MANCHESTER COLLEGE
Education Department

Lesson Plan By: Emily Quandt

Lesson: 5E Magnets **Length:** 2-30 to 45 minute lessons

Age or Grade Intended: 4th

Academic Standards:

4.3.15 Demonstrate that without touching them, a magnet pulls all things made of iron and either pushes or pulls other magnets.

4.3.16 Investigate and describe that without touching them, material that has been electrically charged pulls all other materials and may either push or pull other charged material.

Performance Objectives:

1. The student, when working with magnets, will make a prediction about what will happen if you put two ring magnets on an upright pencil, with 100% accuracy.
2. When given two magnets, the student will show how like poles repel by demonstrating a magnet pushing another magnet away, with 100% accuracy.
3. When given two magnets, the student will show how opposite poles attract by demonstrating a magnet pulling another magnet towards it, with 100% accuracy.

Advance Preparation by Teacher:

- Ring magnets (2 or more per student)
- Pencils or dowel rods (1 per student)
- Clay (enough to hold up the pencil or dowel rod)
- Worksheet
- Long dowel rod (1 for every 2 students)

Procedures

Introduction/Motivation: I will begin by asking, what would happen if you put two ring magnets on an upright pencil? (Comprehension) As a class we would brainstorm ideas and write them on the board. I would ask the students why they believe this would happen and what information led them to make this prediction. Then I would have them write their own prediction on the worksheet I had passed out. I would explain that we are going to first use two magnets to examine what will happen.

Step by Step Plan: I will give the students time to explore on their own with two magnets. Then I will have them get into groups of two or three and allow them to explore with more magnets. I will ask the students what will happen

if we put more than two magnets on the pencil. (Comprehension) Then they will have time to explore with more magnets. I will walk around the room and pose questions to the individual groups and to the class. I will find a group that has magnets "floating" because the same poles are facing each other and a group that has magnets connected because they have opposite poles facing each other. I will hold them up and ask the class why some magnets are "floating" and others are not. (Analysis) I will ask why a magnet floats when it is on one side but not on the other. (Comprehension) During this time students will also be filling out the worksheet with what they see, if their predictions were right or wrong, and why. They will also be drawing what they see while experimenting with the magnets. I will ask other questions to guide the students in their exploration. What happens if you put your fingers between the magnets? Where are the positive and negative poles on the ring magnets? Does the pencil have anything to do with the magnets floating? Why doesn't gravity hold the magnets down? What happens to the spaces in-between the magnets when you add more magnets? Can you make the magnets bounce? Why does this happen? Can you make a magnet jump off the pencil? These questions cover Blooms Taxonomy and will promote exploration on many levels. During this time the students will explore what happens when they put the magnets on their pencils in a variety of ways.

I will then move into the explanation part of the lesson. We will use the answers from the previous questions to have a discussion about electrical charges. We will discuss how the positive and negative poles on the magnets produced the out comes we saw. We will also go back to our original predictions and compare them with what really happened. I would explain that tomorrow we will work more with magnets and elaborate on what we learned today.

Closure: The next day we would have a whole class activity using the magnets. I will have a large dowel rod so we can place multiple magnets on it. One by one I will have the students come up and add their magnets on the dowel rod until all magnets are floating. We will observe what happens and discuss it as a class. We will do this many times and let the students place the magnets on the rod in a variety of ways. We will measure the distance between the magnets at the bottom of the rod and at the top. We will discuss why there is a larger difference between the magnets at the top. I will then give the students their own long dowel rod. In their groups they will be challenged to experiment and come up with different combinations of floating and non-floating magnets. I will ask them to see the greatest number of floating magnets they can make and the least number they can make.

Assessment for this activity will be done through observation, class discussion and the worksheet turned in by students. During the introduction I will use the information given by the students to develop the rest of my lesson. Aspects may need to be changed after I obtain the data. Then while the students are exploring I will be facilitating and observing. I will create my instruction from the answers I receive from students. I will also use the information from the elaboration stage to gage how the students comprehend

the information and concepts. The assessment will be continuous and determine the next stage in the lesson. The students will also fill out the worksheet, only to keep track of their predictions and what really happened so they can easily compare the information. The "grade" will come from the students turning in the worksheet with the information they obtained.

Gardner's multiple intelligences used in this lesson are visual-spatial, interpersonal, intrapersonal, bodily-kinesthetic, and verbal-linguistic.

Adaptations/Enrichments: Students having disabilities will have peer support, assistance from an aide, or me. If they have problems with writing they will be able to orally answer the questions on the worksheet or will not be required to fill it out. However, they will be required to participate in their group and a group member can fill out one worksheet for both students. Students with oral communication problems will be able to write their predictions or answers to the questions posed in class. Students with other disabilities will have a modified activity where they either have more time to complete the requirements or fewer requirements. Students needing enrichments will go beyond the magnet activity and explore gravity more in depth. They will explore gravity as related to magnetic pull and how gravity affects magnets.

This lesson was taken from Lessonplanspage.com and was adapted.

WORKSHEET

Name_____ Date_____

Prediction #1

Draw what you see.

What happens if you put your fingers between the magnets?

Where are the positive and negative poles on the ring magnets?

Why doesn’t gravity hold the magnets down?

What happens to the spaces in-between the magnets when you add more magnets?

Draw what you see.

Prediction #2

Draw what you see.