

Abhiyan Bista  
Collins  
April 6, 14

## **Best Lesson Plan**

**Grade Level:** 3<sup>rd</sup> Grade

**Title of Lesson:** How to turn a metal into a Magnet?

**Unit Title:** Electromagnets

**Performance Standard(s) Covered:**

S3P2 (Science 3<sup>rd</sup> Grade Physical Science Standard #2)

Students will investigate magnets and how they affect other magnets and common objects.

- a. Investigate to find common objects that are attracted to magnets.
- b. Investigate how magnets attract and repel each other.

**Essential Question:** What question are you answering with your lesson?

- 1) What are electromagnets?
- 2) How to make electromagnets?
- 3) What causes attraction in magnets and other objects?
- 4) What are some uses of electromagnets?

**Objective:** What is the goal of your lesson? What will your students accomplish during the lesson?

- To teach students about electromagnets and how they attract objects. They will be able to make their own electromagnets and learn about the magnetic properties.

Abhiyan Bista

Collins

April 6, 14

### **Key Words and Terms:**

**Magnets:** is an object made of iron that is attracted to other iron objects, has two opposite poles, and exhibits magnetism.

**Electromagnets:** Temporary magnets made out of electrical energy.

**Magnetic Field:** the magnets pull or force; exhibited all around the magnet,

**Magnetic (North and South) Poles:** The two areas of a magnet with the strongest magnetic force.

### **Learning Activity**

**Abstract (limit 100 characters):** This lesson covers electromagnets. Students will learn how to create electromagnets using batteries, copper wire, metal (nail), and paper clips. Upon creating this electromagnet, students will then identify what objects are attracted to magnets, and how this attraction works. At the end of the lesson, students should be able to discern what properties cause the electromagnet to effectively attract objects and what causes the attraction.

### **Materials Needed:**

- 10 Batteries (1 per group)
- 10 Nails (1 per group)
- 15 Feet of Copper Wire (approximately 1.5' per group)
- 20 Paper Clips (2 per group)

### **Safety Concerns:**

- Heat: If the copper wire is attached to the battery for too long, it can get hot (gloves)
- Sharp Objects: The copper wire can be sharp if not cut properly; nails can cut students if they horse play and do not follow instructions (gloves)
- Shock: Students should be supervised closely to avoid any misuse of batteries (keep away from water, observe closely, gloves)

### **Procedure:**

- Review lesson about electromagnets, the magnetic field, and North and South Poles.
- Review Safety Procedures and Precautions before experiment
- Organize groups and distribute materials to each group
- Begin building electromagnets: wrap copper wire 50 times around the nail, leaving about an inch of wiring on both ends free; attach the two free sides onto the negative and positive sides of the battery (can be taped, but is not necessary)

Abhiyan Bista

Collins

April 6, 14

- The electromagnet should now be working: the nail side should be able to attract the paper clips
- Ask students questions regarding the attraction and why the paperclips are sticking to the electromagnet
- Review the properties and quiz the students on what they have learned from the lesson

### **Notes and Tips:**

- Instead of naked copper wire, I would have used painted wire to prevent too much heat from being given off (even when students were warned of the heat cautions, they continued to ignore the warnings)
- Keep a closer eye on the students as they put their experiment together
- Make the groups a bit larger as opposed to having 10 groups (this way it is easier to supervise them and make sure that everyone is being safe)

### **References:**

- How to make electromagnets: <http://www.youtube.com/watch?v=emlzh9XXWgQ>
- Electromagnets for kids: <http://www.sciencekids.co.nz/videos/physics/magnets.html>
- How magnets work and properties of electromagnets: <http://science.howstuffworks.com/electromagnet.htm>
- Key terms for electromagnets: <http://quizlet.com/5787271/magnetism-key-terms-flash-cards/>