Separating Mixtures

Mixtures

- **A Mixture** is made up of 2 or more substances mixed together that can be separated and are not chemically combined

- **Examples**

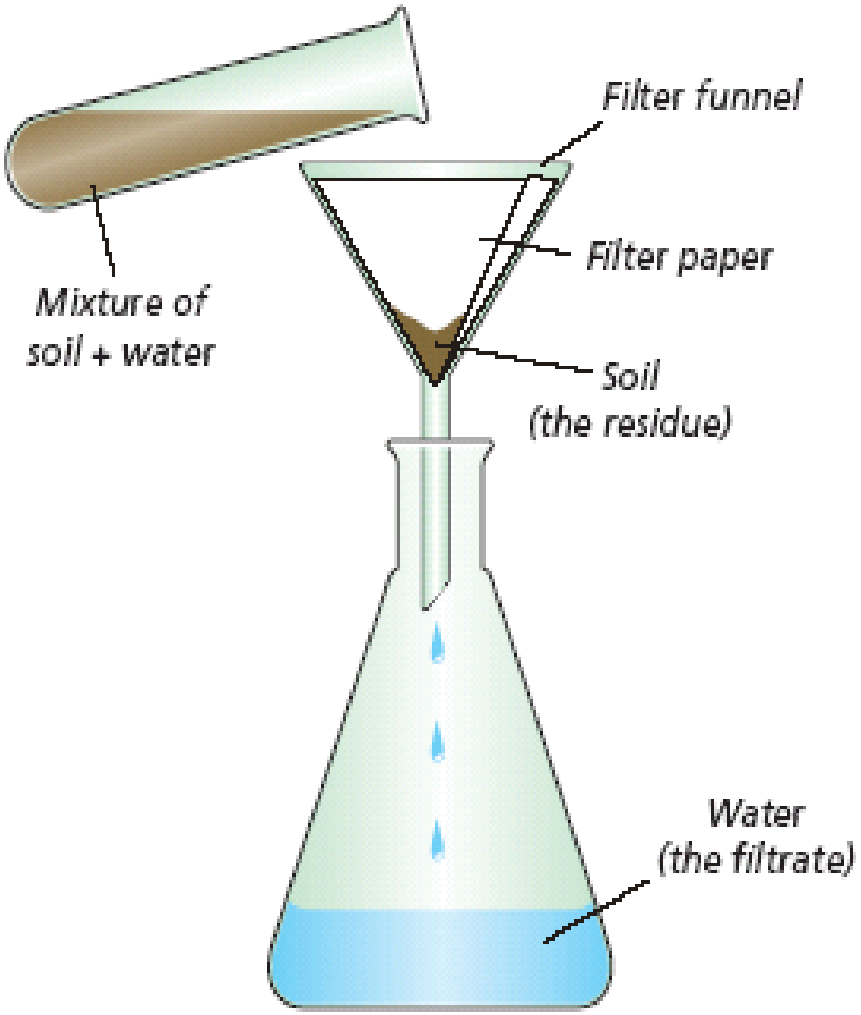
1. Air is a mixture of many different gases
2. Sea water is a mixture of salt and water

Filtration

- **Filtration** is used to separate an insoluble solid (one that doesn't dissolve in the liquid) from a liquid

- **Example**
- Soil and Water
- Sand and Water

- Pour a mixture of soil and water into the filter paper
- The soil is caught by the filter paper and the clear water passes through the filter paper to the beaker below

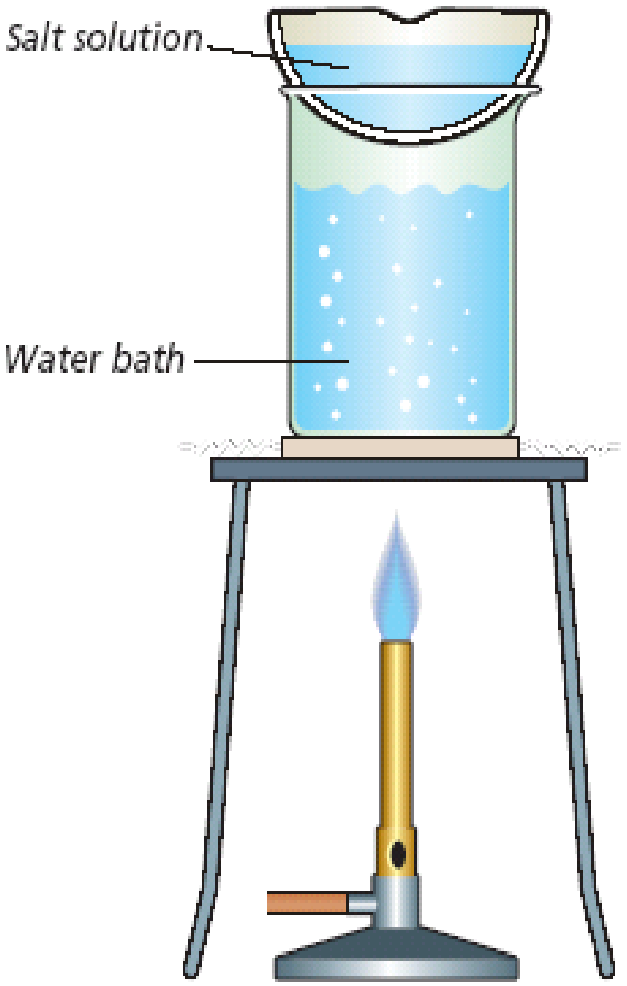


Evaporation

- **Evaporation** is used to separate a soluble solid (one that does dissolve in the liquid) from a liquid

- **Example** Salt and Water

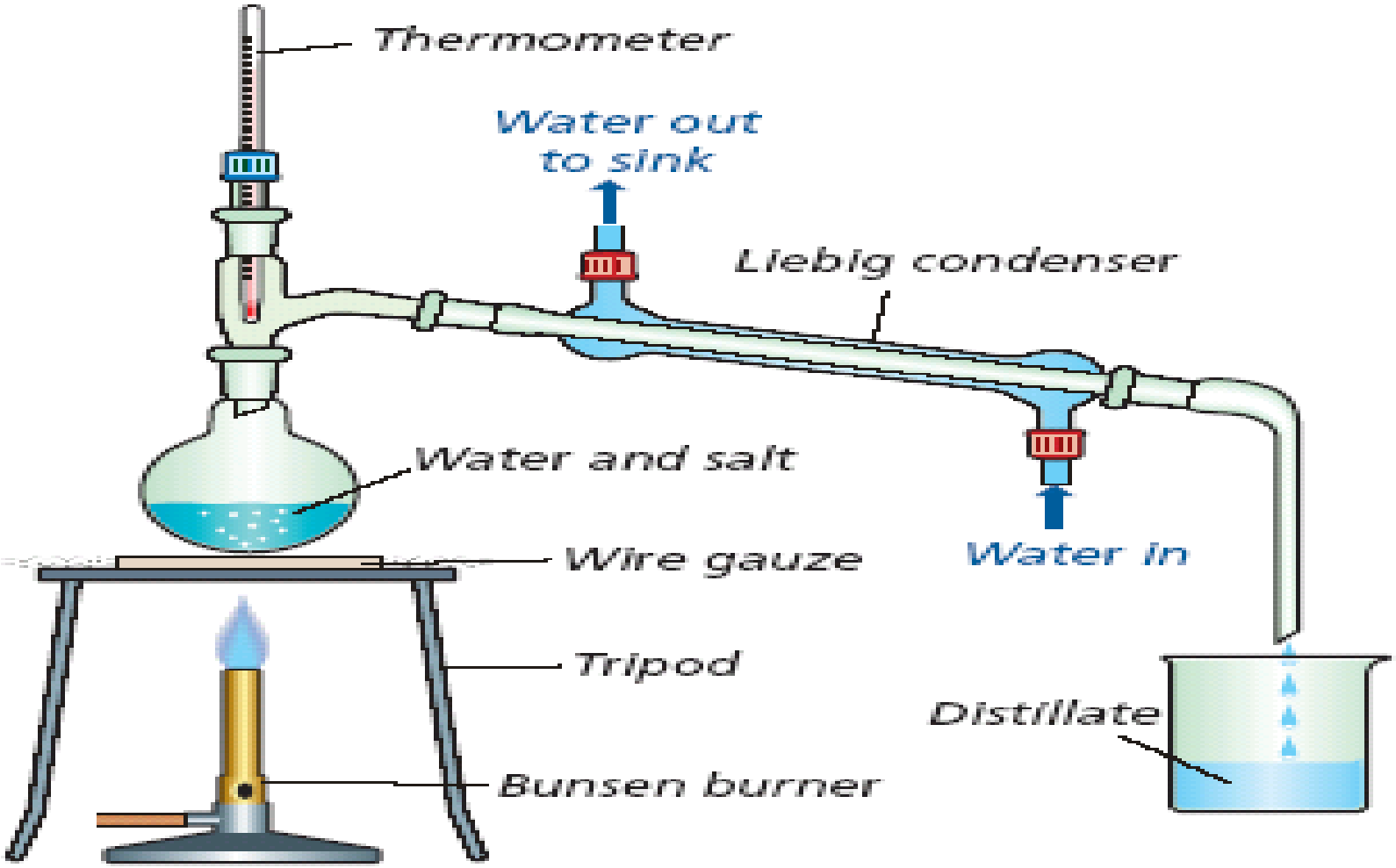
- The salt and water mixture is placed in an evaporating dish.
- The mixture is boiled over a Bunsen burner
- The water evaporates (turns to steam) and the salt solid is left behind in the dish



Distillation

- **Distillation** is used to separate 2 miscible liquids (2 liquids that mix together)
- Distillation is evaporation followed by condensation

- **Example:**
- Alcohol and water
- Salt and water


Thermometer
Water out to sink
Liebig condenser
Water and salt
Wire gauze
Water in
Tripod
Distillate
Bunsen burner

- A mixture of water and alcohol is placed in the round bottomed flask
- It's heated by the bunsen burner
- Alcohol will boil at 78°C and the water will boil at 100°C
- This means that the alcohol will evaporate first
- The steam from the alcohol boiling goes into the condenser

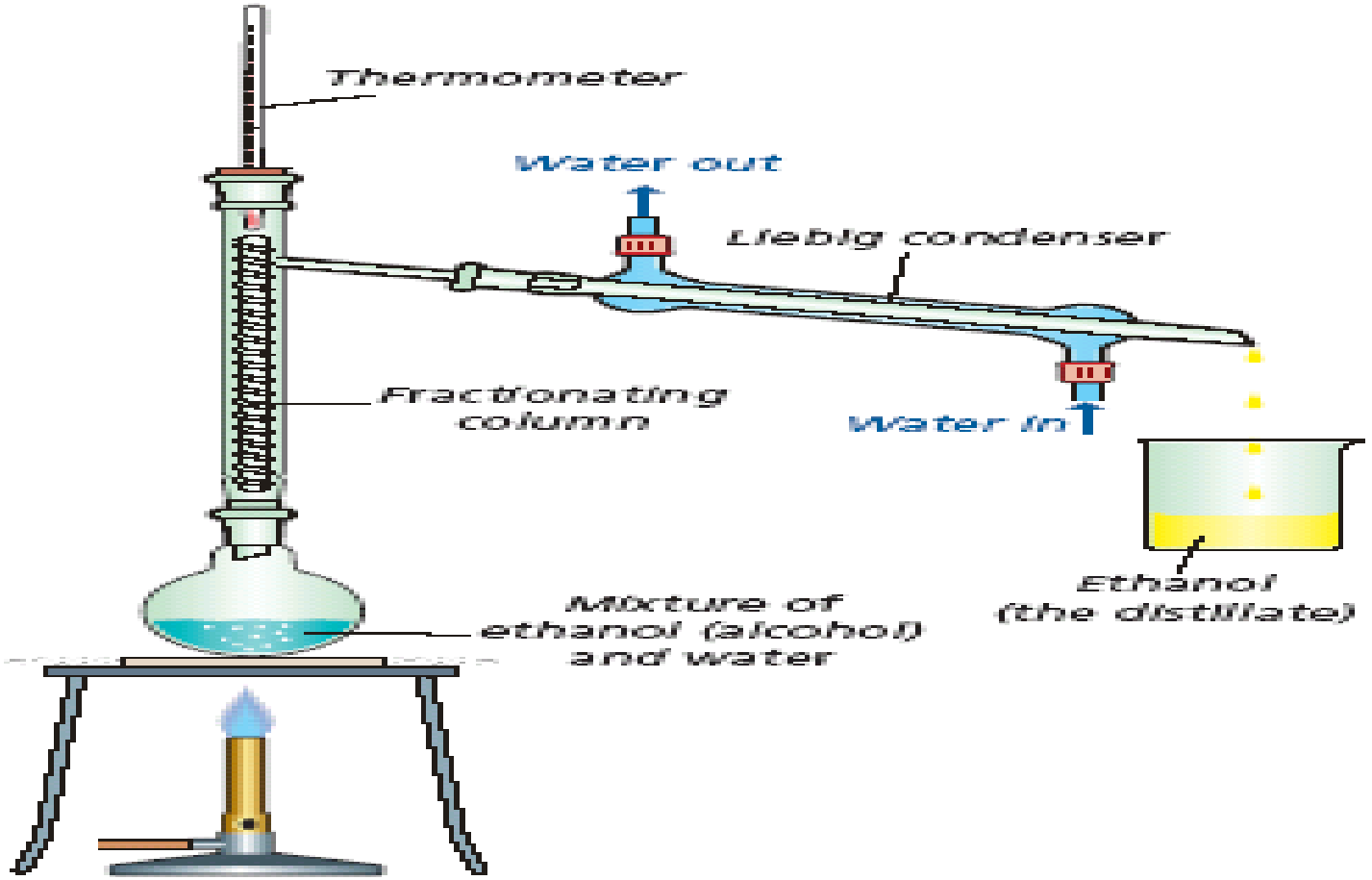
- Cold water is pumped all around the outside of the condenser
- The cold water causes the hot steam from the alcohol to cool down and condense back into liquid alcohol
- This liquid alcohol is collected at the bottom of the condenser in a beaker
- This liquid is known as the Distillate

Distillation

- Water boils at 100°C and turns to steam
- The steam goes through the condenser
- The steam is cooled down quickly by the cold water on the outside of the condenser and is condensed back into water

Fractional Distillation

- Fractional Distillation is like normal distillation except you use a fractionating column
- This improves the quality of separation by making sure the alcohol and water don't mix as gases


Thermometer
Water out
Liebig condenser
Fractionating column
Water in
Ethanol (the distillate)
Mixture of ethanol (alcohol) and water

Paper Chromatography

- **Paper Chromatography** is used to separate a mixture of dyes in ink using a solvent (water) and some paper

- To make blue ink a mixture of different coloured dyes are used e.g. Green, blue, red, yellow

Place a dot of blue ink 10cm above the end of some chromatography paper

Place into a beaker of solvent (water). Make sure the solvent is below the ink dot (to allow the water to carry the ink upwards)

Clip into a cylinder shape and leave for 15 minutes

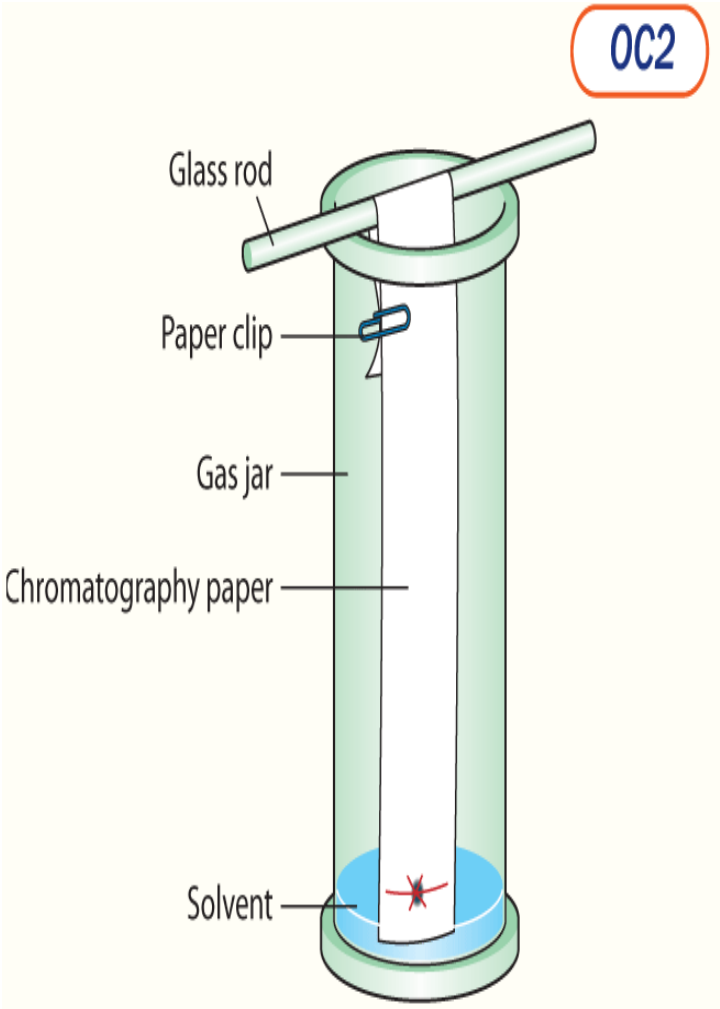
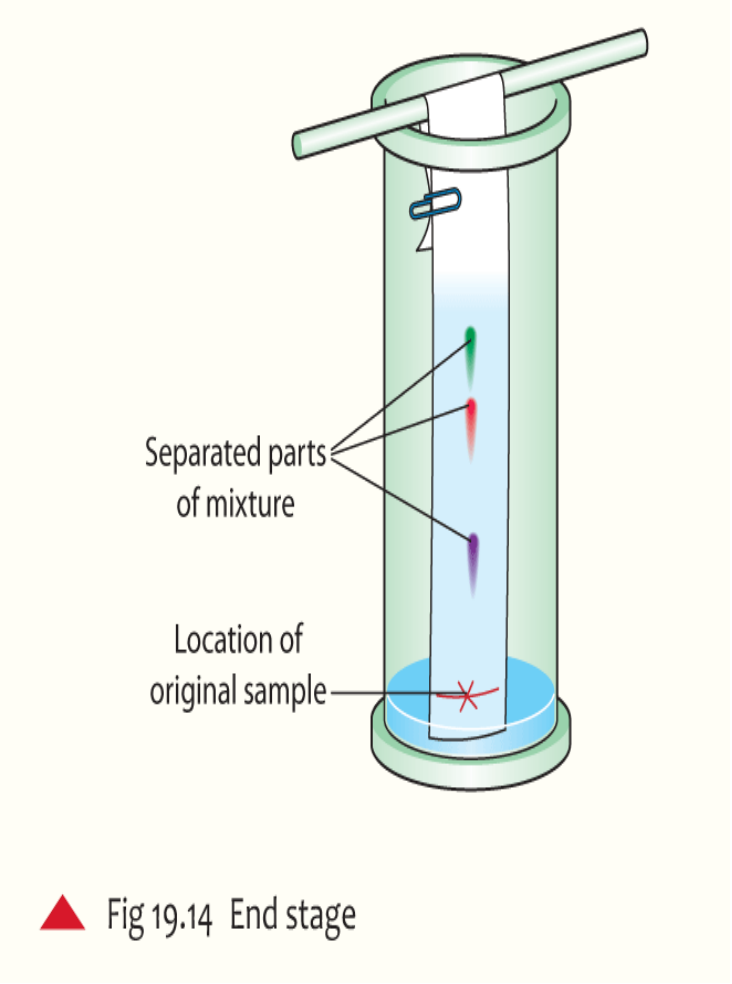


Fig 19.13 Initial stage

The different coloured dyes are separated along the chromatography paper

The water moves upwards

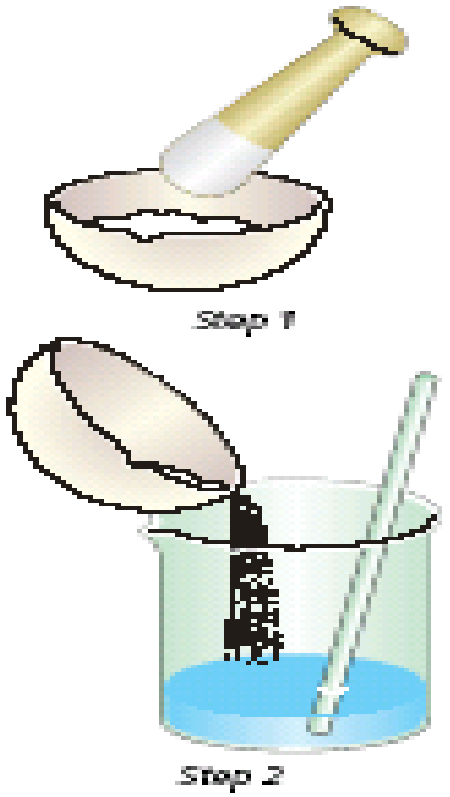


▲ Fig 19.14 End stage

To purify rock salt

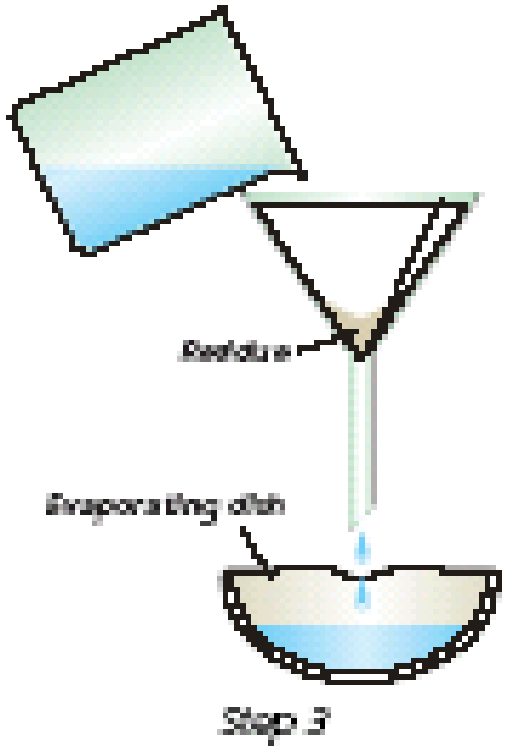
Crush some rock salt using a pestle and mortar

Add the crushed salt to water in a beaker



Filter this salt and water solution

Large particles of rock salt are left behind in the filter paper



The liquid that was filtered is now evaporated

Pure salt is left behind on the evaporating dish