

# All about electromagnets!!!

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!

## How is it made????

Material's needed:

- A large Iron nail.
- 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 wire around the end.
2. Cut the wire (if needed) so that there is about another 8 inches loose at the other end.
3. Now, remove an inch of the plastic coating from both ends of the wire and attach the one end of the wire to one end of a battery and the other wire to the other end of the battery.



4. Now you have an Electromagnet. Put the point of the nail near a few paper clips and it should pick them up.

## **Principal applications:**

Electromagnets have a wide variety of uses. A summary of the principles of operation of some of the important devices in a few major areas of application—communications, research, electrical industry, and magnetic recording and many more.....

### **Televisions**

Traditional television sets use an electromagnet to power the cathode ray tube. The electromagnet directs the beaming of electrons, which in essence illuminates the television.

### **Computer Screens**

Before the advent of LCD and plasma, the electromagnet was an essential part of computer monitors. The electromagnet bends the electrons when they pass through the screen, which is how the image on the screen is prepared.

### **Motors**

Electromagnets are used in many motors. Electric motors have an electromagnet as an integral part of their circuitry. Electromagnets are used in ceiling fans, in the fans installed inside computers and in generators.

### **Sound**

If you have ever used a loudspeaker, you have heard an electromagnet in use. If you have an MP3 player or another portable audio device and use earphones to listen to music, you have used an electromagnet. An electromagnet draws the speaker diaphragm, allowing the music to be played.

### **Scrap yards**

In scrap yards, electromagnets lift cars and other magnetic objects.



## Fire Doors and Automatic Doors

Fire doors and doors that close automatically both use electromagnets.

## Relays

Electromagnets are used in relays, as switches that control the relay. Electromagnetic relays were used in traditional telephones as well as the first computers.

## Transport

Electromagnets are used to power some trains like maglev trains. Electromagnets are used in automobiles. The electromagnet is essential to the starter motor. Also, the ignition coil is an enhanced electromagnet. Electromagnets are used in the self-closing mechanism found in some automobile doors.



## The Difference:

<b>Permanent</b>	<b>Electromagnet</b>
1. Is permanently magnetized	Is only magnetized when electricity passes through it
2. Doesn't require constant supply of electricity	Requires constant supply of electricity
3. As it's permanently magnetized, can't control the magnetic flux.	Can control magnetic flux.
4. Once we heat the material, magnetism cannot be regained.	Magnetism can be regained by passing electricity.
5. Magnetic field stays the same	Can manipulate the magnetic field by controlling amount of electric current
6. Form elliptical magnetic field	Form concentric magnetic field
7. Can't change polarity	Can change the polarity