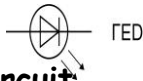
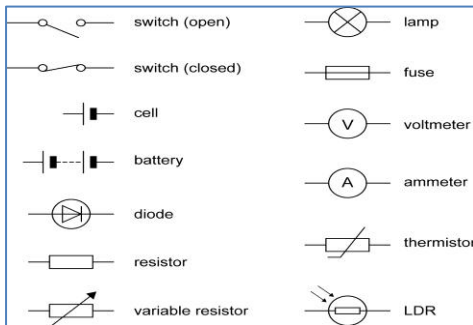
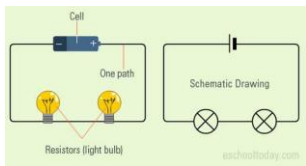


## 2) Electricity

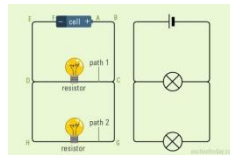
### Circuit symbols



### Series Circuit



### Parallel circuit



### Equations

Charge flow (C) = Current (A) x Time (s)

Potential difference (V) = Current (A) x Resistance ( $\Omega$ )

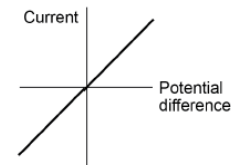
Power (W) = Potential difference (V) x Current (A)

Power (W) = Current<sup>2</sup> x Resistance ( $\Omega$ )

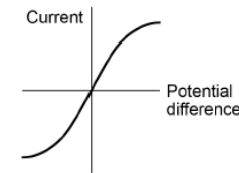
Energy transferred (J) = Power (W) x Time (s)

Energy transferred (J) = Charge flow(C) x Potential difference(V)

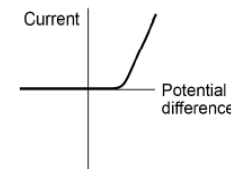
### Graphs



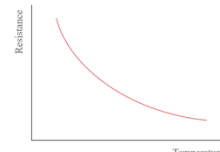
**Fixed or ohmic resistor.** Current and resistance are directly proportional.



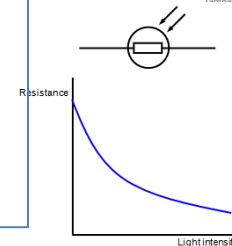
**Filament bulb.** Resistance increases as temperature increases.



**Diode.** Current only flows in one direction.



**Thermistor.** Resistance decreases as temperature increases.



**Light dependant resistor.** Resistance decreases as light intensity increases.

Figure 1

- Current at any point is the **same** as the current at any other point.
- Potential difference **is shared** between the components.
- Adding resistors **increases** the total resistance.

- Current is **shared** between branches.
- Potential difference is the **same** across each component.
- Adding resistors in parallel **decrease** the total resistance.

### Definitions

**Current** - a flow of charged particles.

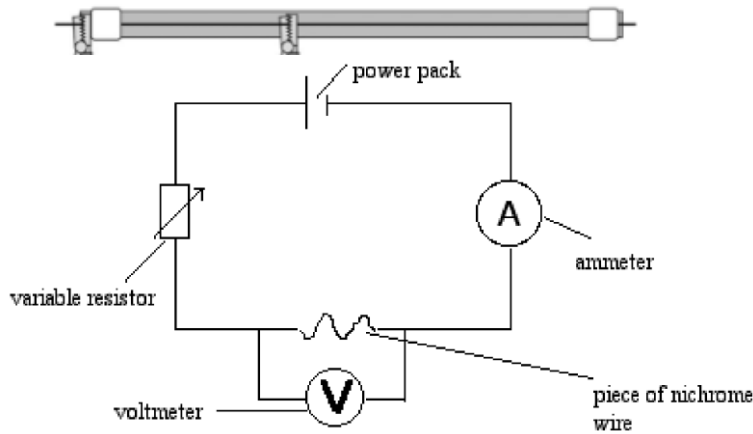
**Potential difference** - the energy transferred per unit of charge

**Resistance** - is the physical property of a substance because of which it opposes the flow of current i.e. Electrons

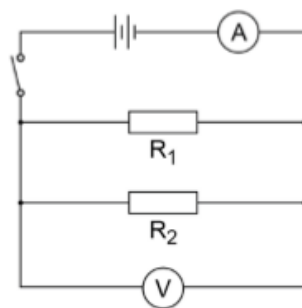
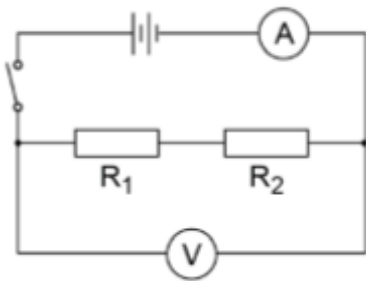
**Charge flow** - the number of particles passing in a given space of time.

**Ohms Law** - the current through an ohmic conductor is directly proportional to the potential difference across the resistor.

## Resistance RP



- The resistance of the wire is proportional to its length.
- A graph of resistance against length should be a straight line through the origin.
- It is hard to attach the crocodile precisely to the zero end of the wire, and there will be some contact resistance. (This gives a zero error).
- For a short length of wire as the current will increase and the wire can get quite hot increasing resistance.

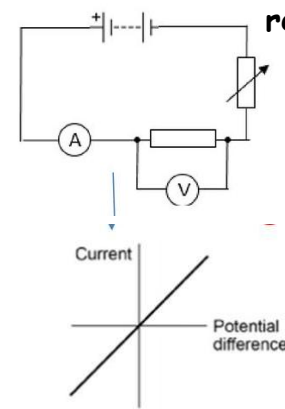


Resistors in series increase the overall resistance .

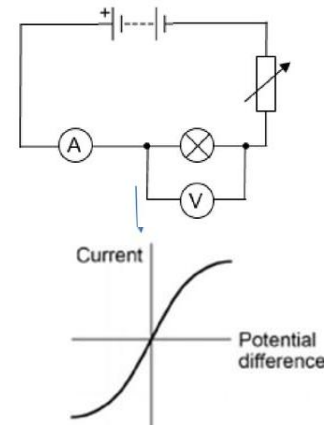
Resistors in parallel decrease the overall resistance.

## IV Characteristics

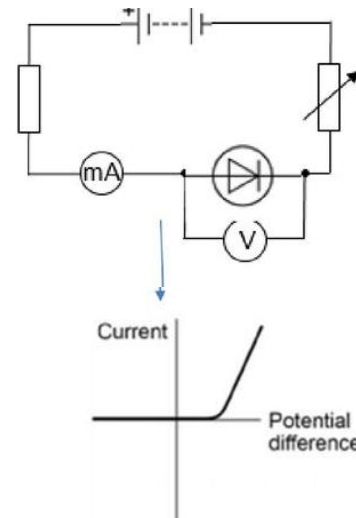
### Fixed resistor



### Filament bulb



### Diode



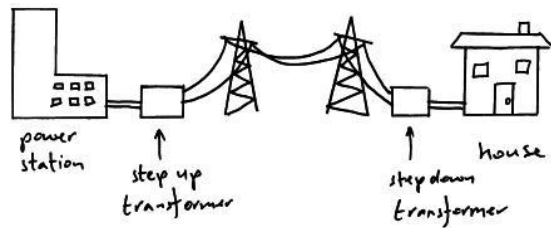
## The plug

### Main Electricity

Frequency - 50Hz  
Potential Difference - 230V  
Alternating current

Name	Colour	Function	Potential Difference (V)
Live	Brown	Carries alternating potential difference from the supply.	230
Neutral	Blue	Completes the circuit.	0
Earth	Green and yellow stripes	A safety wire to stop the appliance becoming live.	0

### The National Grid



- Step up transformers increase the potential difference from the power station.
- This is to decrease the current and energy loss due to heating.
- Step down transformers decrease the potential difference.
- This makes it safe for household appliances.

### Definitions

**Direct current (DC)** - Potential difference is in the same direction. It doesn't change polarity e.g. Cells and batteries.

**Alternating current (AC)** - The potential difference changes direction. The polarity changes e.g. mains electricity.

### Static - Triple only

Static is formed when insulating materials are rubbed against each other. Negatively charged electrons are rubbed off one material and onto the other.

If it gains electrons it becomes negatively charged.

If it loses electrons it becomes positive.

If the potential difference between the 2 is great enough you get a spark.

