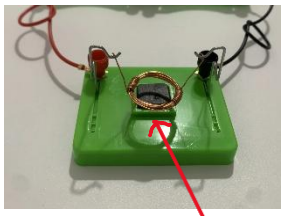
PROJECT HELP (7th PROJECT) **PHYSICS (INVENTIONS)**

DUE DATE

May 1st 7th Project – Electromagnet – NO NEED TO RETURN PROJECT 6 OR 7

This project uses a very weak magnet, adds an electrical charge (from a battery), to make an **ELECTROMAGNET**. Students will connect an energy source to the magnet's base being careful to assure metal to metal conduction.



Electromagnets are created by passing an electric current through a coil of wire, often wrapped around a core of ferromagnetic material like iron. The strength of the magnetic field in an electromagnet can be controlled by adjusting the electric current. Increased current creates a stronger magnetic field, while decreased current weakens it. This principle is used in various applications like generators, motors, and electric devices.

TEST YOUR MAGNET'S STRENGTH BEFORE ADDING THE COIL AND POWER SOURCE (a nail or iron)

1. Add alligator clips to battery wire leads (one black/one red).
   a) Be certain that the exposed wire tips touch the metal on the alligator clip.
   b) If not touching, it's possible to expose more wire. (Parental supervision required to strip the plastic back.)

2. Use pliers to collapse the hollow end opposite the alligator teeth onto a strand of wire. This prevents wires from slipping out of the clip. These clips provide metal contacts to transfer electrons.

3. Attach the leads to the 9V battery. Your energy source is READY!

Copper Wire:

4. Carefully wrap the copper wire into a small coil (like pictured). Leave enough uncoiled copper to:
   a) secure the coil with tiny, looped wire at opposite sides.
   b) create a small, hooked hanger at each end of the coil.

5. Hang the coil as shown above. Leave enough room above the magnet to test the magnet's strength as you previously.

6. Attach the energy source under the red and black knobs (red to red, black to black). Be certain each alligator clip makes contact with the metal.

6. Test the magnet. If the magnet's strength has not changed, try your power source (battery, wires, clips) on Project 6 using the lights or clock. If these don't work either, then your power source is the problem (check to make sure all the metal-to-metal connections are good – especially the wire ends inside the alligator clips). If they work, look for gaps in connections on the magnet's base unit.

PROBLEM SOLVING IS ESSENTIAL FOR DESIGNING, INVENTING, OR ENGINEERING!!!