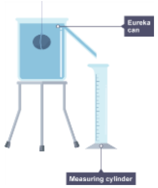
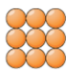
Density:



Density = Mass (kg) / Volume (m^3)
(kg/m^3)

Calculating the density of an irregular shape, can be done using a Eureka can and measuring the volume of water displaced.

State of matter	Diagram of structure	Movement of particles	Can it be compressed?	Density
Solid		Vibrate around a fixed position. They don't have enough energy to move apart	No, the particles have no space between them to move into.	High, there are lots of particles in a unit of area.
Liquid		They have enough energy to move from place to place but are still attracted to each other	No, the particles have no space between them to move into.	Quite high, there are lots of particles in a unit of area.
Gas		The have so much energy that they are not attracted to each other. Collisions with containers cause pressure.	Yes, the particles have lots of space between them to move into.	Low, there are few particles in a unit of area.

Internal Energy

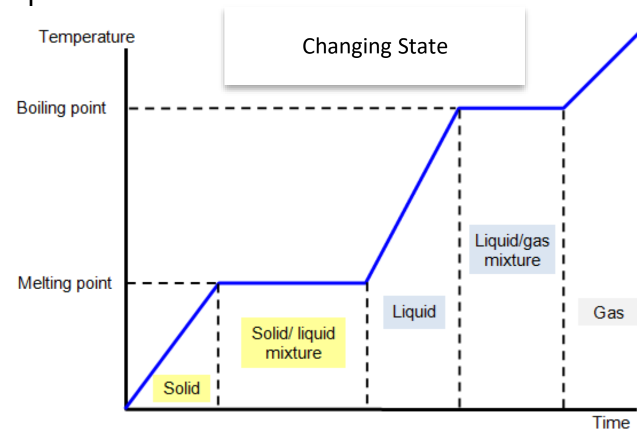
The energy in a substance is stored in its particles, this is called internal energy.

Internal energy = kinetic energy + potential energy.

Temperature: This is linked to the kinetic energy of the gas. The higher its temperature the higher its kinetic energy. If the temperature remains constant so does the kinetic energy of the particles.

Changing State

When a material changes state (melting or boiling) its internal energy increases, but its temperature does not. This means that its kinetic energy remains constant until it has changed state.



Specific Latent Heat

The specific latent heat of a substance is the energy needed to change 1kg of the substance with no change in state.

Energy = Mass x Specific Latent Heat
(J) (kg) (J/kg)

E = m x L

Specific heat of fusion: when turning from a solid into a liquid
Specific heat of vapourisation: when turning from a liquid into gas

Pressure and volume

Pressure x Volume = constant
(Pa) (m^3)

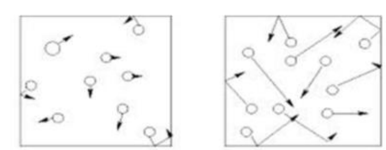
so $P_1 \times V_1 = P_2 \times V_1$

Increasing the volume of a gas (making the container bigger) whilst keeping the temperature constant will decrease the pressure of the gas.

Temperature and pressure

Increasing the temperature of a gas increases the kinetic energy of the gas particles, this increases the number of collisions with the surface, this increases the pressure acting on the sides of the container.

Temperature and gas



Cool gas, fewer and less energetic collisions

Hot gas, more and more energetic collision

Particles move in different directions with a range of speeds.

As the particles hit the side of the container they create a net force which acts at right angles to the