Sciencenter 601 First Street, Ithaca, NY 14850 • (607) 272-0600

Dear (Teacher's Name),

We are so pleased that you will be joining us for the Kids Discover the Trail! *Hidden Attractions* program on magnetism. This letter confirms your reservation. Please review the details and contact us if you have any questions.

Date of Visit:
Number of Children:
Number of Chaperones:
Program Time/s:
Lunchroom Time/s:

Logistics
We require at least one adult chaperone for every six children but you may bring additional chaperones if you like. All chaperones are admitted to the Sciencenter free of charge. Remind chaperones that programs and visits are an even better learning experience when adults participate, and they are encouraged to enjoy the activities with the students.

We will provide space for you to store your lunches while exploring the Sciencenter. You may bring trash bags to carry out your lunch trash or we will dispose of it for an additional $15 trash-handling fee.

What to expect
Your class has been paired with a second grade class from (School). Upon your arrival at the Sciencenter, we will meet your entire group for a short welcome and then take a group of students to our classroom for the *Hidden Attractions* program, while the other students explore the Sciencenter. At (time) the groups will trade, and at (time) you can regroup with your partner-class, so that the students can enjoy lunch with their new friends. Encourage your students to make at least one new friend from the other school.

Before you go
Our classroom has space for up to 24 students at one time. Please take time to divide your students into (number) of groups before you arrive at the Sciencenter, so that we may easily gather students at their program times.

Enclosed you will find a sheet of background information about magnets, an overview of the program we will be presenting, and a pre-program activity. Doing the activity and simply allowing your students time to explore and play with magnets will enhance their experience in the *Hidden Attractions* program.

After the trip
Talk with your students about the trip. Ask them one thing they learned or found most interesting. (This makes a great writing assignment!) After your program you will receive a packet of post-program materials that includes evaluation materials and activities for your students to try in-class or at home.

If there is any way we can enhance your experience during your Kids Discover the Trail! visit, don't hesitate to contact Shannon McSurely at smcsurely@sciencenter.org or at 272-0600 ext. 23.

We are looking forward to meeting your class!

Sincerely,

The Sciencenter Education Team

***Hidden Attractions:* A Program about Magnets and Magnetism**
Presented by the Sciencenter
Program Overview

Hidden Attractions introduces students to magnets and magnetism. The program is designed for classes or home-school groups of up to 24 students in grades 1-4. Each program runs approximately 45 minutes to one hour, and is held in the Sciencenter classroom.

Students begin by sharing and activating prior knowledge of magnetism. They view several demonstrations and in pairs or small groups, they participate in hands-on exploration of the properties of magnets. The number and complexity of the activities depends on the group and their level of background knowledge.

Although there are a number of learning objectives, most students will grasp only one or two during the program. Pre-program and post-program activities will reinforce their learning and help broaden their understanding.

Learning Objectives: Students will be able to:

- make and test predictions regarding magnetism
- demonstrate an understanding of the following properties of magnets
  - magnetism is a force that attracts some (but not all) metals.
  - a magnetic field extends beyond the physical object of the magnet and can attract objects from a distance.
  - a magnetic field can work through other materials (but may be weakened or blocked by the thickness of those materials).
  - all magnets have a north and south pole; opposite poles attract each other and like poles repel.
  - a magnetic field is not the same throughout a magnet, it is strongest near the poles.
  - some magnets work for a long time, other magnets work for a short time and magnets can lose their magnetism.

These learning objectives are aligned with the following
New York State Math, Science and Technology Curriculum Standards:

Standard 1 Analysis, Inquiry and Design

Scientific Inquiry

1. The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing creative process.

2. Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.

Standard 4 Science

The Physical Setting

3. Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

5. Energy and matter interact through forces that result in changes in motion.

Hidden Attractions
Background Information and Resources for Teachers

Background Information (Source: http://my.execpc.com/~rhoadley/magindex.htm)

Ancient people (either Greeks or Chinese) discovered that certain rare stones attracted iron and would always turn in the same direction when allowed to swing freely. These naturally occurring magnets, or *lodestones* (lode means to attract), were rocks which contained magnetite, named after a region in Greece where many lodestones were found.

A magnet is any object that creates a *magnetic field*. A magnetic field is a force exerted on objects around the magnet. The magnetic field of one magnet will interact with another magnet or a piece of magnetizable material.

Iron, cobalt, nickel and a few other elements and alloys of these metals are *magnetizable*. Magnetizable materials contain "magnetic pockets" which behave like many little magnets. Ordinarily their magnetic forces are disorganized. They pull in many different directions and the net effect is that they cancel each other out. When exposed to a magnet, the magnetic pockets align and the magnetizable material behaves like a magnet itself. Depending on the *retentivity* of the material, this temporary magnetism may last only while exposed to a magnet or it may be retained for a long time.

Magnets are dipoles, meaning that they have at least two poles, a north and a south pole. If you break a magnet, each of the new pieces will have both a north and south pole. The north pole of a magnet is actually a "north-seeking" pole, and will align itself to point toward magnetic north. Opposite poles will attract each other and like poles will repel.

Websites

Exhaustive site about magnets and magnetism, includes many great links
http://my.execpc.com/~rhoadley/magindex.htm
Great general background on magnets
http://www.newi.ac.uk/BUCKLEYC/magnet.htm
Ideas for fun demonstrations, experiments, and hands-on activities
http://www.exploratorium.edu/snacks/iconmagnetism.html
Resources for buying magnets and other science supplies
http://www.teachersource.com/
http://www.scientificsonline.com/
http://www.arborsci.com/

Books

Doherty, P. & J. Cassidy. *Magnetic Magic*. Palo Alto, CA: Klutz, 1994

Feiler, J., & N. Hooten, *Magnets… A World to Discover!* Level 1. Sonoma, CA: Dowling Miner Magnetics Corporation, 1990.

Livingston, J. D., *Driving Force: The Natural Magic of Magnets*. Cambridge, MA: Harvard University Press, 1996.

Vecchione, G. *Magnet Science*. New York: Sterling Publishing, 1996.

Hidden Attractions
Pre-Program Activities

This activity should be adjusted to suit the needs of your class and your students. It may be done as a whole-class activity on the board, using objects around the classroom. It may be set up as a work-center activity, which students can do individually, or it may be done in small groups.

Materials

- Magnets of different sizes, shapes and strengths
- A number of small objects; some magnetizable, some not (A variety of familiar and unfamiliar objects of different materials works best. For example: paperclips, rubber bands, small pieces of wood, old keys, coins, aluminum foil, twist ties, pipe cleaners, straws, silverware, paper fasteners, pen caps, jar lids, matchbox cars, clothes pins, cut-up credit cards, plastic lids, small toys, and any other small objects that would interest students).

Procedure

1. Prepare bags or other containers of objects. (Note: when doing the activity in small groups, it is best to have a set of similar objects for each group).
2. Ask students what they know about magnets and where they usually find them – they will probably talk about how magnets stick to metal.
3. Ask if magnets stick to all metal.
4. Explain what a prediction is. Tell the students that they are going to be real scientists who make and test predictions.
5. Show students the container of objects and tell them that after examining each object they are going to sort into one of three groups. Students can simply make three piles or use the attached prediction chart.
    - objects they predict will stick to a magnet
    - objects they predict will not stick to a magnet
    - objects they are not sure about

Do not hand out magnets until after the students have made their predictions

6. Explain that they will each receive a magnet to test their predictions one by one. Tell them to take note of any surprises and examine the objects more closely to see if they can figure out why the object behaved differently than they expected.
7. Share your knowledge about why some of their predictions might have surprising results.
8. Now is a great time to allow students simply to play with their magnets and different objects.

For fun, try playing magnetic hide and seek with your class. One student picks an object in the classroom to test with a magnet. Have the class vote on their predictions (stand if they think it will stick and sit if they don't, etc.). Now let the first student use a magnet to test the object for magnetism. Discuss the results as a group.

Name: _____ **Date**: _____

Instructions: Look at all the objects in your PREDICTION pile. Study each object with your partners and decide whether you think it will stick to a magnet. Write the name of the object in the column where it belongs.

Things that WILL STICK to a magnet	Not sure	Things that WILL NOT STICK to a magnet

Did you have any surprises? Circle objects that were in the wrong column. Draw arrows to show where the objects in the "Not Sure" column belong.