

1) Circuit Symbols

- When drawing circuits:
- Use pencil
 - Draw circuit symbols first, then
 - Draw wires with straight lines (use a ruler)
 - Do not leave gaps between wires and symbols

Cell	
Battery	
Ammeter	
Voltmeter	
Motor	
Bulb	
Open switch	
Closed switch	
Resistor	
Variable resistor	

2) Current and Voltage

Current
The rate of flow of charge.

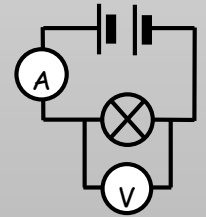
Units – Amps (A)
Meter – Ammeter

Voltage (potential difference)
A 'push' that causes current to flow.

Units – Volts (V)
Meter - Voltmeter

Ammeter is placed in **series**.

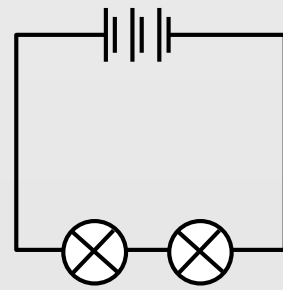
Voltmeter is placed in **parallel**.



3) Series Circuits - Components are one after the other

Current is the **same** at any point in the circuit.

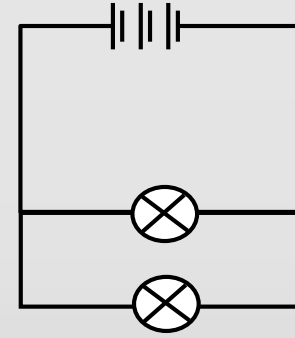
Voltage is **split** between each component.



4) Parallel Circuits - Components along side one another

Current is **split** down each 'path' in the circuit.

Voltage is the **same** across each component.

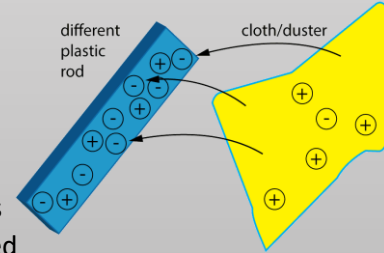


5) Static Electricity

Atoms contain small particles called **electrons**. Electrons have a **negative charge**. Electrons can move from one substance to another when objects are **rubbed** together.

Static electricity is the gain or loss of electric charge in the form of electrons.

- Negative charge – gain of electrons
- Positive charge – loss of electrons
- Neutral charge – positives and negatives are balanced



6) Resistance – Anything that **resists** the flow of current

Units – Ohms (Ω)

$$\text{Resistance } (\Omega) = \frac{\text{Voltage (V)}}{\text{Current (A)}}$$

Resistors



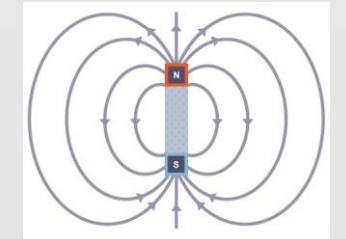
Ohm's law $V = IR$

$$V = \text{Voltage (V)}$$

$$I = \text{Current (A)} \quad R = \text{Resistance } (\Omega)$$

7) Magnetism

Like poles repel, opposite poles attract.



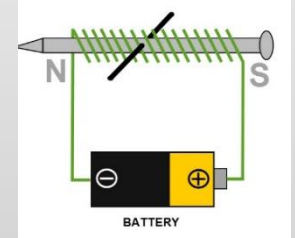
Magnetic materials:

- Iron (Fe)
- Nickel (Ni)
- Cobalt (Co)

Magnets create a **magnetic field** and if a magnetic material is inside the magnetic field it will attract.

8) Electromagnets

When a **magnetic field is produced by an electric current** it is called an electromagnet. Simple electromagnets are made from a length of **wire coiled** and connected to a battery.



To increase the strength of an electromagnet:

- Increase the number of coils
- Increase the current
- Add a core inside the coils e.g. an iron nail

Investigating electromagnets:

- **Independent variable** – what you change e.g. current, core,
- **Dependent variable** – what you measure e.g. number of paper clips picked up
- **Control variable** – what you keep the same e.g. size of paper clips