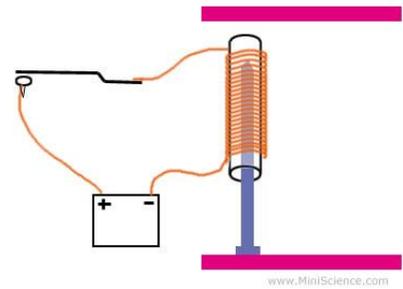


Magnetism – Sucks!

How does your doorbell work?

Materials:

- A plastic or cardboard tube 10 cm long and about 6 mm diameter. You can make your own tube from thin cardboard and tape.
- 12 m of insulated bell wire.
- Wire strippers
- The largest iron nail that will fit loosely in the tube.
- A large 6 v battery or a car battery charger. (An ordinary 1.5-volt D battery will work, but quickly goes dead)



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

- Tightly wrap as many coils of wire as possible around the tube, leaving the two ends free.
- Strip the insulation off these ends and connect one of them to a battery (or one battery charger clamp.)
- Insert the nail part of the way into the coil.
- **Briefly** touch the unattached exposed wire to the other battery terminal (or the other battery charger clamp). Observe what happens when you do this. **Note:** Don’t leave the wires connected too long as it could cause them to heat up and burn you.
- Predict what would happen when you reverse the leads to the battery or battery charger.
- Repeat the experiment and observe the surprise.

What's Happening:

Any moving electric charge like the current in the wire creates a magnetic field around it. This coil of wire has a north pole and a south pole. When you add the nail all the poles of the iron atoms line up in the same direction and the nail becomes magnetized, with its north poles facing the south pole of the electromagnet. The opposite poles attract each other, and the nail is sucked into the electromagnet.

When the direction of current is reversed, the poles of the electromagnet reverse. You might expect the nail to be repelled but it is once again sucked in because the nail's iron atoms all reorient by the current. Thus the nail will always be attracted to the electromagnet and will never be repelled.

Extension:

The principle of magnetic suction is used in many devices, from doorbells (in which an iron rod is sucked into a coil to strike a chime) to pinball machines (the flipper).

This activity is based on our Magnetism kit. The source for this lab was: http://www.exploratorium.edu/snacks/magnetic_suction/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 (Happy Birthday Mom)

PRAXIS, “Making Science Fun”. Contact Praxis at praxis@praxismh.ca, www.praxismh.ca, Tweet or follow us @PraxisMedHat, or friend us on Facebook. Address: c/o 200 7th Street S.W., Medicine Hat, AB, T1A 4K1 Phone: 403-527-5365, Fax: 403-527-6570.