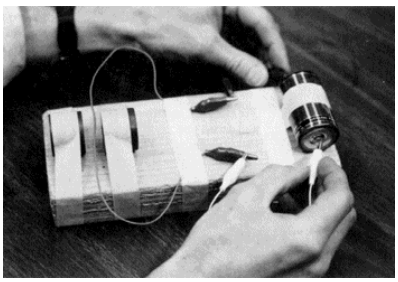
Magnetism – Motor Effect



What effect can a magnet have on a wire carrying a current?

Materials:

- 6 small disk magnets (about 2.5 cm diameter)
- Masking tape
- 1.5 v D cell batteries
- 60 cm of iron wire (flexible braided picture-hanging wire).
- Knife
- 2 x 4 about 15 cm long (5x10x15 cm block of wood)

Procedure: (Remember to have your parent's permission and have them watch and help you.)

- Group the disk magnets into a single cylindrical pile.
- Split the pile in the middle, leaving a gap of about 1.5 cm between the faces of the two groups.
- Tape the two groups to the board.
- Tape the battery onto the board.
- If necessary use the knife to remove the insulation from the ends of the wire.
- Loop the wire through the gap between the magnets, with the ends of the wire is close enough to the battery to touch it.
- Predict what will happen when you touch one end of the wire to the positive side of the battery and simultaneously touch the other end of the wire to the negative side. Do it and observe.
- Predict what might happen when you reverse the wires used to touch the battery. Try it.

What's Happening:

When you separated the magnetic pile one north pole will face a south pole across the gap. When you put a current through the wire, the wire loop jumped either up or down. When you reversed the direction of current flow, the wire jumped in the opposite direction.

The magnetic field of the disk magnets exerts a force on the electric current flowing in the wire. The wire will move up or down, depending on the direction of the current and the direction of the disks' magnetic field.

The deflecting force that a magnet exerts on a current-carrying wire is the mechanism behind the operation of most electric motors. The reverse effect is also true: Move a loop of wire across the pole of a magnet, and a current will begin to flow in the wire. This is the principle of the electric generator.

Extension:

This experiment creates just a short pulse of motion. A motor requires continuous motion. This problem was solved and the first electric motors were constructed in 1821 by Michael Faraday in England.

This activity is based on our Magnetism kit. The source for this lab was: http://www.exploratorium.edu/snacks/motor_effect/index.html. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom guest speaker or allow your business as a field trip location.

Praxis will be hosting Operation Minerva, a conference for grade nine girls, on March 15th. http://praxismedhat.com/services-operation-minerva.

Lorne Cooper, Regional Executive Director

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