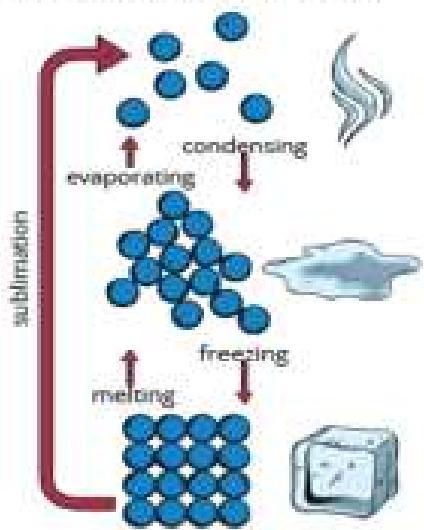


KNOWLEDGE ORGANISER

Changes of State

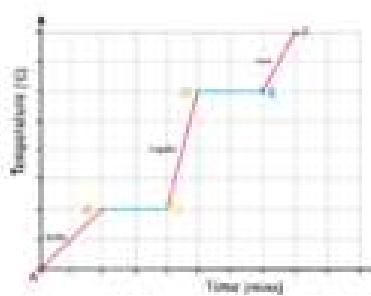
The arrangement of particles changes when the substance changes state.

Sublimation is when a solid changes to a gas, without going through the liquid phase.



Specific Latent Heat

Energy is being put in during melting and boiling. This increases the amount of internal energy. The energy is being used to break the bonds, so the temperature does not increase. This is shown by the parts of the graph that are flat.



The amount of energy needed/released when a substance of mass changes state:

$$\text{energy } (E) = \text{mass } (m) \times \text{specific latent heat } (L)$$

$$E = mL$$

Specific latent heat is the amount of energy needed to change 1kg of a substance from one state to another without changing the temperature. Specific latent heat will be different for different materials.

- solid — green line = specific latent heat of fusion
- liquid — blue line = specific latent heat of evaporation

Solid	Liquid	Gas
Very high density	High density	Low density
Retains its own shape	Assumes shape of container	Assumes shape of container
Fixed volume - not compressible	Fixed volume - not compressible	No fixed volume - Highly compressible
Vibrates about a fixed point	Moves randomly by sliding past each other	Constant random motion, with a range of fast speeds.

Required Practical

Measuring the density of a regularly shaped object:

- Measure the mass using a balance.
- Measure the length, width and height using a ruler.
- Calculate the volume.
- Use the density ($\rho = m/V$) equation to calculate density.

Measuring the density of an irregularly-shaped object:

- Measure the mass using a balance.
- Fill a sarska can with water.
- Place the object in the water - the water displaced by the object will transfer into a measuring cylinder.
- Measure the volume of the water. This equals the volume of the object.
- Use the density ($\rho = m/V$) equation to calculate density.

