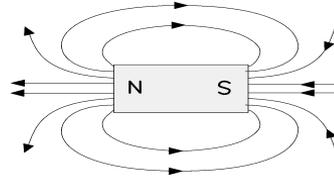Similar charges **repel**. Opposite charges **attract**

Similar poles of a magnet **repel**
Opposite poles **attract**

$$potential\ difference = \frac{energy}{charge}$$

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

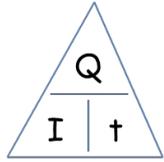Sketch the magnetic field pattern around a bar magnet

An electric current is a flow of **charge**. In wires it is **electrons** that flow through.

The equation for current flow

Charge (C) = current (A) × time (s)

Q = I x t

Component	Symbol	Purpose
Cell		Provides electrical energy into the circuit
Battery		Two (or more) cells joined together to provide electrical energy
Bulb/lamp		Converts electrical energy into light and heat
Switch (open)		Prevents there being a complete circuit
Switch (closed)		Completes the circuit
Ammeter	A	Measures the electric current flowing through it
Voltmeter	V	Measures the potential difference across a component
Resistor		Opposes the flow of electric current through it

Series Circuit – one pathway around circuit e.g.

Electricity and magnetism (EM)
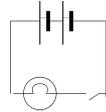
Parallel Circuit – more than one pathway around circuit.
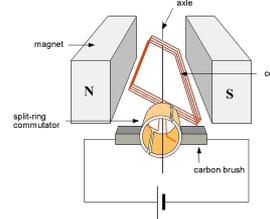e.g.
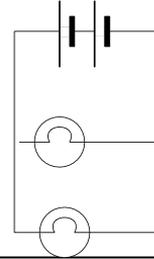
potential difference = current × resistance

V = I x R

- potential difference (V) is measured in volts (V)
- current (I) is measured in amps (A)
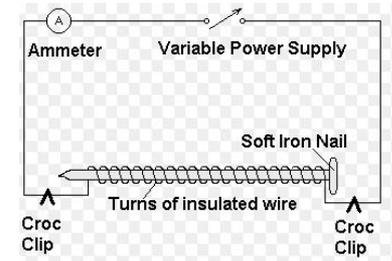- resistance (R) is measured in ohms (Ω)

How can a motor be made to spin faster?
1. More coils
2. Stronger magnets
3. More current

How could the motor be made to spin the other way?

How could an Iron nail be turned into an electromagnet? Draw the circuit diagram:

How could you investigate how the strength changes with the number of coils? What would be the independent and dependent variables?

Independent = **number of coils**   Dependent = **number of paperclips lifted**

Similar charges _____. Opposite charges _____

Similar poles of a magnet _____. Opposite poles _____

$potential\ difference = \frac{energy}{charge}$

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

Sketch the magnetic field pattern around a bar magnet

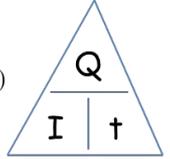| N | S |

An electric current is a flow of _____. In wires it is _____ that flow through.

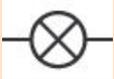The equation for current flow

_____ (C) = _____ (A) × _____(s)

Q = I x t

Q / I | t

Component	Symbol	Purpose
Cell		
		Two (or more) cells joined together to provide electrical energy
	⊗	
Switch (open)		
	—o o—	
		Measures the electric current flowing through it
		Measures the potential difference across a component

Draw a series Circuit – one pathway around circuit e.g.

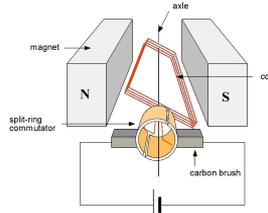Draw a parallel Circuit – more than one pathway around circuit. e.g.

_____ = _____ × resistance

V = I x R

- potential difference (V) is measured in volts (V)
- current (I) is measured in amps (A)
- resistance (R) is measured in ohms (Ω)

Electricity and magnetism (EM)

How can a motor be made to spin faster?
1.
2.
3.

axle
magnet
coil
N S
split-ring commutator
carbon brush

How could the motor be made to spin the other way?

How could an Iron nail be turned into an electromagnet? Draw the circuit diagram:

How could you investigate how the strength changes with the number of coils? What would be the independent and dependent variables?

Independent =_____ Dependent =_____