

AQA Physics GCSE

4.5.5 - Pressure and Pressure Differences in Fluids (Physics Only)

Flashcards

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What is meant by the term 'fluid'?



What is meant by the term 'fluid'?

A liquid or a gas.



In any fluid, at what angle do the forces due to pressure act on a given surface?



In any fluid, at what angle do the forces due to pressure act on a given surface?

At right angles (normal to) the surface.



State the equation used to calculate pressure. Give appropriate units.



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$$\text{Pressure} = \text{Force}/\text{Area}$$

Pressure (Pascals), Force (Newtons),
Area (metre²)



What happens to the density of the atmosphere with increasing altitude?



What happens to the density of the atmosphere with increasing altitude?

The atmosphere becomes less dense as altitude increases.



Explain why atmospheric pressure decreases with an increase in height.



Explain why atmospheric pressure decreases with an increase in height.

- Pressure is created by collisions of air molecules
- The quantity of molecules (and so weight) decreases as the height increases
- This means atmospheric pressure decreases with an increase of height



What is the Earth's atmosphere?



What is the Earth's atmosphere?

A thin (relative to the magnitude of the Earth) layer of gas surrounding the Earth.



How does pressure in fluids increase with depth?



How does pressure in fluids increase with depth?

As the depth increases, the mass of liquid above that depth also increases. This means that the force due to the mass increases. Since the force has increased whilst the area has remained constant, the pressure will increase.



Why does pressure in fluids increase with density?



Why does pressure in fluids increase with density?

As the density of a fluid increases, the number of particles in a given volume increases.

Consequently the weight of the fluid is greater. This means that the force from the fluid above a certain point is larger. Since the force has increased, the pressure also increases.



What equation shows the magnitude of pressure in liquids at different depths?



What equation shows the magnitude of pressure in liquids at different depths?

Pressure due to a column of liquid(Pa) =
Column height(m) x density(kg/m³) x
gravitational field strength(N/kg)

$$P = h\rho g$$



Why are objects in a fluid subject to an upthrust?



Why are objects in a fluid subject to an upthrust?

When an object is submerged in a fluid, it has a higher pressure below it than it does above, as there is more weight above it at the bottom than there is at the top. This leads to an upwards force called upthrust. You float or sink depending on whether the upthrust is more or less than your weight.



What is upthrust always equal to?



What is upthrust always equal to?

The weight of the fluid that the object displaces.



What factors influence whether an object will sink or float?



What factors influence whether an object will sink or float?

- Upthrust
- Weight
- Density of fluid



Explain why an object with a density greater than that of water can never float.



Explain why an object with a density greater than that of water can never float.

Upthrust is equal to the weight of the displaced fluid. If the density of the object is high, there would not be enough volume displaced to produce an upthrust larger than the object's weight. This means that it will sink.

