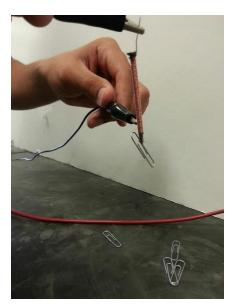






California State University of Bakersfield, Department of Chemistry

# **Magnetic Attraction**



#### **Standards:**

<u>HS-PS1-3.</u> Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

<u>HS-PS1-4.</u> Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

# **Introduction:**

Have you ever needed an easier and cooler way to pick up paper clips? With just a few simple household supplies, you can create a very powerful electromagnet of your own. By wrapping copper wire around a nail, you can create an electrical field which then in turn produces a magnetic field (right hand rule). When you complete the circuit, electrons flow through the copper wire and produce a magnetic field that allows you to pick up iron objects such as paperclips with the tip of the nail.

# **Materials:**

- 9-V battery
- About 3 feet of thin coated copper wire

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- A large iron nail
- Some paper clips
- Alligator clips
- Light switch

# Safety:

- Always have an adult with you to help you during your experiment.
- Always wear eye protection and gloves when doing chemistry experiments

### **Procedure:**

- 1. Coil the wire around the nail. The more and tighter the coils the better. Make sure that some of the wire is sticking out on both ends.
- 2. Make sure the switch is off and then connect the alligator clips to the light switch.
- 3. Clip the other end of each alligator clip to each end of the nail.
- 4. Flip the switch on.
- 5. Move the nail near the paper clips. It should pick up some of them.

### **Data and Observations:**

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2. How many paper clips were you able to pick up at a time?

### **References:**

1. . (n.d.). . Retrieved July 30, 2014, from http://www.sciencebob.com/experiments/electromagnet.php.