Your notes

KS3 Science: revision notes

C1.3 Mixtures

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Mixtures and pure substances

- A **mixture** contains two or more substances that are not chemically joined. Each keeps its own properties, and they can be separated by physical methods. Air, sea water and soil are **mixtures**.
- In science, a **pure substance** contains only one element or compound.
- A **pure substance** melts and boils at fixed temperatures: pure water melts at 0 °C and boils at 100 °C. Impurities lower the melting point, raise the boiling point, and make the substance melt over a range of temperatures.

Solutions

- A **solute** (such as salt) dissolves in a **solvent** (such as water) to make a **solution**.
- **Soluble** substances dissolve; **insoluble** substances (such as sand) don't.
- A **saturated solution** can't dissolve any more **solute**. For most solids, solubility increases as the temperature rises.
- Mass is conserved: mass of **solution** = mass of **solute** + mass of **solvent**.

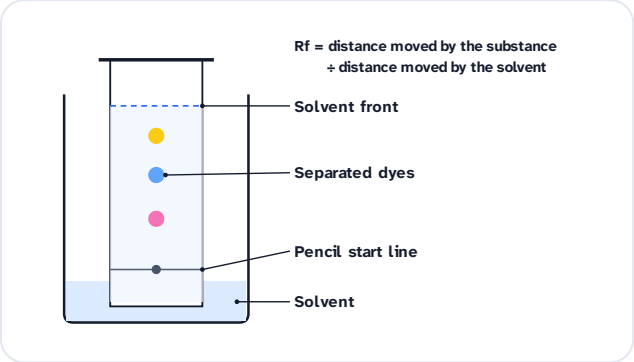
Separating mixtures

- **Filtration** separates an **insoluble** solid from a liquid (sand from water). The solid left in the filter paper is the residue; the liquid that passes through is the filtrate.
- Evaporation or **crystallisation** gets a **soluble** solid from a **solution** (salt from salt water). For crystals, heat to evaporate some water, then leave the solution to cool.
- Simple **distillation** gets the **solvent** from a **solution** (pure water from sea water): the water evaporates, then condenses in a cooled condenser.

- Fractional **distillation** separates liquids with different boiling points, such as ethanol and water, or the parts of crude oil.

Chromatography

- **Chromatography** separates the dyes in inks or food colourings.
- Put a spot of ink on a pencil line near the bottom of the paper and stand the paper in a **solvent** below the line.
- The **solvent** moves up the paper. Dyes that are more **soluble** travel further, so the dyes separate.
- Draw the line in pencil because pencil doesn't dissolve in the **solvent**.



Key terms

Mixture	Two or more substances that are not chemically joined.
Pure substance	A single element or compound with nothing else mixed in.
Solute	The substance that dissolves.
Solvent	The liquid that the solute dissolves in.
Solution	A mixture of a solute dissolved in a solvent.
Soluble	Able to dissolve.
Insoluble	Not able to dissolve.
Saturated solution	A solution that can't dissolve any more solute.
Filtration	Separating an insoluble solid from a liquid with filter paper.
Crystallisation	Getting crystals of a solid by evaporating some solvent and letting the solution cool.
Distillation	Separating a liquid from a mixture by evaporating it and condensing it again.
Chromatography	Separating dissolved substances, such as dyes, as a solvent moves up paper.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

Your notes

1. What is a mixture?
2. In salty water, what is the solvent?
3. How would you separate sand from water?
4. How would you get salt crystals from salt water?
5. How would you get pure water from sea water?
6. Which method separates the dyes in an ink?
7. Why is the start line in chromatography drawn in pencil?
8. What is a saturated solution?

Answers

1. Two or more substances that are not chemically joined
2. Water
3. Filtration
4. Evaporation or crystallisation
5. Distillation
6. Chromatography
7. Pencil doesn't dissolve in the solvent
8. A solution that can't dissolve any more solute

What to do next

Practise 14 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

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