

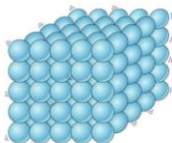
The Particle Model

All materials are made up of particles. We can represent these particles as tiny solid balls.

The **properties** of a material describe what it looks like and how it behaves.

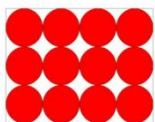
The properties of a substance depend on three things:

- 1) what its particles are like
- 2) how its particles are arranged
- 3) how its particles move around



Properties of a solid

It has a fixed shape or volume
 It cannot be compressed
 It cannot flow
 It will not take the shape of a container.

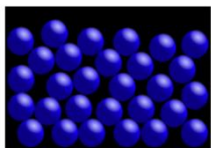


The particles in a solid are in a regular arrangement. They have very little energy and can't move around.

Properties of liquid



It has a fixed volume but the shape can change
 It cannot be compressed
 It can flow
 It will take the shape of a container.

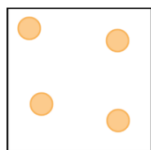


The particles in a liquid have an irregular but they are not in a fixed position. They have some energy so they can move around and flow over each other.

Properties of a gas

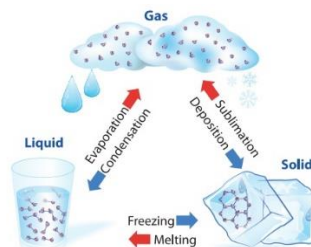


It does not have a fixed shape or volume
 It can be compressed
 It can flow
 It will take the shape of a container.

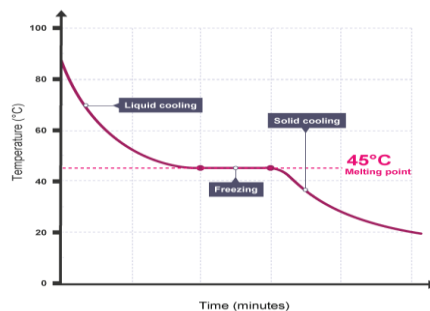


The particles in a gas are spread out. They have lots of energy and they flow over each other.

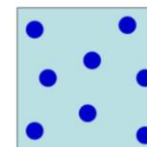
Changes of state



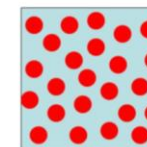
- **melting point** is the temperature at which a solid changes into a liquid.
- **boiling point** is the temperature at which a liquid changes into a gas.



Density is the measure of how much matter (how many particles) there is in a given amount of space



Low density



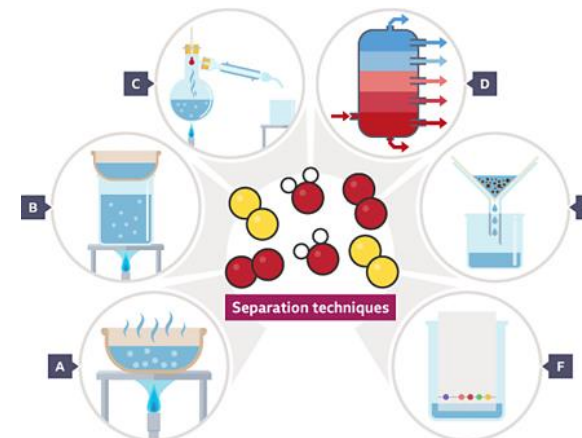
High density

The higher the density, the more matter (particles) there will be in the same amount of space

A **mixture** is a substance made up of two or more different elements or compounds that are not joined together.



Mixtures can be separated in the following ways:



- | | |
|--|--|
| A Evaporation – to separate a soluble solid from a solution | D Fractional distillation – to separate two or more liquids which have different boiling points |
| B Crystallisation – The process of producing crystals from a solution by evaporating the solvent | E Filtration – to separate an insoluble solid from a liquid |
| C Distillation – to separate the solvent from a solution, or to separate a mixture of two liquids | F Chromatography – to separate different soluble substances, usually coloured pigments, which are mixed in a solution |