

# WJEC Wales Physics GCSE

## 1.8 - Kinetic Theory

### Flashcards

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State the equation used to calculate the temperature change when a substance is heated. Give appropriate units.



State the equation used to calculate the temperature change when a substance is heated. Give appropriate units.

- $\Delta E = m c \Delta \theta$
- Energy (J), Mass (kg), Specific Heat Capacity ( $\text{J/kg/}^\circ\text{C}$ ), Temperature ( $^\circ\text{C}$ )



Define specific heat capacity.



# Define specific heat capacity.

The amount of energy needed to increase the temperature of 1kg of a substance by  $1^{\circ}\text{C}$ .



Define specific latent heat.



# Define specific latent heat.

The amount of energy needed to change the state of 1kg of a substance **with no change in temperature.**



State the equation for the energy required to change state. Give appropriate units.





State the equation for the energy required to change state. Give appropriate units.

- Energy to change state = mass  $\times$  specific latent heat
- $E = mL$
- Energy (J), Mass (kg), Specific latent heat (J/kg)



Describe the motion of molecules in a gas.



Describe the motion of molecules in a gas.

They are in constant random motion.



What is the name given to the constant motion of gas particles?



What is the name given to the constant motion of gas particles?

Brownian motion.



What factor affects the average kinetic energy of gas molecules?



What factor affects the average kinetic energy of gas molecules?

- The temperature of the substance.
- 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 the container's surface.
- 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 and so time between collisions increases.
- This reduces the rate of collisions.
- 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 or a change of state



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





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

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



What is true when a gas is at absolute zero?



What is true when a gas is at absolute zero?

The gas molecules have no kinetic energy.



# What is the Kelvin scale?



## What is the Kelvin scale?

A temperature scale starting at absolute zero.



What is the value of absolute zero in degrees celsius?



What is the value of absolute zero in degrees celsius?

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

