

CHAPTER 2

Is Matter Around Us Pure?

CBSE · Science · Class 9

WHAT THIS CHAPTER DOES

Boards prep that builds confidence, not anxiety.

TODAY'S MISSION

Today's Mission

WHY THIS MATTERS

All matter is either PURE (one type of particle) or a MIXTURE (two or more substances physically mixed).

TOPIC

A

Part A — Pure Substances vs Mixtures

TOPIC

Pure Substance — The Definition

POINT 1

POINT 2

POINT 3

TOPIC

Quick Check — Is It Pure?

TOPIC

Mixtures — Homogeneous vs Heterogeneous

POINT 1

POINT 2

POINT 3

TOPIC

B

Part B — The Three Mixtures Compared

TOPIC

The Master Table — Solution vs Colloid vs Suspension

WORKED EXAMPLE

Worked Example 1 — Identifying the Type

- 1 Sugar in water: sugar particles are <1 nm in solution, the mixture is transparent and stable. → TRUE SOLUTION.
- 2 Milk: contains fat droplets 1-100 nm dispersed in water, appears uniform but is heterogeneous, shows Tyndall effect. → COLLOID (emulsion).
- 3 Chalk in water: chalk particles are large (>100 nm), the mixture is opaque, particles settle on standing and can be filtered. → SUSPENSION.
- 4 Air: a gaseous mixture of N_2 , O_2 , Ar, CO_2 all at molecular level (<1 nm), uniform composition. → HOMOGENEOUS MIXTURE (gaseous solution).

TRY IT · SOLVE BEFORE YOU PEEK

Quick Test — 60 Seconds

Work it out before you flip the answer.

SOLUTION

TOPIC

Solutions — A Closer Look

POINT 1

POINT 2

POINT 3

WORKED EXAMPLE

Worked Example 2 — Mass Percentage Numerical

- 1 Given: mass of solute (NaCl) = 15 g; mass of solvent (water) = 60 g.
- 2 Mass of solution = mass of solute + mass of solvent = 15 + 60 = 75 g.
- 3 Mass percentage formula: $(\text{mass of solute} / \text{mass of solution}) \times 100$.
- 4 Substitute: $(15 / 75) \times 100 = (1/5) \times 100 = 20\%$.
- 5 Always write the % sign and label as 'mass percentage'.

TOPIC

C

Part C — Separation Techniques

TOPIC

Techniques 1-3 — Evaporation, Centrifugation, Separating Funnel

POINT 1

POINT 2

POINT 3

TRY IT · SOLVE BEFORE YOU PEEK

Pause — colloid vs solution

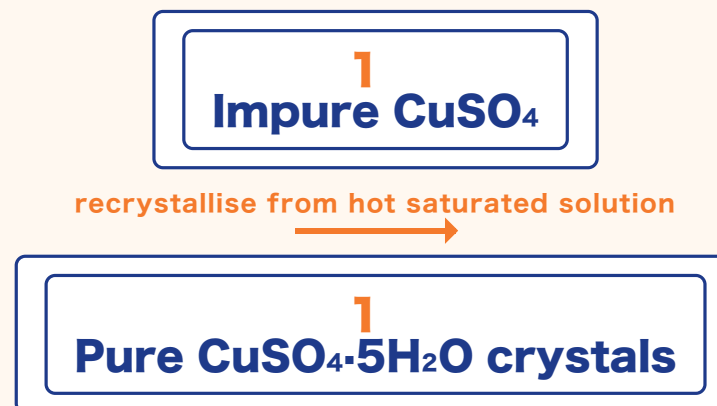
Work it out before you flip the answer.

SOLUTION

WORKED EXAMPLE

Worked Example 3 — Crystallisation of Copper Sulfate

- 1 Take impure copper sulfate crystals in a beaker. Add a minimum amount of water and stir while heating gently.
- 2 Filter the hot solution to remove any insoluble impurities (sand, dust). The filtrate is a HOT SATURATED solution of copper sulfate with soluble impurities dissolved in it.
- 3 Cover the filtrate and allow it to cool slowly and undisturbed at room temperature.
- 4 As the solution cools, the solubility of CuSO_4 decreases. Pure copper sulfate forms LARGE BLUE CRYSTALS ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$), while the soluble impurities remain dissolved in the mother liquor.



TOPIC

Match the Mixture to the Technique

TOPIC

Physical vs Chemical Change — Mid-Chapter Recap

TOPIC

D

Part D — Elements, Compounds and Colloids in Daily Life

TOPIC

Types of Colloids — Eight Everyday Examples

POINT 1

POINT 2

POINT 3

TOPIC

Separation techniques recap

TOPPER TEMPLATE · MARK-BY-MARK

Topper's 5-Mark Model Answer — Fractional Distillation

PYQ PATTERNS

Top 5 PYQ Patterns — Last 6 Years

MARKS DISTRIBUTION

Sub-topic Marks Heatmap

PYQ PATTERNS

Top PYQ patterns to drill

#1	Tabular comparison of solution / colloid / suspension on 5-6 parameters (3 marks)	85%
#2	Tyndall effect	definition + two daily-life examples (3 marks) — 70%
#3	Choose the right separation technique for a given mixture (2 marks)	90%
#4	Mass percentage numerical with given solute + solvent masses (2 marks)	75%
#5	Identify pure substance / mixture / element / compound from a list (2 marks)	60%

RECAP · MEMORISE THESE

Chapter Summary — The 8 Must-Remembers

1 Pure substances have ONE kind of particle; mixtures have two or more.

2 Mixtures are homogeneous (salt water, air, brass) or heterogeneous (sand+iron, oil+water).

3 Particle size: solutions <1 nm, colloids 1-100 nm, suspensions >100 nm.

4 Tyndall effect = light scattering by colloid particles. True solutions do NOT show it.

5 Mass % = (mass of solute / mass of solution) × 100. Always add solute + solvent for the denominator.

6 Six separation techniques: evaporation, centrifugation, separating funnel, sublimation,

WHAT'S NEXT

Chapter 3 — Atoms and Molecules



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