Paper 1

Chapter 3 — Particle Model

Units

Mass = kg

Volume =

Energy =

Temperature Change =

Specific Latent Heat =

Specific Heat Capacity =

What is the Change of State Called?

Solid —> Liquid

Liquid —> Gas

Gas —> Liquid

Liquid —> Solid

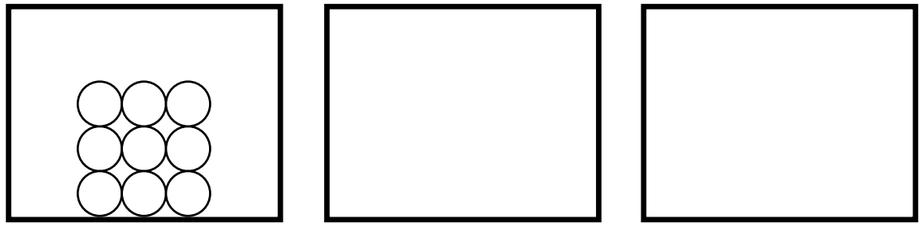
Solid —> Gas

Complete the Equations (include units)

density (kg/m^3) =

Solid Liquid Gas

Draw the particles after the original solid has changed state



Solid Liquid Gas

What happens to the mass of a substance when it changes state?

What happens to the properties of a substance if it state is changed and then changed back again?

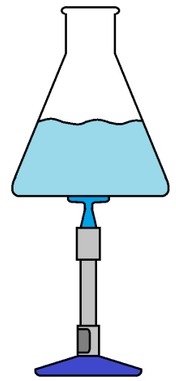
Calculation Practice

Use the equation to calculate the specific latent heat of vaporisation for the water

energy for a change of state = mass × specific latent heat

Mass of water = 500g

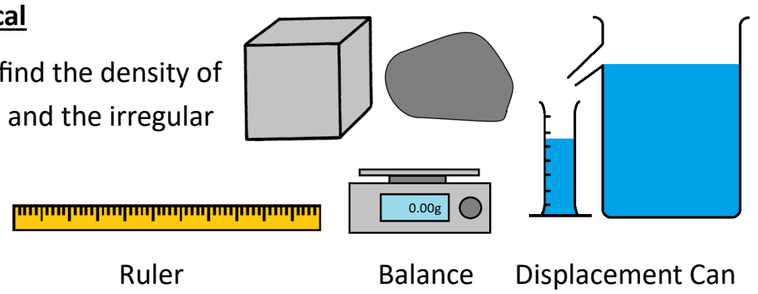
Energy added = 1MJ



Specific Latent Heat of Vaporisation = ____ (__)

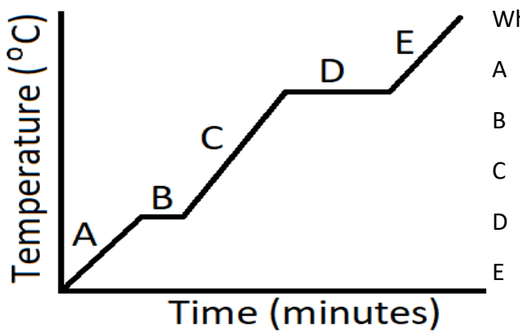
Required Practical

How would you find the density of the regular cube and the irregular rock?



Ruler Balance Displacement Can

Heating Curves— A substance is heated for 10 minutes.



What happens at each stage of the graph?

A

B

C

D

E

Why does the temperature not increase at B and D even though it is being heated?

Gas Pressure

The molecules of a gas are in constant _____ motion.

The temperature of the gas is related to the _____ _____ _____ of the molecules.

Changing the temperature of a gas, held at constant volume, changes the _____ exerted by the gas.

Specific Heat

The specific heat capacity of a substance is the _____ __ _____ required to raise the temperature of _____ of the substance by ___ _____ _____.

The specific latent heat of a substance is the _____ ___ _____ required to _____ ___ _____ of _____ of the substance with no change in _____.

Changing State

Specific latent heat of _____ is the energy required to change the state of a substance from solid to liquid.

Specific latent heat of _____ is the energy required to change the state of a substance from liquid to gas.

Internal Energy

Internal energy is the total k_____ e_____ and p_____ e_____ of all the particles (atoms and molecules) that make up a system.

Heating a substance either r_____ the t_____ of the system or produces a c_____ of s____.

Paper 1

Chapter 3 — Particle Model

Units

Mass = kg

Volume = m^3

Energy = J

Temperature Change = ^oC

Specific Latent Heat = J/kg

Specific Heat Capacity = J/kg^oC

What is the Change of State Called?

Solid —> Liquid

Melting

Liquid —> Gas

Boiling/Evaporation

Gas —> Liquid

Condensation

Liquid —> Solid

Freezing

Solid —> Gas

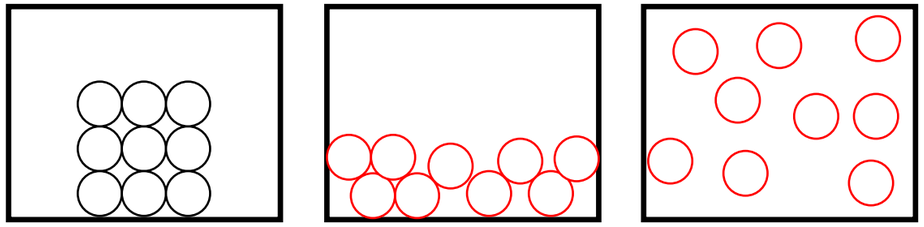
Sublimation

Complete the Equations (include units)

density (kg/m^3) = mass (kg) / volume (m^3)

Solid Liquid Gas

Draw the particles after the original solid has changed state



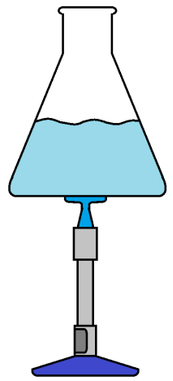
Solid Liquid Gas

What happens to the mass of a substance when it changes state? Stays the same

What happens to the properties of a substance if it state is changed and then changed back again? Properties the same as before the change in state

Calculation Practice

Use the equation to calculate the specific latent heat of vaporisation for the water



energy for a change of state = mass × specific latent heat

Mass of water = 500g

Energy added = 1MJ

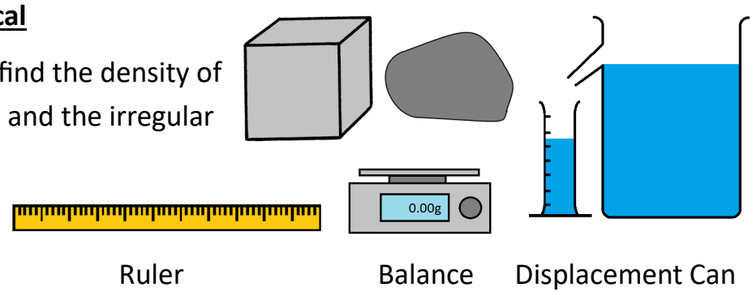
1,000,000J = 0.5kg x specific latent heat

Specific latent heat = 1,000,000 / 0.5 = 2,000,000

Specific Latent Heat of Vaporisation = 2,000,000J/kg

Required Practical

How would you find the density of the regular cube and the irregular rock?

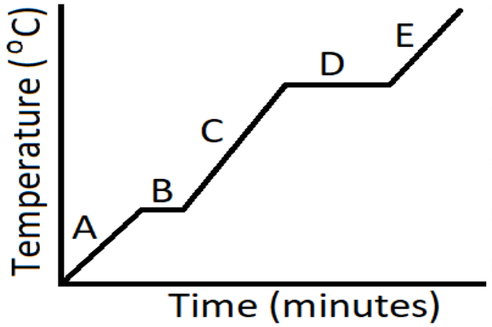


Ruler Balance Displacement Can

Cube—Use the balance to find mass in kg, use height (m) x width (m) x length (m) to find volume in m^3 ,Density = mass/volume

Rock—Use the balance to find mass in kg, use displacement can to find volume in m^3 ,(displaced water in ml or cm^3 / 1,000,000 = m^3) Density = mass/volume

Heating Curves— A substance is heated for 10 minutes.



What happens at each stage of the graph?

A Solid heating up

B Melting

C Liquid heating up

D Boiling

E Gas heating up

Why does the temperature not increase at B and D even though it is being heated? The heating is causing a change in state rather than increasing the temperature. (Particles gain potential energy rather than kinetic energy)

Gas Pressure

The molecules of a gas are in constant random motion.

The temperature of the gas is related to the average kinetic energy of the molecules.

Changing the temperature of a gas, held at constant volume, changes the pressure exerted by the gas.

Specific Heat

The specific heat capacity of a substance is the amount of energy required to raise the temperature of 1kg of the substance by 1 degree Celsius.

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

Changing State

Specific latent heat of fusion is the energy required to change the state of a substance from solid to liquid.

Specific latent heat of vaporisation is the energy required to change the state of a substance from liquid to gas.

Internal Energy

Internal energy is the total kinetic energy and potential energy of all the particles (atoms and molecules) that make up a system.

Heating a substance either raises the temperature of the system or produces a change of state.