

OCR (B) Physics GCSE

Topic 6.4 - How does the particle model relate to pressure in fluids? **(physics only)**

Flashcards

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What is a fluid?



What is a fluid?

A liquid or gas.



What does an object in a fluid experience as a result of pressure?



What does an object in a fluid experience as a result of pressure?

Forces at right angles to all of its surfaces.



How does increasing the volume of a gas affect the pressure?



How does increasing the volume of a gas affect the pressure?

It decreases the pressure (for a gas with a fixed mass and temperature) as the particles have more space to move around and therefore collide with container walls less frequently.



Give an equation relating pressure and volume



Give an equation relating pressure and volume

Where...

$$pV = \text{constant}$$

p = pressure, Pa

V = volume, m^3



Pressure in a fluid _____ with depth.
Why? (Higher)



Pressure in a fluid _____ with depth. Why?
(Higher)

Increases, because it is caused by the gravitational force on the fluid above that point.



How does the atmosphere compare to the size of the Earth?



How does the atmosphere compare to the size of the Earth?

It is a very thin layer (relatively).



Describe the density of the atmosphere



Describe the density of the atmosphere

Density decreases with increasing altitude.



Why does density decrease with altitude?



Why does density decrease with altitude?

The total weight of the air above a point decreases as the altitude of the point increases, reducing the pressure.



Give 3 assumptions for the basic atmospheric model



Give 3 assumptions for the basic atmospheric model

- **Isothermal** (all the same temperature).
- **Transparent** to (transmits) solar radiation.
- **Opaque** to (does not transmit) terrestrial radiation.



What is upthrust? (higher)



What is upthrust? (**higher**)

The resultant upwards force produced when a submerged object experiences a greater pressure on the bottom surface than on the top.



When do objects float in water? (higher)



When do objects float in water? (**higher**)

When the object is less dense than the water it displaces.



How much water is displaced by an object? (higher)



How much water is displaced by an object? (**higher**)

A mass (or weight) of water equal to the mass (or weight) of the object.



Give the equation for pressure at different depths of a fluid (**higher**)



Give the equation for pressure at different depths of a fluid (**higher**)

pressure (Pa) = density (kg/m^3) x gravitational field strength (N/kg) x depth (m)

$$p = h\rho g$$



What is buoyancy? (Higher)



What is buoyancy? (Higher)

The upwards force that counteracts the weight of a floating object.



What is buoyancy equal to? (Higher)



What is buoyancy equal to? (Higher)

The weight of fluid displaced by the object in it.

