

Edexcel IGCSE Physics

5 - Solids, Liquids and Gases

Flashcards

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Explain what is meant by density of a material



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- It is the mass per unit volume of the material. e.g.
- It states how many kg is the mass of one meter-cube of the material
- It states how many g is the mass of one centimeter-cube of the material



What equation is used to calculate density, when you know the mass and volume?



What equation is used to calculate density, when you know the mass and volume?

$$\text{Density} \left(\frac{\text{kg}}{\text{m}^3} \right) = \frac{\text{mass}(\text{kg})}{\text{Volume}(\text{m}^3)}$$

$$\rho = \frac{m}{V}$$



What is pressure?



What is pressure?

- It is the amount of force applied per unit area
e.g.
- How many newtons of force applied per meter-square



State an equation linking pressure, force and area



State an equation linking pressure, force and area

$$\textit{Pressure} = \frac{\textit{Force}}{\textit{Area}}$$



What is the SI unit of pressure?
How else it can be expressed?



What is the SI unit of pressure?
How else it can be expressed?

Pressure is measured in Pascals(Pa)

$$1 \text{ Pascal} = 1 \frac{\text{Newton}}{\text{meter}^2}$$



In solids, pressure acts in the direction of force.
In which direction does pressure act in liquids or
gases?



In solids, pressure acts in the direction of force.
In which direction does pressure act in liquids or gases?

It acts in all directions equally



State an equation linking pressure difference, depth (height), density of liquid and gravitational field strength.



State an equation linking pressure difference, depth(height), density of liquid and gravitational field strength.

$$\text{pressure}(Pa) = \text{depth}(m) \times \text{density}(kg/m^3) \times g(m/s^2)$$

$$p = h \times \rho \times g$$



How do you convert between degree Celsius and Kelvin?



How do you convert between degree celsius and kelvin?



Explain why kelvin scale is used in science instead of celsius scale.



Explain why kelvin scale is used in science instead of celsius scale.

Kelvin scale is directly proportional with the average kinetic energy (average speed) of the particles. At 0 K, particles do not move but at 0 °C particles still move .



What is absolute zero?



What is absolute zero?

$-273\text{ }^{\circ}\text{C}$ or 0 K

Particles has no kinetic energy and do not move.



Explain the pressure of a gas in terms of the motion of particles.



Explain the pressure of a gas in terms of the motion of particles.

The particles move in random directions. When they collide with the walls of a container they exert a force which acts at a right angle to the container. This causes pressure.



How does changing the temperature of a gas affect the velocity of the particles?



How does changing the temperature of a gas affect the velocity of the particles?

The higher the temperature, the more kinetic energy the particles have and therefore the faster the average velocity of the particles.



How does temperature affect the pressure of a gas?



How does temperature affect the pressure of a gas?

Increasing temperature increases the average kinetic energy of particles so they move faster. Therefore particles collide harder and more frequently. This increases the pressure



State an equation linking initial pressure, final pressure, initial temperature and final temperature



State an equation linking initial pressure, final pressure, initial temperature and final temperature

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

*Temperature should be measured in Kelvins.

*Volume and mass(number of molecules) is constant



Explain how changing the volume of a gas affects the pressure of the gas



Explain how changing the volume of a gas affects the pressure of the gas

Volume and pressure are inversely proportional assuming temperature and mass of the gas is kept constant. Therefore as volume decreases (gas is compressed) pressure increases; as volume increases (gas is expanded) pressure decreases



State an equation linking initial pressure, initial volume, final pressure and final volume for a gas.



State an equation linking initial pressure, initial volume, final pressure and final volume for a gas.

$$P_1 \times V_1 = P_2 \times V_2$$



State 2 assumptions you should make while using this equation



State 2 assumptions you should make while using this equation

- Fixed mass(number of molecules)
- Fixed Temperature



In a bicycle pump, how does pressing the piston lead to an increase in the temperature inside the piston?



In a bicycle pump, how does pressing the piston lead to an increase in the temperature inside the piston?

- Pressing the piston leads to a decrease in volume
- This leads to an increase in pressure
- The particles collide more frequently
- The velocity of the particles increases
- Therefore their temperature will increase

