KS3 Electricity Lesson 8: Making Electromagnets
Teaching Ideas

		Resources
Learning Objective:	To construct a working electromagnet.	graph paper Per group: nail 30cm insulated copper wire wires crocodile clips paperclips power pack
Success Criteria:	• To **recall** that when current flows through a wire, a magnetic field is created around the wire. • To **carry out** an investigation to determine how changing a variable can affect the strength of an electromagnet. • To **explain** how an electromagnet can be made using a coil of wire and power supply.	
Context:	This is lesson 8 in a series of lessons that covers the topic of KS3 electricity with a focus on making an electromagnet. Students imagine that they are working as a mechanical engineer for the local scrapyard company. News has just come in that the electromagnet used for lifting the cars into the scrap machine has broken down. Students are asked to complete a practical investigation into making an electromagnet and report their findings back to the head of the company. You can teach this lesson as a stand-alone lesson or use it to form the wider unit of work on the introduction of electricity. The choice is yours!	

Starter

Students are challenged to make as many words as they can from the keyword of the lesson.

Main Activities

What Do You Already Know about Magnets?

You can use this section to recap magnets with your students. There is room for a class discussion to gather students' ideas and understanding of magnets. You may choose to record students ideas as a mind map. There is an interesting video on magnets which includes visual animations detailing how magnets attract objects.

Electromagnets

You can use this section to introduce the topic of electromagnets. There is an interesting video on electromagnets which includes lots of detail about how to make an electromagnet. After watching the video clip, you may choose to ask students to write down three things that they have learnt from it. You may also choose to enter into a class discussion about how electromagnets work and their construction.

The Investigation

This is a core practical that is designed to give students an insight into the demands of GCSE required practical investigations.

Provide students with a brief background on the context of the lesson and the investigation. Students should imagine that they currently work as a mechanical engineer for a local scrap yard company. Before you begin the practical investigation, present students with a selection of the equipment and ask students to suggest how they could build an electromagnet. There is a step-by-step method for those students who may need more support for this task.

Provide students with the **Making Electromagnets Core Practical HA Activity Sheet**. There is a lower-ability version of this which provides tables for collecting data rather than asking students to formulate their own.

Core Practical Investigation

Ask students to make a prediction about what they think might happen. Will the number of coils affect the number of paperclips attracted to the electromagnet?

At this point, you may choose to remind students how to write a method. Go through the three examples on the board and ask students to suggest the good and bad points of each method and how they may apply this to their own work. After demonstrating the practical to the class, you may wish to ask students to write the method. Allow students time to self-assess their method. You may choose to do this as a peer-assessment activity instead.

Safety

Before carrying out the practical, discuss the risks associated with it. You may choose to ask students to discuss the safety aspects in pairs before gathering ideas as a whole class.

Conclusion

After students have been given time to complete the investigation, there is scope for a class discussion on the findings of the investigation. Depending on the ability of the class, you may choose to do this as a mind map. Allow students time to self-assess the findings from the investigation and correct any mistakes. You may choose to do this as a peer-assessment activity instead.

Plenary

Tweet Me!

What have you learnt this lesson?

Write two old-style, 140-character Tweets. One for the things that you have done well his lesson; one for things that you need to improve for next lesson.

Remember, spaces and punctuation count as characters!