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Glue on this side

Magnetism and EM

1	I can state that a magnetic object experiences a force in a magnetic field.
2	I can describe the difference between a magnet, magnetism and magnetic.
3	I can draw the magnetic field around a bar magnet and recall the investigation to determine a magnetic field pattern.
4	I can recall that the Earth has a magnetic field and describe uses for this.
5	I can describe the difference between a permanent magnet and an electromagnet.
6	I can recall factors effecting the strength of an electromagnet.


	Keyword	Definition
1	Attraction	Opposite poles will experience a force of attraction, meaning they will experience a force towards each other.
2	Repulsion	Like-poles will experience a force of repulsion, meaning they will experience forces in opposite directions.
3	Electromagnet	A solenoid with an iron core that can be turned on and off.
4	Magnetic Field	The region around a magnet in which another magnet or magnetic material will experience a force.
5	Magnetic Materials	Materials which experience a force in a magnetic field. Iron, steel, cobalt and nickel.
6	Magnetic Field Lines	Lines representing the strength and direction of a magnetic field.
7	Magnet	A material that produces its own magnetic field.

Magnetism


Magnetism is a **non-contact force**. Magnetic materials can be magnetised or will be attracted to a magnet. There are three magnetic metals: **iron, nickel and cobalt**. Steel is also magnetic because it contains iron.

A bar magnet is a permanent magnet. It has a **north pole** and a **south pole**.

Like poles repel. This means that the two poles push each other away.



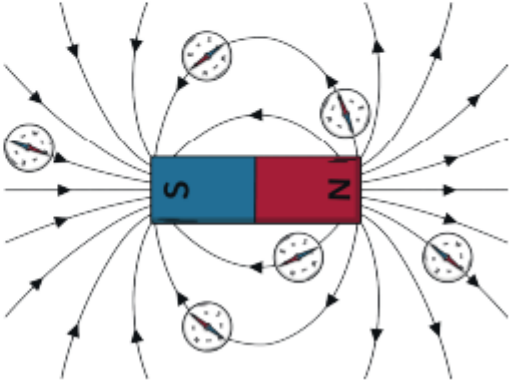
Opposite poles **attract**. This means that the invisible magnetic force between the magnets pulls the poles towards each other.



Magnetic Field Lines

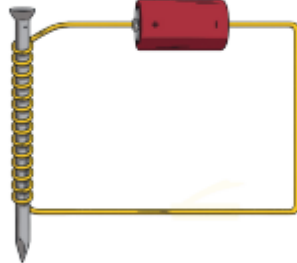
The magnetic field around a magnet can be shown as a series of lines around the magnet. The magnetic field lines can be plotted using a plotting compass.

The compass will always point towards to the south pole, wherever the compass is placed near the magnet. The arrows show the direction of the magnetic field.



Electromagnets

When electrical charge flows in a wire, a magnetic field is created around the wire. The larger the current, the stronger the electromagnet. The strength of the magnetic field can be increased by wrapping the wire around a magnetic material, such as iron.




The strength of an electromagnet can be changed by changing the number of coils of wire around the iron core. This can be measured by counting the number of paperclips that become attracted to the electromagnet.

Independent variable – number of coils of wire
Dependent variable – number of paperclips picked up
Control variables – current supplied to the circuit, core material, width of wire, length of wire, potential difference of the battery or power pack

The **greater the number of coils**, the **stronger the electromagnet** and the more paperclips it will pick up.

Electromagnets are useful because they can be switched on and off. This makes them suitable for sorting scrap metal at a recycling centre.



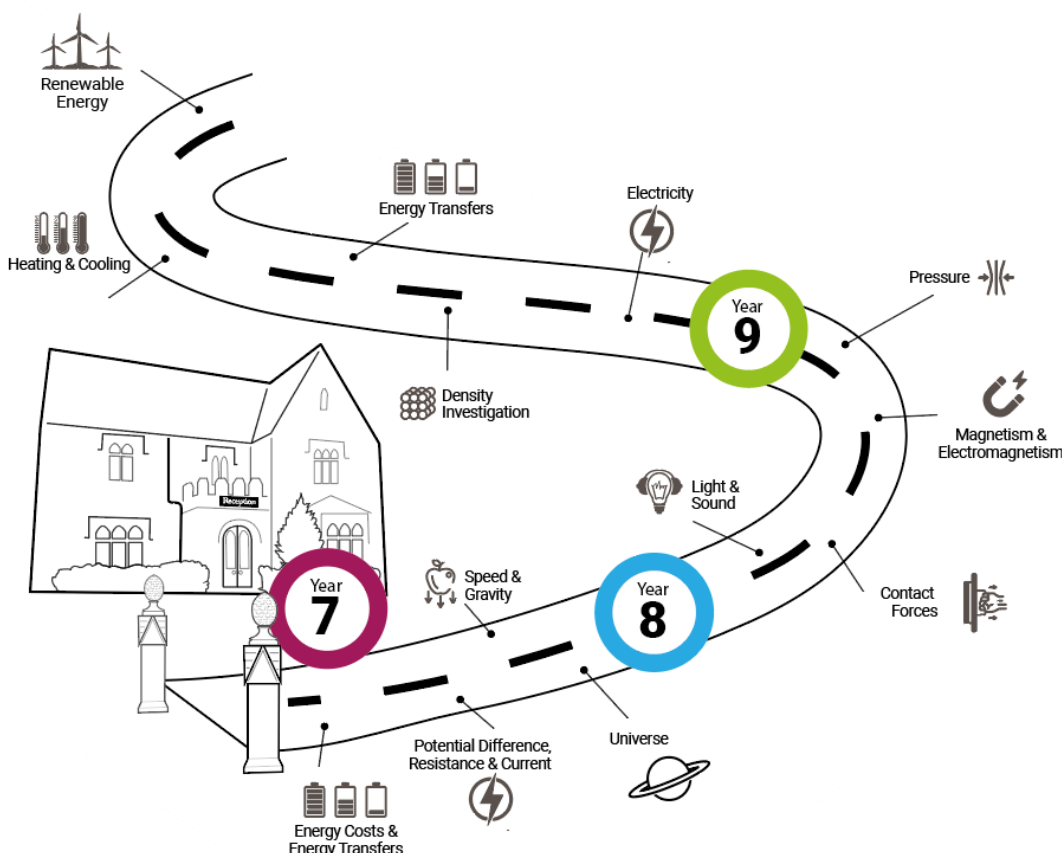
Prior Knowledge:
 You have covered magnets and magnetic materials in KS2 and in year 7 you started learning about electrical circuits.

Future Learning:
At GCSE you will continue learning about electricity, how we can create magnetic fields using electrical current and how this is used.



Why?
Most electrical devices we use such as phones, computers and even electric cars use the principles of electromagnetism to work.

Careers:
*Electrical engineer
 Recycling and waste processing
 Pilot or Captain
 Mechanical engineering*

Homework Menu Grid



Complete some of the tasks below to reach a total of _____ points over this unit of work – Highlight the box once completed.

Topic	1 Point	2 Points	4 Points	6 Points	10 Points
Magnets/Plotting magnetic fields 	Draw a diagram of the field lines around a magnet	Write a list of all of the keywords you have used in this topic so far, along with their definitions. Make sure you learn them!	Produce a report on how magnets are used in our everyday lives.	Explain how magnets could be used to sort through recycling. You could present this as a storyboard or you could write a story.	Produce a video that demonstrates how magnets work and include an explanation.
Electromagnets 	What is significant about Japan's Maglev train? Apply your knowledge of magnets to the answer	What is an electromagnet? Provide some examples	Draw a labelled diagram of an electromagnet.	Produce an information leaflet that explains how electromagnets in speakers work	Make up an answer to a six mark exam question on electromagnets, include mistakes in it, get a friend to find the mistakes.