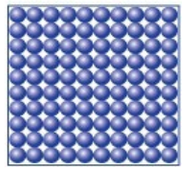
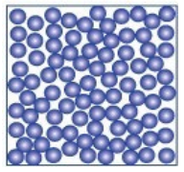
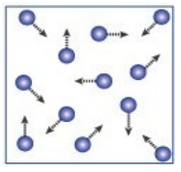
AQA P3 Particle model of matter
Combined foundation

The following required practicals are covered in this topic: RP5 Density

Quantities are things that can be measured or calculated.

Quantity	Symbol	Unit
Density	p	kg/m^3
Mass	m	Kg
Volume	V	M^3
Change in thermal energy	ΔE	J
Specific heat capacity	c	J/kg °C
Specific latent heat	L	J/kg
Temperature change	Δθ	°C

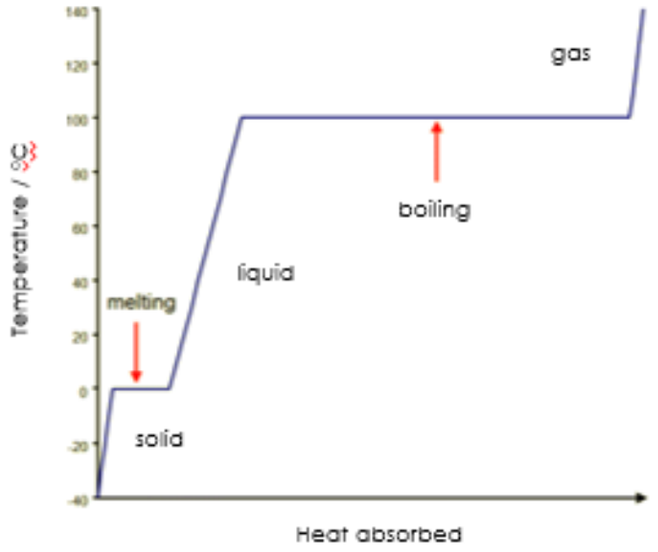
Solid	Liquid	Gas
		
Very high density	High density	Low density
Retains it's own shape	Assumes shape of container	Assumes shape of container
Fixed volume - not compressible	Fixed volume – not compressible	No fixed volume - Highly compressible
Vibrates about a fixed point	Moves randomly by sliding past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

Here are the equations you need to <u>memorise:</u>

Word equation	Symbol equation
density = mass / volume	**P = m / V**

These equations are provided for you but you need to be able to select and apply them:

Word equation	Symbol equation
change in thermal energy = mass x specific heat capacity x temperature change	$\Delta E = m\ c\ \Delta\theta$
energy for a change of state = mass × specific latent heat	**E = mL**
(For a gas) pressure x volume = constant (So pressure x volume before = pressure x volume after)	**PV = constant** (So, $P_1V_1=P_2V_2$)



Key word	Definition	Examples / additional information
Change of state	A **reversible** change of a substance from one physical state e.g. solid to liquid. **Mass is conserved** when a change of state happens	Melt is solid to liquid. Condense is gas to liquid. **Sublimate** is from solid straight to gas
Internal Energy	Energy is stored inside a system by the particle that make up the system (the total kinetic energy and potential energy of all the particles)	When objects are heated the internal energy always increases (due to particles increasing their kinetic energy)
Specific heat capacity	The amount of energy required to increase the temperature of 1 kg of a substance by 1 °C	Water has a specific heat capacity of 4,200 J/kg °C. It takes 4,200 J to increase the temperature of 1 kg of water by 1°C.
specific latent heat	the amount of energy required to change the state of one kilogram of the substance with no change in temperature	It is also the energy released into the surroundings when objects condense or freeze.
Specific latent heat of fusion	the amount of energy required to change the state from solid to liquid	E.g. Amount of energy required to change ice to water
Specific latent heat of vaporisation	the amount of energy required to change the state from liquid to gas	E.g. Amount of energy required to change water to steam
Gas pressure	The pressure of a gas is due to the particles colliding with the wall of the container that the gas is held in.	An increase in temperature increases the kinetic energy (speed) of the particles. It also increases the pressure.