

Pressure

Pressure of a fixed volume of gas increases as temperature increases

(as temperature increases, particle speed increases, collisions occur more frequently and with more force so pressure increases).

As the temperature of a gas increases the average kinetic energy of the particles increases



Particle model

State	Particle arrangement	Properties
Solid	Packed in a regular structure. Strong forces hold in place so cannot move.	Particles vibrate in position. Least energy.
Liquid	Close together, forces between particles less than for solids	Particles are able to move, more energy than solid
Gas	Separated by large distances. Weak forces between particles	Most energy. Moving rapidly and randomly

	Units
Density	Kilograms per metre cubed (kg/m³)
Mass	Kilograms (kg)
Volume	Metres cubed (m³)
Energy needed	Joules (J)
Specific latent heat	Joule per kilogram (J/kg)
Change in thermal energy	Joules (J)
Specific heat capacity	Joule per kilogram degrees Celsius (J/kg°C)
Temperature change	Degrees Celsius (°C)
Pressure	Pascals (Pa)

AQA P2

<https://www.bbc.co.uk/bitesize/topics/z3ybb82> bbcbitesize-ks4 science-physics – aqa combined science – particle model of matter

<https://www.kayscience.com/physics.html>

Seneca-combined science physics – AQA foundation or higher – particle model of matter

<https://app.senecalearning.com/classroom/course/fe56ca00-05aa-11e8-9a61-01927559cf5>

Specific Heat Capacity

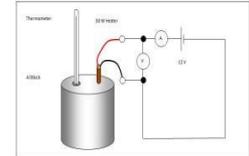
Energy needed to raise 1kg of substance by 1°C

Depends on:

- Mass of substance
- What the substance is
- Energy put into the system.

Change in thermal energy = mass X specific heat capacity X temperature change

$$\Delta E = m \times c \times \Delta \theta$$



Density

Density

Mass of a substance in a given volume

• Density is a physical property of a substance that is used to identify that substance.



Density = mass ÷ volume.

• The size of the object does not change the density. The density of Lead is going to be the same.

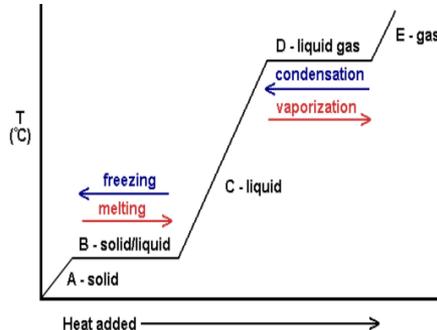
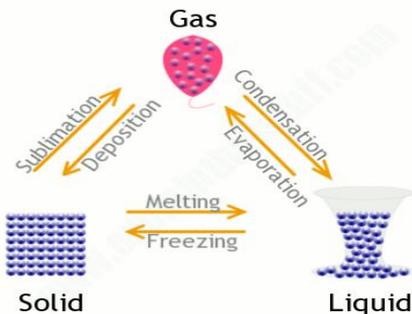
Specific Latent Heat	Energy needed to change the state of 1kg of a substance
Specific Latent Heat of Fusion	Energy needed to change 1kg of solid into 1 kg of liquid at the same temperature
Specific Latent Heat of Vaporisation	Energy needed to change 1kg of liquid into 1 kg of gas at the same temperature

Energy needed = mass X specific latent heat.

$$\Delta E = m \times L$$

Internal energy and energy transfers

Change of state



Latent heat is the flat part of the graph

Internal energy	Energy stored inside a system by particles	Internal energy is the total kinetic and potential energy of all the particles (atoms and molecules) in a system.
	Heating changes the energy stored within a system	Heating causes a change in state. Particles separate, so potential energy stored increases. Particles move faster so kinetic energy of particles increases.