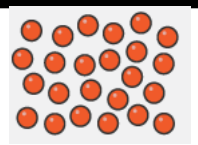
Physics Topic P6: Molecules and Matter

Keywords

Internal energy	Sum of the potential and kinetic energy of the particles.
Melting point	The temperature where a solid changes to a liquid.
Boiling point	The temperature where a liquid changes to a gas.
Latent heat	Energy transferred when a substance changes state

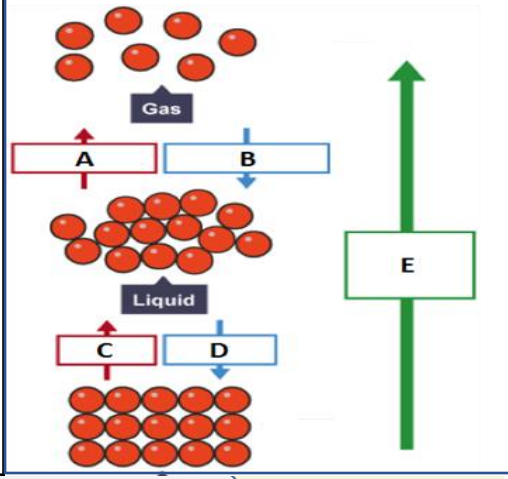
Gas properties

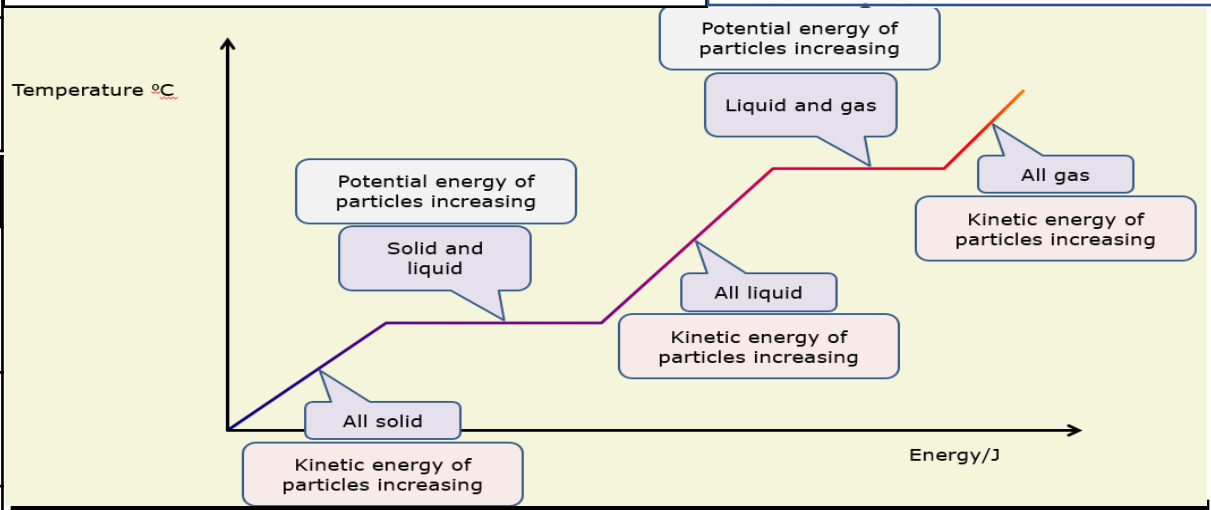
Diagram	
Arrangement of **particles**	Randomly arranged Far apart
Movement of **particles**	**Brownian** motion , random speed, random direction.
Energy of **particles**	Very high **kinetic** energy. Increases with temperature causes greater pressure.
Density of substance	Very low **density**.

Changes of state

A. Evaporation/ Vaporisation
B. Condensation
C. Melting/ Fusion
D. Freezing
E. Increasing internal energy

Changes of state





The specific latent heat equation.

Energy transferred, ΔE (joules, J) = **mass, m** (kilograms, kg) x **Latent heat, L** (joule per kilogram J/kg)

To find the **specific latent heat** of a substance the equation can be rearranged to:

$$L = \frac{\Delta E}{m}$$

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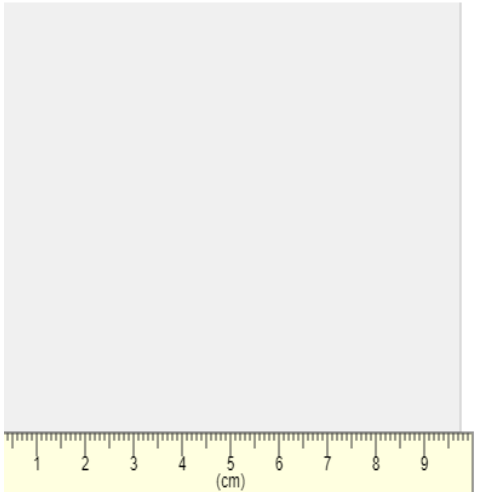
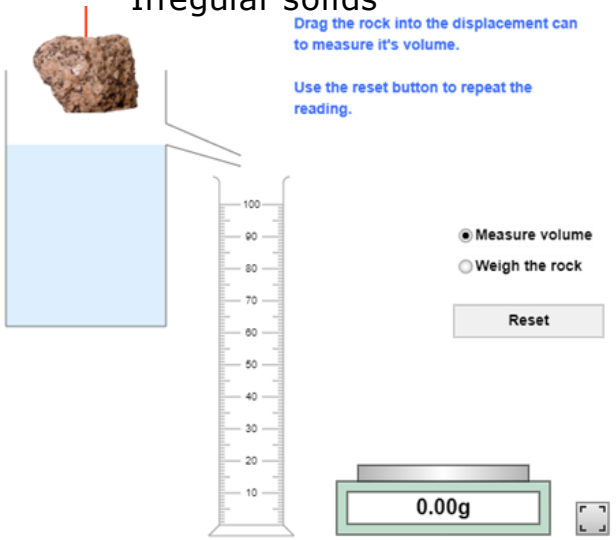
Required practical - density

Regular solids



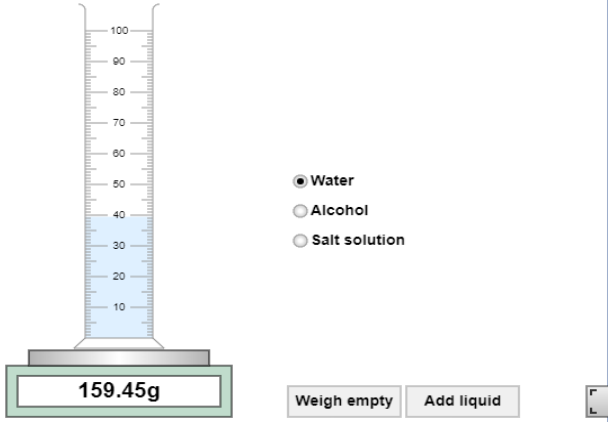
Volume = side 1xside 2xside 3 cm^3
Mass on a balance

Irregular solids



The rock is lowered into the can and the water that overflows is collected in a measuring cylinder. The volume of the water = the volume of the rock.
Mass on a balance

Liquids



Zero the measuring cylinder on the balance. Pour liquid and read volume. Read mass on balance.

6. Pressure and volume in gases (TRIPLE ONLY)

change	effect	reason
Increase **pressure**	Increase **volume**	More particles so more collisions. More force exerted on the container.
Decrease **pressure**	Decrease **volume**	Less particles so less collision. Less force exerted on wall of container
Formula	**pV=constant**	**IF fixed mass and constant temperature**

Density

$$\rho = \frac{m}{V}$$

Density = $\frac{\text{mass}}{\text{volume}}$

Symbol	Meaning	Unit
ρ	density	kg/m^3
m	mass	kg
V	volume	m^3