Los Angeles Department of Water & Power

e-SMARTkids

EXPERIMENT TIPS

Electromagnetic

This experiment helps students understand how electricity is generated at power plants. It appears in the section *World of Wires.*

Materials

- 1 compass
- 1 iron nail
- 1 pkg. ring magnets, stacked together
- 2 pcs. 18–22 gauge wire, each 50 inches long with ends stripped
- 1 D battery
- electrical tape
- wire cutters

Safety First

Students should be supervised by an adult while doing this experiment.

Setup

Make sure the compass and the nail are at least a meter apart; otherwise the magnet will directly affect the compass.

Objective

Students will observe the process of electromagnetic induction, which converts mechanical energy into electrical energy in order to turn electricity-generating turbines.

Continue>

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EXPERIMENT TIPS

Electromagnetic (continued)

Questions and Answers

Touch the ends of the galvanometer wire to the positive and negative ends of the D battery. What happens to the needle in your galvanometer? What caused this?
When students touch the ends of the galvanometer wire to the terminals on the D battery, they should notice that the needle turns in one direction. This is caused by the direct current from the battery.

Is the current produced by the battery AC or DC?
The current is produced by direct current (DC); the needle moved in one direction only, just as DC current flows in one direction.

When you move the stack of magnets back and forth over the nail, what happens to the needle in your galvanometer? What can you conclude from this?
When the magnets are moved back and forth over the nail, the needle should move in one direction and then the other. Students should be able to conclude that the current is flowing in one direction and then the other when they move the magnet back and forth over the coils.

Did you produce AC current or DC current when you moved the magnet back and forth over the coils?
The fact that the current is flowing in one direction and then the other means the current produced is alternating current (AC).

What do you think would happen if you used a stronger magnet? More magnets? More coils of wire?
A stronger magnet or more magnets would make the needle swing farther or faster. So would more coils of wire around the nail.

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