

What is electric current? What is it measured with and what is it measured in?
Electric current is a flow of electric charge or electrons.

Measured in **amperes (A or amps)** with an **ammeter**

What is measured in volts and what would you use to measure it?

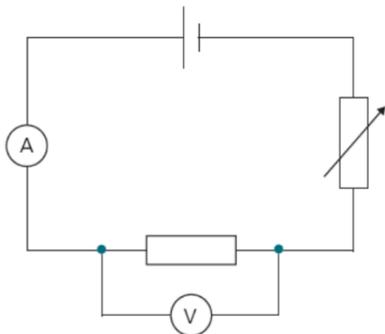
Potential Difference is measured in volts. Measured with a voltmeter

The National Grid uses various different voltages. How many can you remember. Where would you find each of them?

Produced at **25000 V (25kV)**
 Stepped up to **400000 V (400 kV)**
 Stepped down to various voltages for factories, hospitals, schools etc
 Ends up at our homes stepped down to **230 V**

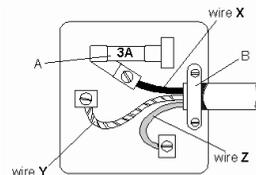
What is resistance measured in and how would you calculate it?

Resistance is measured in **Ohms**
 $R=V/I$



30 Questions: Answer these in your book

- 1 Draw a fuse
- 2 Draw a light bulb and a resistor
- 3 What component will only allow current to flow in one direction?
- 4 If the light intensity falling on an LDR increases, what happens to the resistance of the LDR?
- 5 What do resistors do?
- 6 What do the letters in $V=IR$ stand for?
- 7 A thermistor would be a good component to use in a circuit designed to do what?
- 8 Should voltmeters be connected in series with or parallel to the component they are testing?
- 9 If you have four 1.5V cells connected in series, what is the output voltage of the battery?
- 10 What is the equation for charge flow?
- 11 Charge is measured in coulombs, C. What is current measured in?
- 12 Electric current is the flow of what?
- 13 In order for current to flow in a circuit, a source of potential difference must be present. Name two ways of supplying this potential difference.
- 14 Potential difference = current x resistance. Write this equation as symbols.
- 15 What are the units for the following: i) current; ii) potential difference; iii) power; iv) resistance
- 16 How does the length of a piece of wire affect its resistance?
- 17 If you have several resistors connected in series, how do you calculate the total combined resistance?
- 18 If you have several resistors in parallel, what is the total combined resistance going to be?
- 19 Draw the IV graph for a filament lamp. The y-axis is current and the x-axis is potential difference.
- 20 If the IV graph for a component is not a straight line, what does this tell you about the component?
- 21 Which component would you use in a circuit to switch on lights when it got dark?
- 22 If a current of 3A flows in a circuit with a 12V supply potential difference, what is the combined resistance of the circuit components?
- 23 What is the mains supply voltage and frequency in the UK?
- 24 Mains electricity is supplied as alternating current and batteries are direct current. What is the difference?
- 25 Name the parts labelled A,B and the 3 wires.

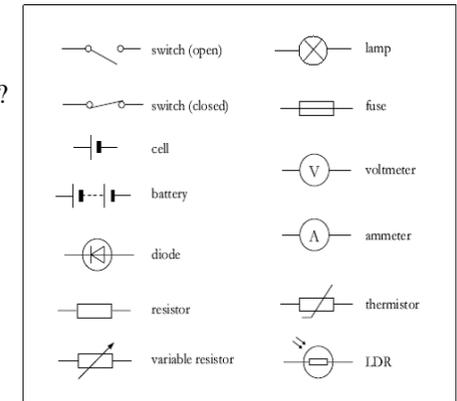


Mains voltage in our homes in the UK is at 230 V, 50 Hz ac. What does ac stand for? Are batteries ac or dc?

AC- Alternating Current DC- Direct Current
Mains is AC Batteries are DC

- 26 Where is the earth wire connected to on an appliance?
- 27 $P = IV$ and $P = I^2R$ are both equations for what?
- 28 What are the energy transfers in an electric drill?
- 29 $E = Pt$ and $E = QV$ are both equations for energy transfer. What do the letters stand for?
- 30 Why do we need transformers in the National Grid?

Module 2 ELECTRICITY Knowledge Organiser



KEY WORDS/IDEAS TO REMEMBER

voltmeter	LDR
ammeter	LED
resistor	plug wires
transformer	resistance
amps	ohms
volts	variable
watts	circuit breaker
power	coulombs
thermistor	charge
diode	IV graphs
filament lamp	directly proportional to
potential difference	National Grid
component	de-localised electrons

What is a fuse and how does it work? What is also a safety device but even better than a fuse?

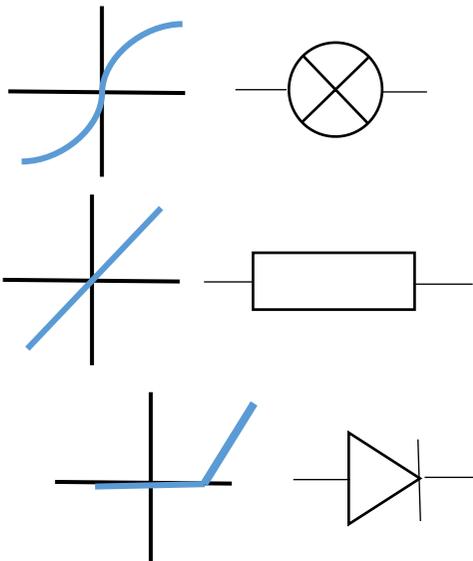
A fuse is a small piece of wire connected to the live wire. It breaks/melts if too much current passes through it.

A circuit breaker is better than a fuse because it reacts more quickly and can be reset.

What does a resistor do?

Controls amount of electrical current flowing around a circuit

Draw 3 mini I-V graphs that you would get for a light bulb, resistor and diode.



Why do you need an earth wire in some plugs and not others? What symbol would indicate that one is not needed?

Earth wire needed if plug becomes faulty and there is a metal case. Electricity is sent to earth instead of giving you a shock.

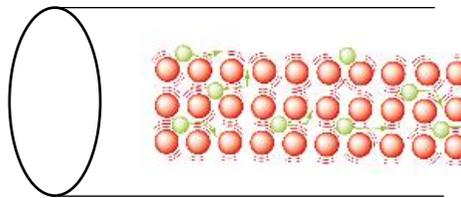
Earth wire not needed if circuit is double insulated. Symbol 

What does a step up transformer do and why is that a good thing?

Increases potential difference between the power station and the National Grid.

This reduces wasted energy because current is kept low so there is less heating of the wires.

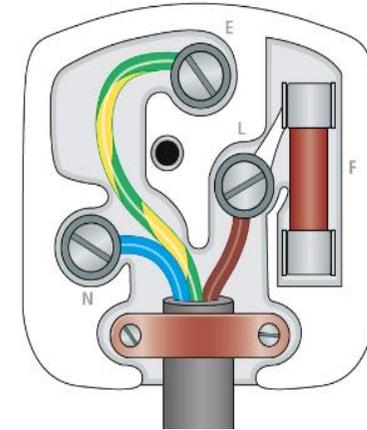
Draw atoms and electrons inside the wire below and explain why it gets hot when a battery is connected across it.



The electrons bump into the metal atoms and transfer their energy. This makes the metal atoms vibrate more and they get hot.

Draw and colour a plug from memory. Label the wires and describe what they do.

- brown is connected to the live terminal (L)
- blue is connected to the neutral terminal (N)
- green/yellow stripe is connected to the earth terminal (E).



What do the following do?

- Thermistor *its resistance decreases as it gets hotter.*
- Light dependent resistor *a component with a resistance that decreases as light intensity increases*
- Diode *allows current to only flow in one direction*