

Year 10 Physics 2: Electricity Knowledge Organiser

2. Electrical charge and current

$$Q = I \times t$$

Charge flow = current x time

Q = Charge (in coulombs C)
 I = Current (in amps A)
 t = Time (in seconds s)

3. Resistance

$$V = I \times R$$

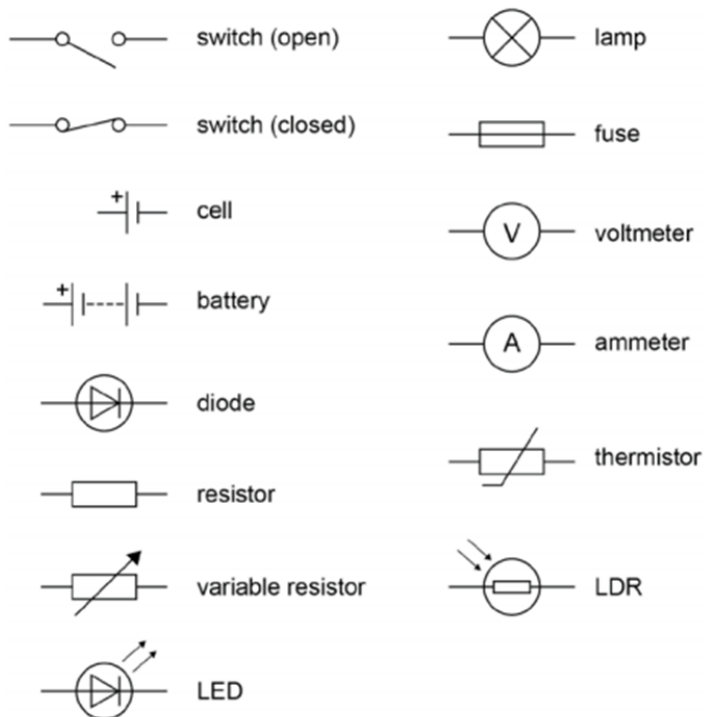
Potential difference = current x resistance

V = Potential difference/voltage (in volts V)
 I = Current (in amps A)
 R = Resistance (in ohms Ω)

Symbols and their units

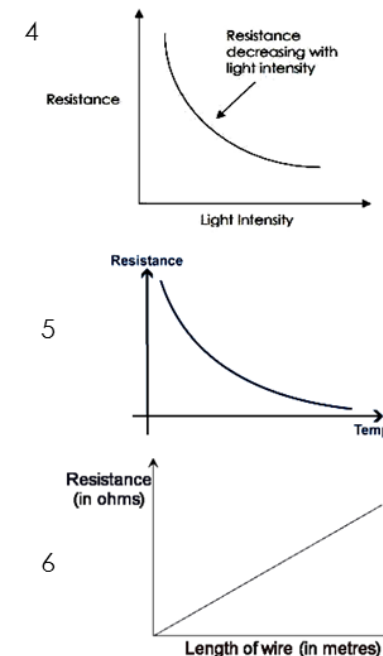
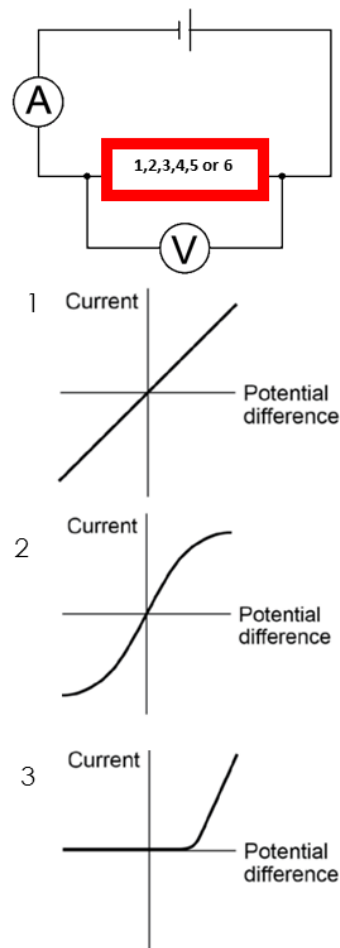
| Symbol | Meaning | Unit | Meaning |
|--------|----------------------|----------|----------|
| V | Potential difference | V | Volts |
| I | Current | A | Amps |
| R | Resistance | Ω | Ohms |
| Q | Charge | C | Coulombs |
| P | Power | W | Watts |
| E | Energy | J | Joules |

1. Standard Circuit Diagram Symbols



| | | | |
|---|-------------------|----|--------------------------------|
| 1 | Switch (open) | 8 | LED (light emitting diode) |
| 2 | Switch (closed) | 9 | Lamp (bulb) |
| 3 | Cell | 10 | Fuse |
| 4 | Battery | 11 | Voltmeter |
| 5 | Diode | 12 | Ammeter |
| 6 | Resistor | 13 | Thermistor |
| 7 | Variable resistor | 14 | LDR (light-dependent resistor) |

4. IV Characteristics and required Practical



| | |
|---|----------------------|
| 1 | Ohmic resistor |
| 2 | Filament bulb |
| 3 | Diode |
| 4 | LDR |
| 5 | Thermistor |
| 6 | Resistance in a wire |

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7. Electrical power

power = current² x resistance

$$P=I^2 R$$

power = current x potential difference

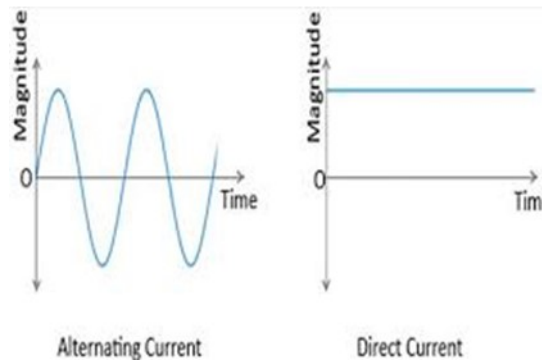
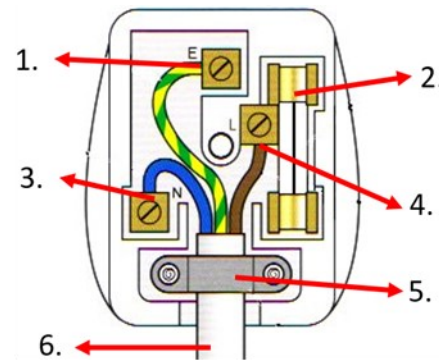
$$P=IV$$

energy transferred = charge flow x potential difference

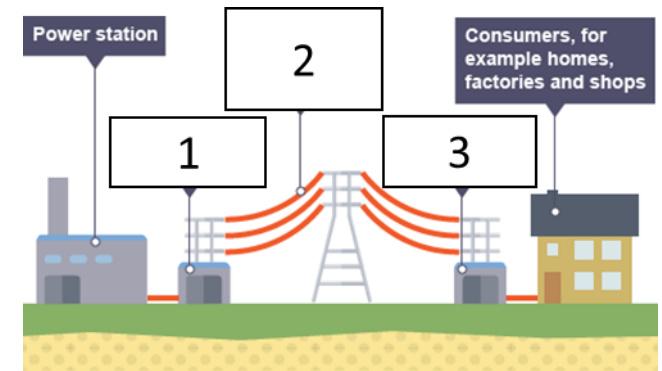
$$E=QV$$

6. Mains electricity keywords

| | |
|-----------------------------|--|
| 1. Earth wire | Prevents danger from short circuits |
| 2. Fuse | Melts if current gets too high |
| 3. Neutral wire | Carries the current away from plug |
| 4. Live wire (230v) | Carries current to plug |
| 5. Cable grip | Prevents a loose wire if cable is pulled |
| 6. Double insulated cable | Prevents electric shock |
| 7. Alternating current (AC) | Current which changes direction 50 times a second (50 Hz). Found in the mains. |
| 8. Direct current (DC) | Current that only travel in one direction. Found in batteries. |



8. The National Grid



| | |
|-------------------------------------|----------------------------------|
| 1. Step up transformer | Increase the voltage of the AC |
| 2. High voltage transmission cables | High voltage reduces energy loss |
| 3. Step down transformer | Decreases the voltage of the AC |