

Year 7 Science knowledge organiser: P3 Electricity and Magnetism

Overview of topic: You will know the symbols, names and functions of the components and a circuit and how to draw them. You will also be able to state the interactions between 2 magnet, the magnetic field which surrounds magnets and how this relates to the Earth. You will describe the current and how this can be measured in the circuit.

Key content/ ideas/ concepts

Keywords/ Glossary

Circuit components

Name of component	Symbol	Function
Cell		Provides stored energy to the circuit in the form of chemical energy (more than 1 cell = battery)
Wire		Allows the electrical energy to flow through to the next component
Switch		Can allow the electrical energy to flow (closed) or break to circuit (open)
Bulb		Gives out light energy. This converts the electrician energy to light energy
Ammeter		Measure the flow of electrons (small charged particles) in the circuit. Also known as the current.
Voltmeter		Measuring the voltage (energy give to components)- you will do this in more detail in year 8.
Resister		Measures how easy/ hard it is for the electrons to flow (the current to flow)- you will do this more in year 8.

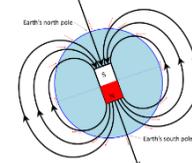
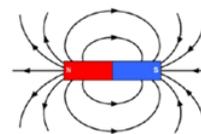


Drawing circuits rules

- ✓ Pencil and a ruler
- ✓ A rectangle shape
- ✓ All components connected
- ✓ 2D and using the circuit symbols

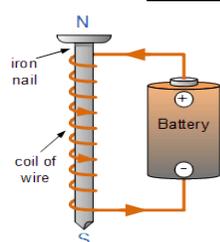
Magnetic fields and drawing them

A magnet's magnetic field is the around in which the force can act. These are drawn using clear 'field lines' with arrows pointing from N → S



The geographic North = magnetic south
The geographic South = magnetic north

Electromagnets



This electromagnet can be switched on/ off.

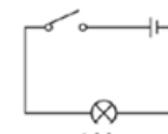
Increasing the number of coils in the wire of increasing the voltage (energy) of the battery can increase the strength of the electromagnet

Magnets

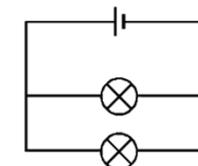
				} Opposite poles = attract (pull towards)
				} Any poles + a magnetic material = attract

Current: The flow of electric charge around a circuit.

Series circuit: A circuit in which the current only has 1 route to flow



Parallel circuit: A circuit in which the current has 2 routes to flow



Conductor: A material that allows electricity to pass through easily

Insulator: Materials that do not conduct electricity well.

Electromagnet: Magnets that are created by wrapping a coil of wire wrapped around a magnetic core

Magnetic material: Will always be attracted to a magnet, will not repel. Iron, nickel and cobalt are the only magnetic elements

Wider reading

- 'The Martian', by Andy Weir.
- 'American Experience: Tesla', Netflix documentary about Nikola Tesla.

Know it	Grasp it	Think it
1. What is current a measure of and what are the units of current?	1. State two differences between series and parallel circuits.	1. Describe an experiment to show how you can find out the shape of a magnetic field.
2. What meter do you use to measure current?	2. What happens to the current if you add more bulbs to a series circuit?	2. Describe how you can use a nail, a piece of wire, crocodile clips, leads and a battery to make an electromagnet.
3. State the two poles of a magnet and describe which poles attract and which repel.	3. What happens to the current in other branches if you add another branch to a parallel circuit?	3. In a circuit with a single bulb, the current is 0.2A. Calculate the current if you add another bulb in series with the first bulb.
4. What do we call more than one cell used together in a circuit?	4. What happens to the total current if you add more branches to a parallel circuit?	4. A bulb in a circuit has a current of 0.6A through it and a potential difference of 12V across it. Calculate the resistance of the bulb.
5. What happens in the wires when you close the switch in a circuit?	5. How is the potential difference split across each component in a series circuit?	5. Compare the resistance of conductors and insulators.
6. What is potential difference a measure of and what unit is potential difference measured in?	6. Describe the potential difference across each component in a series circuit.	6. Explain why the needle of a compass always points in the same direction wherever you point it.
7. What meter do you use to measure potential difference?	7. Describe the potential difference across each component in a parallel circuit.	7. Compare the readings on ammeters and voltmeters when you connect them in series and parallel circuits.
8. What type of material can you use for the core of an electromagnet?	8. State the equation for calculating current, including units.	8. State the parts of an electric motor and describe how a motor works.
9. How are components joined together in a series circuit?	9. Define a conductor and an insulator.	9. Only one of Mr Jones' headlights is working on his car. Are the series connected in series or parallel? Explain your answer.
10. How are components joined together in a parallel circuit?	10. State 3 things that affect the strength of an electromagnet.	10. A cell connected to two bulbs in a series circuit will last longer than if it is connected to the same two bulbs in a parallel circuit. Explain why.
Total score	Total score	Total score

