IGCSE PHYSICS • EXERCISE SHEET

1.4 Density

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

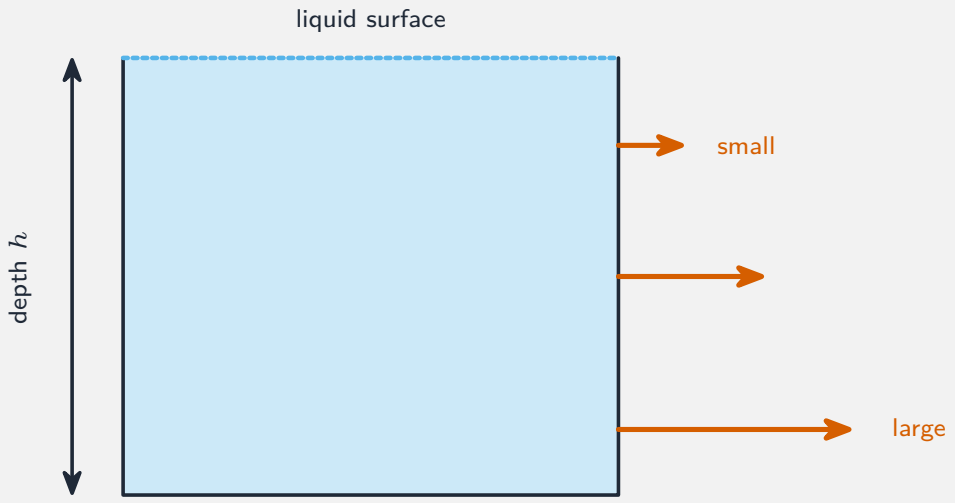
Build the skills to answer exam questions on **density** 密度—using $\rho = \frac{m}{V}$, finding volume (incl. the **displacement method** 排水法), and floating/sinking.

You must be able to:

- use $\rho = \frac{m}{V}$ with consistent units
- find the volume of a regular and an irregular solid
- predict floating or sinking from densities

1 Worked examples

■ Density and the displacement method



Density ρ is mass per unit volume; a denser liquid also gives a greater pressure with depth

Stone, mass 54 g, water rises 20 → 40 cm³: volume = 20 cm³; $\rho = \frac{54}{20} = 2.7$ g/cm³.

> **Float/sink:** floats if its density < the liquid's density.

2 Practice

2.1 A block has mass 240 g and volume 30 cm^3. Find its density. [2]

2.2 State how to find the volume of a small irregular stone. [1]

3 Exam-style questions

3.1 An object floats on water (density 1.0 g/cm^3) if its density is: [1]

- **A** greater than 1.0 g/cm^3
- **B** less than 1.0 g/cm^3
- **C** exactly 1.0 g/cm^3 only
- **D** any value

3.2 A rectangular metal block measures 2.0 cm × 3.0 cm × 5.0 cm and has mass 216 g.

(a) Find its volume. [1]

(b) Find its density. [2]

3.3 A liquid of density 0.80 g/cm^3 is poured onto water. State, with a reason, which liquid floats on top. [2]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **1.4 Density** past-paper sheet in the Library, or try these in **Practice mode**:

- 0625/21 N25 —Q4 (density)
- 0625/22 N25 —Q4 (density)
- 0625/23 N25 —Q5 (floating)

Solutions

2.1 $\rho = \dfrac{m}{V} = \dfrac{240}{30} = 8.0$ g/cm^3.

2.2 lower it into water in a measuring cylinder; the rise in water level is its volume.

3.1 B. It floats if its density is less than that of water.

3.2 (a) $V = 2.0 \times 3.0 \times 5.0 = 30$ cm^3.
(b) $\rho = \dfrac{216}{30} = 7.2$ g/cm^3.

3.3 the liquid of density 0.80 g/cm^3 floats; because its density is less than that of water (1.0 g/cm^3).