Pressure in fluids and upthrust

Name _____ Class _____ Date _____

Fluids (liquids and gases) exert pressure on every surface they touch. Pressure increases with depth.

KEY EQUATIONS

p = F ÷ A
pressure (Pa), force normal to the surface (N), area (m^2)

p = h ρ g (Higher)
pressure due to a column of liquid (Pa), height (m), density (kg/m^3), g (N/kg)

Section A · Recall and calculate

Grade 4–5

1 A force of 600 N acts on an area of 0.2 m^2. Calculate the pressure. [2]

2 State the direction in which the pressure of a fluid acts on a surface. [1]

3 Explain why atmospheric pressure decreases as you go higher up a mountain. [2]

Section B · Apply

Grade 5–6

4 Explain why a dam is built much thicker at the bottom than at the top. [2]

5 Calculate the pressure due to the water at a depth of 15 m in a lake. (ρ = 1000 kg/m^3, g = 9.8 N/kg) (Higher) [2]

Section C · Stretch

Grade 7+

6 Explain why an object submerged in water experiences an upward force (upthrust). (Higher) [3]

7 Explain why a block of wood floats but a stone of the same size sinks. [3]

Exam-style question

AQA style

8 A diver is swimming 12 m below the surface of the sea. The density of sea water is 1030 kg/m³.

a Calculate the pressure due to the water on the diver. (g = 9.8 N/kg) [2]

b The diver's face mask has an area of 0.015 m². Calculate the force of the water on it. [2]

c Explain why the total pressure on the diver is greater than your answer to (a). [1]

Total: _____ / 20

How confident am I?	Not yet	Nearly	Got it
I can use p = F ÷ A	☐	☐	☐
I can explain how pressure changes with depth and height	☐	☐	☐
I can explain upthrust and floating	☐	☐	☐