

GCSE Edexcel

Separation and purification

There are different ways to separate mixtures, for example by filtration, crystallisation, distillation or chromatography. The method chosen depends upon the type of mixture.

Part of [Chemistry \(Single Science\)](#) | [States of matter and mixtures](#)

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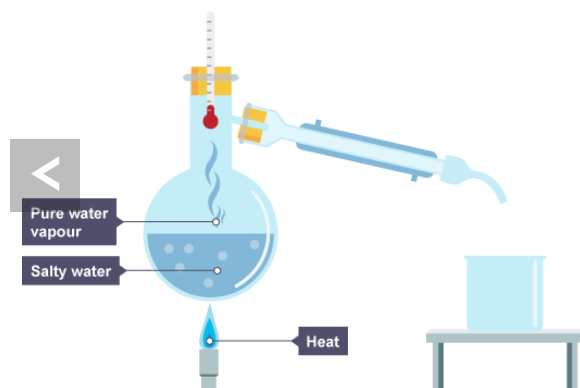
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Distillation

Simple distillation

Simple distillation is used to separate a **solvent** from a **solution**. It is useful for producing water from salt solution.

Simple distillation works because the **dissolved solute** has a much higher **boiling point** than the solvent. When the solution is heated, solvent **vapour** evaporates from the solution. The gas moves away and is cooled and **condensed**. The remaining solution becomes more **concentrated** in solute as the amount of solvent in it decreases.



Simple distillation

1. Salty water is heated



Fractional distillation

Fractional distillation is used to separate different liquids from a mixture of liquids. It is useful for separating **ethanol** from a mixture of ethanol and water, and for separating different **fractions from crude oil**.

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Fractional
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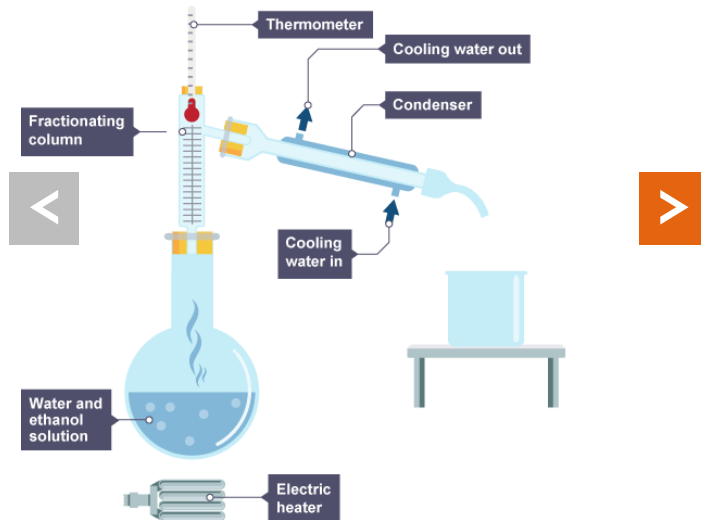
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- vapours rise through a column which is hot at the bottom, and cold at the top
- vapours condense when they reach a part of the column that is below the temperature of their boiling point
- the liquid flows out of the column

There are two ways of obtaining different liquids from the column:

- By collecting different liquids from different parts of the column. The substance with the lowest boiling point is collected at the top of the column.
- By continuing to heat the mixture to increase the temperatures in the column. The substance with the lowest boiling point is collected first.

Different liquids can be obtained from different parts of the column, or by continuing to heat the mixture to increase the temperatures in the column.



Distillation process to separate ethanol from water

1. Water and ethanol solution is heated

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