



Drexel-SDP GK-12 ACTIVITY

Activity Template

Subject Area(s) Physical Science

Associated Unit Electricity and Magnetism

Associated Lesson

Activity Title Magnetic Mapping

Grade Level 6 (6-7)

Activity Dependency

Time Required 30 minutes

Group Size 1

Expendable Cost per Group US\$0

Summary

Students map the magnetic field of magnets in different orientations using only a compass. The students then test how the magnets interact with each other and how the field pattern changes with multiple magnets.

Engineering Connection

Engineers regularly investigate fields and their distributions. Electrical engineers must understand the field patterns of different magnets in order to design specific systems, such as magnetic manipulation devices. This activity allows students to visualize the abstract concept of fields and how those fields relate to forces.

Keywords

compass, field, force, magnet

Educational Standards

- Science: 3.2, 3.4c
- Math:

Pre-Requisite Knowledge

Learning Objectives

After this lesson, students should be able to:

- Explain how compasses react to the presence of magnetic fields
- Describe the magnetic field pattern of several different permanent magnets

Materials List

Each group needs:

- Magnets, a bar, horseshoe, and ring are convenient
- Compass

To share with the entire class:

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Introduction / Motivation

Compasses have been used for many years by travelers and they continue to be used today as means of navigation. Compasses help people navigate by pointing along the direction of Earth's magnetic field, which is north. However, permanent magnets create their own magnetic field which is much stronger than the Earth's at small distances. Today we will complete a simple exercise that will allow us to see the magnetic fields of different magnets. We will also be able to see how far the magnetic field of the magnetic reaches before it gets too weak to affect a compass.

Vocabulary / Definitions

Word	Definition
Magnetic Field	Field produced by magnetic objects which results in a force on moving charges or other magnetic materials.

Procedure

Background

Check the compasses and make sure they are all working properly.

Before the Activity

- Gather the compasses and magnets.
- Discuss with the students what they know about compasses and Earth's magnetic field.

With the Students

1. Give out the materials to each student.
2. Start by having the students put a magnet on a piece of paper and tracing the outline.
3. Then have the students put the compass down near one end of the magnet. They should lift the compass up and draw a line pointing in the same direction of the compass needle.
4. The students should move the compass slightly in the direction of the line they drew and then draw another line beneath the compass in the same way they drew the first line.
5. Repeat the process until the field line has completed a loop, the start on another line.
6. The final drawings should look similar to those in figure 1.
7. Discuss with the students about special features in their drawings.

Image

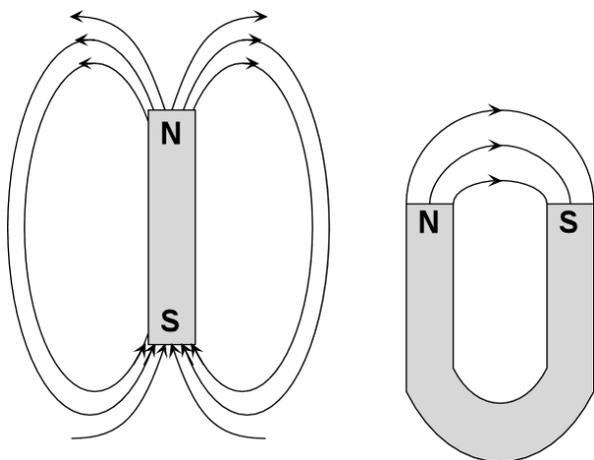


Figure 1.

Image shows magnetic field lines of a bar magnet and horseshoe magnet.

Source: Physics Instructional Resource Association

Investigating Questions

Do all the lines form loop? What about the ones directly in line with the bar magnet?

Can you tell which end of the magnet is north or south?

Assessment

Pre-Activity Assessment

Discussion: The discussion about magnetic fields and compasses will let you see how much the students know before the activity.

Activity Embedded Assessment

Magnetic Field Drawings: Examine the students' magnetic field sketches.

Post-Activity Assessment

Investigating Questions: Have the students write a paragraph answering the investigation questions.

Owner

Drexel University GK-12 Program

Contributors

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