

Pressure – PHYSICS ONLY

Pressure and surfaces

1.

$$p = \frac{F}{A}$$

← force (N)
← area (m)

↑
pressure (Pa)

2. The unit of pressure is the pascal (Pa), which is equal to 1 N/m².

3. The equation can be rearranged to calculate force or area;

$$F = p A \qquad A = \frac{F}{p}$$

Pressure in liquids

4. The pressure in a liquid increases with increasing liquid depth.
5. A liquid flows until the pressure along the same horizontal level is constant.
6. The greater the density of a liquid, the greater the pressure in the liquid.

$$p = h \rho g$$

↓ density (kg/m³)
← Gravitational field strength (N/kg)

↑
pressure (Pa)

↑
height (m)

7.

8. The symbol for density is ρ (the Greek letter rho).

Atmospheric pressure

9. Air molecules collide with surfaces and create pressure on them.
10. Atmospheric pressure decreases with higher altitude because there is less air above a given altitude than there is at a lower altitude.
11. The density of the atmosphere decreases with increasing altitude for the same reason.

$$\text{the force on a flat object due to a pressure difference} = \text{the pressure difference} \times \text{the area of the flat surface}$$

12.

Buoyancy and flotation

13. The buoyancy on an object in a fluid:
 - is an upward force on the object due to the fluid
 - is caused by the **pressure** of the fluid.
14. The pressure at a point in a fluid depends on the **density** of the fluid and the **depth** of the fluid at that point.
15. An object floats if the weight is equal to the buoyancy.
16. An object sinks if its weight is greater than the buoyancy force on it when it is fully immersed.

