

Electrical Circuits

Key terms

- Current** is the flow of electrical charge.
- Current is measured in amps (A).
- Potential difference** is the force that pushes the charge around.
- P.D. is measured in volts (V) using a voltmeter.

Charge

- Current depends on the rate of flow of charge.

$$I = \frac{Q}{t}$$

Current (A) ← I = Q / t ← Charge (coulombs, C)
Time (s) ← t

Resistance

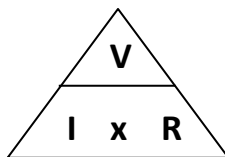
- Resistance** is something that slows down the flow of current and is measured in ohms (Ω).
- Resistance can be changed using a variable resistor.
- Resistance of a component can be calculated if you know the potential difference and the current.

$$V = IR$$

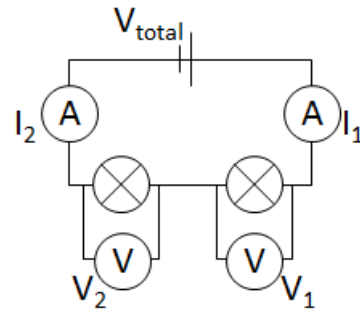
Potential difference (V) ← V = IR ← Resistance (Ω)

Re-arranged to:

$$R = \frac{V}{I}$$



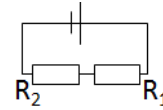
Series Circuits



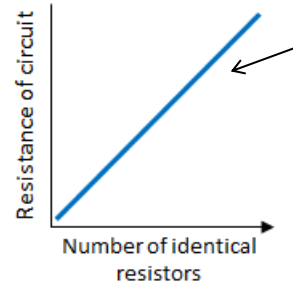
11. **Current** is the same throughout the circuit: $I_1 = I_2 = \dots$

12. **Potential difference** is shared across the components: $V_{total} = V_1 + V_2 + \dots$

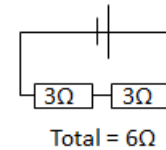
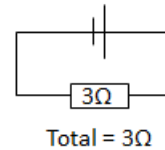
13. **Resistance** adds up: $R_{total} = R_1 + R_2 + \dots$



Investigating Resistance



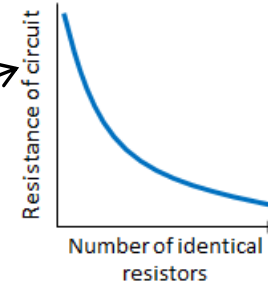
17. As more resistors are added in **series** the total resistance will **increase**.



REQUIRED PRACTICAL
SEE PRACTICAL SHEET FOR DETAIL

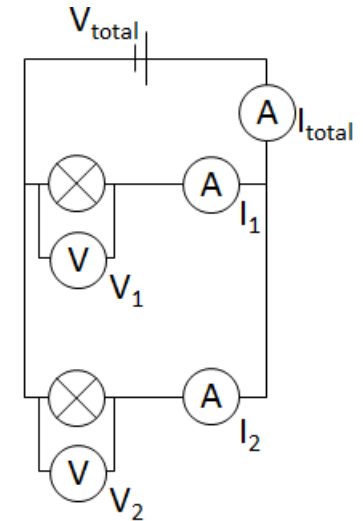
18. As more resistors are added in **parallel** the total resistance will **decrease**.

19. This is because resistors in parallel have the **same pd** across them as the power supply.
20. Adding another loop to the circuit means the current has more than one way to go and the total current around the circuit increases.



21. An increase in current means a **decrease** in resistance. $(V = IR)$

Parallel Circuits



14. **Current** is shared across the components: $I_{total} = I_1 + I_2 + \dots$

15. **Potential difference** is the same across all components: $V_1 = V_2 = \dots$

16. Total **resistance** will fall if two or more resistors are added in parallel.

22. Factors Affecting Resistance

Resistance

- Length or diameter of wire
- Temperature
- Types of components

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