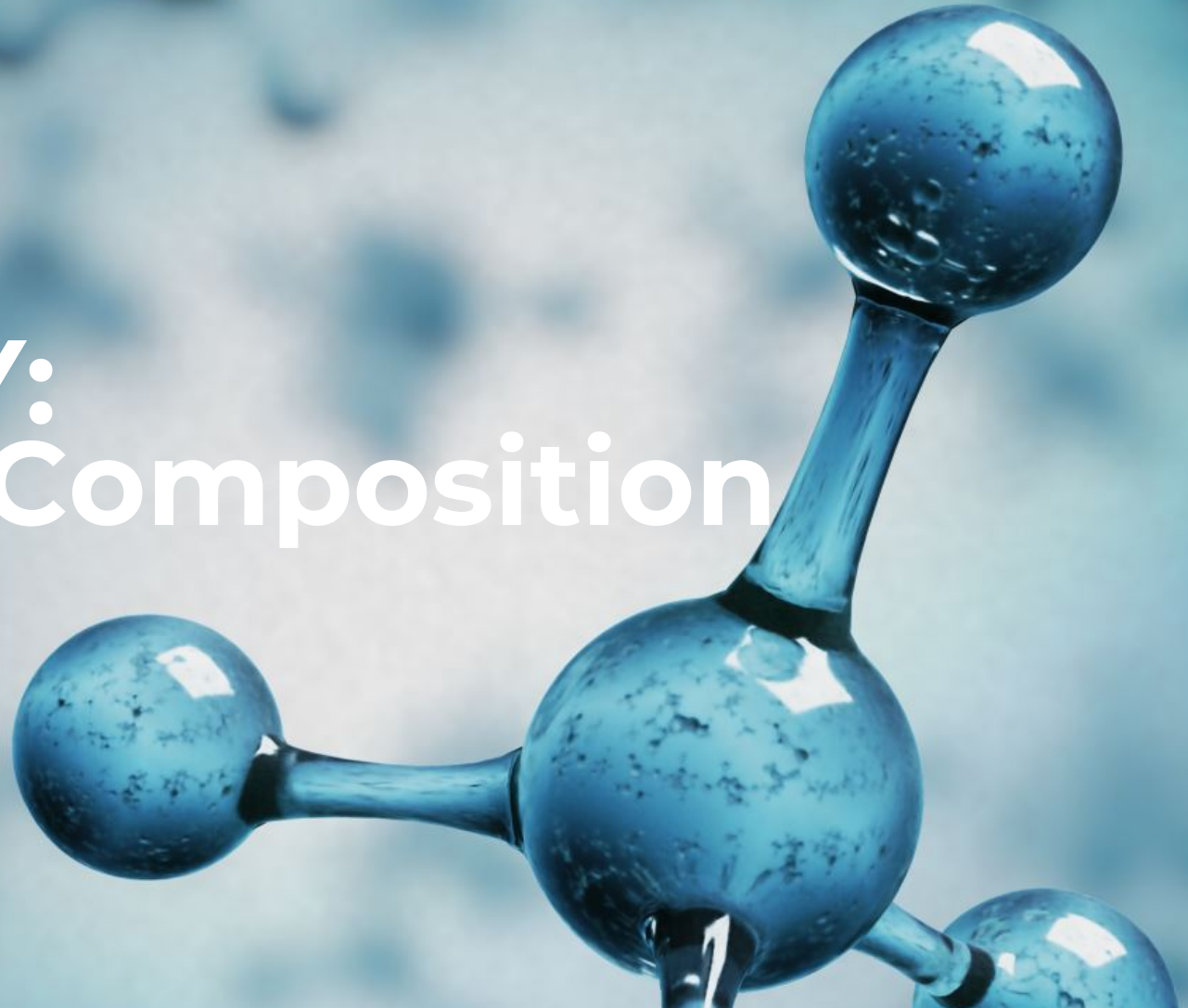


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DIVERSITY: Chemical Composition



CHAPTER ANALYSIS



5 KEY CONCEPTS

- Distinguish among elements, compounds and mixtures & classify substances accordingly
- State that elements are the basic building blocks of living & non-living matter, and classify them according to properties
- Show an understanding of compounds and mixtures
- Distinguish among solute, solvent, and solution
- Understand that solutions and suspensions are mixtures



3 ADVANCED CONCEPTS

- Classify elements as metals and non-metals based on their characteristic properties
- Investigate the factors that affect the solubility and rate of dissolving of substances
- Evaluate how the disposal of harmful pure substances (eg. Mercury) and mixtures (eg. Sewage) impact the environment

KEY CONCEPT

ELEMENTS

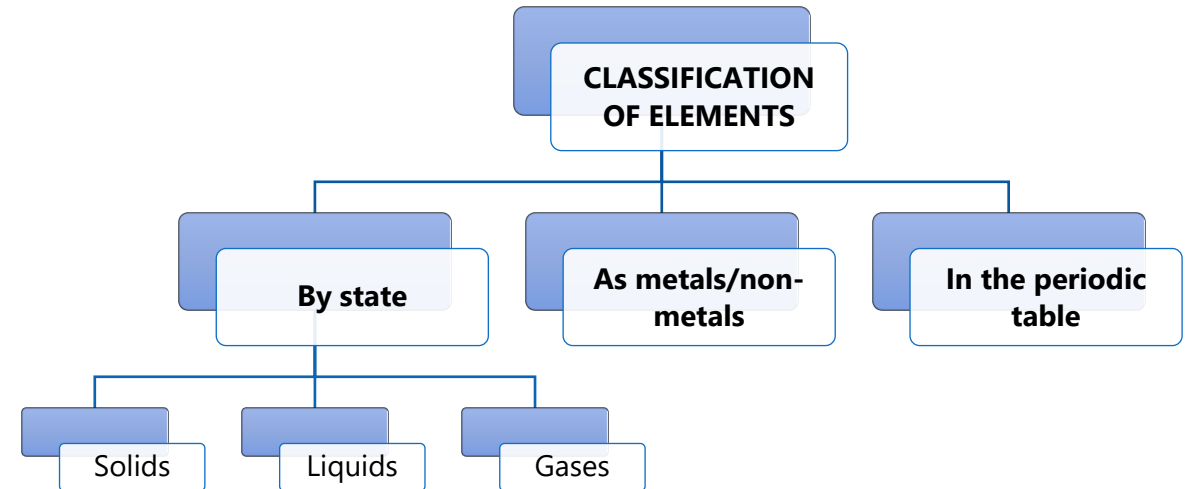


ELEMENTS

ELEMENTS

Elements are the **basic building blocks of matter**.

Definition: An element is a pure substance that cannot be broken down into any simpler substances by chemical methods.



Properties of metals	Properties of non-metals
• Shiny	• Dull & soft
• Good conductors of heat and electricity	• Poor conductors of heat and electricity
• Malleable (can be beaten into different shapes without breaking) • Ductile (can be pulled into shape without breaking)	• Brittle (solid non-metals)
• Some corrode easily while others do not	• Do not corrode

KEY CONCEPT

COMPOUNDS





COMPOUNDS

COMPOUNDS

Definition: A compound is a substance made up of two or more elements **chemically** joined together

Many elements combine directly to form compounds in fixed proportions.

Examples of compounds

1. WATER is made up of **hydrogen** and **oxygen**
2. COMMON SALT is made up of **sodium** and **chlorine**
3. SUGAR is made up of **carbon**, **hydrogen**, and **oxygen**

Characteristics of compounds

1. The different elements in a compound are joined together in a **fixed proportion by mass**
2. Compounds have **different properties** from the elements they are made up of
3. Compounds **cannot** be separated into their elements by physical means

KEY CONCEPT

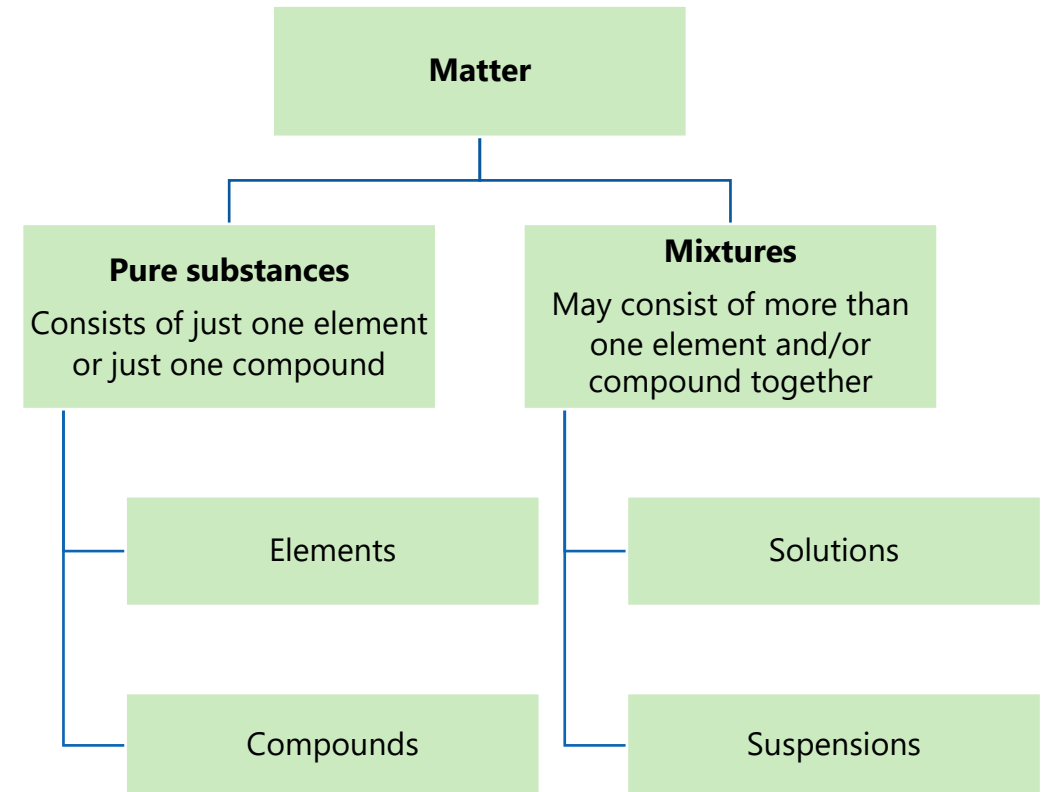
MIXTURES



MIXTURES

MIXTURES

Definition: A mixture consists of two or more substances (elements and/or compounds) which are **not joined together chemically**



KEY CONCEPT

SOLUTIONS & SUSPENSIONS



SOLUTIONS & SUSPENSIONS

SOLUTIONS

Solutions are formed when one substance (solute) **dissolves** into another substance (solvent)

Eg. Sugar (solute) dissolves in water (solvent) to give a solution (sugar water)

Solute + solvent = solution

SUSPENSIONS

Suspensions are formed when the solute **does not dissolve but remains suspended** inside the solvent

Eg. Sand (solute) does not dissolve in water (solvent), giving a suspension

Behaviour of particles in a suspension

- When a solution is passed through a filter paper, no residue is left behind
- When a suspension is passed through a filter paper, a residue is left behind (solid particles are too large to pass through the pores of the filter paper)

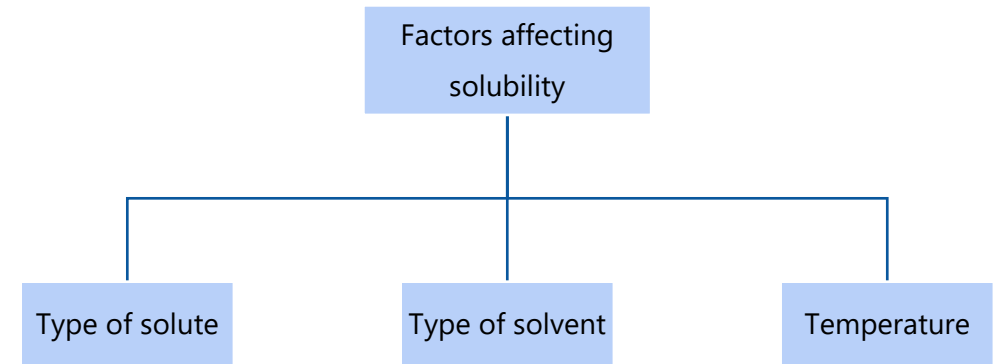
KEY CONCEPT

SOLUBILITY & DISSOLVING

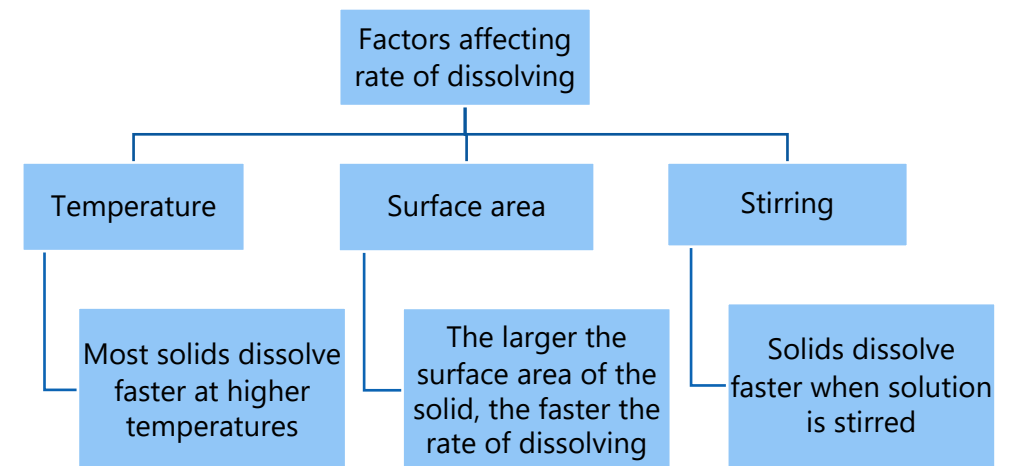


SOLUBILITY

Definition: Solubility refers to the maximum amount of solute that can dissolve in a given amount of solvent at a given temperature.



Rate of dissolving is a measure of how fast a substance dissolves in a solvent.



SOLUBILITY

KEY CONCEPT

DISPOSAL OF HARMFUL SUBSTANCES





ENVIRONMENTAL IMPACTS

Human waste

Human waste may enter rivers directly from **floating toilets**. This waste contains **harmful bacteria** that can cause **diseases like cholera**.

Untreated waste water

Untreated waste water from factories is sometimes **dumped into rivers or the sea**.

This water contains **poisoning substances** like **mercury or lead compounds**. These substances can **damage our organs and affect children's development**.

Electronic waste

Electronic waste like your **old mobile phones** are often discarded in landfills. These devices contain **harmful compounds and metals like lead and mercury**. In a landfill, these substances can **leak into soil and into water supplies**.

Nuclear waste

Waste released from nuclear plants include **plutonium and radium**. Improper disposal of these substances can **contaminate soil and water supplies**, which can lead to **cancer and affect the development of unborn babies (genetic damage)**.



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