



SfS Away from the Classroom!

P09: Electromagnetism (Recommended for Grades 6-8)

Please use the following resources to learn about electromagnetism!

Watch this Video: <https://www.youtube.com/watch?v=cxELqN7wjS0>

Answer these questions:

- Why does a compass react to a magnet?
- How can we know that electricity produces a magnetic field, like in a wire?
- What do you need to build a strong electromagnet?

Activities: Follow these directions to make an electromagnet at home!

You will need:

<ul style="list-style-type: none">• Paper clips• Electric tape (masking tape, or packing tape will work)	<ul style="list-style-type: none">• Iron nail (any iron object 2 inch or longer)• Wire **	<ul style="list-style-type: none">• Scissors• A battery (D is best- but any will do)
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1. Take the plastic coating off the last 2 cm of the wire using scissors to scrape off the plastic. Do not cut the wire!
2. Wind the wire tightly around the nail. Make sure to leave 20 cms of wire unwound at each end and to leave the tip of the nail free of wire.
3. Tape each of your free ends of wire to an end of the battery. One end should be taped to the positive side, and the other end to the negative side.
4. Use the tip of the nail to pick up paper clips!
5. How many paper clips did you pick up? Can you change your design to make a stronger magnet and pick up more paper clips? Try changing the battery size or the number of coils of wire. Write down your results.

**If you don't have wire, follow the directions on the next page to make some!



To make DIY wire you will need:

<ul style="list-style-type: none">• 3 - 12 in x 12 in squares of aluminum foil	<ul style="list-style-type: none">• 4 - 12 in x 12 in squares of plastic wrap	<ul style="list-style-type: none">• Tape• Ruler• Scissors
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1. Roll each piece of foil into a wire by starting at one corner and rolling tightly towards the opposite corner (see picture.)
2. Connect your 3 “wires” by twisting the ends together.
3. Reinforce the connection between the wires by using tape around the outside of the connecting twists.
4. Insulate the wire by wrapping plastic wrap around the outside of your entire long wire.
 - a. Repeat the rolling step that created the wire originally - except with plastic wrap and using the “wire” as your core. Leave an inch on both ends of your wire free of plastic.



Make observations & use Claims, Evidence, and Reasoning!

1. **Claim:** Electricity can generate magnetic force.
 - **Evidence:**

 - **Reasoning:**

2. **Claim:** With an electromagnet you can change the strength of the magnetic force.
 - **Evidence:**

 - **Reasoning:**