

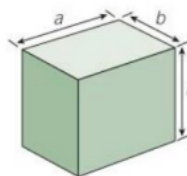
**Required practical:** Density is calculated by finding the mass and volume of an object.

Mass is found by using scales.

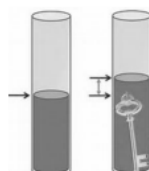
$$\rho = \frac{m}{v}$$

density      mass  
                    volume

Measure **volume** of a **cuboid**  
=  $a \times b \times c$

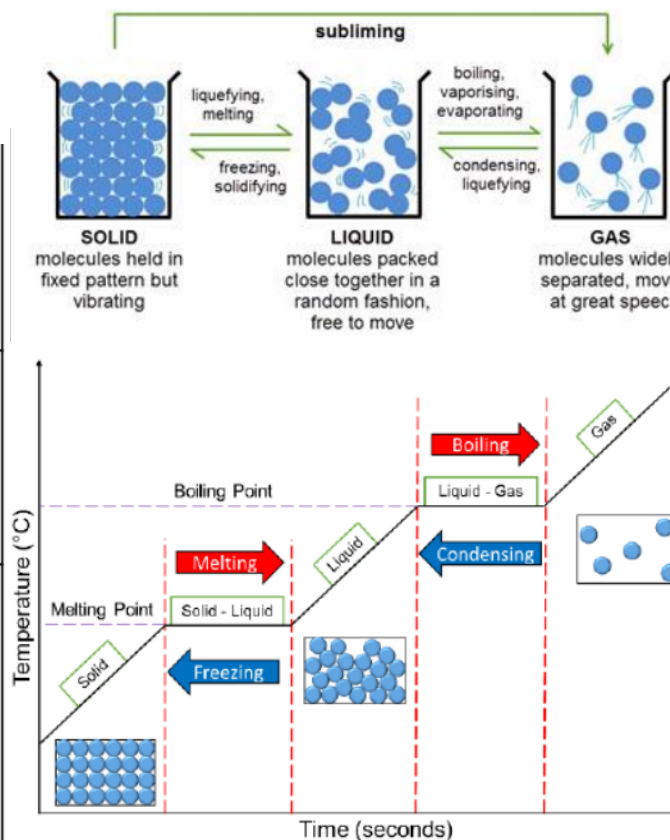
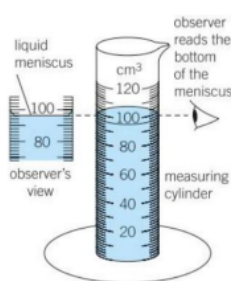


Volume of an **irregular object** can be found by **dropping in a liquid** and **measuring Displacement**.



Find the volume of a **liquid** using a measuring cylinder.

When reading a meniscus the observer must read the **bottom** of the **meniscus**.



# AQA Physics GCSE Knowledge organiser

## Yr10 Matter

### Internal energy

**Internal energy** is the sum of all of the kinetic and potential energies of its particles.

**Kinetic energy** is due to the motion of each particle.

Increases with temperature.

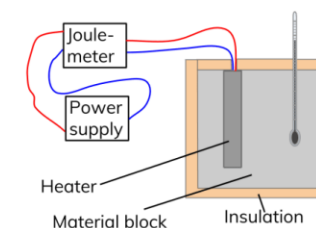
**Potential energy** is due to the particles relative positions.

Increases when melting, boiling or subliming.

### Specific heat capacity

This is energy required to heat 1kg of a substance by 1°C.

### Measuring specific heat capacity



A metal block of **known mass** is heated. A **joulemeter** is used to **measure the energy** supplied  $\Delta E$  and a **thermometer** to **measure the temperature rise**  $\Delta \theta$ .

The measurements are then inserted into the equation and used to calculate the specific heat capacity:

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

Energy (J)      Mass (kg)      Specific heat Capacity ( $\text{J } ^\circ\text{C}^{-1} \text{ kg}^{-1}$ )      Change in temperature ( $^\circ\text{C}$ )

| State         | Arrangement | Particle separation | Intermolecular forces | Random particle motion | Internal energy |
|---------------|-------------|---------------------|-----------------------|------------------------|-----------------|
| <b>Solid</b>  | Fixed       | Very close          | Strong                | Vibrations             | Least           |
| <b>Liquid</b> | Random      | Very close          | Weak                  | Move past each other   | Some            |
| <b>Gas</b>    | Random      | Far apart           | None                  | Freely moving          | Most            |

Gas pressure is due to collisions of gas particles with a surface. Gas moves randomly as proven by **Brownian motion**.

Hotter temperatures increases the kinetic energy of gas particles, which increases there speed, which increases the frequency of collisions, which increases the gas pressure.

### Latent heat      $E = m \times L$

Latent heat of fusion is the energy required to melt 1kg of a substance.

Latent heat of vaporisation is the energy required to boil 1kg of a substance.