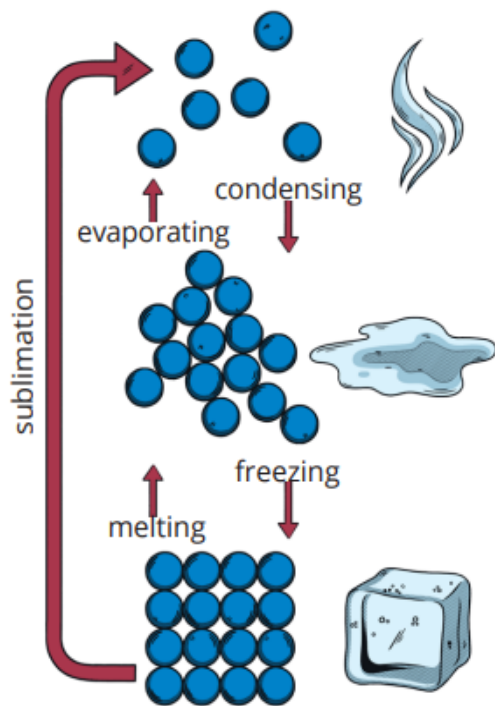


Particles & Separation Techniques



- When an object gets heated up the particles take in energy from the surroundings.
- This causes the particles to move faster with more energy.
- When an object cools down the particles transfer energy to the surroundings.
- This causes the particles to move slower.

Dissolving is the process of mixing a **soluble solute** into a **solvent** to make a **solution**.



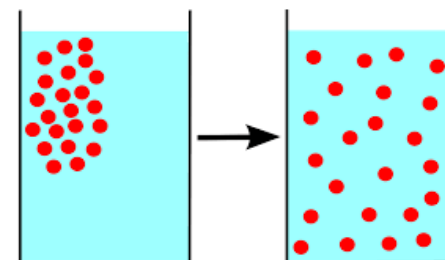
Solutes dissolve faster at higher temperatures and with stirring.

- Solute:** the substance that is dissolved.
- Soluble:** able to be dissolved.
- Solvent:** the liquid that something dissolved in.
- Solution:** a liquid containing a dissolved solid.

Diffusion

When a liquid or gas is mixed with another, the particles will flow and move about until they are evenly spread. The particles move **from an area of high to low concentration**. This is called **diffusion**.

Diffusion happens faster at higher temperatures and concentrations.

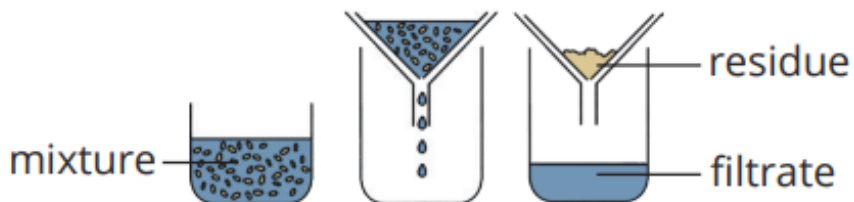


	Solid	Liquid	Gas
Particle Model			
Particle arrangement	Regular structure. No space between particles	Irregular structure. Very little space between particles	Irregular structure. Large space between particles
Volume and shape	Fixed volume and shape	Fixed volume, shape fills bottom of container	Volume and shape fills container
Able to flow	No	Yes	Yes
Density	High	High	Low
Particle energy	Low	Moderate	High
examples	Wood, plastic, stone	Water, milk, acid	Air, oxygen, carbon dioxide

Filtration

Filtration is used to separate an **insoluble solid** from a liquid. The solution is passed through a filter paper and funnel.

The **residue** remains in the filter paper, and the liquid which passes through is called the **filtrate**. A mixture of sand and water can be separated by filtration.

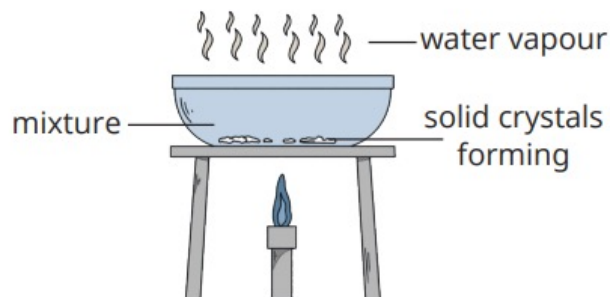


Evaporation

Evaporation separates a **soluble solid** from a **solvent**. The solution is heated, the liquid **evaporates** and the solid **crystallises**.

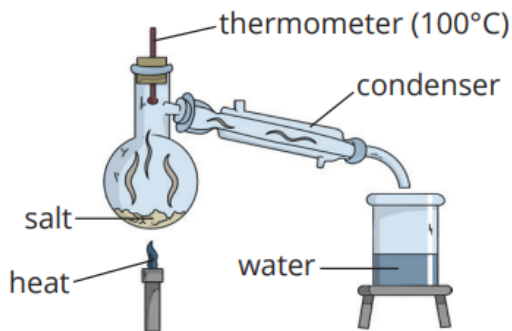
If the evaporation and crystallisation occur quickly, the crystals will be small. If it happens more slowly the crystals have time to grow and become larger.

A solution of salt water can be separated using evaporation.



Distillation

Distillation can separate a **solvent** from a **solution**, e.g. salt water. As the water is heated it **evaporates** from the flask and flows upwards into the **condenser**. The condenser is surrounded by cold water which causes the water vapour to condense back into a liquid. The liquid flows down the tube and into the beaker. The collected water is called **distilled water**.



Chromatography

Chromatography can be used to separate different dyes in ink. The colours are separated because they have different **solubilities**.

The separate inks are carried different distances up the paper by the solvent.

