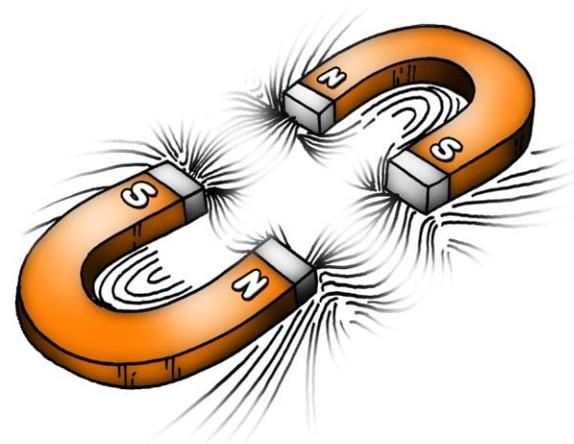
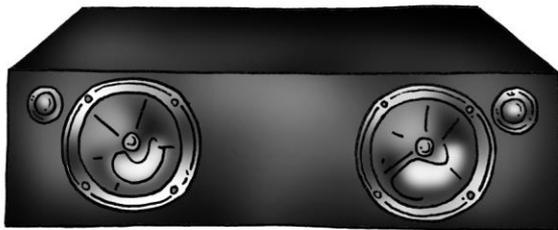
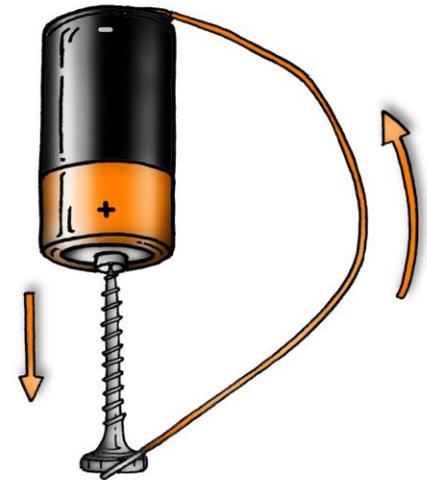


**AQA GCSE
MAGNETISM AND
ELECTROMAGNETISM
THINK IT!**



Magnetism:

- Magnetic liquids are sold as toys. They are known as Ferrofluids. Ferrofluids were originally designed for NASA. Find out how NASA were going to use Ferrofluids and what Ferrofluids are used for today.
- Find out where permanent and electromagnets are used in the home.
- Magnets have a north pole and a south pole. If you were given an unmarked bar magnet how could you determine which side was the north pole?

Magnetic Fields:

- Find out how the Earth's magnetic field changes with time. You should include the polarity of the field and the location of the magnetic poles.
- The Earth's magnetic field protects the Earth from the Solar Wind. Find out how the magnetic field protects us, and what would happen if a solar flare was headed straight for Earth.
- Research the current theories on why the Earth has a magnetic field. Explain why there is still some uncertainty about this.

Electromagnets:

- Discuss the advantages and disadvantages of using an electromagnet in a scrapyards, to pick up old cars rather than a permanent magnet.
- Find out why electromagnets can be made a lot stronger than permanent bar magnets.
- A magnetic compass is useful in finding your way in remote areas. Discuss ways of making a magnetic compass to use if you were lost in the woods. How accurate would your compass be?

Speakers and Microphones:

- Headphones are often used to listen to music. Often the sound quality of cheap headphones is not as good as the sound quality of cheap speakers. Explain why.
- Noise cancelling headphones can eliminate background noise. Find out how noise cancelling headphones cut out background noise.
- Compare the workings of headphones and microphones.

Magnetic Flux Density:

- The unit of magnetic flux density is the tesla. Research the person the tesla is named after. Is there any link to the car company of the same name?
- The magnetic flux density of a bar magnet may be in the region of 10^{-2} T. Find the magnetic flux density at the surface of the Earth (in the UK) and inside an MRI scanner.
- How can the magnetic flux density of an electromagnet be increased?

Transformers:

- A step-up transformer has 1000 turns of wire on the primary coil and 10,000 turns of wire on the secondary coil. Find out why the transformer would not have 1 turn of wire on the primary coil and 10 turns of wire on the secondary coil as the output should be the same.
- Find out why transformers are not used with direct current electricity supplies.
- Research the reasons behind different countries having different electricity supplies to the home, e.g., the UK 230 V 50 Hz and the USA 120 V 60 Hz.

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Motor Effect:

- Fleming's left-hand rule shows the direction of the force on a conductor in a magnetic field. The current direction is for conventional current. What is conventional current and why is it used?
- A person cannot move their left-hand. How can they determine the direction of the force on the conductor in a magnetic field?
- A simple electric motor will have brushes that contact the commutators. Some motors are brushless. How do they work?

Generators:

- The generator in a power station is not the same as a simple alternator used in a science lab. Describe the construction of a generator in a power station. Explain why it is constructed like this.
- Micro-generators can be used to generate electricity on a small scale, or in the home. Find out where micro-generators are used and how they generate electricity.
- Compare the workings of generators and dynamos.