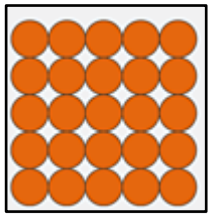
ATHERTON HIGH SCHOOL

Science: Particles and Separation Techniques

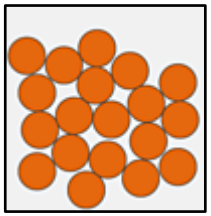
1. States of matter

Particle	A basic unit of matter

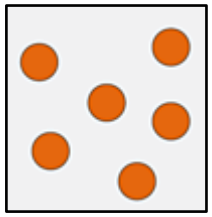
The particles of a substance do not change but the arrangement of the particles are different in each state of matter



Solid



Liquid

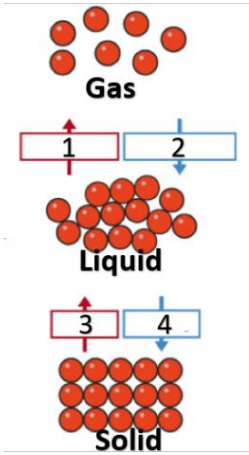


Gas

Comparing Properties

Property	Solid	Liquid	Gas
Fixed shape	✓	×	×
Fixed volume	✓	✓	×
Can be compressed	×	×	✓
Can flow	×	✓	✓

2. Changing states

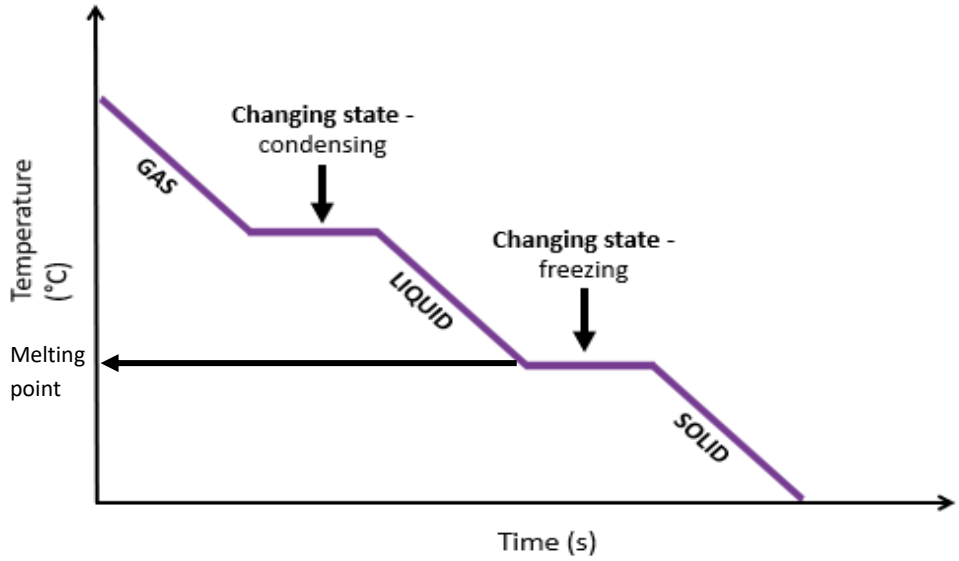
1	**Evaporation** Liquid changing into a gas.	
2	**Condensation** Gas changing into a liquid.	
3	**Melting** Solid changing into a liquid.	
4	**Freezing** A liquid changing into a solid.	

3. Solubility Key Words

Soluble	A substance that can dissolves in a solvent.
Insoluble	A substance that will **not** dissolve e.g., sand.
Mixture	2 or more substances that are not chemically combined and can be separated.
Pure substance	A substance that contains only one type of particle.

4. Cooling Curves

A graph to show the temperature of a pure substance as it cools.



As a pure substance changes state, the temperature remains constant, this is called the melting or boiling point.
This shown on the graph with a harizontal line.

The melting point of pure water is 0°C

The boiling point of pure water is 100°C

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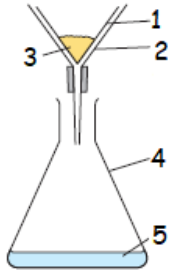
5. Filtration

Separates: an insoluble solid from a liquid e.g., sand and water.

1	Filter paper
2	Funnel
3	Residue (solid)
4	Conical flask
6	Filtrate (liquid)



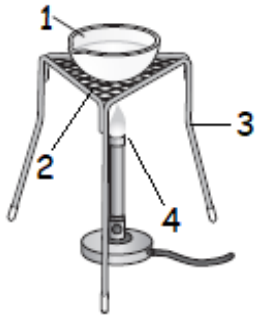
Method

1	Fold a piece of filter paper in half and then into a quarter circle.
2	Open the filter paper into a cone and place into the funnel.
3	Pour the mixture in to the cone and wait for the solution to pass through into the conical flask.

6. Evaporation

Separates: a soluble solid from a solution e.g., copper sulphate and water.

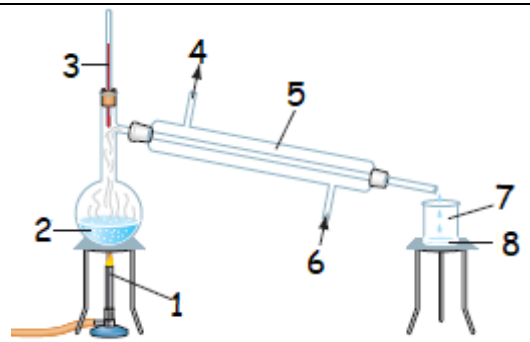
1	Evaporating basin
2	Gauze
3	Tripod
4	Bunsen burner



7. Distillation

Separates: a liquid from a solution e.g., alcohol and water or salt water.

1	Bunsen burner
2	Salt water
3	Thermometer
4	Water out
5	Condenser
6	Water in
7	Beaker
8	Water



Method

1	As the solution is heated the water evaporates.
2	The steam travels into the condenser, cools and changes back into liquid water.
3	The water collects in the beaker at the end.

8. Chromatography

Separates: dissolved substances in a mixture

1	Water
2	Pencil line
3	Ink spot
4	Beaker
5	Chromatography paper
6	Separated dyes