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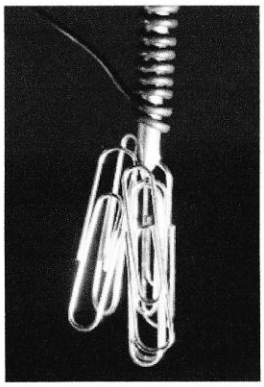
MAKE AN ELECTROMAGNET

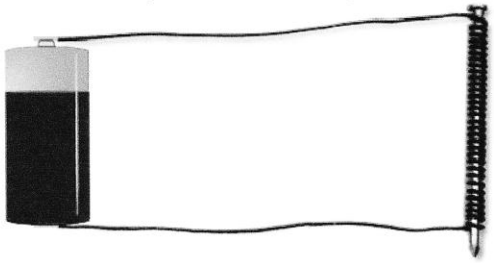
YOU WILL NEED:



- A large iron nail (about 3 inches)
- About 3 feet of THIN COATED copper wire
- A fresh D size battery
- Some paper clips or other small magnetic objects

WHAT TO DO:

- 1. Leave about 8 inches of wire loose at one end and wrap most of the rest of the wire around the nail. Try not to overlap the wires.
- 2. Cut the wire (if needed) so that there is about another 8 inches loose at the other end too.
- 3. Now remove about an inch of the plastic coating from both ends of the wire and attach the one wire to one end of a battery and the other wire to the other end of the battery. See picture below. (It is best to tape the wires to the battery - be careful though, **the wire could get very hot!**)



- 4. Now you have an ELECTROMAGNET! Put the point of the nail near a few paper clips and it should pick them up!
- **NOTE:** Making an electromagnet uses up the battery somewhat quickly which is why the battery may get warm, so disconnect the wires when you are done exploring.

HOW DOES IT WORK?

Most magnets, like the ones on many refrigerators, cannot be turned off, they are called permanent magnets. Magnets like the one you made that can be turned on and off, are called **ELECTROMAGNETS**. They run on electricity and are only magnetic when the electricity is flowing. The electricity flowing through the wire arranges the molecules in the nail so that they are attracted to certain metals. NEVER get the wires of the electromagnet near at household outlet! Be safe - have fun!

MAKE IT AN EXPERIMENT

The project above is a DEMONSTRATION. To make it a true experiment, you can try to answer these questions:

1. Does the number of times you wrap the wire around the nail affect the strength of the nail?

2. Does the thickness or length of the nail affect the electromagnets strength?

3. Does the thickness of the wire affect the power of the electromagnet?

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