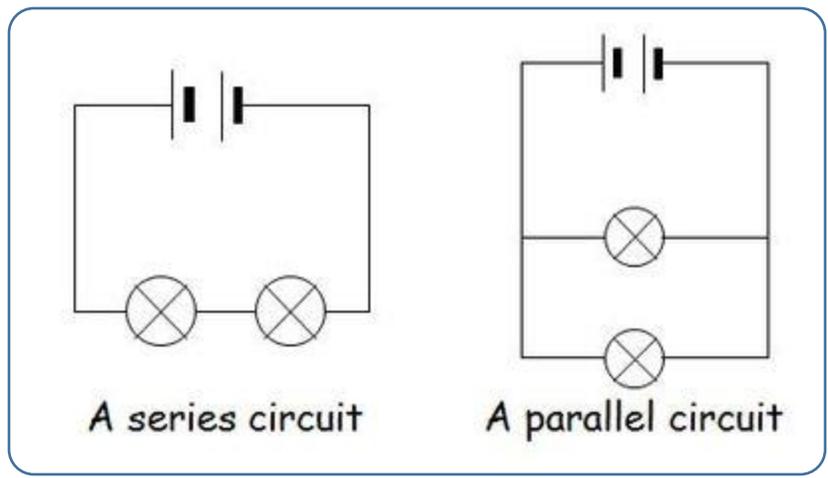
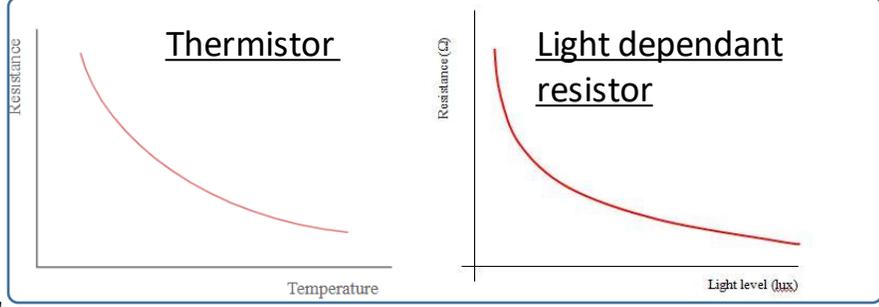


# Electricity

## Big idea: Energy

Key words	Definition
Charge (measured in Coulombs, C)	Unequal amount of protons and neutrons. Electrons have a negative charge, protons have a positive charge.
Current (Measured in Amps, A)	The rate of flow of charge past a certain point. A current of 2 amps means that 2 coulombs of charge flows past a point each second
Potential difference (Measured in Volts, V)	The work done by one coulomb of charge as it passes through a component
Resistance (measured in Ohms, $\Omega$ )	How hard it is for a current to pass through a component
Component	A piece of an electrical circuit, for example, a light bulb or a resistor.
Series circuit	A circuit with only one 'loop' or 'path' for the current to take
Parallel circuit	A circuit with multiple 'loops' or 'paths' for the current to take



### Circuit symbols

- switch (open)
- switch (closed)
- cell
- battery
- diode
- resistor
- variable resistor
- LED
- lamp
- fuse
- voltmeter
- ammeter
- thermistor
- LDR

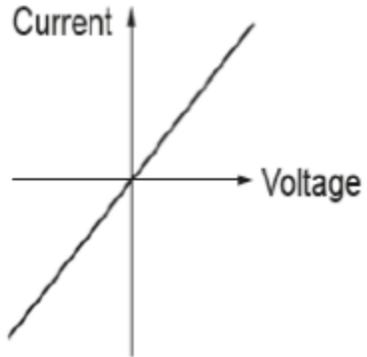
Rules for:	Series Circuit	Parallel circuit
Current	The same current passes through each component in a series circuit	the current through the cells is equal to the sum of the current through each separate loop
Potential Difference	The sum of the potential difference of cells in series will equal the sum of the potential difference of the components in series	The potential difference across each 'loop' will be equal to the total potential difference of the cells
Resistance	The total resistance of a series circuit is equal to the sum of the resistance of each component	The total resistance of two (or more) components in parallel is less than the resistance of the resistor with the least resistance

# Electricity

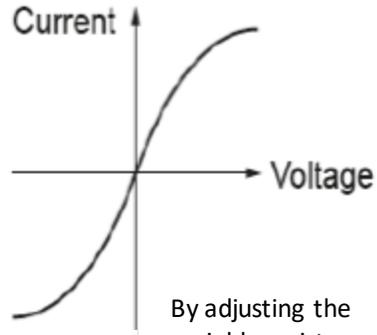
## Big idea: Energy

### Finding the IV characteristic of a component

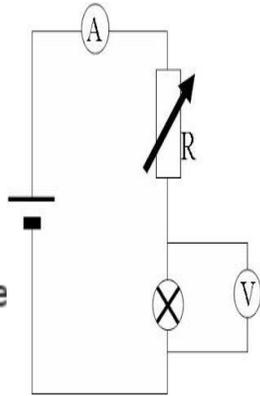
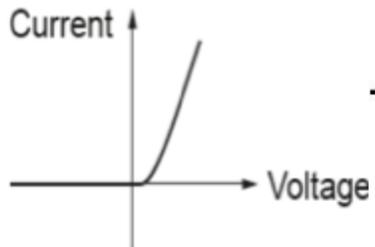
Fixed resistor



Bulb



Diode



By adjusting the variable resistor you can measure how the changing P.D. across a component affects the current through it. You are expected to be able to sketch and identify the three graphs to the left

### Equations

$$V = I \times R$$

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

$$V = \frac{W}{Q}$$

$$P = I^2 \times R$$

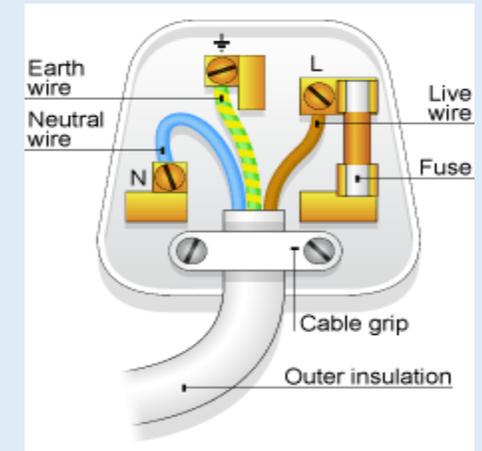
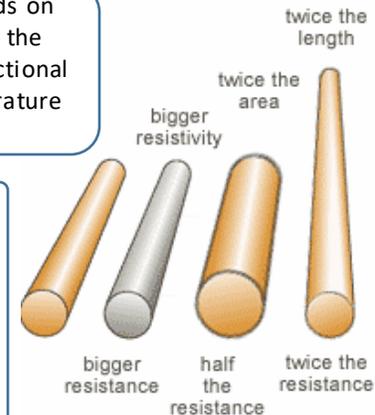
$$P = I \times V$$

$$P = \frac{W}{t}$$

$$Efficiency = \frac{useful\ energy\ output}{total\ energy\ input}$$

V = potential difference (V)  
I = Current (A)  
R = resistance ( $\Omega$ )  
Q = Charge (C)  
t = time (s)  
W = work done (J)  
P = electrical power (W)

The resistance of a wire depends on the material it is made out of, the length of the wire, the cross-sectional area of the wire and the temperature of the wire



Wire	Colour	Function
Live wire	brown	Carries the 230V. Makes a complete circuit with the neutral wire.
Neutral wire	Blue	Completes the circuit with the live wire. Carries 0V.
Earth wire	Yellow and Green stripes	Does not usually form part of the circuit. It is a safety wire which can help to prevent electrocution if there is a malfunction.

Alternating Current (AC): the current (and P.D.) alternate directions.  
Direct current (DC): the current (and P.D.) remain constant.

The Mains electricity which comes from the national grid has an average P.D. of 230V and alternates directions with a frequency of 50 Hz, or 50 times per second.

