

# BUILD AN ELECTROMAGNET

## GRADE LEVEL

6th-8th grade

## OBJECTIVE

Students will build a simple electromagnet to help them understand how electricity can be made.

## PURPOSE OF ACTIVITY

Review  
Identify Details  
Apply Skills

## COGNITIVE LEVEL

Skills and Concepts  
Strategic Thinking  
Extended Thinking

## CLASS TIME

One class period

## MATERIALS

- D cell battery
- A large steel nail
- About 20" of insulated wire
- A variety of objects from the classroom to test the electromagnet

## PROCEDURE

1. Strip the insulation off two ends of the wire.
2. Carefully wrap the wire around the nail to form tight coils. Don't overlap the coils. Make sure that you leave at least 3" of wire free at each end.
3. Connect the two ends of the wire to the two ends of the D cell battery and bring the tip of the nail very near some metal paper clips. The magnet will only attract if the circuit is complete.

Use a variety of objects classroom to test the electromagnet on. Have students make predictions as to whether or not the objects they use are magnetic before they try their electromagnet on them.

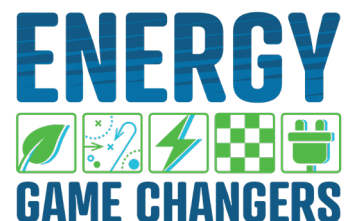
## CRITICAL THINKING QUESTIONS

### How are magnets and electricity related?

*Moving magnetic fields pull and push electrons. Metals such as copper and aluminum have electrons that are loosely held. Moving a magnet around a coil of wire, or moving a coil of wire around a magnet, pushes the electrons in the wire and creates an electrical current.*

### Why isn't something like wood magnetic?

*A magnet is not attracted to materials such as wood because no internal field is induced in the wood. With no induced internal field, there is no field interaction and no attraction.*



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