Sorting Materials into Groups

Synopsis

- The process of the classification of objects based on some known criteria is called grouping or sorting.

- We have a huge variety of objects present around us. Because of this, it is very important to classify objects into groups. If we know the properties of one member of the group, it would be very easy to predict the properties of the other members too.

  Some of the properties of materials are:

- **Appearance**

  The various parameters governing the appearance of materials are colour/texture, roughness, shape, size, etc.

- **Lustre**

  Some materials shine when light falls on them. This property is generally observed in objects that are grouped as metals, e.g. gold and silver. They are hard, strong, flexible and good conductors of heat and electricity. They can be drawn into wires (ductile) and sheets (malleable).

- **Hardness**

  It is the measure of how resistant a material is to various kinds of shape changes when a force is applied. Hardness can also be measured by the ease with which a material can be compressed or stretched. Materials that can be easily stretched and compressed are called soft materials. Materials which are difficult to compress and stretch are called hard materials.

- **Solubility**

  In general, solubility is defined as the ability of a substance to dissolve in water. In the process of dissolving/the substance which is being dissolved is called a solute and the substance in which the solute is dissolved is called a solvent. A mixture of solute and solvent is called a solution, e.g. if we add sugar to water, then, sugar is the solute

and water is the solvent. The mixture of sugar and water is called sugar solution. Substances which are not soluble in water are called insoluble substances, e.g., sand, wood. If two liquids mix together completely then they are called misdble liquids, e.g. water and ink. If two liquids do not mix but form separate layers, then they are called immiscible liquids, e.g., water and oil.

- **Relative density or Density with respect to water**

  $$\text{Relative density} = \frac{\text{Mass of substance}}{\text{Mass of water}}, \quad \text{Density} = \frac{Mass}{Volume}$$

  The density of water at $4°C$ is taken as 1. Substances having relative density of more than 1 tend to sink in water and those having less than 1 tend to float on water.

- **Behaviour towards light**

  Substances can be divided into three groups depending on their behaviour towards light.

  Transparent materials

  They allow most of the light to pass through them, e.g., glass.

  Translucent materials

  They allow only some part of the light to pass through them, e.g., butter paper.

  Opaque materials

  They do not allow light to pass through them, e.g. iron sheet or wood.