating.
    - (b) **Condensation**: Process by which conversion of gaseous state into liquid state on cooling.
  - (iii) Separation of insoluble solids from Liquids:
    - (a) **Sedimentation**: It allows heavier matter to settle down. Example: sand, water.
    - (b) **Decantation**: The methods of separating insoluble solids from liquids.
    - (c) **Loading**: The methods by which finer particles are made to settle faster by dissolving a small quantity of alum.
    - (d) **Filtration**: The liquid that collects in the beaker is called filtrate.
  - (iv) Separation of Immiscible Liquids:
    - (a) **Funnel**: The method of separating mixture of oil and water.

(b) **Centrifugation:** The method in which mixture containing suspended particles is rotated at a high speed in a centrifuge and heavier particles settle down. It is used for separating cream from milk.

(c) **Churning:** The method which is used for separating lighter particles of solid suspended in a liquid. Example: butter from curd.

- Husk and stones could be separated from grains by handpicking.
- Husk is separated from heavier seeds of grain by winnowing.
- A saturated solution is one in which no more of that substance can be dissolved.
- More of a substance can be dissolved in a solution by heating it.
- Water dissolves different amount of soluble substances in it.

## CHAPTER – 6

### Changes Around Us

- Some changes can be reversed and some cannot be reversed.
- A change may occur by heating a substance or by mixing it with some other.
- Types of changes:
  - (a) **Reversible change:** A change in which the initial substance can be obtained back by reversing the action. Example: folding of paper, dissolving sugar in water, etc.
  - (b) **Non-irreversible change:** Change in which the initial substance cannot be obtained back by reversing the action. Example: burning of paper, grinding grains etc.
  - (c) **Physical change:** Changes in the form of substance but not in chemical identity. No new substance formed. Change is sometimes reversible. Example: breaking a log of wood.
  - (d) **Chemical changes:** Changes in which substance is transformed into new substance. Initial substance is lost. Change is always irreversible. Example: burning a log of wood.
- Ways by which changes occur:
  - (a) **Boiling and Condensation:**
    - (i) **Boiling:** The rapid vaporization of a liquid when it is heated to its boiling point.
    - (ii) **Condensation:** The change of water vapor into liquid water on cooling.
  - (b) **Heating of metal:** Process in which a **metal** is **heated** to a certain temperature and then cooled in a particular manner to alter its internal structure for obtaining desired degree of physical and mechanical properties such as brittleness, hardness, and softness.
  - (c) **Freezing and Melting:**
    - (i) **Freezing:** The process in which a liquid turns into solid when its temperature is lowered.
    - (ii) **Melting:** The process in which a solid converts to a liquid by applying heat.

**CHAPTER – 7**  
**GETTING TO KNOW PLANTS**

- Plants are usually grouped into herbs, shrubs, trees, and climbers based on their height, stems and branches.
- Classification of Plants on the of Growth Habit:
  - (a) **Herbs:** Have soft, green and week stems. Example: rice, wheat, maize, sunflower, mint, etc.
  - (b) **Shrubs:** They are bushy and have hard stems that do not bend easily. These are plants with the stem branching out near the base. Example: lemon, china rose, jasmine, Nerium, etc.
  - (c) **Trees:** These are big plants which have a tall and strong stem (trunk). Stems have branches in the upper part, much above the ground. Live for many years. Example: mango, neem, banyan, coconut, etc.
  - (d) **Climbers:** Have weak stems and cannot stand erect. They take support of other trees and climb on them. Example: pea, grape, vine, etc.
  - (e) **Creepers:** Plants which creep on the ground and spread out. Example: pumpkin and watermelon.
- Classification of plants on the basis of their Life Cycle:
  - (a) **Annuals:** Plants whose life cycle is completed in the one season. These are generally herbs. Example: wheat and mustard.
  - (b) **Biennials:** Plants whose life cycle requires two seasons for completion. They are generally herbs and rarely shrubs. Example: carrot, radish and potato.
  - (c) **Perennials:** Plants whose life cycle runs for more than two seasons example: guava, babul and palm trees.
- Parts of a Plants:
  - (a) **Root system:** It is the underground portion of the plant.
    - (i) **Tap Root:** It is the main primary root arises from lower end of the stem. A number of tiny braches called secondary roots. Example: mustard, neem, rose, etc.



- (ii) **Fibrous Root:** A bunch of roots arises from the base of stem. Example: wheat, maize, etc.

Functions of root system:

- (i) Roots absorb water and nutrients from the soil.
- (ii) Roots help the plant to stand erect.
- (iii) Roots check soil erosion.
- (iv) Roots store food.
- (v) Prop roots offer extra support.

(b) **Shoot system:** The part of the plant which grows above the soil. It includes stems, branches, leaves, flowers and fruits.

- (i) **Stem:** Gives rise to a number of branches that bear leaves. The stem bears leaves, flowers and fruits.
- (ii) **Leaf:** Leaf arises from the leaf base. A leaf usually has a petiole and a lamina.

**Parts of leaf:**

- (a) **Petiole:** Stalk of the leaf with which it joined to the stem.
- (b) **Leaf lamina:** The flat green portion of the leaf.
- (c) **Veins:** These are the network of small, narrow, tube-like structures on both sides of the midrib present in the middle of leaf.

- (iii) **Flower:** It is the reproductive organ of the plant.

- **Function of Stem:**

- (i) It provides support to plant.
- (ii) It bears important plant parts.
- (iii) It helps in transportation of water and food.
- (iv) Underground stems store food.
- (v) Thick and fleshy stems make food.
- (vi) Stem modified into tendrils give extra support for plants.

- **Function of Leaf:**

- (i) **Transpiration:** Process of loss of water by the leaves of a plant.
- (ii) Preparation of food by the process of photosynthesis.

- **Function of Flowers:**

- (i) Help in reproduction.
- (ii) These become fruits that store food and seeds.

(iii) Modified flowers like cauliflower, broccoli are rich sources of vitamins.

- **Parts of Flower:**

(i) **Pedice:** Stalk of the flower through which the flower is joined to the branch. It has joined to the branch.

(ii) **Sepal:** Small green leaf-like structures on the thalamus. They protect the flower.

(iii) **Petals:** Brightly colored leaf-like structures present inside the sepals. Petals attract the insects and help in the process of reproduction.

(iv) **Stamens:** These are long, thin and needle-like structures. These are male organs of the flower. It consists of two parts: Anther, Filament.

(a) **Anther:** The swollen tip of each stamen that encloses in it a small powdery substance called pollen grains.

(b) **Filament:** Long stalk-like structure that joins the anther with thalamus.

(v) **Carpel:** It is a flask-shaped organ in the centre of flower. It is the female organ of the flower. It consist three parts: Style, Stigma and Ovary.

(a) **Style:** Long thin tube-like structure which is swollen at the base.

(b) **Stigma:** Small, round and sticky part of the carpel at the top of the style the traps the pollen grains.

(c) **Ovary:** Swollen part of carpel that contains ovules.

- The pattern of veins on the leaf is called venation. It can be reticulate or parallel.
- Leaves give out water vapour through the process of transpiration.
- Green leaves make their food by the process of photosynthesis using carbon dioxide and water in the presence of sunlight.
- Roots absorb water and minerals from the soil and anchor the plant firmly in the soil.
- Roots are mainly of two types: tap root and fibrous roots.
- Plants having leaves with reticulate venation have tap roots while plants having leaves with parallel venation have fibrous roots.
- The stem conducts water from roots to the leaves (and other parts) and food from leaves to other parts of the plant.

**CHAPTER – 8**  
**Body Movements**

- **Locomotion:** Movement of organisms from place to place.
- **Locomotion in human body:**
  - (i) **Human skeleton:** It forms a framework that gives shape and support to the body. It consists of 206 bones. It protects internal organs.
    - (a) **Skull:** It protect the brain. It is rigid box made up of plates of bone firmly joined together.
    - (b) **Rib cage:** It is flexible case of ribs. Each rib curves round the side of the chest from the backbone and is joined in front to a plate of bone called sternum. Ribs are conneceted to one another by the muscles. Two lower most pairs of ribs are called 'floating ribs'.
    - (c) **Backbone:** It is also called the spine or vertebral column. It is a chain of small bones called **vertebrae**. It protect the spinal cord, which carries maessages between the brain and body. It also support the skull, ribs and limbs.
    - (d) **Limbs:** It is made up of long bones with joints that allows them to move. They are mainly for support.
      - (i) **Arms:** fore-arms is made up of two bones and hands have several small bones. Shoulder bones have a pair of collar bones in front and a pair of shoulder blades.
      - (ii) **Legs:** Lower leg is made up of two bones and feet have several small bones. Hip bones or gridles bear weight of body and are attached to thigh bones.
  - (ii) **Joints:** The point where two bones meet. Allow movement to take place. Bones are held together by ligaments.
    - (a) **Movable Joints:** It allows movement between bones and have cartilage between them. Type of movable joints are:
      - (i) **Hinge Joints:** It allow movement only in one plane backwards and forwards. Example: elbow joints, knee joints and joint between phalanges of fingers and toes.

- (ii) **Ball and Socket Joints:** It permit a circular movement. Example: the shoulder.
- (iii) **Gliding Joints:** It allow bones to slide a little. Example: bones inside wrists and feet.
- (iv) **Pivotal Joints:** Joint where the neck joins the head. It allows head to move backward and forward and turn to right and left.

(b) **Immovable or Fixed Joints:** The bones cannot move at these joints. Example: bones in skull, joint between upper jaw and rest of skull.

- **Locomotion in other animals:**

- (i) **Fish:** Locomotion achieved by lateral contractions of the muscular body with a final thrust by the tail. Fish swim by forming loops alternately on two sides of the body.
  - (ii) **Birds:** When the large flight muscles contract, they pull the wings down.
  - (iii) **Snails:** The muscular foot helps in locomotion.
  - (iv) **Earthworms:** Move by stretching out body in front and keeping the hind end fixed to the ground.
- The bones are moved by alternate contractions and relaxations of two sets of muscles.
  - The bone joints are of various kinds depending on the nature of joints and direction of movement they allow.
  - Strong muscles and light bones work together to help the birds fly. They fly by flapping their wings.
  - Snakes slither on the ground by looping sideways. A large number of bones and associated muscles push the body forward.
  - The body and legs of cockroaches have hard coverings forming an outer skeleton. The muscles of the breast connected with three pairs of legs and two pairs of wings help the cockroach to walk and fly.

**CHAPTER – 9****THE LIVING ORGANISMS AND THEIR SURROUNDINGS**

- The surroundings where plants and animals live, is called their habitat.
- Several kinds of plants and animals may share the same habitat.
- The presence of specific features and habits, which enable a plant or an animal to live in a particular habitat, is called adaptation.
- There are many types of habitats, however, these may be broadly grouped as terrestrial (on the land) and aquatic (in water).
- There is a wide variety of organisms present in different habitats.
- Plants, animals and microorganisms together constitute biotic components.
- Rocks, soil, air, water, light and temperature are some of the abiotic components of our surroundings.
- Characteristics of living things:
  - (i) They need food to grow and for the processes.
  - (ii) The young ones grow into adults.
  - (iii) They respire. Animals breathe in oxygen and breathe out carbon dioxide. Plants take in carbon dioxide and give out oxygen.
  - (iv) They respond to changes in the surrounding (stimuli).
  - (v) They all get rid of wastes produced in the body (excretion).
  - (vi) They reproduce their own kind.
  - (vii) They show movement.
- **Habitat:** The surroundings where organisms live. It has two components biotic (living things like plants and animals) and abiotic (non-living things like rocks, soil, air and water).
- **Type of Habitat:**
  - (a) **Terrestrial Habitat:** Plants and animals live on land. Example: forest, grasslands, deserts, coastal and mountain ranges.
  - (b) **Aquatic Habitat:** Plants and animals live in water. Example: ponds, swamps, lakes, rivers and oceans.

## Key Notes

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**Adaptations:** Presence of specific features or certain habits which enable an organism to live in its surrounding.

### **Terrestrial:**

- (a) **Deserts:** Small animals stay in borrows deep in sand during day, and come out at night. In plants, leaves are either absent or very small as spines; stem has a thick waxy coating; roots go deep into the soil.
- (b) **Mountains:** Animals have thick skin or fur; mountain goat has strong hooves. Trees are cone shaped having sloping branches; leaves are needle like.
- (c) **Grasslands:** Animals are light brown in colour; **Lion:** Long claws in front legs that can be withdrawn inside the toes; eyes in front of face. **Deer:** Strong teeth, long ears, eyes on the sides of head.

### **Aquatic:**

#### (a) **Ponds:**

- **Plants with roots fixed in soil:** Stems are long, hollow and light; leaves float on water.
- **Plants with roots submerge:** Leaves are narrow and thin ribbon-like.

#### (b) **Oceans:**

- Animals have streamlined body; gills to respire (dolphins and whales have blowholes).
- Animals like squids and octopus do not have streamlined body and stay deep in water.

**CHAPTER – 10****MOTION AND MEASUREMENT OF DISTANCES**

- Different modes of transport are used to go from one place to another.
- In ancient times, people used length of a foot, the width of a finger, the distance of a step as units of measurement. This caused confusion and a need to develop a uniform system of measurement arose.
- Now, we use International System of Unit ( SI unit). This is accepted all over the world.
- Metre is the unit of length in SI unit.
- Motion in a straight line is called rectilinear motion.
- In circular motion an object moves such that its distance from a fixed point remains the same.
- Motion that repeats itself after some period of time, is called periodic motion.
- **Measurement:** The comparison of an unknown quantity with some known quantity of the same kind. Measurement of an object consists of :  
The unit of measurement.  
The number of units the object measures.
- **Conventional Methods of Measurement:** Conventional measurements have only been approximate measurement. Differ from person to person. Lack precision.
  - (i) **Handspan:** Length between the tip of thumb and little finger.
  - (ii) **Cubit:** Length between the tip of middle finger and elbow.
  - (iii) **Arm length:** Length from shoulder to the tip of middle finger.
  - (iv) **Footstep:** It is the distance covered by a step.
- **Standard units of Measurement:** It is a unit to measure any quantity completely and uniformly. Standard units for measuring, length-metre, mass-kilogram, time-second.
- **Motion:** When the position of a body does not change with the passage of time, the body is said to be at rest. When the position of a body changes with the passage of time, the body is said to be in motion.  
**Types of motion:**
  - (a) **Linear motion:** Linear motion are further classified into two:

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- (i) **Rectilinear Motion:** Object moves from one position to another along a straight line. Example: group of ants moving in a line.
- (ii) **Curvilinear Motion:** Object moving along a curved line. Example: a car moving along a curved road.
- (b) **Random Motion:** When object moves from one position to another and changes direction in an irregular manner. Example: butterfly, flies randomly in garden.
- (c) **Circular Motion:** Object moves in a circular manner in relation to its own axis or around a fixed centre. Object remains at the same distance from a fixed point which is the centre of the path of the motion. Two types of circular motion:
  - (i) **Revolution:** Object moves as a whole around a fixed centre. Example: earth revolving around the sun in a definite orbit.
  - (ii) **Rotation:** Object moves in a circular path in relation to its own fixed axis. Example: blades of a moving fan, windmill, etc.
- (d) **Vibratory Motion:** Object moves to and fro very fast. Example: strings of a guitar when plucked.
- (e) **Periodic Motion:** Object oscillates to and fro along the same path again and again and with the same speed. Time taken by an object to complete one oscillation is same, no matter how many oscillations the object takes. Example: heartbeat, pendulum of a clock.
- (f) **Non-periodic Motion:** Object does not repeat motion at regular intervals of time.
- (g) **Uniform Motion:** When the body covers equal distance in equal time interval.
- (h) **Non-uniform Motion:** Motion in which the body covers unequal distance in equal interval of time.



**CHAPTER – 11****LIGHT, SHADOWS AND REFLECTIONS**

- **Light:** Light is the natural agent that stimulates sight and makes things visible.
- Light is classified into two:
  - (i) **Emission of light:** Classifying objects on the basis of emission of light.
    - (a) **Luminous Objects:** Objects that emit their own light. Example: sun, electric torch, firefly, etc.
    - (b) **Non-luminous Objects:** Objects that do not emit their own light but are visible due to light falling on them. Example: moon, chair, table, etc.
      - **Transparent:** Objects or materials through which light can pass totally. Example: glass, water, air, etc.
      - **Translucent:** Objects that allow light to pass through them partially. Example: butter paper, tissue paper, etc.
      - **Opaque:** Objects that do not allow light to pass through them. Example: book, brick, etc.

**Shadow:** Region without light that forms behind an object kept in the path of light. Opaque object casts a dark shadow. Translucent objects produce a weak shadow. Transparent objects do not cast a shadow at all.

**Types of shadow:**

**Due to smaller light source:** Only one dark shadow is formed and this is known as **umbra**.

**Due to larger light source:** Two shadows are formed—a dark one in the centre and a light one on the outside. Dark shadow is called **umbra** and the faint or lighter shadow is called **penumbra**.

**Eclipse:** A shadow formed in space that makes the sun or the moon invisible for some time.

**Solar eclipse:** The moon comes between the sun and the earth, so that the earth (in the shadow) darkens during the day.

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**Lunar eclipse:** The moon and the sun are in a straight line such that the earth is in the between the sun and the moon, the shadow of the earth falls on moon and the moon cannot be seen.

- (ii) **Reflection of light:** The process of sending back the light rays whichafall on the surface of an object. Silver metal is one of the best reflector of light.

**CHAPTER – 12****ELECTRICITY AND CIRCUITS**

- **Electricity:** It is a flow of electric current.
- **Electric Current:** The electric current flows around by **Electric Circuit**.
- **Electric Circuit:** In a closed electric circuit, the electric current passes from one terminal of the electric cell to the other terminal.
- **Circuit Diagram:** It is a symbolic representation of the electric circuit.
- **Component of Electricity:**
  - (i) **Connecting wires:** Help to conduct the electric current and complete the circuit.
  - (ii) **Bulb:** Lights up when an electric current flows through it. An electric bulb has a filament that is connected to its terminals. An electric bulb glows when electric current passes through it.
  - (iii) **Switch:** Switch is a simple device that is used to either break the electric circuit or to complete it. When a switch is on, a gap in the circuit is bridge by a conducting material through which the current flows.
  - (iv) **Electric cell:** An electric cell has two terminals; one is called positive (+ ve) while the other is negative (– ve).
- Connecting wires, bulb, switch and electric cell is used in Torch, Battery, LED (Light Emitting Diode), etc.
- Electric current is carried by **Conductor**.
- **Conductor:** Materials that allow electric current to pass through them. All metals are good conductors of electricity. Carbon is the only non-metal which is a good conductor of electricity.
- Electric current is stopped by **Insulators**.
- **Insulators:** Materials which do not allow electric current to pass through them. Example: plastic, rubber, wood, glass, polythene, PVC, etc.

## CHAPTER – 13

### FUN WITH MAGNETS.

- **Magnets:** Materials that attract iron. Natural magnet is called lodestone or magnetite.
- Magnetite is a natural magnet.
- Magnet attracts materials like iron, nickel, cobalt. These are called magnetic materials.
- Materials that are not attracted towards magnet are called non-magnetic.
- A freely suspended magnet always aligns in N-S direction.
- Classification of substances based on attraction to magnets:

**Magnetic Substances:** Materials which get attracted towards magnets. Example: copper, iron, nickel, etc.

**Non-magnetic Substances:** Materials which do not get attracted towards magnets. Example: wood, paper, plastic and most metals.

- Methods to make Magnet:
  - (i) **Single Touch Method:** A piece of iron or steel can be magnetized by stroking it several times with a magnet in one direction.
  - (ii) **Double Touch Method:** Opposite poles of two bar magnets are brought together in the middle and then moved from the middle in the opposite directions to each other.
  - (iii) **Using Electric Current:** The bar to be magnetized is placed inside the coils of a conductor and current is passed through these coils of wire.
- Properties of Magnet:
  - (i) A magnet has two poles – north pole and south pole.
  - (ii) Similar poles repel each other.
  - (iii) Opposite poles attract each other.
  - (iv) Magnetic poles always exist in pairs.
- Applications of Magnet:
  - Compass needle:** It points north-south because the earth is also a giant magnet. The compass lines up with the earth's magnetic field.
  - Used in factories for lifting heavy masses of iron like scrap iron.
  - Used by surgeons in hospitals to remove steel splinters from the wounds.
  - Used in the construction of telephones, electric bells, etc.
  - Used to separate iron and steel from non-magnetic materials.

## CHAPTER – 14

### WATER

- Water is essential for life.
- Water which is fit for human consumption is known as **Fresh water** or **Potable water**.
- Only 2.6% of total water is fresh water.
- Only 0.01% of the total water reaches humans and animals.
- **Water Cycle:** The cycle of processes by which water circulates between the earth's oceans, atmosphere, and land, involving precipitation as rain and snow, drainage in streams and rivers, and return to the atmosphere by evaporation and transpiration.
- **Water Conservation:** It is the wise and judicious use of water.
- **Ways of conserving water:**
  - (i) Get all leaking taps repaired.
  - (ii) Use a bucket for taking bath instead of a shower.
  - (iii) Collect rainwater and use it for gardening and recharging ground water.
  - (iv) Wash your cycles, cars, etc. with a bucket of water instead of pipes.
  - (v) Instead of washing the floor use a mop.
- **Importance of Water:**
  - (i) Digestion of food takes place in the stomach when food is mixed with water.
  - (ii) Important medium for the transportation of food, oxygen and carbon dioxide in the body.
  - (iii) Water is used to produce electricity.
  - (iv) Water is essential for the germination of seeds.
  - (v) Water helps in maintaining the body temperature.
- **Excess of water:** When it rains or snow, some of the water is retained by soil. Its caused flood. It effects by damage property and endanger the lives of humans and animals. Rapid run-off causes soil erosion.
- **Lack of water:** It is the lack of sufficient available **water** resources to meet **water** needs within a region. It cause drought like condition. It effect by acute water crisis, crop failure, loss of life in all forms due to starvation.

- **Rainwater Harvesting:** Method of collecting rainwater and storing it for use during scarcity. It can be used for several purposes including drinking, washing, gardening, flushing, etc.
- Water vapour gets added to air by evaporation and transpiration.
- The water vapour in the air condenses to form tiny droplets of water, which appear as clouds. Many tiny water droplets come together and fall down as rain, snow or hail.
- Rain, hail and snow replenish water in rivers, lakes, ponds, wells and soil.
- Excessive rains may cause floods while lack of it for long periods may cause droughts.
- The amount of usable water on earth is limited so it needs to be used carefully.

## CHAPTER – 15

### Air Around Us

- **Air:** The invisible gaseous substance surrounding the earth, a mixture mainly of oxygen and nitrogen.
- The blanket of air that surround the earth is called atmosphere.
- Air is found everywhere. We cannot see air, but we can feel it.
- Air in motion is called wind.
- Air occupies space.
- Air is present in water and soil.
- Air is a mixture of nitrogen, oxygen, carbon dioxide, water vapour and a few other gases. Some dust particles may also be present in it.
- Atmosphere is essential for life on earth.
- Aquatic animals use dissolved air in water for respiration.
- Plants and animals depend on each other for exchange of oxygen and carbon dioxide from air.

- **Constituent of Air:**

**Nitrogen:** Plants need nitrogen to grow.

**Oxygen:** Used by all living things to respire and help to burn things.

**Carbon dioxide:** Plants and animals consume oxygen and produce carbon dioxide during respiration. It is used by green plants for photosynthesis. It is released on burning.

**Water Vapour:** Formed due to evaporation of water. Amount of water vapour present in the air is called humidity. Varies from place to place and also in the same place during day and night.

**Dust and Smoke:** Smoke contains a few gases and fine dust particles. It is very harmful. Presence of dust particles in air varies from time to time and from place to place.

- **Importance of Air:**

- (i) Air aids burning.
- (ii) Air is needed for breathing.
- (iii) Plants need air to make food.
- (iv) Birds fly in air. Aeroplanes also go up in the air because of air pressure.
- (v) Moving air is called wind. The wind makes the windmill rotate.
- (vi) Air help in quick evaporation of sweat that helps in keeping us cool.

**CHAPTER – 16**

**GARBAGE IN, GARBAGE OUT**

- **Waste:** A material that has no longer any value to the person who is responsible for it.
- **Source of Waste:**
  - (i) **Domestic Wastes:** garbage, rubbish, excreta, ashes, sullage are domestic wastes.
  - (ii) **Industrial wastes:** wastes produced by industries. The common industrial wastes are smoke, plastic, objects, glass, fly ash, etc.
  - (iii) **Agricultural wastes:** common agricultural wastes are rice husk, dried stems and straw, weeds and cattle waste.
  - (iv) **Commercial wastes:** wastes generated from commercial establishments such as shops, malls, stores, restaurants, hotels, motels, printing press, auto-repair shops, medical facilities.
- **Type of wastes:**
  - (i) **Biodegradable wastes:** Wastes which can be broken down through the action of microorganisms into their simple constituents. Example: plant products, organic wastes, domestic refuse and animal wastes.
  - (ii) **Non-biodegradable wastes:** Wastes which cannot be disintegrated by action of microorganisms and remains unaffected from decomposition. Example: plastics, glass, metal, scraps, etc.
  - (iii) **Plastics:** Many things are made up of plastics like bags, shoes, bottles, pipes, pens, etc. it cannot be converted into less harmful substances by composting.
- **Ill effect of Plastics:**
  - (a) Burning emits poisonous gases which cause health problems.
  - (b) Foods thrown in plastic bags are eaten by stray animals which can lead to death.
  - (c) Carelessly thrown plastic bags choke sewer system.
  - (d) Food stored in bad quality plastics can be harmful.
- **Management of Plastics:**
  - (a) Do not throw plastics here and there after use.
  - (b) Do not burn plastic bags and other plastic items.
  - (c) Use paper or cloth bags in place of plastic bags.
  - (d) Educate friends and family members about the proper disposal of plastics.
- **Management and Disposal of Waste:**



(a) **3R's** – Reduce, Reuse, Recycle. It means the **reduce** waste production, **reuse** of materials and **recycle** and reprocessing of waste materials for making new products

(b) **Landfills or Composting:** Converting plant and animal waste including that from kitchen, into manure, is called composting. Low lying open areas to deposit biodegradable waste.

(c) **Vermi-composting:** Method of preparing compost with the help of red worms. Excreta of the worms make the compost very rich in nutrients.

- Landfill is an area where the garbage collected from a city or town is dumped. The area is later converted into a park.
- Paper can be recycled to get useful products.
- Plastics cannot be converted into less harmful substances by the process of composting.
- We need to generate less waste and find ways of dealing with the increasing amount of garbage in our surroundings.