- Provide materials such as glass, water, wax, paper, plastic, wood and metal. Ask students to find out through trial and error what substances magnetic fields will work through.
- Give students each a toy car, tape and a number of small magnets. Ask them to devise a way to make the cars move without touching them.

## Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.libraryvideo.com

- **www.science-tech.nmstc.ca/english/schoolzone/Info_Magnets.cfm**
  Canada Science and Technology Museum presents this informative site that answers basic questions concerning magnets.
- **www.windows.umich.edu/physical_science/magnetism/force_of_magnetism.html**
  "Windows to the Universe" is an easy-to-comprehend site with a friendly beginner's interface to provide all the details students need to know about the force of magnetism.

## Suggested Print Resources


- Levine, Shar. *The Magnet Book.* Sterling Publications, New York, NY; 1997.
- Olien, Rebecca. *Magnets*. Bridgestone Books, Mankato, MN; 2002.
- Parker, Steve. *Opposites Attract; Magnetism*. Heinemann Library, Chicago, IL; 2004.
- Tocci, Salvatore. *Experiments With Magnets*. Children's Press, Danbury, CT; 2002.




TEACHER'S GUIDE

**TEACHER'S GUIDE CONSULTANT**

**Conrad M. Follmer**

25 years as a K-5 Science & Math Coordinator for a Pennsylvania public school system, currently an independent consultant to elementary schools.

**TITLES**

- **ALL ABOUT ELECTRICITY**
- **ALL ABOUT FLIGHT**
- **ALL ABOUT FORCES & GRAVITY**
- **ALL ABOUT LIGHT**
- **ALL ABOUT MAGNETS**
- **ALL ABOUT MOTION & BALANCE**
- **ALL ABOUT PROPERTIES OF MATTER**
- **ALL ABOUT SIMPLE MACHINES**
- **ALL ABOUT SOLIDS, LIQUIDS & GASES**
- **ALL ABOUT SOUND**
- **ALL ABOUT WAVES**

**Teacher's Guides Included and Available Online at:**

libraryvideo.com
The Leading Educational Video, DVD & CD-ROM Distributor

**800-843-3620**

SCHLESSINGER MEDIA
A DIVISION OF LIBRARY VIDEO COMPANY



4/04

K7110
V8855

TEACHER'S GUIDE

# Physical Science for Children™

# All About Magnets

**Grades K–4**

This guide is a supplement, designed for educators to use when presenting this program in an instructional setting.

**Before Viewing:** Research in learning suggests that it is important for the teacher to discover what the students know — or think they know — about a topic, at the start of a new unit, so that their accurate conceptions can be validated and reinforced, and their misconceptions identified and corrected. Therefore, after reviewing the pre-viewing discussion questions provided for your class, create a "Everything We Know About…" list. Preview key vocabulary words and have students raise additional questions they hope will be answered by this program. Most importantly, students should be told that as "science detectives" they must listen closely, so that after viewing the program, they will be able to tell whether or not the facts/beliefs they put on their list were scientifically accurate.

**After Viewing:** After a brief discussion about the program, challenge your "science detectives" to prove or disprove the accuracy of the facts they put on their "Everything We Know About…" list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.

SCHLESSINGER SCIENCE LIBRARY

## Program Summary

Magnets use an invisible force called magnetism to attract certain items. Items made of metal, especially iron, are attracted to magnets, while other objects (such as the family dog) are not. Regardless of their shape or size, all magnets have two things in common — a north pole and a south pole. Opposite poles attract and pull together, while like poles repel and push apart. Magnets can be used to make some things move without touching them. An example of this is the Bullet Train, which uses repelling magnets on the train and the track to move at high speeds without ever touching the train track!

All magnets have an invisible magnetic force field that can be seen when a sheet of paper is placed over a magnet and iron filings are sprinkled on top. We can see that the lines of force are strongest at the two poles and that the lines move from one pole to the other because they attract each other. For a metal object to be pushed or pulled by a magnet, it has to be in its magnetic field. In a demonstration, find out how it is possible to use a magnet to pull tiny bits of iron out of fortified breakfast cereals!

To explain why magnets attract certain things and not others, the alignment of atoms in an object is discussed. Atoms in magnetic materials line up when placed in a magnetic field. This does not happen to the atoms in non-magnetic objects. A magnet that uses electricity is called an electromagnet. People use the power of magnets in many ways from making and recording music to finding their way with a compass, using the Earth's magnetic field.

## Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the show.

**magnet —** Something that can attract certain metals and has an invisible magnetic field surrounding it.

**attract —** To pull together. When opposite magnetic poles are put together, they attract one another.

**pole —** The north or south end of a magnet. The poles are the strongest areas of a magnet.

**repel —** To push away. When two similar magnetic poles are put together, they repel one another.

**magnetism —** A natural force of attraction or repulsion of magnetic materials, caused by the lining up of their atoms.

**magnetic field —** An area around a magnet in which an invisible magnetic force exists.

**atoms —** The smallest particles that all living things are made of.

**lodestone —** A rock found in the Earth that is a permanent magnet.

*(Continued)*



**permanent magnet —** A substance with atoms that are always lined up and therefore always has magnetic properties.

**temporary magnet —** A substance with atoms that line up and become magnetized for a short time after being held close to a permanent magnet.

**electromagnet —** A strong temporary magnet created by electricity and permanent magnets.

**compass —** Instrument that uses magnets and the Earth's magnetic poles; used by travelers to determine geographic direction.

**Earth's magnetic poles —** The Earth is the largest magnet we know; it has two magnetic poles and a magnetic field, just like other magnets.

## Pre-viewing Discussion

Before students generate their list of "Everything We Know About…" this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

1. How do magnets work?
2. What are magnets attracted to? What types of items aren't they attracted to?
3. What are magnets used for?

After the class has completed their "Everything We Know About…" list, and before watching the show, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

## Focus Questions

You may wish to ask your class the following questions to assess their comprehension of key points presented in the program:

1. What is a magnet?
2. What shapes do magnets usually come in?
3. What are three objects that are attracted to magnets?
4. What metal is most commonly attracted to magnets?
5. What do all magnets have in common?
6. What is meant by "opposites attract?"
7. If two magnets are stuck together, which poles are touching?
8. What happens if the north poles of two magnets are moved close to each other?
9. How does the magnetic Bullet Train work?
10. What is a magnetic field?
11. How can a magnetic field be seen?
12. Why is iron added to some breakfast cereals?

*(Continued)*



13. What is different between the atoms found in magnets and the atoms found in objects that are not magnetic?
14. What is lodestone?
15. What is a permanent magnet?
16. How can one make a temporary magnet using a magnet and paper clips?
17. What are some ways people use electromagnets?
18. What is the biggest magnet known?
19. What is a compass?

## Follow-up Discussion

The most important part of this segment is to examine both the facts and beliefs generated by the class in their "Everything We Know About…" list. Research indicates that students will retain their previous misconceptions — in preference to the new information — until they actively recognize and correct their own errors. Because of this, it is important to lead students to the correct ideas while identifying and correcting any misconceptions from the class list. After reviewing the list, encourage students to share the answers they got to the questions raised before viewing the program.

Raising a thought-provoking question is a good way to assess the overall depth of understanding. A couple of suggestions are listed below:

1. Discuss what would happen when the ends of two bar magnets are placed close together, north pole to north pole. Ask students to discuss what they think the magnetic field would look like if iron fillings were used to show it.
2. Magnets should not be placed near many objects (television screens, computer monitors, library cards, credit cards, video and audio tapes). Using what they have learned about the alignment of atoms in magnetic material, have students discuss why this is and what might happen to objects damaged by magnets.

## Follow-up Activities

- Working in teams, instruct students armed with magnets to create lists of objects found in school that are or are not attracted to a magnet. Have students select a few examples from their lists to demonstrate to the class.
- Ask students if they think magnets with different shapes will have magnetic fields that are shaped differently. Have students replicate the magnetic field activities demonstrated in the program by using paper, iron filings and magnets of many different shapes and sizes. Have students draw the magnetic fields they see, labeling the poles.

*(Continued)*