

The Earth Magnet

Katherine Kay

Introduction:

Paleomagnetism has shown polar reversal multiple times in the earth's history. This evidence of sea floor spreading has made it possible for scientists to look into earth's history and predict earth's future based on the past. Students will get an introduction to this by using a compass to detect earth's current magnetic field to navigate terrain.

Notes for the teacher:

This lesson is supplemental for the 6th grade Battle Creek Mathematics and Science

“Science Unit 3 - Earth: Yesterday, Today, and Tomorrow – 6ES2

Sixth graders gain an understanding of the Earth's history and future through the study of plate tectonics and major geological events. They build their knowledge from the unit, Planet Rock to include tectonic movement, layers of the Earth, the magnetic properties of the Earth, and how rocks, rock layers, and fossils tell the history of the Earth.”

Grade Level:

6th Grade

Objectives:

1. A student will be able to demonstrate understanding of using a compass to detect earth's magnetic field.
2. A student will be able to correctly use a compass.
3. A student will be able to identify properties of a magnet.

Michigan Benchmarks:

E.SE.M.6 Magnetic Field of Earth- Earth as a whole has a magnetic field that is detectable at the surface with a compass.

E.SE.06.61 Describe the Earth as a magnet and compare the magnetic properties of the Earth to that of a natural or manufactured magnet. *

E.SE.06.62 Explain how a compass works using the magnetic field of the Earth, and how a compass is used for navigation on land and sea.

Overview

Lesson	Objective	In-class Activity	Homework
1. Exploring/reviewing magnets	E.SE.06.61 Describe the Earth as a magnet and compare the magnetic properties of the Earth to that of a natural or manufactured magnet.	Students will use unmarked bar magnets to determine the magnets' poles. They will then use the magnets to model the earth.	Students figure out which direction their entry door faces.
2. Using a compass	E.SE.M.6 Magnetic Field of Earth- Earth as a whole has a magnetic field that is detectable at the surface with a compass. E.SE.06.62 Explain how a compass works using the magnetic field of the Earth, and how a compass is used for navigation on land and sea	Students get an introductory lesson with a compass. Students then will use the compass to navigate to different destinations in and around the building.	Students will make a map of the school with a compass rose.

Lesson 1

Materials:
Journal
Bar Magnets
String
Other Magnets

5 minute warm-up: Type 1 Collins writing: Why is it called the North Pole?

15 minutes engage:

Students use a Collins Science Lab format to record procedure and observations in their journals. Each pair of students will receive 2 bar magnets the have masking tape over their pole indicators. Students spend time trying to predict which pole of the magnet is which and why, recording their observations and thinking.

20 minutes activity:

Students tie their magnets in the middle and let them hang freely. Students record what happens to their magnets and any other observations. The teacher then identifies North and has students turn that way. What happens to the magnet? If you keep the magnet still and turn your body 90 degrees clockwise, which way do you think you are facing? Again? And again? And again? And back to the original direction?

15 minutes think and conclude:

Have students check their predicted magnetic poles. Do they think they are still right or do they want to change their predictions? Check with partner – how can you be sure? What are properties of like poles? Attraction?

Pass out other types of magnets –horseshoe and circle. Draw and identify the poles in journal and explain how you know.

Lesson 2

Materials:

Journal

Compasses

5 minute warm-up: Type 2 Collins writing: If you were in downtown Kalamazoo and wanted to go North, how could you figure out the direction using a bar magnet?

10 minutes engage:

Students use a Collins Science Lab format to record procedure and observations in their journals. Each pair of students will receive 2 compasses. Where's North? Why? Students view http://www.youtube.com/watch?v=aWSqhD02G_M to watch and follow how to use a compass.

30 minutes activity:

Move outdoors or to an open space. Have students start in center of area with their compass. Ask them to face north, then east, then south, then west, then north again. Go through these a couple of times to gain confidence. Then have students move by stepping, skipping, or running in a given direction. Give students prepared written directions sending groups to different starting points, then going different directions or to different destinations, and finally back to start if completed correctly using the compass.

10 minutes think and conclude:

Did you make it back to the starting point? Why or why not? Which direction does our classroom door face? Write the steps to get from our classroom door to the lab door.

References:

Working a compass

<http://www.learn-orienteeing.org/old/>

<http://www.learn-orienteeing.org/old/lesson1.html>

http://www.youtube.com/watch?v=aWSqhD02G_M

Magnets

http://cse.ssl.berkeley.edu/segwayed/lessons/exploring_magnetism/exploring_magnetism/s1.html

Battle Creek Mathematics and Science Center

<https://www.bcamsc.org/>