MAGLAB FIELD TRIP
DC ELECTRICITY

NATIONAL HIGH MAGNETIC FIELD LABORATORY

FSU FLORIDA STATE UNIVERSITY

NSF

Center for Integrating Research & Learning
1800 East Paul Dirac Drive
Tallahassee, FL 32310
nationalmaglab.org/education

Pre-Visit 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 DO YOU KNOW	WHAT DO YOU WONDER	WHAT HAVE YOU 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 electricity and electromagnetism. You may need to provide prompts such as:

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

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: _____

TOPIC: _____

TEACHER: _____

NATIONAL HIGH MAGNETIC FIELD LABORATORY

K	W	L
WHAT DO YOU KNOW	**WHAT DO YOU WONDER**	**WHAT HAVE YOU LEARNED**

Post-Visit Activity: Varying Resistance

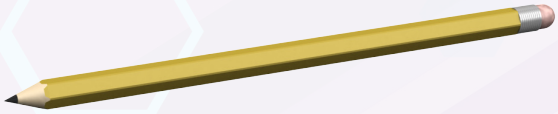
Teacher Background:

When electrons are travelling through a wire to make electricity, they will bump into each other. These collisions create a tiny amount of heat, but over millions and billions of collisions, the heat begins to build up, and we feel it as electrical devices get hot to the touch.

These collisions also reduce the flow of electricity. We call this resistance. The greater the resistance is, the less electricity is created, and the hotter the circuit will become.

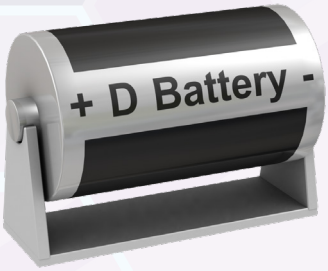
MATERIALS:

> *1 Soft pencil*

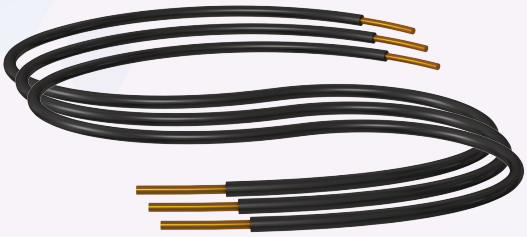


> *1 Flashlight light bulb*

> *1 D-cell battery*
> *1 battery holder*



> *3 or more strips of copper wire*



ACTIVITY INSTRUCTIONS

1 Soak the pencil in water until it becomes soft. Then you can strip the wood from the pencil easily so that the lead is exposed inside.

2 Attach the wires to the battery and the light bulb. Then connect one end of the battery to the light bulb, leaving two unattached wires.

3 Use the two free ends of the circuit to touch the pencil lead. Move the ends closer together, and then further apart. What do you see the light bulb doing? What do you feel happening?

Florida's State Academic Standards for Science

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.1.5, SC.4.N.1.7, SC.4.N.1.8, 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.1.5, SC.5.N.1.6, SC.5.N.2.1, SC.5.N.2.2, SC.5.P.8.3, SC.5.P.8.4, SC.5.P.10.2, SC.5.P.10.3, SC.5.P.10.4, SC.5.P.11.1, SC.5.P.11.2, SC.5.P.13.1, SC.5.P.13.2, 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.2.2, SC.6.N.2.3, SC.6.N.3.1, SC.6.N.3.2, SC.6.P.13.1

7th Grade:
SC.7.N.1.1, SC.7.N.1.2, SC.7.N.1.3, 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.4.1, SC.8.P.8.1, SC.8.P.8.4, SC.8.P.8.5, SC.8.P.8.7

High School:
SC.912.N.1.1, SC.912.N.1.2, SC.912.N.1.3, SC.912.N.1.5, SC.912.N.1.6, SC.912.N.1.7, SC.912.N.2.1, SC.912.N.2.4, SC.912.N.3.1, SC.912.P.8.4, SC.912.P.8.5, SC.912.P.10.10, SC.912.P.10.16, SC.912.P.10.17

Next Generation Science Standards

NGSS:
4-PS3-2, 4-PS3-4, HS-PS2-5, HS-PS3-3

VOCABULARY LIST

Static Electricity	*A type of electricity that involves charges that are not moving, but are transferred from one item to another.*
Current Electricity	*A type of electricity where the charges are moving in an organized way, all flowing together like stream or river.*
Insulator	*A material that electricity has a hard time moving through, if it can at all.*
Conductor	*A material that allows electricity to move through it easily*
Electron	*The part of an atom that is constantly moving around the nucleus. It is this sub-atomic particle that gives us electricity.*

If you have any questions, please contact Carlos Villa: **villa@magnet.fsu.edu**