CLASSROOM VISIT
MAGNETS

NATIONAL HIGH MAGNETIC FIELD LABORATORY

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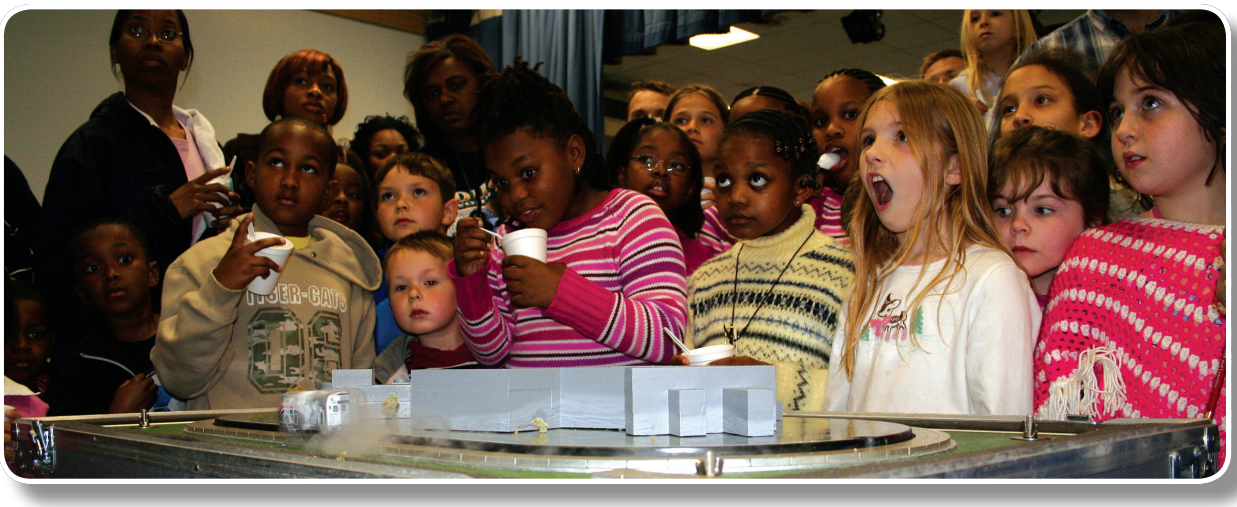
Pre-Outreach Activity: What Do We Already Know?



Teacher Background: A simple, yet effective learning strategy, a K-W-L chart, is used to help students clarify their ideas. The chart itself is divided into three columns:

K	W	L
WHAT WE KNOW	WHAT WE WANT TO KNOW	WHAT WE LEARNED

MATERIALS: > Chart Paper > Markers

ACTIVITY INSTRUCTIONS

1. Copy the K-W-L chart and pass out so that each student has their own sheet. Explain how the chart is to be filled out, then brainstorm with the class and have the students list everything that they know about magnets and magnetism. There are no right or wrong answers.

2. Next have the students list everything that they want to know about magnets and magnetism. You may need to provide prompts such as:

   If magnet experts were here, what questions would you ask them?
   If you were a scientist, what would you like to discover about magnets?

3. Keep the chart accessible so that you and the students can enter ideas, new information, and new questions, at any time. The class can return to the K-W-L chart after completing the activities. As students learn the answers to their questions, list the answers in the L column of the chart.

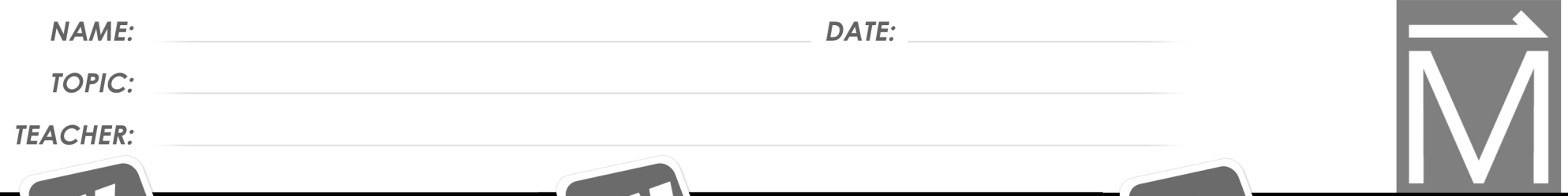
4. K-W-L charts are useful in identifying misconceptions that students have about magnets and magnetism. Once the misconceptions are identified, have students design a way to test their ideas, reflect on what they observe, and refine the original conclusion.

5. Periodically, return to the K-W-L chart during the activities to check off items from the W column and to add to the L column. Students may want to add items to the W column to further their explorations.

NAME: _____ DATE: _____

TOPIC: _____

TEACHER: _____



K — WHAT DO YOU KNOW

W — WHAT DO YOU WANT TO KNOW

L — WHAT HAVE YOU LEARNED

Outreach Follow-up Activity: Does a Magnet Work in Water?

Teacher Background:

This experiment addresses a question that students often ask. How do various substances affect a magnet? This experiment can be repeated, each time changing the variable (the substance), allowing the children to explore not only magnets, but the scientific process.

MATERIALS: > *Round donut magnet* > *500 mL beaker (a mason jar will also work)* > *Metal paper clips* > *Six-sided pencil* > *8 inch piece of string* > *Water* > *Scissors* > *Tape*

ACTIVITY INSTRUCTIONS

1. Tape a piece of string to the middle of the pencil so it winds as the pencils turns. Tie the other end of the string to the magnet. Turn the pencil so that the magnet is wound all the way to the top.
2. Place the paper clip inside of the beaker and hold the pencil on top of the beaker so that the magnet is hanging inside the beaker.
3. Slowly turn the pencil so that the magnet is lowered into the center of the beaker. Keep unwinding until the paperclip is attracted to the magnet. Have students record their observations.
4. Repeat steps 2 & 3 with the beaker half full of water.
5. Have students record their observations after the addition of the water. Pay particular attention to any changes.
6. This experiment can be repeated several times, each time using a different liquid and observing changes. Try using salt water, clear soda, juice, etc.
7. Have students compare results among groups and devise a way to quantify them. One way is to mark the string in equal units, and observe the magnet in different liquids.

Outreach Follow-up Activity: Iron In Our Food

Teacher Background:

The human body needs iron for many reasons. The iron in hemoglobin attracts oxygen molecules, allowing the blood cells to carry oxygen to the rest of the body. Red blood cells have a very short life span, and new cells are always being created. Therefore, there is a constant need for a new supply of iron. Many people buy certain foods in an effort to increase the iron in their diets. Cereal is one of those foods.

In this activity, students will literally pull the iron from cereal. Try this with different food products that claim to be "iron rich."

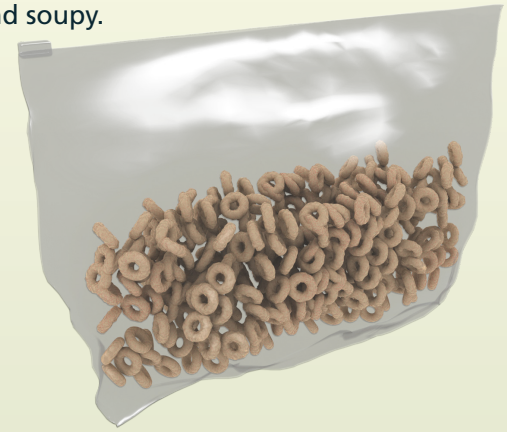
MATERIALS:

- Wand magnets
- Total brand Cereal
- Small bowls
- Clear plastic disposable cups
- Water
- Ziploc sandwich bags

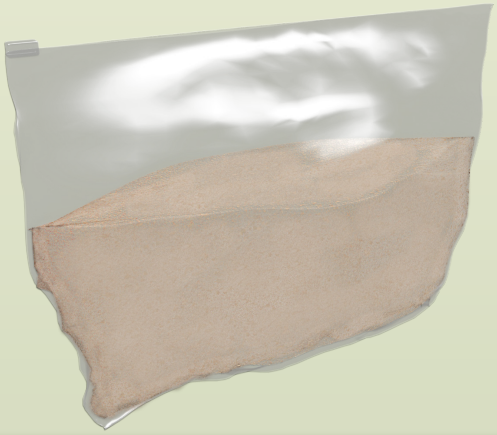
ACTIVITY INSTRUCTIONS

1. Have students predict what will happen if they put a magnet in a bowl of cereal. Place 1 cup of cereal in the bowl. Students then crush the flakes with their hands.

2. Transfer the crushed flakes to a Ziploc bag. Add water and mix. The mixture should be thin and soupy.



3. Let the mixture sit for at least 1 hour; overnight is fine.



4. After the cereal mixture has been allowed to sit, pour some of it into the plastic cup.

5. Drag the wand magnet against the side of the cup for about a minute. Then tip the cup so that the cereal mixture runs to one side of the cup, away from the magnet. Students will observe iron particles on the side of the cup. Have students record their observations.

Next Generation Sunshine State Science Standards

Kindergarten:
SC.K.N.1.1, SC.K.N.1.2, SC.K.N.1.5

1st Grade:
SC.1.N.1.1, SC.1.N.1.2, SC.1.N.1.4, SC.1.P.13.1

2nd Grade:
SC.2.N.1.1, SC.2.N.1.2, SC.2.N.1.3, SC.2.N.1.4, SC.2.N.1.5, SC.2.P.8.1, SC.2.P.13.2

3rd Grade:
SC.3.N.1.1, SC.3.N.1.2, SC.3.N.1.4, SC.3.N.1.5, SC.3.N.1.6

4th Grade:
SC.4.N.1.1, SC.4.N.1.2, SC.4.N.1.3, SC.4.N.1.4, SC.4.N.1.7, SC.4.N.2.1, SC.4.P.8.1, SC.4.P.8.4

5th Grade:
SC.5.N.1.1, SC.5.N.1.2, SC.5.N.1.3, SC.5.N.1.4, SC.5.N.1.5, SC.5.N.1.6, SC.5.N.2.1, SC.5.N.2.2, SC.5.P.8.4, SC.5.P.10.3, SC.5.P.13.1, SC.5.P.13.2, SC.5.P.13.3, SC.5.P.13.4

6th Grade:
SC.6.N.1.1, SC.6.N.1.2, SC.6.N.1.3, SC.6.N.1.4, SC.6.N.1.5, SC.6.N.2.1, SC.6.N.2.2, SC.6.N.2.3, SC.6.N.3.1, SC.6.N.3.2, SC.6.N.3.3, SC.6.N.3.4, SC.6.P.13.1, SC.6.P.13.2, SC.6.P.13.3

7th Grade:
SC.7.N.1.1, SC.7.N.1.2, SC.7.N.1.3, SC.7.N.1.4, SC.7.N.1.5, SC.7.N.1.6, SC.7.N.1.7

8th Grade:
SC.8.N.1.1, SC.8.N.1.2, SC.8.N.1.3, SC.8.N.1.4, SC.8.N.1.5, SC.8.N.1.6, SC.8.N.2.1, SC.8.N.2.2, SC.8.N.4.1, SC.8.N.4.2, SC.8.P.8.1, SC.8.P.8.2, SC.8.P.8.3, SC.8.P.8.4, SC.8.P.8.5, SC.8.P.8.6, SC.8.P.8.7, SC.8.P.8.8, SC.8.P.8.9

Next Generation Science Standards

NGSS:
K-PS2-1, 2-PS1-1, 2-PS1-3, K-2-ETS1-3, 3-PS2-1, 3-PS2-3, 3-PS2-4

VOCABULARY LIST

Attract	*To cause to draw near by a force.*
Electromagnet	*A temporary magnet that is run with electricity.*
Magnet	*An object that is surrounded by a magnetic field and that has the property, either natural or induced, of attracting certain metals. All magnets have a North and South pole.*
Magnetic field	*A region around a magnet in which objects are affected by the magnetic force.*
Magnetic Pole	*The north or south pole of a magnet, where the magnetic field is the strongest.*
Permanent Magnets	*A piece of magnetic material that retains its magnetism after it is removed from a magnetic field.*
Repel	*To push back or away by a force.*
Temporary Magnets	*A piece of magnetic material that demonstrates the properties of a permanent magnet only while in a magnetic field.*