

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

	Units
Density	<b>Kilograms per metre cubed (kg/m<sup>3</sup>)</b>
Mass	<b>Kilograms (kg)</b>
Volume	<b>Metres cubed (m<sup>3</sup>)</b>
Energy needed	<b>Joules (J)</b>
Specific latent heat	<b>Joule per kilogram (J/kg)</b>
Change in thermal energy	<b>Joules (J)</b>
Specific heat capacity	<b>Joule per kilogram degrees Celsius (J/kg°C)</b>
Temperature change	<b>Degrees Celsius ( °C)</b>
Pressure	<b>Pascals (Pa)</b>

## 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-11e8-9a61-01927559cfd5>

Specific Heat Capacity

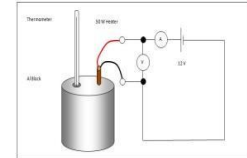
**Energy needed to raise 1kg of substance by 1°C**

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.

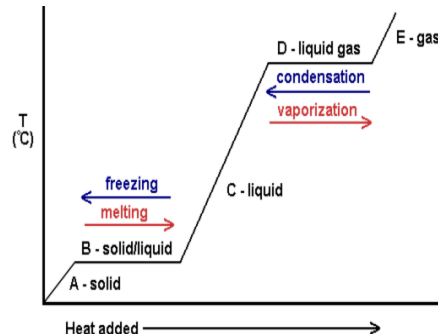
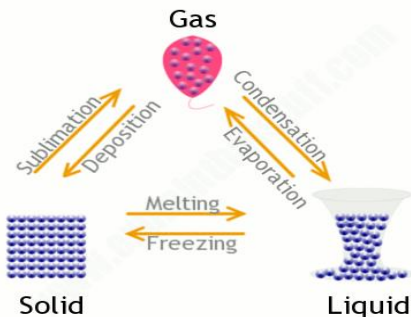
Specific Latent Heat	<b>Energy needed to change the state of 1kg of a substance</b>
Specific Latent Heat of Fusion	<b>Energy needed to change 1kg of solid into 1 kg of liquid at the same temperature</b>
Specific Latent Heat of Vaporisation	<b>Energy needed to change 1kg of liquid into 1 kg of gas at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

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