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 behing an object kept in the path of light. Opaque object cast 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.

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

- **Electiricity:** It is a flow of electic current.
- **Electric Current:** The Electic 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 electic 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 Iodestone 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 strocking it several times with a magent 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.

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.

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 wstes 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 restarurants, 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 pastic 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.

(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 deposite 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.