Real World Science: Magnetism

AIMS Multimedia is a leading producer and distributor of educational programs serving schools and libraries for nearly 40 years. AIMS draws upon the most up-to-date knowledge, existing and emerging technologies, and all of the instructional and pedagogical resources available to develop and distribute educational programs in film, videocassette, laserdisc, CD-ROM and CD-i formats.

Persons or schools interested in obtaining additional copies of this AIMS Teaching Module, please contact:

AIMS Multimedia

1-800-FOR-AIMS
1-800-367-2467

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Congratulations!

You have chosen a learning program that will actively motivate your students AND provide you with easily accessible and easily manageable instructional guidelines designed to make your teaching role efficient and rewarding.

The AIMS Teaching Module provides you with a video program keyed to your classroom curriculum, instructions and guidelines for use, plus a comprehensive teaching program containing a wide range of activities and ideas for interaction between all content areas. Our authors, educators, and consultants have written and reviewed the AIMS Teaching Modules to align with the Educate America Act: Goals 2000.

This ATM, with its clear definition of manageability, both in the classroom and beyond, allows you to tailor specific activities to meet all of your classroom needs.

RATIONALE

In today's classrooms, educational pedagogy is often founded on Benjamin S. Bloom's "Six Levels of Cognitive Complexity." The practical application of Bloom's Taxonomy is to evaluate students' thinking skills on these levels, from the simple to the complex: Knowledge (rote memory skills), Comprehension (the ability to relate or retell), Application (the ability to apply knowledge outside its origin), Analysis (relating and differentiating parts of a whole), Synthesis (relating parts to a whole), and Evaluation (making a judgment or formulating an opinion).

The AIMS Teaching Module is designed to facilitate these intellectual capabilities, AND to integrate classroom experiences and assimilation of learning with the students' life experiences, realities, and expectations. AIMS' learner verification studies prove that our AIMS Teaching Modules help students to absorb, retain, and to demonstrate ability to use new knowledge in their world. Our educational materials are written and designed for today's classroom, which incorporates a wide range of intellectual, cultural, physical, and emotional diversities.

ORGANIZATION AND MANAGEMENT

To facilitate ease in classroom manageability, the AIMS Teaching Module is organized in four sections. You are reading Section 1, Introduction to the Aims Teaching Module (ATM).

SECTION 2,

INTRODUCING THIS ATM
will give you the specific information you need to integrate the program into your classroom curriculum.

SECTION 3,

PREPARATION FOR VIEWING
provides suggestions and strategies for motivation, language preparedness, readiness, and focus prior to viewing the program with your students.

SECTION 4,

AFTER VIEWING THE PROGRAM
provides suggestions for additional activities plus an assortment of consumable assessment and extended activities, designed to broaden comprehension of the topic and to make connections to other curriculum content areas.

FEATURES

INTRODUCING EACH ATM

SECTION 2

Your AIMS Teaching Module is designed to accompany a video program written and produced by some of the world's most credible and creative writers and producers of educational programming. To facilitate diversity and flexibility in your classroom, your AIMS Teaching Module features these components:

Themes

The Major Theme tells how this AIMS Teaching Module is keyed into the curriculum. Related Themes offer suggestions for interaction with other curriculum content areas, enabling teachers to use the teaching module to incorporate the topic into a variety of learning areas.

Overview

The Overview provides a synopsis of content covered in the video program. Its purpose is to give you a summary of the subject matter and to enhance your introductory preparation.

Objectives

The ATM learning objectives provide guidelines for teachers to assess what learners can be expected to gain from each program. After completion of the AIMS Teaching Module, your students will be able to demonstrate dynamic and applied comprehension of the topic.

PREPARATION FOR VIEWING

SECTION 3

In preparation for viewing the video program, the AIMS Teaching Module offers activity and/or discussion ideas that you may use in any order or combination.

Introduction To The Program

Introduction to the Program is designed to enable students to recall or relate prior knowledge about the topic and to prepare them for what they are about to learn.

Introduction To Vocabulary

Introduction to Vocabulary is a review of language used in the program: words, phrases, usage. This vocabulary introduction is designed to ensure that all learners, including limited English proficiency learners, will have full understanding of the language usage in the content of the program.

Discussion Ideas

Discussion Ideas are designed to help you assess students' prior knowledge about the topic and to give students a preview of what they will learn. Active discussion stimulates interest in a subject and can motivate even the most reluctant learner. Listening, as well as speaking, is active participation. Encourage your students to participate at the rate they feel comfortable. Model sharing personal experiences when applicable, and model listening to students' ideas and opinions.

Focus

Help learners set a purpose for watching the program with Focus, designed to give students a focal point for comprehension continuity.

Jump Right In

Jump Right In provides abbreviated instructions for quick management of the program.

AFTER VIEWING THE PROGRAM

SECTION 4

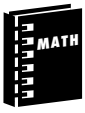
After your students have viewed the program, you may introduce any or all of these activities to interact with other curriculum content areas, provide reinforcement, assess comprehension skills, or provide hands-on and in-depth extended study of the topic.

SUGGESTED ACTIVITIES

The Suggested Activities offer ideas for activities you can direct in the classroom or have your students complete independently, in pairs, or in small work groups after they have viewed the program. To accommodate your range of classroom needs, the activities are organized into skills categories. Their labels will tell you how to identify each activity and help you correlate it into your classroom curriculum. To help you schedule your classroom lesson time, the AIMS hourglass gives you an estimate of the time each activity should require. Some of the activities fall into these categories:

Meeting Individual Needs

These activities are designed to aid in classroom continuity. Reluctant learners and learners acquiring English will benefit from these activities geared to enhance comprehension of language in order to fully grasp content meaning.



Curriculum Connections

Many of the suggested activities are intended to integrate the content of the ATM program into other content areas of the classroom curriculum. These cross-connections turn the classroom teaching experience into a whole learning experience.

Critical Thinking

Critical Thinking activities are designed to stimulate learners' own opinions and ideas. These activities require students to use the thinking process to discern fact from opinion, consider their own problems and formulate possible solutions, draw conclusions, discuss cause and effect, or combine what they already know with what they have learned to make inferences.

Cultural Diversity

Each AIMS Teaching Module has an activity called Cultural Awareness, Cultural Diversity, or Cultural Exchange that encourages students to share their backgrounds, cultures, heritage, or knowledge of other countries, customs, and language.

Hands On

These are experimental or tactile activities that relate directly to the material taught in the program.Your students will have opportunities to make discoveries and formulate ideas on their own, based on what they learn in this unit.

Writing

Every AIMS Teaching Module will contain an activity designed for students to use the writing process to express their ideas about what they have learned. The writing activity may also help them to make the connection between what they are learning in this unit and how it applies to other content areas.

In The Newsroom

Each AIMS Teaching Module contains a newsroom activity designed to help students make the relationship between what they learn in the classroom and how it applies in their world. The purpose of In The Newsroom is to actively involve each class member in a whole learning experience. Each student will have an opportunity to perform all of the tasks involved in production: writing, researching, producing, directing, and interviewing as they create their own classroom news program.

Extended Activities

These activities provide opportunities for students to work separately or together to conduct further research, explore answers to their own questions, or apply what they have learned to other media or content areas.

Link to the World

These activities offer ideas for connecting learners' classroom activities to their community and the rest of the world.

Culminating Activity

To wrap up the unit, AIMS Teaching Modules offer suggestions for ways to reinforce what students have learned and how they can use their new knowledge to enhance their world view.

VOCABULARY

Every ATM contains an activity that reinforces the meaning and usage of the vocabulary words introduced in the program content. Students will either read or find the definition of each vocabulary word, then use the word in a written sentence.

CHECKING COMPREHENSION

Checking Comprehension is designed to help you evaluate how well your students understand, retain, and recall the information presented in the AIMS Teaching Module. Depending on your students' needs, you may direct this activity to the whole group yourself, or you may want to have students work on the activity page independently, in pairs, or in small groups. Students can verify their written answers through discussion or by viewing the video a second time. If you choose, you can reproduce the answers from your Answer Key or write the answer choices in a Word Bank for students to use. Students can use this completed activity as a study guide to prepare for the test.

CONSUMABLE ACTIVITIES

The AIMS Teaching Module provides a selection of consumable activities, designed to specifically reinforce the content of this learning unit. Whenever applicable, they are arranged in order from low to high difficulty level, to allow a seamless facilitation of the learning process. You may choose to have students take these activities home or to work on them in the classroom independently, in pairs or in small groups.

CHECKING VOCABULARY

The Checking Vocabulary activity provides the opportunity for students to assess their knowledge of new vocabulary with this word game or puzzle. The format of this vocabulary activity allows students to use the related words and phrases in a different context.

TEST

The AIMS Teaching Module Test permits you to assess students' understanding of what they have learned. The test is formatted in one of several standard test formats to give your students a range of experiences in test-taking techniques. Be sure to read, or remind students to read, the directions carefully and to read each answer choice before making a selection. Use the Answer Key to check their answers.

ADDITIONAL AIMS MULTIMEDIA PROGRAMS

After you have completed this AIMS Teaching Module you may be interested in more of the programs that AIMS offers. This list includes several related AIMS programs.

ADDITIONAL READING SUGGESTIONS

AIMS offers a carefully researched list of other resources that you and your students may find rewarding.

ANSWER KEY

Reproduces tests and work pages with answers marked.

Real World Science: Magnetism

THEMES

Real World Science: Magnetism explores the various properties of magnets, including the principles of attraction and repulsion. Viewers learn how to make simple magnets and how to use them. In addition, the program explains how the Earth is like a huge magnet, with poles at each end. The concepts of magnetization and electromagnetism are also discussed.

OVERVIEW

The Greeks first discovered magnets when they realized that magnetite attracted materials that contained iron. All magnets have a north pole and a south pole. When placed together, like poles will repel one another, while opposite poles attract. The geographic poles are at the top and bottom of the Earth. As electrons spin around the nucleus of an atom, they create a magnetic field. Materials with strong magnetic properties are called ferromagnetic. If we rub an ordinary nail with one end of a magnet, we can magnetize the nail. The nail will become a temporary magnet, which means it will lose its magnetism easily. We can also use an electric current to produce a magnetic field. This is called electromagnetism.

OBJECTIVES

- To study our discovery and understanding of magnetism.
- To explore how magnets can be used in many ways.
- To learn about the attracting and repelling properties of magnets.
- To understand how the Earth is like a magnet.
- To identify magnetic materials.
- To learn how to create simple magnets.
- To better understand electromagnetism.

Use this page for your individual notes about planning and/or effective ways to manage this AIMS Teaching Module in your classroom.

Our AIMS Multimedia Educational Department welcomes your observations and comments. Please feel free to address your correspondence to:

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Chatsworth, California 91311-4409

INTRODUCTION TO THE PROGRAM

Magnets can be found in many objects that we use everyday. They are found in objects made by humans, as well as in natural materials. In fact, the mineral magnetite was found to have magnetic properties long before humans learned how to create magnets using magnetization. By viewing the video and discussing the concepts presented, students will have a better understanding of magnets and their uses in our world.

INTRODUCTION TO VOCABULARY

Before starting the program, write the following words on the board. Ask the class to discuss the meaning of each word, and review the terms that are unfamiliar to students.

repel - to move away from one another

attract - to move toward one another

poles - opposite ends of a magnet

FOCUS

Magnets are found in many of the appliances and machines we use. They are also used to help us create electricity. Without magnets, our lives would be very different. Ask students to keep this in mind as they begin the unit.

DISCUSSION IDEAS

Ask students to think about what they know about magnets. What does a simple magnet do? What kinds of materials does it attract? Does a magnet attract more material to its middle or to its ends? Two things can happen when magnets are placed near each other. What are they? (Magnets attract metal objects, such as iron and steel. A magnet attracts more material at its ends or poles. If two magnets are placed with the same poles together, they will repel each other. If they are placed with opposite poles together, they will attract each other.)

JUMP RIGHT IN

HOW TO USE THE *REAL WORLD SCIENCE: MAGNETISM* AIMS TEACHING MODULE

Preparation

- Read *Real World Science: Magnetism* **Themes, Overview,** and **Objectives** to become familiar with program content and expectations.
- Use **Preparation for Viewing** suggestions to introduce the topic to students.

Viewing *REAL WORLD SCIENCE: MAGNETISM*

- Set up viewing monitor so that all students have a clear view.
- Depending on your classroom size and learning range, you may choose to have students view *Real World Science: Magnetism* together or in small groups.
- Some students may benefit from viewing the video more than one time.

After Viewing *REAL WORLD SCIENCE: MAGNETISM*

- Select **Suggested Activities** that integrate into your classroom curriculum. If applicable, gather materials or resources.
- Choose the best way for students to work on each activity. Some activities work best for the whole group. Other activities are designed for students to work independently, in pairs, or in small groups. Whenever possible, encourage students to share their work with the rest of the group.
- Duplicate the appropriate number of **Vocabulary, Checking Comprehension**, and consumable activity pages for your students.
- You may choose to have students take consumable activities home, or complete them in the classroom, independently, or in groups.
- Administer the Test to assess students' comprehension of what they have learned, and to provide them with practice in test-taking procedures.
- Use the **Culminating Activity** as a forum for students to display, summarize, extend, or share what they have learned with each other, the rest of the school, or a local community organization.

SUGGESTED ACTIVITIES

Hands On

Ask students to use a magnet to test the magnetic properties of the following items. Encourage them to keep careful notes of which objects are attracted by the magnet and which are not.

When they are finished, ask them to look closely at the objects that were attracted by the magnet. What do they have in common? Do they have similar weights, colors or forms? What are they made of? (The objects attracted by the magnet will be made of various metals, such as steel and iron.)

sewing needle	(attraction)
pencil	(no attraction)
eraser	(no attraction)
plastic comb	(no attraction)
copper wire	(attraction)
paper	(no attraction)
thumbtack	(attraction)
paper clip	(attraction)
rubber ball	(no attraction)
cloth	(no attraction)
toothpick	(no attraction)

Meeting Individual Needs

Ask students to make sentences using the following words. Encourage them to use a dictionary if they are unsure of the meanings. Make sure that their sentences display an understanding of the words as they relate to the program.

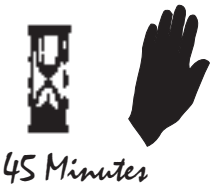
- compass - device that has a magnetic needle that always points due north
- electromagnet - magnet that only works while electricity is flowing through it
- magnetize - to turn an object into a magnet
- ferromagnetic - material that is strongly attracted to a magnet and can easily keep a magnetic charge
- induce - to create; for example, to *induce* a magnetic force
- magnetite - mineral that is naturally magnetic
- solenoid - a coil of wire that produces a magnetic field when electricity is passed through it

Critical Thinking

An audio tape works because of magnets, but magnets can also ruin audio tapes if they get too close to them. An audio tape is really a plastic ribbon coated with a layer of metal powder. When we record sounds onto the tape, the metal particles are magnetized by an electromagnet in the recording head. The magnetic pattern on the tape is a code that can be turned back into sound. Why might a magnet ruin the sounds recorded onto an audio tape? (The magnet can change the pattern of the metal particles, and therefore, change the resulting sounds.)

A compass uses a small magnetized needle to help us find directions. What might happen if a powerful magnet got too close to a compass? (The powerful magnet could demagnetize the compass needle.)

Hands On

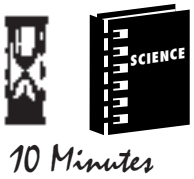


Magnets are invisible, but we can see their forces by using iron filings. Allow the class to work with iron filings and two small bar magnets. First, have them place the bar magnets with like poles facing each other. Next, the students should place a sheet of paper over the bar magnets and sprinkle iron filings on the sheet. What happens? (Filings will gather around each end of the magnets, but there will be few filings between the magnets.)

Have them repeat the experiment by placing the magnets with opposite poles facing each other. What happens to the filings now? (Filings will collect in a thick pattern between the opposite poles.)

What could be the explanation? (More filings gather at the ends of the magnets because magnetic force is strongest at the poles. When like poles are placed next to one another, the iron filings, which are magnetized, are pushed apart by the magnetic field. When opposite poles are placed next to one another, the filings are drawn together by the magnetic field.)

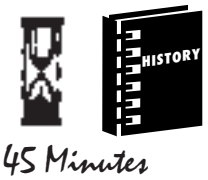
Connection to Science



The strength of a magnetic field is measured in units called gauss. The earth's magnetic field is about 1/2 gauss. A small bar magnet can produce a field that is 200 gauss. Electromagnets are the most powerful magnets of all. They can produce fields that are 30,000 gauss.

Ask students to use an encyclopedia to find out who the gauss is named for. What was this person's contribution to the study of magnetism? (The gauss named was for Karl Friedrich Gauss. He was a German scientist and mathematician who did important work in electromagnetism.)

Connection to History



Many scientists contributed to our understanding of magnetism and electromagnetism. Ask students to investigate the contributions of each scientist listed below. Encourage them to summarize the main discovery or invention of each scientist in a few sentences.

Thales of Miletus - He worked to understand why amber that had been rubbed with wool attracted small pieces of paper.

William Gilbert - He was an English physician who discovered the Earth's magnetism. He also was able to explain magnetism's use in a simple compass.

Hans Christian Oersted - He discovered that electricity can create a magnetic field.

Andre Marie Ampere - He developed the electric generator by understanding how electric current is related to magnetism.

William Sturgeon - He created the first electromagnet.

Extended Activity

Scientists believe that magnetite, the mineral that the Ancient Greeks discovered to be magnetic, was formed deep in the Earth. It started as a molten (liquid) metal that was mostly made of iron. Ask students if they can guess why the magnetite gained magnetic properties. Tell them to keep two things in mind: the Earth's natural magnetic field and the presence in all magnets of atoms lined up in the same direction.

(In its molten form, the magnetite's atoms lined up according the Earth's natural magnetic field. As the molten liquid cooled, the atoms locked in the same direction. As a result, the mineral was magnetized.)

Culminating Activity

Ask students to go through their homes making a list of the things that use magnets. Remind them to include appliances, video and audio recorders, televisions, radios, door bells, telephones and other small machines. When they are finished, ask them to choose one of the items on the list. Have them write a paragraph describing what life would be like without the item. How would their lives be more difficult? Encourage class members to share their paragraphs with one another.

Name

VOCABULARY

The following terms are from *Real World Science: Magnetism*. Fill in the number of each term next to its closest definition.

1. magnetite
2. horseshoe
3. repel
4. attract
5. magnetic field
6. poles
7. compass
8. electromagnetism
9. solenoid
10. sun spots

___ move toward one another

___ magnetic force that surrounds a magnet

___ each end of a magnet; where magnetic force is the strongest

___ device with a magnetic needle that always points to the Earth's north pole

___ mineral discovered by Greeks that attracted materials containing iron

___ move away from one another

___ the relationship between electricity and magnets

___ coiled wire that carries an electric current with a magnetic field

___ type of magnet that has a bend in the middle

___ dark areas where the magnetic field has broken through the corona

Name

CHECKING COMPREHENSION

Read the following sentences and circle the letter of the word that best fills each blank.

The Greeks first discovered magnets when they realized that magnetite attracted materials that contained ___1___ . All magnets have ___2___ poles. When placed together, like poles will ___3___ one another, while opposite poles ___4___ . The geographic poles are at the top and bottom of the ___5___ . As ___6___ spin around the nucleus of an atom, they create a magnetic field. Materials with strong magnetic properties are called ___7___ . If we rub an ordinary nail with one end of a magnet, we can ___8___ the nail. The nail will become a ___9___ magnet, which means it will lose its magnetism easily. We can also use an electric current to produce a magnetic field. This is called ___10___ .

1. A. wood
   B. atoms
   C. iron
   D. electricity

2. A. positive and negative
   B. north and south
   C. left and right
   D. active and inactive

3. A. repel
   B. magnetize
   C. polarize
   D. attract

4. A. electrify
   B. attract
   C. demagnetize
   D. repel

5. A. horseshoe magnet
   B. bar magnet
   C. galaxy
   (D.) Earth

6. A. protons
   B. molecules
   C. electrons
   D. tiny magnets

7. A. ferromagnetic
   B. soluble
   C. ionic
   D. polar

8. A. heat
   B. magnetize
   C. electrify
   D. dissolve

9. A. temporary
   B. permanent
   C. current
   D. solenoid

10. A. conduction
    B. electromagnetism
    C. polarization
    D. atomic magnetism

Name

REVIEW QUESTIONS

1. Where does the word "magnet" come from?

2. Name three things at home that contain magnets.

3. What can be done to weaken a magnet?

4. When electric current is turned off, an electromagnet loses its magnetic field. How does this make electromagnets useful?

5. What kinds of objects are easiest to magnetize? Why?

6. How is the Earth like a giant magnet?

Name

TRUE OR FALSE

Place a T next to statements that are true and an F next to statements that are false.

1. ___ All magnets have a horseshoe shape.
2. ___ Like magnetic poles move away from one another.
3. ___ Magnetic forces are strongest in the center of a magnet.
4. ___ Magnetic fields are found on planets throughout our galaxy.
5. ___ The corona, or outermost layer of the sun, traces the sun's magnetic field.
6. ___ Spinning protons give each atom a tiny magnetic field.
7. ___ Ferromagnetic material shows strong magnetic properties.
8. ___ All metals can be easily turned into permanent magnets.
9. ___ A magnet cut in half will lose all of its magnetic properties.
10. ___ An electromagnet loses its magnetism when the electric current is turned off.

Name _____

NUMBER CODE

A = 1	H = 8	P = 15
B = 2	I = 9	R = 16
C = 3	K = 10	S = 17
D = 4	L = 11	T = 18
E = 5	M = 12	U = 19
F = 6	N = 13	V = 20
G = 7	O = 14	W = 21

1. 4-9-17-10 magnets are used in the speakers of radios and televisions.

   _____

2. A permanent magnet is usually made from 8-1-16-4 metals, like iron and steel.

   _____

3. Small 8-14-16-17-5-17-8-14-5 magnets are used in radar machines.

   _____

4. During the Middle Ages, people thought that magnets had 12-1-7-9-3-1-11 powers.

   _____

5. Magnets are used to keep cabinets and refrigerator doors 3-11-14-17-5-4.

   _____

6. The 3-14-12-15-1-17-17 made it possible for navigators to explore unknown worlds.

   _____

7. Even the most powerful magnetic field is 9-13-20-9-17-9-2-11-5 to the human eye.

   _____

8. There are two types of magnets: 13-1-18-19-16-1-11 magnets, like lodestone, and 1-16-18-9-6-9-3-9-1-11 magnets, which are made by people.

   _____

_____

Name

MAGNETISM PUZZLE

M_____ The force created by a magnet is known as a _____ field.

A_____ Spinning electrons make each _____ like a tiny magnet.

G_____ The Ancient _____ discovered the first natural magnets.

N_____ A compass needle always points to the _____ pole.

E_____ _____ can be used to create a magnet using electricity.

T_____ A _____ magnet gains and loses magnetism very easily.

I_____ Materials containing _____ have strong magnetic properties.

S_____ A _____ is created with a coiled wire and electricity.

M_____ A permanent _____ keeps its magnetism for a long time.

Name

WORD SEARCH

The following words can be found in the maze below. The letters may be arranged horizontally, vertically, diagonally or backward.

magnetism
attract
repel
corona
compass
ferromagnetic
demagnetize
solenoid
electromagnet
poles

D C L J L M Q P R M B L K
E L E C T R O M A G N E T
M A T T R A C T C B E R M
A A L G E G Y O R L A T A
G S S A P M O C R T R D G
N O C P E Z Q Z M O L W N
E B P O L E S G M H N B E
T N Q N Q C Y H M A L A T
I S O L E N O I D S E S I
Z H B G C B X D A W B L S
E P N H N W D M T E S V M
F E R R O M A G N E T I C

Name

TEST

Circle the phrase which best answers each question.

1. Magnetic objects easily attract materials that contain:

   - wood.
   - plastic.
   - water.
   - iron.

2. A magnet has the strongest magnetic force at:

   - the center.
   - the north pole.
   - the south pole.
   - both poles.

3. The Earth's magnetic north and south poles are:

   - the same as the geographic North and South Poles.
   - different from the geographic North and South Poles.
   - areas with very little magnetic force.
   - slowly becoming weaker.

4. A compass helps people:

   - produce electricity.
   - navigate.
   - operate appliances.
   - create atomic energy.

5. The sun's magnetic field extends far above its outermost layer, which is called the:

   - stratosphere.
   - pole.
   - corona.
   - ionosphere.

Name

TEST (CONTINUED)

6. The atomic particle that creates magnetism is the:

   - proton.
   - neutron.
   - ion.
   - electron.

7. Materials that have atoms lined up in the same direction have a strong magnetic:

   - solubility.
   - domain.
   - current.
   - resistance.

8. A coiled wire carrying an electric current that has a magnetic field is called a:

   - reverse magnet.
   - polar magnet.
   - colloid.
   - solenoid.

9. Electromagnets lose their electricity when the electric current is:

   - turned on.
   - turned off.
   - increased.
   - none of the above

10. Moving a wire through a magnetic field _____ a current.

    - slows
    - creates
    - terminates
    - branches

ADDITIONAL AIMS MULTIMEDIA PROGRAMS

You and your students might also enjoy these other AIMS Multimedia programs:

2569-EN-VID-NR: "Real World Science: Matter: Solids, Liquids, and Gases"
2570-EN-VID-NR: "Real World Science: Electricity"
2571-EN-VID-NR: "Real World Science: The Scientific Method"
2287-EN-VID-NR: "Real World Science: Rocks and Minerals"
2290-EN-VID-NR: "Real World Science: Dinosaurs"

ANSWER KEY for page 18

VOCABULARY

The following terms are from *Real World Science: Magnetism*. Fill in the number of each term next to its closest definition.

1. magnetite
2. horseshoe
3. repel
4. attract
5. magnetic field
6. poles
7. compass
8. electromagnetism
9. solenoid
10. sun spots

4 move toward one another

5 magnetic force that surrounds a magnet

6 each end of a magnet; where magnetic force is the strongest

7 device with a magnetic needle that always points to the Earth's north pole

1 mineral discovered by Greeks that attracted materials containing iron

3 move away from one another

8 the relationship between electricity and magnets

9 coiled wire that carries an electric current with a magnetic field

2 type of magnet that has a bend in the middle

10 dark areas where the magnetic field has broken through the corona

ANSWER KEY for page 19

CHECKING COMPREHENSION

Read the following sentences and circle the letter of the word that best fills each blank.

The Greeks first discovered magnets when they realized that magnetite attracted materials that contained ___1___ . All magnets have ___2___ poles. When placed together, like poles will ___3___ one another, while opposite poles ___4___ . The geographic poles are at the top and bottom of the ___5___ . As ___6___ spin around the nucleus of an atom, they create a magnetic field. Materials with strong magnetic properties are called ___7___ . If we rub an ordinary nail with one end of a magnet, we can ___8___ the nail. The nail will become a ___9___ magnet, which means it will lose its magnetism easily. We can also use an electric current to produce a magnetic field. This is called ___10___ .

1. A. wood
   B. atoms
   (C.) iron
   D. electricity

2. (A.) positive and negative
   B. north and south
   C. left and right
   D. active and inactive

3. (A.) repel
   B. magnetize
   C. polarize
   D. attract

4. A. electrify
   (B.) attract
   C. demagnetize
   D. repel

5. A. horseshoe magnet
   B. bar magnet
   C. galaxy
   D. Earth

6. A. protons
   B. molecules
   (C.) electrons
   D. tiny magnets

7. (A.) ferromagnetic
   B. soluble
   C. ionic
   D. polar

8. A. heat
   (B.) magnetize
   C. electrify
   D. dissolve

9. (A.) temporary
   B. permanent
   C. current
   D. solenoid

10. A. conduction
    (B.) electromagnetism
    C. polarization
    D. atomic magnetism

ANSWER KEY for page 20

REVIEW QUESTIONS

1. Where does the word "magnet" come from? **The Ancient Greeks discovered rocks that contained the mineral magnetite. The mineral attracted materials that contained iron. Magnetite and magnet both come from the Greek word for the mysterious mineral, *magnesia*.**

2. Name three things at home that contain magnets. **Magnets are found in many items, including omputers, tape recorders, videocassette recorders, televisions, compact disc players, compasses and computers.**

3. What can be done to weaken a magnet? **The magnetic field of an object can be weakened if the object is dropped, hit or struck with an object, or heated. This is called demagnetization.**

4. When electric current is turned off, an electromagnet loses its magnetic field. How does this make electromagnets useful? **Electromagnets are used in many devices with electric motors, such as electric mixers and power drills. When the switch is turned off, the device stops running.**

5. What kinds of objects are easiest to magnetize? Why? **Ferromagnetic objects are easiest to magnetize. That's because they contain materials like iron that have atoms lined up in the same direction.**

6. How is the Earth like a giant magnet? **The Earth is surrounded by magnetic lines of force. The Earth also has a magnetic north and south pole. These poles are different than the areas we know as the geographic North and South Poles.**

ANSWER KEY for page 21

TRUE OR FALSE

Place a T next to statements that are true and an F next to statements that are false.

1. **F** All magnets have a horseshoe shape.
2. **T** Like magnetic poles move away from one another.
3. **F** Magnetic forces are strongest in the center of a magnet.
4. **T** Magnetic fields are found on planets throughout our galaxy.
5. **T** The corona, or outermost layer of the sun, traces the sun's magnetic field.
6. **F** Spinning protons give each atom a tiny magnetic field.
7. **T** Ferromagnetic material shows strong magnetic properties.
8. **F** All metals can be easily turned into permanent magnets.
9. **F** A magnet cut in half will lose all of its magnetic properties.
10. **T** An electromagnet loses its magnetism when the electric current is turned off.

ANSWER KEY for page 22

NUMBER CODE

A = 1	H = 8	P = 15
B = 2	I = 9	R = 16
C = 3	K = 10	S = 17
D = 4	L = 11	T = 18
E = 5	M = 12	U = 19
F = 6	N = 13	V = 20
G = 7	O = 14	W = 21

1. 4-9-17-10 magnets are used in the speakers of radios and televisions.

   Disk

2. A permanent magnet is usually made from 8-1-16-4 metals, like iron and steel.

   hard

3. Small 8-14-16-17-5-17-8-14-5 magnets are used in radar machines.

   horseshoe

4. During the Middle Ages, people thought that magnets had 12-1-7-9-3-1-11 powers.

   magical

5. Magnets are used to keep cabinets and refrigerator doors 3-11-14-17-5-4.

   closed

6. The 3-14-12-15-1-17-17 made it possible for navigators to explore unknown worlds.

   compass

7. Even the most powerful magnetic field is 9-13-20-9-17-9-2-11-5 to the human eye.

   invisible

8. There are two types of magnets: 13-1-18-19-16-1-11 magnets, like lodestone, and 1-16-18-9-6-9-3-9-1-11 magnets, which are made by people.

   natural, artificial

ANSWER KEY for page 23

MAGNETISM PUZZLE

M**agnetic field** The force created by a magnet is known as a _____ field.

A**tom** Spinning electrons make each _____ like a tiny magnet.

G**reeks** The Ancient _____ discovered the first natural magnets.

N**orth** A compass needle always points to the _____ pole.

E**lectromagnetism** _____ can be used to create a magnet using electricity.

T**emporary** A _____ magnet gains and loses magnetism very easily.

I**ron** Materials containing _____ have strong magnetic properties.

S**olenoid** A _____ is created with a coiled wire and electricity.

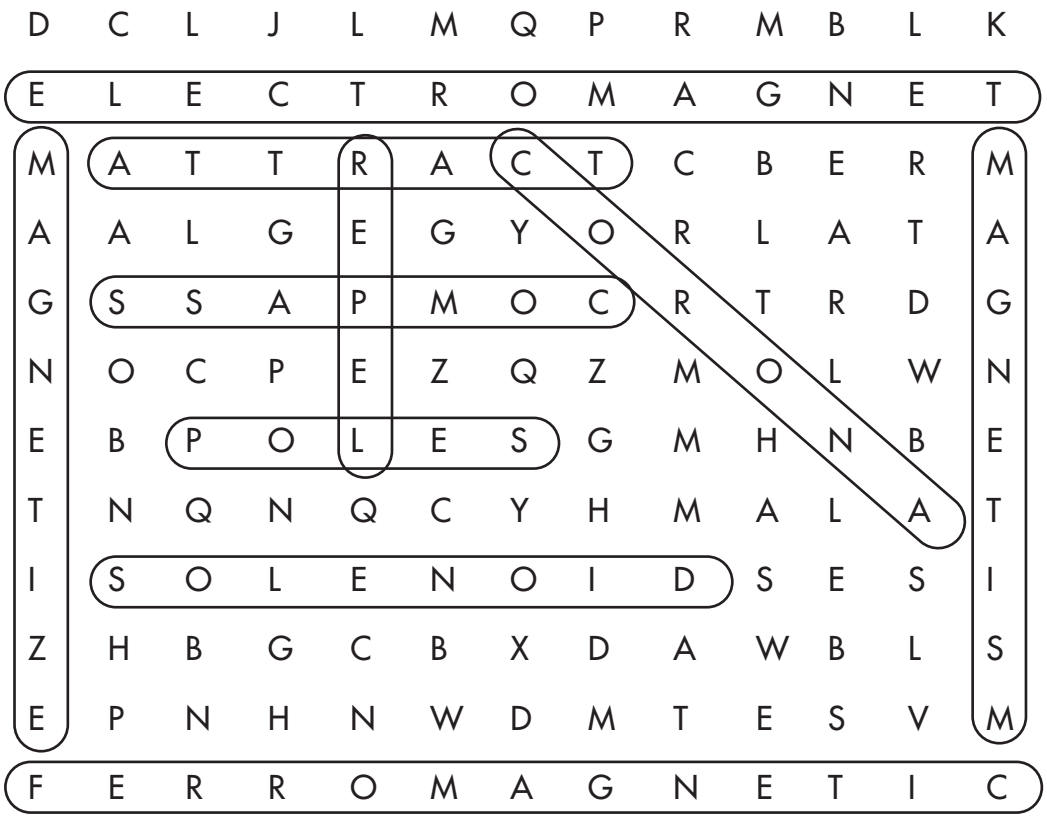
M**agnet** A permanent _____ keeps its magnetism for a long time.

ANSWER KEY for page 24

WORD SEARCH

The following words can be found in the maze below. The letters may be arranged horizontally, vertically, diagonally or backward.

magnetism
attract
repel
corona
compass
ferromagnetic
demagnetize
solenoid
electromagnet
poles



ANSWER KEY for page 25

TEST

Circle the phrase which best answers each question.

1. Magnetic objects easily attract materials that contain:

   - wood.
   - plastic.
   - water.
   - **iron.**

2. A magnet has the strongest magnetic force at:

   - the center.
   - the north pole.
   - the south pole.
   - **both poles.**

3. The Earth's magnetic north and south poles are:

   - the same as the geographic North and South Poles.
   - **different from the geographic North and South Poles.**
   - areas with very little magnetic force.
   - slowly becoming weaker.

4. A compass helps people:

   - produce electricity.
   - **navigate.**
   - operate appliances.
   - create atomic energy.

5. The sun's magnetic field extends far above its outermost layer, which is called the:

   - stratosphere.
   - pole.
   - **corona.**
   - ionosphere.

ANSWER KEY for page 26

TEST (CONTINUED)

6. The atomic particle that creates magnetism is the:

   - proton.
   - neutron.
   - ion.
   - (electron.)

7. Materials that have atoms lined up in the same direction have a strong magnetic:

   - solubility.
   - (domain.)
   - current.
   - resistance.

8. A coiled wire carrying an electric current that has a magnetic field is called a:

   - reverse magnet.
   - polar magnet.
   - colloid.
   - (solenoid.)

9. Electromagnets lose their electricity when the electric current is:

   - turned on.
   - (turned off.)
   - increased.
   - none of the above

10. Moving a wire through a magnetic field _____ a current.

    - slows
    - (creates)
    - terminates
    - branches