

Make an electromagnet

Brief summary:

In this activity you will make an electromagnet using some wire, a nail and a small battery.

You will need:

- Help from an adult
- 2-3 feet of ball wire (copper wire with a plastic insulated sheathing)
- Large nail
- C or D battery
- Small metal objects (paper clips, thumbtacks, safety pins etc.)
- Scissors (or a wire stripping tool)
- Sticky tape

What to do:

Step 1. Wrap the wire around the nail making a coil, leaving 10 – 15cm of wire extending from each end. Do your best to wrap it as tightly as you can.

Step 2. With the help of an adult, rim about 1.5cm of the plastic covering from each end of the wire. If you have a wire stripping tool you can use these, or you can score them with a pair of scissors strip off the plastic using your fingers.

Step 3. Cut a long strip of tape and use it to secure the battery to the table.

Step 4. Hold the nail wrapped wire and pinch the ends of the wire so they touch both metal ends of the battery. Don't touch the exposed wire - Because electric current passes through the wire these ends will become hot.

Step 5. Take your small metal objects (e.g. paper clips or safety pins) and see if the electricity in the battery has made the ends of the nail magnetic.



Make an electromagnet

Take it further:

- Repeat the experiment by varying the number of times you wrap the wire around the nail - how does this affect the strength of the nail?
- Repeat the experiment by using nails of different thicknesses or lengths - how does this affect the electromagnet's strength?
- Repeat the experiment using wire of different thicknesses - how does this affect the power of the electromagnet?

Have a look at our other magnet experiment: *Make a compass*.

Big questions:

- Where and how are electromagnets used?
- How do magnets work?
- Where are magnets used?



For more information on how you can help our environment, or to make some suggestions of your own, please go to www.coolaustralia.org