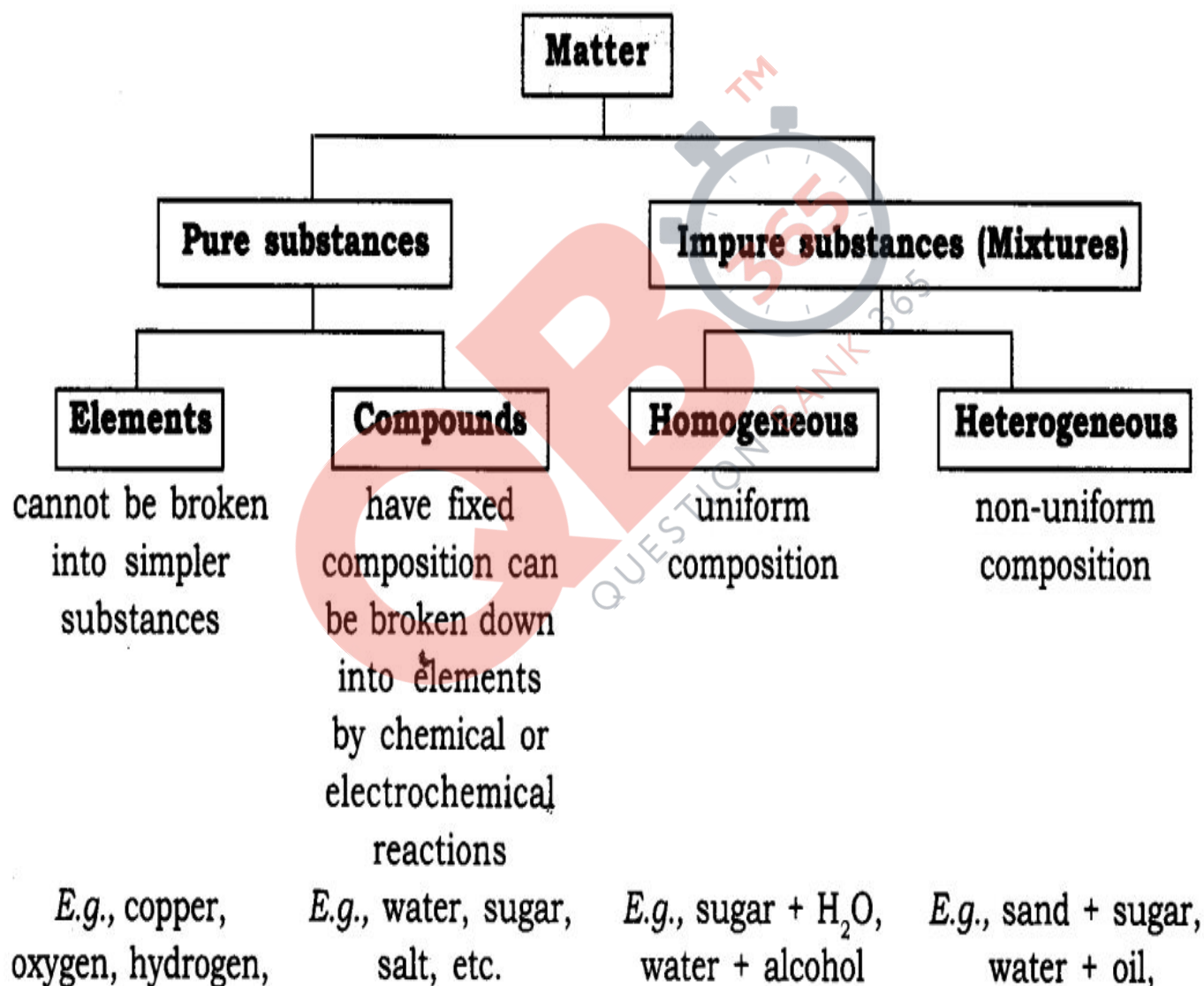


# 9<sup>th</sup> Standard Science

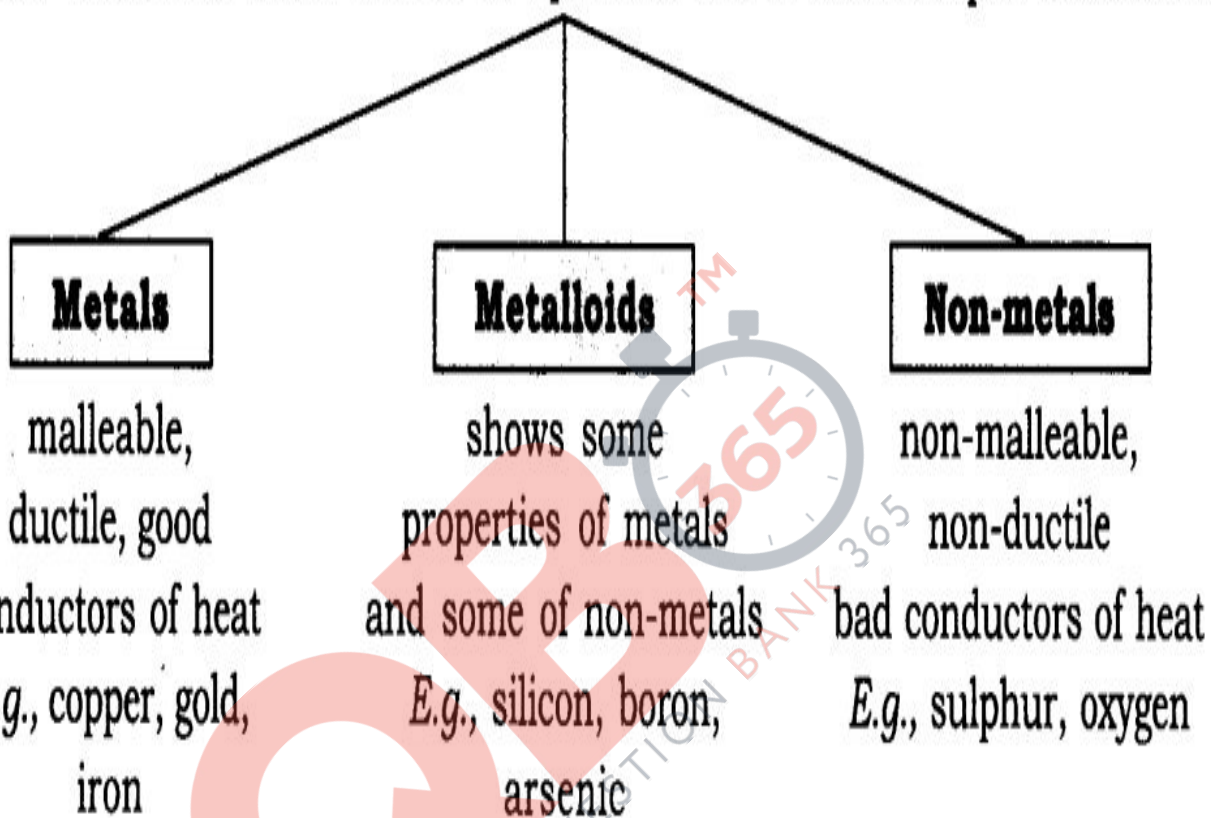
## Is Matter Around Us Pure

### Facts that Matter



## **Elements**

It is a pure substance which cannot be split into two or more simpler substances.



## **Compounds**

The compound is a pure substance made up of two or more elements combined chemically in a definite ratio.

### **Characteristics:**

- The properties of compound differ from those of its constituents.
- Compound has fixed melting point and boiling point.
- Compound is a homogeneous substance.
- Constituent elements can be separated by chemical process.

## Mixtures

It is made up of two or more elements or compounds mixed in any ratio/proportion.

### Properties:

- It may be homogeneous or heterogeneous.
- The properties of constituent substances are retained.
- No new compound is formed.
- Elements can be separated by simple physical processes.
- It does not have a fixed melting and boiling point.

### Separation of Mixtures:

<b>Type of Mixture</b>	<b>Separation method</b>
1. Two immiscible liquids. Example, oil + water	By using separating funnel
2. Ammonium chloride + sand	Sublimation
3. Dyes in black ink. (One solvent different constituents)	Chromatography
4. Two miscible liquids. (Acetone + water)	Distillation
5. Solid particles insoluble from (solvent) liquid. (Milk + Cream)	Centrifugation

**Physical and Chemical Change**

<b>Physical Change</b>	<b>Chemical Change</b>
<ul style="list-style-type: none"><li>● No new substance is formed.</li><li>● Properties of constituent elements/ substance is retained.</li><li>● Change does not involve loss or gain of heat.</li><li>● This change is generally reversible.</li></ul>	<p>A new substance is formed.</p> <p>Properties of constituent elements/substance changes.</p> <p>Loss or gain of heat may be involved in this reaction.</p> <p>This change is generally irreversible.</p>

**Solution**

It is a homogeneous mixture of two or more substances.

<b>Solute</b>	<b>Solvent</b>
<p>A substance which is dissolved in a solvent. <i>E.g.</i>, salt, sugar.</p> <p>Solute can be solid, liquid or gas.</p>	<p>Liquid part of solution in which a substance is dissolved. <i>E.g.</i>, water.</p> <p>Solvent can be liquid, solid or gas.</p>

**TYPES OF SOLUTION**

**Aqueous solution**

A solution in which water is a solvent.

E.g., salt + water

**Non-aqueous solution**

A solution in which water is not a solvent.

E.g., sulphur + carbon disulphide.

**True solution**

Solute particles completely dissolve in solvent and are not visible. E.g., sugar + water

**Solution can be dilute or concentrated**

(Depending on the amount of solute dissolving in solvent).

**Saturated solution**

A solution in which no more solute can dissolve at given temperature.

**Unsaturated solution**

A solution in which more solute can dissolve at a given temperature.

- Concentration of solution =  $\frac{\text{Amount of solute}}{\text{Amount of solution}}$  or  $\frac{\text{Amount of solute}}{\text{Amount of solvent}} \times 100$

- Mass by mass percentage of a solution

$$= \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$$

- Mass by volume percentage of a solution

$$= \frac{\text{Mass of solute}}{\text{Volume of solution}} \times 100$$

<b>Suspension</b>	<b>Colloidal Solution</b>
<ul style="list-style-type: none"> <li>Size of solute particles are visible with naked eyes</li> <li>Shows tyndall effect</li> <li>Translucent</li> <li>Solute particles settle down</li> </ul>	<ul style="list-style-type: none"> <li>Size of solute particles are not visible with naked eyes.</li> <li>Shows tyndall effect</li> <li>Translucent</li> <li>Colloidal particles do not settle down</li> </ul>

**Different Types of Colloids**

<b><i>Dispersed Phase</i></b>	<b><i>Dispersing Medium</i></b>	<b><i>Type</i></b>	<b><i>Example</i></b>
Liquid	Gas	Aerosol	Fog, clouds, mist
Solid	Gas	Aerosol	Smoke, automobile exhaust
Gas	Liquid	Foam	Shaving cream
Liquid	Liquid	Emulsion	Milk, face cream
Solid	Liquid	Solution	Milk of magnesia, mud
Gas	Solid	Foam	Sponge, pumice
Liquid	Solid	Gel	Jelly, cheese, butter
Solid	Solid	Solid sol	Coloured gemstone, milky glass