

1.8 Pressure

Name: _____ Class: _____ Date: _____

Total: 9 marks

Objective

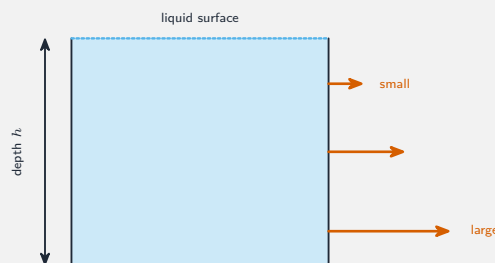
Build the skills to answer exam questions on **pressure** 压强 — $p = \frac{F}{A}$, and **pressure in a liquid** $\Delta p = \rho g \Delta h$.

You must be able to:

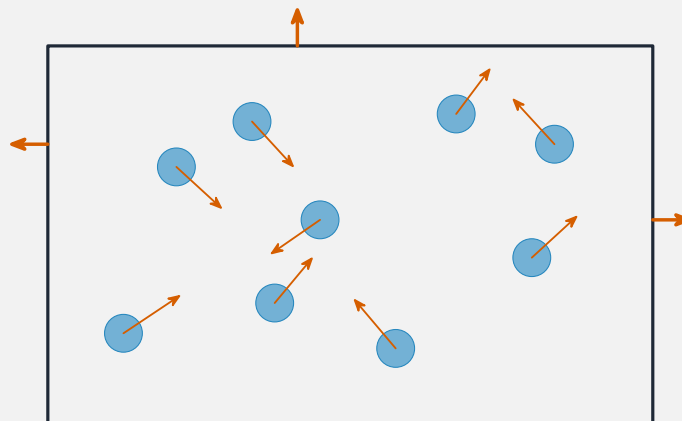
- use $p = \frac{F}{A}$ and explain area effects (sharp knife, snowshoes)
- use $\Delta p = \rho g \Delta h$ for pressure with depth
- state that liquid pressure acts in all directions and grows with depth

1 Worked examples

■ Pressure in a liquid



Pressure increases with depth and with density: $\Delta p = \rho g \Delta h$



gas particles hit the walls — each hit is a tiny force.

Pressure = force per unit area

Depth 2.0 m in water ($\rho = 1000$, $g = 10$): $\Delta p = 1000 \times 10 \times 2.0 = 20\,000$ Pa.

Area effect: a small area under a force gives a large pressure.

2 Practice

2.1 A force of 200 N acts on an area of 0.50 m². Find the pressure. [2]

2.2 State why a sharp knife cuts more easily than a blunt one. [1]

3 Exam-style questions

3.1 The pressure in a liquid increases with: [1]

- A depth only
- B density only
- C both depth and density
- D neither

3.2 A diver is 15 m below the surface of sea water of density 1030 kg/m³ ($g = 10$ N/kg).

(a) Find the extra pressure due to the water. [2]

(b) State the direction(s) in which this pressure acts on the diver. [1]

3.3 A box weighing 240 N stands on the ground on a base of area 0.30 m². Find the pressure it exerts on the ground. [2]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **1.8 Pressure** past-paper sheet in the Library, or try these in **Practice mode**:

- 0625/21 N25 —Q9 (pressure)
- 0625/22 N25 —Q9 (pressure)
- 0625/42 N25 —Q4 (pressure in a liquid)

Solutions

2.1 $p = \frac{F}{A} = \frac{200}{0.50} = 400 \text{ Pa.}$

2.2 its edge has a very small area, so the same force gives a very large pressure.

3.1 C. Liquid pressure increases with both depth and density.

3.2 (a) $\Delta p = \rho g \Delta h = 1030 \times 10 \times 15 = 154\,500 \text{ Pa.}$

(b) in all directions.

3.3 $p = \frac{F}{A} = \frac{240}{0.30} = 800 \text{ Pa.}$