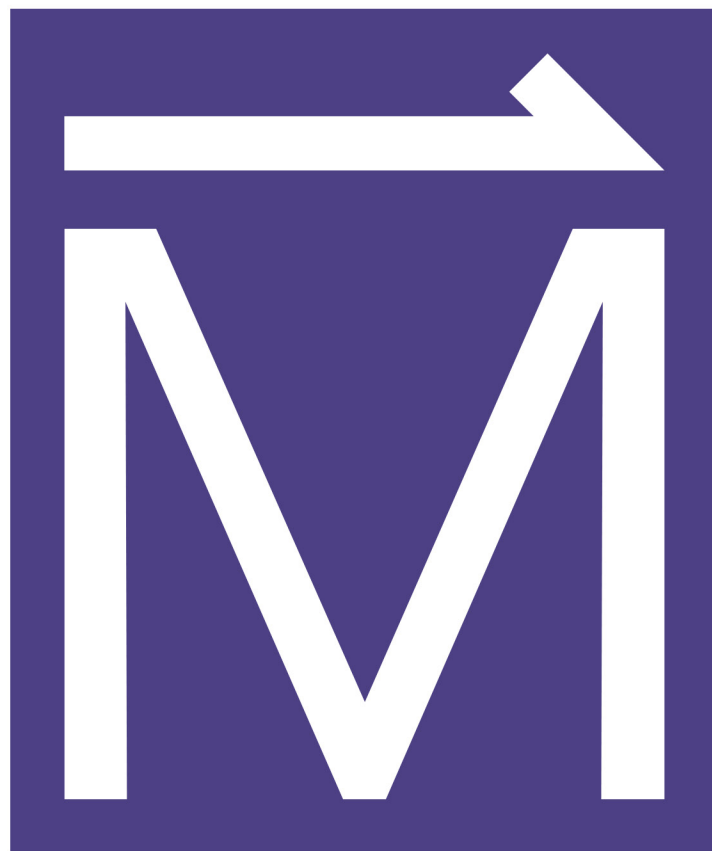


CLASSROOM VISIT WHAT IS A SCIENTIST?



 NATIONAL HIGH
MAGNETIC
FIELD LABORATORY



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Pre-Outreach Activity: What Do We Already Know?



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



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

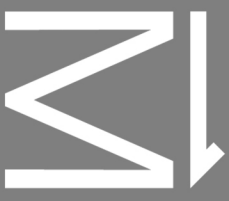
Periodically, return to the K-W-L chart during the activities to check off items from the W column and to add to the L column. Students may want to add items to the W column to further their explorations.

NAME: _____

DATE: _____

TOPIC: _____

TEACHER: _____



**WHAT DO YOU
KNOW**



**WHAT DO YOU
WANT TO KNOW**



**WHAT HAVE YOU
LEARNED**

Blank writing area for 'WHAT DO YOU KNOW'.

Blank writing area for 'WHAT DO YOU WANT TO KNOW'.

Blank writing area for 'WHAT HAVE YOU LEARNED'.

Pre-Outreach Activity: Draw a Scientist



Teacher Background:

Close your eyes and imagine a scientist. If 100 people do this, we could get 100 different images of a scientist; but some themes will be reoccurring. Lab coats and test tubes are popular images, but unfortunately is the image of an old white man with grey hair. The truth is that scientists come in all different shapes and sizes, and often it takes actually meeting a scientist to break that stereotype in our heads.

MATERIALS:

> Drawing paper

> Crayons

> Markers

ACTIVITY INSTRUCTIONS

- 1 Ask your students: When you hear the word "scientist" what comes to mind? Allow your students a minute to think about their answer, and then let them share their answers with the class.
- 2 Ask your students: What do scientists do? What is their job? Again, give them think time before sharing answers.
- 3 Give each student a sheet of drawing paper and ask them: What does a scientist look like? This time, instead of sharing their answers, they are asked to draw their scientist. Give them some time to finish their drawings.
- 4 Create a checklist on the board of items or characteristics that their drawing displays.
- 5 Hold on to their drawing until after MagLab Personnel visits the classroom.
- 6 After their visit from the MagLab, have the students draw a scientist again. Use the checklist again.
- 7 Now give the students back their original drawing and have the students compare the differences. Ask them if there is a reason for some of the differences.

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 > Metal paper clips
(a mason jar will also work)
> 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.

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

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	<i>To cause to draw near by a force.</i>
Electromagnet	<i>A temporary magnet that is run with electricity.</i>
Magnet	<i>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.</i>
Magnetic field	<i>A region around a magnet in which objects are affected by the magnetic force.</i>
Magnetic Pole	<i>The north or south pole of a magnet, where the magnetic field is the strongest.</i>
Permanent Magnets	<i>A piece of magnetic material that retains its magnetism after it is removed from a magnetic field.</i>
Repel	<i>To push back or away by a force.</i>
Temporary Magnets	<i>A piece of magnetic material that demonstrates the properties of a permanent magnet only while in a magnetic field.</i>