

Project FOCUS
Best Lessons
FIFTH GRADE

Title of Lesson: How to create an electromagnet

Theme: Physical Science

Unit Number: S5P3-D **Unit Title:** Electricity & Magnetism

Performance Standard(s) Covered (enter code):

S5P3. Students will investigate the electricity, magnetism, and their relationship.

D. Compare a bar magnet to an electromagnet.

Enduring Standards (objectives of activity):

Habits of Mind

- Asks questions
- Uses numbers to quantify
- Works in a group
- Uses tools to measure and view
- Looks at how parts of things are needed
- Describes and compares using physical attributes
- Observes using senses
- Draws and describes observations

Content (key terms and topics covered):

Key Terms: magnet, magnetism, current, electricity, and electromagnetism.

Topics: Compare a bar magnet to an electromagnet, describe how magnets and electricity are related to each other, talk about the ways the students use electricity and electromagnetism in their everyday lives, and ask what would life be like without electricity.

Learning Activity (description in steps)

Abstract (limit 100 characters): Students will create an electromagnet and compare and contrast bar magnets and electromagnets.

Details:

Before the experiment, students will record vocabulary words, record the procedure in their science notebooks, and discuss electromagnetism and how they are related to everyday life.

Each group is handed a set of materials (wire, D battery, battery holder, paper clips)

1. Ensure that the copper ends of the wire are exposed
2. The students will then use the nail and try to pick up paper clips
3. Wrap the wire around the nail 15 times
4. Insert the D battery into the holder with the opposite charges
5. Attach one end of the wire to the positive terminal of the battery holder and the other to the negative terminal.
6. Touch the nail to the paper clips
7. Record the number of paper clips the nail picks up
8. Repeat steps 3-7 coiling the wire 25 and 40 times around the nail

9. Record Observations

10. Students will then draw conclusions and make comparisons and contrast an electromagnet and a bar magnet.

Materials Needed (type and quantity):

Per Group:

Long nail (about 3 inches long)

Battery (D cell)

Battery holder

1 pair of scissors

Thin electrical wire

Paper clips (a handful of about 30)

Science notebooks and pencils (to record key terms, predictions, observations, and conclusion)

Notes and Tips (general changes, alternative methods, cautions):

For homework, my students recorded the procedure their science notebooks the day before the experiment was conducted. Although there was a picture of how the wire should be wrapped around the nail, some students had difficulty following the picture and did not have nearly enough coils around the wire. I let the students perform the experiment on their own and some groups finished before others. Also, some groups did not work as a group at all and one or two students created the electromagnet. If I could perform the lab again, I would perform the lab step by step together. Although scissors are a part of the materials, I cut the ends of the wires myself so students would not injure themselves.

Sources/References:

1) Georgia HSP Science 5th Grade Textbook

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