

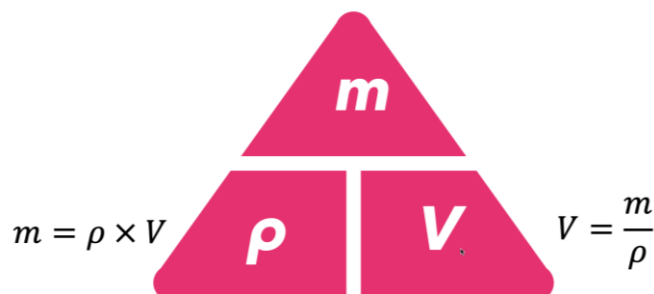
Box 1: Keywords

Word	Definition
Density	The mass per unit volume of an object, usually measured in kg/m ³ or g/cm ³
Displacement can (Eureka can)	A container which is filled with water, with a spout at the top of it, to hold an object. Used to determine the volume of irregular solid
Vernier callipers	A measuring device that consists of a main scale with a fixed jaw and a sliding jaw with an attached Vernier; gives a precise measurement on a linear scale

Box 2: Density

Denoted by the Greek letter *rho* (ρ)

Density describes the **mass** (m) present within a specified **volume** (V)



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

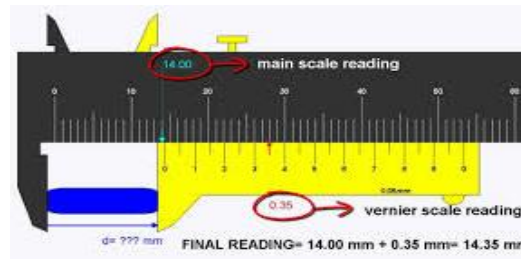
Box 4: Required practical (Part 1): Density of a regular shaped object

To determine the **density** of an object you need to find its **mass** and its **volume**. If the object has a regular shape e.g. cuboid; cylinder etc you can simply measure it using a ruler (or Vernier callipers – see box 5) and find its mass using a top pan balance



$$\text{density (g/cm}^3\text{)} = \frac{\text{mass (g)}}{\text{volume (cm}^3\text{)}}$$

Box 5: How to use Vernier callipers



Place the object between jaws of callipers then read the main scale reading from just before where the 0 on the Vernier scale is.

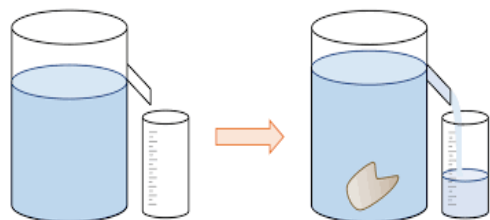
Then look along the Vernier scale to find the first division that coincides exactly with a line on the main scale. Add the two values together to get the precise measurement of the object.

Box 3: Key skills

Carry out practical work accurately and safely; evaluate methods; manipulate data; predict outcomes

Box 6: Required practical (part 2): Density of an irregular shaped object

Volume is measured using a displacement (Eureka) can



Volume = 10cm^3

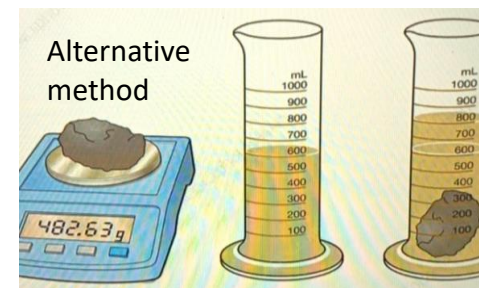
$$\text{Density} = \frac{9.43}{10}$$

Mass is measured using a top pan balance



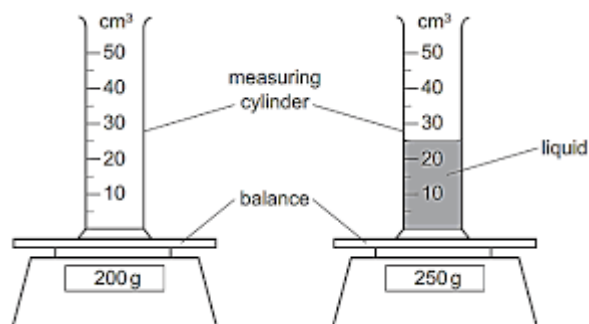
Mass = 9.43 g

$$\text{Density} = 0.943\text{ g/cm}^3$$



Alternative method
If the object will fit into a measuring cylinder, the volume of it can be measured directly by reading the scale to measure the displacement of the water by taking the initial volume of liquid away from the final volume on the measuring cylinder.

Box 7: Required practical (part 3): Density of a liquid



$$\text{Density} = \frac{50}{25}$$

$$\text{Density} = 2\text{ g/cm}^3$$

$$\text{density (g/cm}^3\text{)} = \frac{\text{mass (g)}}{\text{volume (cm}^3\text{)}}$$

Box 8: Pathway

Previous knowledge:

Particle Theory; Mass and weight

Future links:

KS4 Forces; KS5 Density

Careers:

Engineers; materials scientists

Box 9: Cross curricular links