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## **BUILD AN ELECTROMAGNET**

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### **CLASS DESCRIPTION**

In this class, students will build a simple electromagnet and understand the concept of magnetic field.

**TOTAL CLASS TIME:** 90 minutes

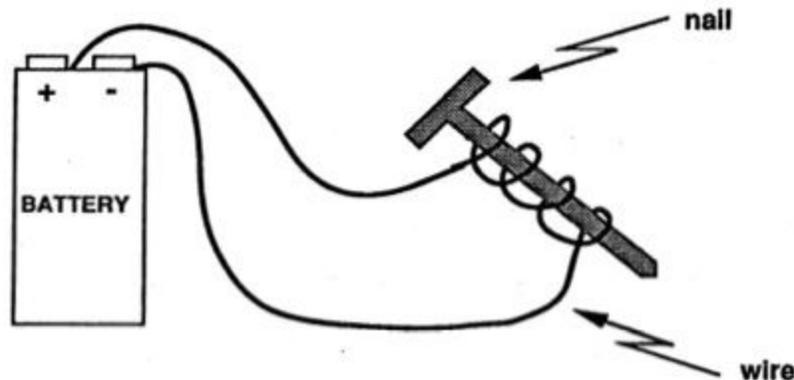
### **CLASS OUTCOME**

By the end of this class, students will Observe how current can create a magnetic field.

### **INTRODUCTION**

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Electricity is carried by current, or the flow of electrons. One useful characteristic of current is that it creates its own magnetic field. Magnets like the one you made that can be turned on and off, are called **ELECTROMAGNETIC**. 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.



### **MATERIALS NEEDED**

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- Large iron nail (3-4 inches)
- Long Coated copper wire or thin flexible wire

- DC Battery
- Small magnetic objects like paper clip, office pins etc
- Scissors
- Masking tape

## PROCEDURES

**Step 1:** leave some end of the wire open and wrap the rest wire around the nail. Try not to overlap the wires.



**Step 2:** Cut and leave the other end of the wire open (that means after wrapping the wires around the nails, the two ends of the wires are open)

**Step 3:** Now remove the plastic coating from both ends of the wire and attach one end of the wire to one end of the battery and the other end of the wire to the other end of the battery.( Tape the wires to the battery)

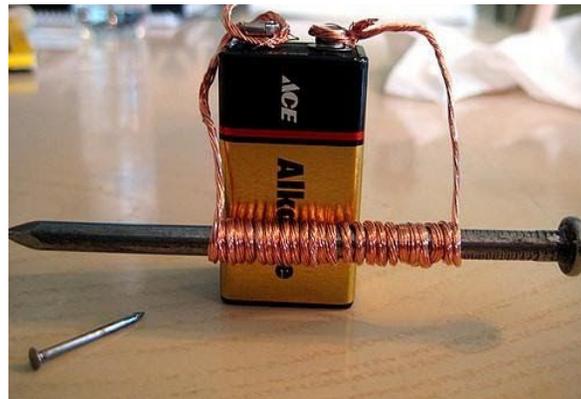


**Step 4:** Now the ELECTROMAGNET is ready. Put the point of the nail near a few paper clips/ other magnetic material and it should pick them up.



### **OBSERVATION**

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.



In this experiment, the battery is a source of electrons. When the wire is connected to the battery, the electrons flow through the wire. If there is no a complete circuit, the electrons will not flow. Electrons behave like little magnets and when they flow through a wire, they create a magnetic field, which turns the nail into a magnet that can pick up paper clips, nails, pins, iron disc etc.



## REFERENCES

<https://sciencebob.com/make-an-electromagnet/>  
<http://www.wikihow.com/Create-a-Magnet-With-a-Wire-and-a-Nail>  
<http://uw.physics.wisc.edu/~wonders/Electromagnet.html>