

Edexcel GCSE Physics

Topic 14.12-14.20P - Pressure

Flashcards

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Describe the structure of particles in a gas.



Describe the structure of particles in a gas.

Particles in a gas have almost no forces between them therefore they are completely free to move, and move at high speeds in random directions.



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.



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



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

$$\text{Pressure (Pa)} = \text{Force (N)} / \text{Area (m}^2\text{)}$$

$$P = F / A$$



What factor affects the average kinetic energy of gas molecules?



What factor affects the average kinetic energy of gas molecules?

- The **temperature** of the gas
- The higher the temperature, the higher the **average** kinetic energy of the molecules



What effect does increasing temperature have on the pressure of a gas when held at constant volume?



What effect does increasing temperature have on the pressure of a gas when held at constant volume?

Gas pressure will increase as the temperature increases.



Why does pressure increase as temperature increases (at a constant volume)?



Why does pressure increase as temperature increases (at a constant volume)?

- Kinetic energy of molecules increases
- Collisions between molecules becomes more frequent
- Greater rate of change of momentum
- Greater force and therefore pressure



If gas A is at a low pressure, and gas B is at a high pressure, what can be said about the rate of collisions in each gas?



If gas A is at a low pressure, and gas B is at a high pressure, what can be said about the rate of collisions in each gas?

- There are more collisions per second in gas A than in gas B
- The rate of collisions is higher in A



Describe the force that the pressure of a gas exerts on the walls of its container.



Describe the force that the pressure of a gas exerts on the walls of its container.

- The net force acts at right-angles to each surface of the container
- The force increases as pressure increases



Explain how increasing the volume of a gas results in a decrease of pressure.



Explain how increasing the volume of a gas results in a decrease of pressure.

- Molecules become more spread out so rate of collision decreases
- Rate of change of momentum decreases, and so force exerted on container decreases, resulting in a lower pressure



What can be said about the product of pressure and volume for a fixed mass of gas at a constant temperature? (Higher)



What can be said about the product of pressure and volume for a fixed mass of gas at a constant temperature? (Higher)

It is constant.

$$p V = \text{constant}$$



What is the unit used for pressure?



What is the unit used for pressure?

Pascal (Pa).



What increases when you do work on a gas?



What increases when you do work on a gas?

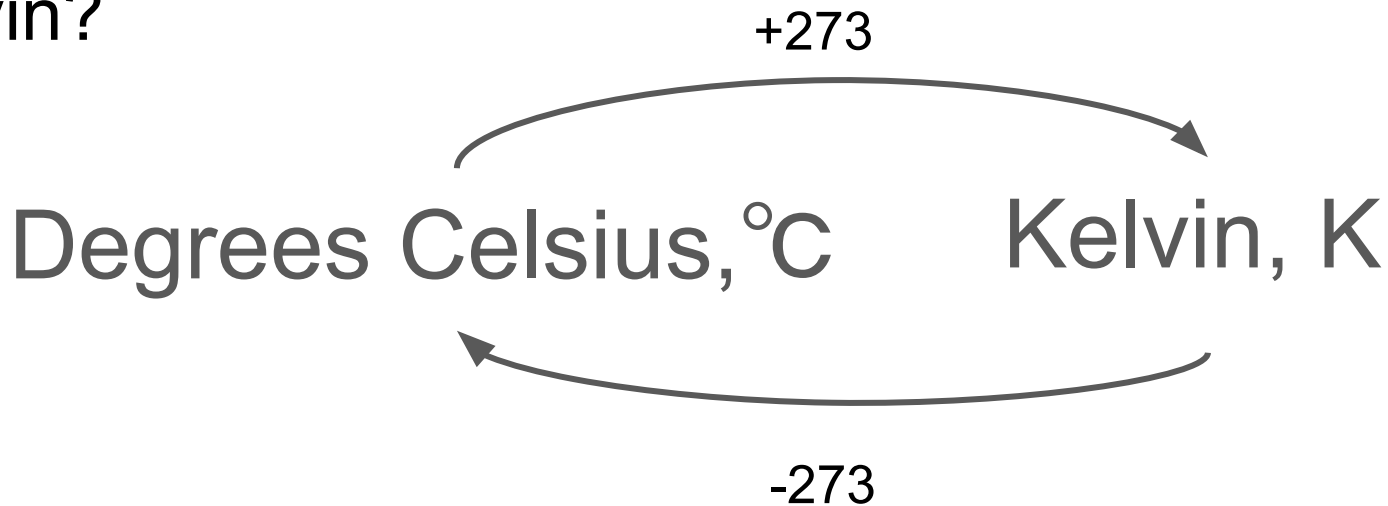
- The internal energy of the gas
- This can also lead to an increase of temperature



How do you convert between degree Celsius and Kelvin?



How do you convert between degree celsius and kelvin?



What is absolute zero?



What is absolute zero?

$-273\text{ }^{\circ}\text{C}$

Particles have no kinetic energy and do not move.



What equation can be used to calculate the pressure/volume for a gas for which the mass is fixed and temperature is constant?



What equation can be used to calculate the pressure/volume for a gas for which the mass is fixed and temperature is constant?

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



Why does the temperature of air inside a bike pump increase when it is pumped?
(Higher)



Why does the temperature of air inside a bike pump increase when it is pumped? (**Higher**)

- Work is done on a gas when it is compressed
- Doing work on a gas increases its internal energy, so increases the average kinetic energy of the molecules
- Temperature increases with an increase of average kinetic energy

