

Magnet Wars!

Standards Statements:

3.2.7.B – Apply process knowledge to make and interpret observations.

3.4.10.C – Distinguish among the principles of force and motion.

National Standard:

- Know that magnets attract and repel each other and attract certain kinds of materials.

- Knows the relationship between the strength of a force and its affect on an object.

Content Objectives:

Students will be able to:

1. Explain the causes of magnetic fields.
2. Explain factors that determine magnetic field strength.
3. Compare the magnetic field of a magnet to the magnetic field of Earth.

Process Objectives:

Students will be able to:

1. Neatly record and organize observations.
2. Communicate with others concerning a magnetic forces.

Assessment Strategies:

1. Neatly organizing and recording of observations collected magnet wars.
2. Written explanation addressing factors that determine magnetic field strength.
3. Obtain accurate measurements with appropriate number of significant figures.

Procedures:

1. Introduce Magnetism.

Use “Magnetism” information found at:

<http://www-istp.gsfc.nasa.gov/Education/Imagnet.html>

2. Collectively brainstorm factors that determine strength of magnetic force.
3. Introduce the challenge: Who will win the magnet war?
4. Distribute magnets to pairs of students and allow the investigation to begin.

Suggested Level:

Intermediate/Secondary

Standard Categories:

3.2 – Inquiry and Design

3.4 – Physical Science, Chemistry, and Physics

Materials:

Variety of magnets

Iron fillings

White paper

Triple-beam balance

Instructional Strategies:

Cooperative Learning

Inquiry

Discussion

Related Concepts:

Organization

Communication Skills

Objective Observation

Prediction

Measurement

Magnet Wars!

An inquiry activity to investigate the force of magnetism.

Thought questions to begin:

What affects the strength of magnetic force?

What causes the force of magnetism?

Investigation:

To investigate the impact force of magnetism, follow the following instructions carefully:

1. Obtain 2 magnets per pair of students. (one large and one small) Each student should choose one magnet.
2. Pour iron fillings in a piece of paper and spread them out.
3. Place magnets approximately 5cm from edges of paper. When teacher says go, begin to move your magnets at the same speed onto the paper.
4. Observe the attraction of iron fillings toward the magnets.
5. Stop moving magnets toward each when they are approximately 2.5cm apart.
6. Using a balance, obtain the mass of iron fillings collected by each magnet.
7. Record data and observations in data table.
8. Repeat the war for 4 more trials. Record all data and observations in table.

Questions to ponder:

1. What is the force of magnetism?
2. What factors determine the strength of magnetic force?
3. Based on your observations, what could you do to give the lesser magnet a “head start?”
4. Obtain a compass. Is the strength of your magnet great enough to overcome the magnetic force of the Earth? Explain your observations.

Magnet Wars Data

Description of Magnet 1:

Description of Magnet 2:

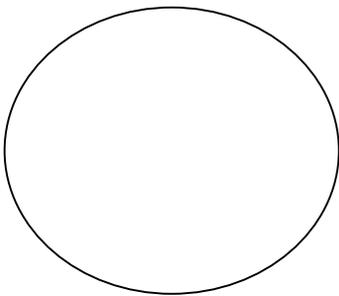
Data Table 1

Trial #	Mass collected by Magnet 1 (grams)	Mass collected by Magnet 2 (grams)	Winner!
1			
2			
3			
4			
5			

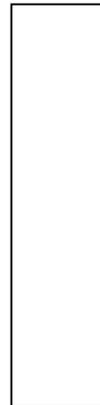
Based on your observations, what determined the strength of the magnetic force?

Draw a representation of the magnetic field of Earth and a bar magnet.

Earth



A Bar Magnet



Writing to Inform in Science (Extended Constructed Response)

Name _____ Date _____ Course/Class _____

Task/Assignment _____

Weights →	Development	Organization	Audience	Language
Expert 4	<u>Development:</u> The writer provides accurate, specific, and purposeful scientific facts and concepts that are extended and expanded to fully explain the topic.	<u>Organization:</u> The writer establishes an organizational plan and consistently maintains it.	<u>Audience:</u> The writer provides scientific information relevant to the needs of the audience.	<u>Language:</u> The writer consistently provides scientific vocabulary and language choices to enhance the text.
Proficient 3	<u>Development:</u> The writer provides scientific facts and concepts that adequately explain the topic with some extension of ideas. The information is usually accurate and purposeful.	<u>Organization:</u> The writer establishes and maintains an organizational plan, but the plan may have some minor flaws.	<u>Audience:</u> The writer provides information most of which is relevant to the needs of the audience.	<u>Language:</u> The writer frequently provides scientific vocabulary and uses language choices to enhance the text.
Emergent 2	<u>Development:</u> The writer provides scientific facts and concepts that inadequately explain the topic. The information is sometimes inaccurate, general, or extraneous.	<u>Organization:</u> The writer generally establishes and maintains an organizational plan.	<u>Audience:</u> The writer provides some information relevant to the needs of the audience.	<u>Language:</u> The writer sometimes provides scientific vocabulary and uses language choices to enhance the text.
Novice 1	<u>Development:</u> The writer provides insufficient scientific facts and concepts to explain the topic. The information provided may be vague or inaccurate.	<u>Organization:</u> The writer either did not establish an organizational plan or, if an organizational plan is established, it is only minimally maintained.	<u>Audience:</u> The writer did not provide information relevant to the needs of the audience.	<u>Language:</u> The writer seldom, if ever, provides scientific vocabulary and uses language choices to enhance the text.

Measuring Scientifically

Name _____ Date _____ Course/Class _____

Task/Assignment _____

Performance Criteria	Assessment			
	Points	Self	Teacher	Other(s)
1. Appropriate tools, techniques, and metric units were selected and used effectively for making measurements.				
2. Measuring techniques were practiced and refined before final measurements were recorded.				
3. Careful measurements were taken in order to minimize systematic measurement error.				
4. The set of measurements is recorded in an organized way (list, table, or chart) so that patterns in the data can easily be discerned.				
5. All measurements are clearly labeled with an appropriate magnitude (numerical value) and unit.				
6. Measurements are reported to the correct number of significant figures.				
7. Alternative strategies, techniques, and measuring tools for improving measurements were examined and discussed.				
8. Multiple measurements were repeated to insure accuracy.				

<input type="checkbox"/> Comments	<input type="checkbox"/> Goals	<input type="checkbox"/> Actions
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