

### What are mixtures?

**Mixtures** are different substances found together, but not chemically bonded. This means the different substances can be **separated** from each other.

In a **compound**, different substances are chemically bonded together, while in a mixture they are not.

The substances that make up a mixture keep their own properties and are easy to separate.

You can change the amounts of the substances in a mixture.

You can tell the difference between a **pure substance** and an **impure substance** – a pure substance has a single, sharp melting point, while an impure substance (a mixture) has a range of temperatures for its melting point.

### Solutions

Solutions are a type of mixture made of two parts:

**1 Solvent:** the liquid that makes up most of the solution.

**2 Solute:** the substance that is added to the solvent and **dissolves** into it.

The solute usually starts as a solid, and its particles break away from each other and move into the solvent.

### Solubility

The **solubility** of a solute means how much solute can dissolve in a certain volume of solvent.

- Different solutes have different solubilities in different solvents.
- Increasing the temperature often increases the solubility.
- Soluble substances can dissolve, **insoluble** substances cannot.

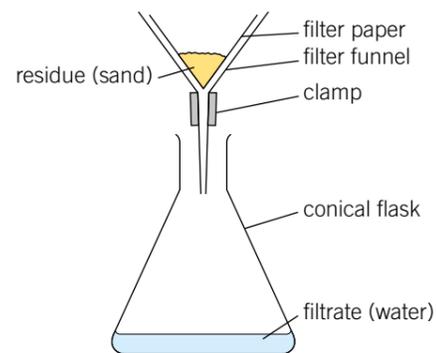
**Saturated:** when so much solute has been added to the solvent that no more can dissolve, we say the mixture is saturated.

### How can we separate mixtures?

#### Filtration

A method to separate a mixture of an undissolved solid and a liquid.

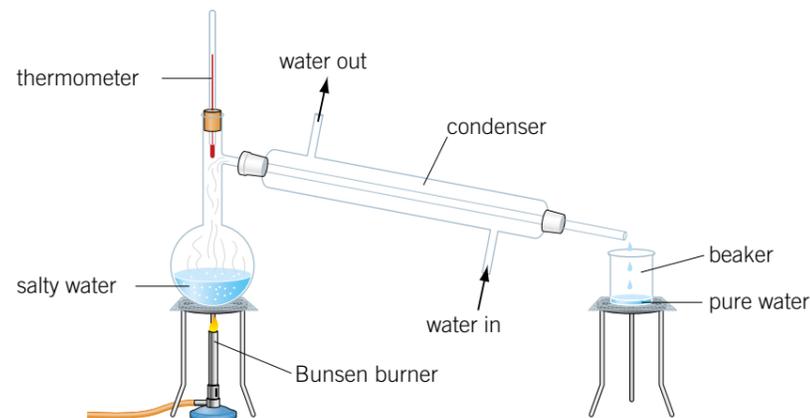
- 1 Filter paper** has extremely small holes in it.
  - Particles in a liquid or solution are so tiny that they can fit through the holes.
  - Larger particles of the solid are too big to fit through the holes and are held back by the paper.
- **Residue:** solids left behind in the filter paper.
  - **Filtrate:** the liquid that passes through the filter paper.



#### Distillation

A method that separates a solute and a solvent while keeping the solvent.

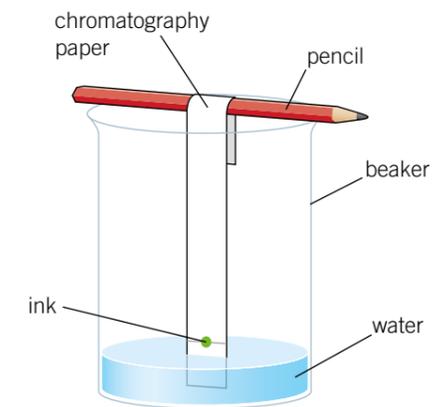
- The solution is boiled so the solvent turns into a gas.
- The gas is then cooled down in a **condenser**, where it turns back into a liquid and can be collected.



#### Chromatography

A method used to separate mixtures that are soluble in the same solvent.

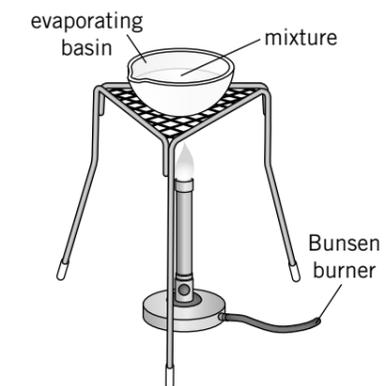
- A mixture like ink is placed on a piece of paper, which is placed in a solvent.
- As the solvent moves up the paper it separates all the different constituents (parts) of the ink, producing a **chromatogram**.



#### Evaporation

A method to separate a solute and a solvent, keeping the solute.

- The solution is heated then left in an evaporating basin until all the solvent evaporates.
- The solute is left behind as a solid.



#### Key terms

Make sure you can write definitions for these key terms.

chromatography chromatogram compound condenser dissolve distillation evaporation filtrate filtration filter paper impure substance insoluble mixture pure substance  
 residue saturated separate solvent solute soluble solubility solution