# Real World Science: Electricity


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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**

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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

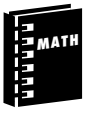
After your students have viewed the program, you may introduce any or all of these activities to interact with other curriculum content areas, provide reinforcement, assess comprehension skills, or provide hands-on and in-depth extended study of the topic.

## 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: Electricity

## THEMES

*Real World Science: Electricity* explores the characteristics of two type of electricity: static electricity and current electricity. It discusses the various types of electrical circuits that exist, and it explains the uses of conductors and insulators. The relationship between magnets and electricity is also explored.

## OVERVIEW

We use electricity to run many of the things in our homes. Electricity is an energy form that has existed on the earth for many years. Static electricity is produced when two objects rub together. Current electricity moves in a stream or path called a circuit. The path must contain an energy source, such as a battery. It also needs a load, like a light bulb. Materials through which electricity easily flows are called conductors. The force needed to drive electricity and get the electrons moving is called electromotive force. The amount of force an energy source pushes out can be measured in volts. The rate at which electricity travels is measured in amps. In the program, students will explore these facts and more, as well as learning about the primary uses of electricity.

## OBJECTIVES

- To identify objects that use electricity
- To distinguish between static and current electricity
- To list the components of a circuit
- To compare a single circuit to a series circuit and a parallel circuit
- To talk about the relationship between magnets and electricity

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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## INTRODUCTION TO THE PROGRAM

Electricity affects our lives in many ways. However, because electricity is virtually unseen, it is often difficult to understand where it comes from and how it works. After watching *Real World Science: Electricity*, students will have a better understand of electricity and electromagnetism. They will understand the differences between static electricity and current electricity. In addition, students will discover how raw electric energy arrives in our homes and powers many of the machines we use.

## 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.

**friction** - rubbing together of two objects

**static** - not moving

**repel** - move away from one another

**circuit** - path or route

## DISCUSSION IDEAS

Electricity makes our lives much easier. It helps to light and heat our homes. It powers the machines that help us to cook food and to keep things clean. Electricity also powers many of the things that entertain us, like televisions and radios. Ask students to discuss some ways in which life would be different without electricity.

## FOCUS

Over the last hundred years, electricity has changed the world dramatically. From communication to transportation, it has made many jobs and tasks faster and easier. Electricity has also presented problems. Ask students to consider electricity's impact on the modern world, in both positive and negative ways.

# JUMP RIGHT IN

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

### Preparation

- Read *Real World Science: Electricity* **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: ELECTRICITY*

- 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: Electricity* together or in small groups.
- Some students may benefit from viewing the video more than one time.

### After Viewing *REAL WORLD SCIENCE: ELECTRICITY*

- 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

### Writing

60 Minutes

Electricity was first discovered by the Greeks during ancient times. However, it wasn't until the 1600s that scientists began to understand how electricity really worked. Over the next few centuries, physicists, chemists, inventors and other scientists learned a great deal about electricity. Ask students to choose a person from the list below. Have each student write a one-page summary of their chosen person's contributions to the understanding of electricity. Encourage students to use library books and encyclopedia articles to learn more about their chosen topics.

Andre Marie Ampere
Charles Du Fay
Benjamin Franklin
Charles Augustin de Coulomb
Michael Faraday
Luigi Galvani
Lord Kelvin
Georg Ohm
Count Alessandro Volta

### Meeting Individual Needs

30 Minutes

Ask students to summarize the basic principles of static electricity and current electricity. Encourage them to put their facts into paragraph form.

Make sure students mention the following principles of static electricity:

- Static electricity is produced when two objects move against one another.
- If one of the objects loses an electron, it gets a positive charge.
- If one of the objects gains an electron, it gets a negative charge.
- Static electricity always stays where it is made or makes a small jump.
- Materials with opposite charges attract one another.
- If the attraction is strong, a spark can be created.
- Lightening is a form of static electricity.

Make sure students mention the following principles of current electricity:

- Current electricity is used in our homes to power lights and appliances.
- It travels through a complete path, or a circuit.
- Every circuit needs an energy source, a load and a conductor.
- Metals are good conductors of current electricity.
- Insulators are materials that do not conduct electricity well.
- Electromotive force is needed to drive the current.

**Connection to Language Arts**

20 Minutes

Ask students if the names Andre Marie Ampere, Count Alessandro Volta and Georg Simon Ohm sound familiar. Encourage them to use library resources to discover each man's contribution to the study of electricity.

(Andre Marie Ampere made discoveries that paved the way for the development of the electric motor and generator. He studied the way currents flow through wires. He also formulated many laws about magnetic forces generated by electric currents. The name ampere was chosen to honor the scientist and his work in the study of electricity.

Count Volta invented the world's first electric battery, which he called a voltaic pile. He also laid the foundations for an area of science known as electrochemistry. The volt was named in his honor.

Georg Simon Ohm developed Ohm's Law, a mathematical theory that deals with electricity and its resistance to certain materials. The ohm, a unit that measures electrical resistance, was named for him.)

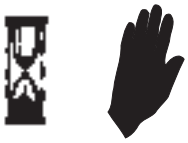
**Critical Thinking**


10 Minutes

Water is a good conductor of electricity. If our hands get wet, it is important to dry them thoroughly before we use electrical products. Ask students to consider why this is so important. What is the connection between water and electricity? Do they think water is a conductor of electricity, or an insulator? Ask them to explain their answers.

(Water is an excellent conductor of electricity. In fact, it carries electricity so well, even a low-voltage dose can be very dangerous to someone whose hands or feet are wet.)

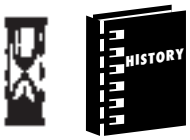
**Hands On**


10 Minutes

To help students understand static electricity, bring a plastic comb and a wool sweater to class. Rub the comb against a wool sweater, then place the comb near small pieces of paper. What happens? Can students guess why?

Explain to them that the comb gains electrons from the sweater. What kind of charge does that give the comb? Do they think the paper has a positive, negative or neutral charge? (The comb gets a negative charge when it gains electrons. Like most materials, the paper has a neutral charge.)

**Connection to History**

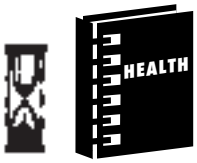


15 Minutes

Benjamin Franklin was one of the first scientists to experiment with electricity. His "kite and key" experiment is one of the most famous. It took place in Philadelphia in 1752. Franklin flew a kite during a thunderstorm. Lightening struck the kite and traveled down to a key that was tied to the kite's rope. The lightening produced a spark, proving that lightening was a form of electricity. Later, Franklin developed the first lightening rod.

Ask students if they know what a lightening rod does. How does it work? (Lightening rods are made of materials that make good conductors of electricity. Lightening charges are attracted to the rods. When they strike the rods, the electricity from the lightening is carried safely to the ground. This prevents buildings from being damaged and people from being injured.)

**Connection to Health**



10 Minutes

Electricity can be very dangerous. There are several things to remember when handling electrical appliances.

Remind students that most electrical wires are covered with an insulating material, like plastic. Do they know the reason? (The wires keep the electricity from touching our hands. Electric wires that are damaged or split open can cause serious electrical shock. We should never use an electrical product with a damaged cord.)

Electric wires on poles or towers are usually not covered. What could be the reason? What should we do if we see a wire knocked down by a storm? (The wires are not covered because they are high and cannot be touched easily. A fallen wire is very dangerous. We should always stay far away from electric wires or power lines.)

**Culminating Activity**


60 Minutes

Ask students to go through their homes, room by room, making a list of the things that use electricity. Remind them to include machines used for entertainment, heating, cooling and cleaning. When they are finished, ask them to choose one of the items on the list. Have them write a paragraph describing what kind of work they would have to do without the item. In other words, without electricity, 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: Electricity*. Fill in the number of each term next to its closest definition.

1. static electricity
2. current electricity
3. friction
4. circuit
5. conductor
6. insulator
7. volt
8. ampere
9. ohm
10. electromotive force

___ material that does not conduct electricity well

___ unit that measures the amount of force an energy source, such as a battery, pushes out

___ kind of energy that stays where it is made or makes a small jump

___ path that electrons move along to produce electricity

___ any material through which electricity can easily flow

___ force needed to drive a current and get the electrons moving

___ kind of energy that moves in a stream

___ unit that measures the rate at which an electric current flows

___ unit that measures the resistance of a material to an electrical current

___ rubbing of two objects together

Name

## CHECKING COMPREHENSION

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

Electricity is ___1___ form that has existed on the earth for many years. Static electricity is produced when two objects ___2___ . Current electricity moves in a stream or path called a ___3___ . The path must contain an energy source, such as a ___4___ . It also needs a ___5___ , like a light bulb. Materials through which electricity easily flows are called ___6___ . A path that powers more than one device at a time, even if some of the devices are not working, is called a ___7___ circuit. The force needed to drive electricity and get the electrons moving is called ___8___ force. The amount of force an energy source pushes out can be measured in ___9___ . The rate at which electricity ___10___ is measured in amps.

1. A. a material
   B. a chemical
   C. an energy
   D. an insulator

2. A. repel each other
   B. exchange protons
   C. give up or lose electrons
   D. both A and C

3. A. circuit
   B. solvent
   C. magnet
   D. load

4. A. bell
   B. switch
   C. wire
   D. battery

5. A. load
   B. conductor
   C. cell
   D. terminal

6. A. insulators
   B. conductors
   C. magnets
   D. amperes

7. A. parallel
   B. single
   C. wire
   D. substation

8. A. electromotive
   B. static
   C. chemical
   D. resistance

9. A. volts
   B. amps
   C. ohms
   D. EKGs

10. A. stops
    B. flows
    C. resists a conductor
    D. produces static

Name

## TERM LINK

Write the letter of each term next to the group of words which best describes it.

A. lightening
B. electrocardiogram
C. electron
D. amber
E. static
F. proton
G. repel
H. load
I. switch
J. dry cell

___ describes something that is not moving

___ positive particle found in an atom

___ to move away from each other

___ substance that the Greeks used to conduct electricity experiments

___ machine that records the small electrical pulses in our hearts

___ output device such as a bell or light bulb

___ kind of static electricity that occurs in clouds or between a cloud and the earth

___ type of control device that opens and closes a circuit

___ type of battery that uses a chemical paste to make electricity

___ tiny, negatively charged particle found in an atom; when a material gains or loses the particle, an electrical charge is formed

Name

## TRUE OR FALSE

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

1. ___ Electricity was invented by scientists in the early 1600s.
2. ___ The word electricity comes from *electron*, the Greek word for amber.
3. ___ Static electricity moves along a current or circuit.
4. ___ When a material loses an electron, it becomes positively charged.
5. ___ Materials with the same electrical charge repel each other.
6. ___ Wood and glass are good conductors of electricity.
7. ___ In a single circuit, all components are connected in one continuous loop.
8. ___ A volt measures the amount of force a battery pushes out.
9. ___ Ohms measure the rate at which electricity flows.
10. ___ Many materials put up no resistance to electricity.

Name

## NUMBER CODE

| | | |
|---|---|---|
| A = 1 | I = 7 | S = 13 |
| C = 2 | L = 8 | T = 14 |
| E = 3 | M = 9 | U = 15 |
| F = 4 | O = 10 | W = 16 |
| G = 5 | P = 11 | Y = 17 |
| H = 6 | R = 12 | Z = 18 |

1. Tiny electric 2-6-1-12-5-3-13 make up the pictures we see on our television screens.

   _____

2. If the lights are out, you can see the glow of 13-14-1-14-7-2 electricity created by a sweater or socks.

   _____

3. Electricity flows well through metals like 2-10-11-11-3-12.

   _____

4. A hydroelectric plant creates electricity by using moving 16-1-14-3-12.

   _____

5. Some 4-7-13-6 make electricity in their muscles and use the energy to stun their 11-12-3-17.

   _____

6. An electricity 9-3-14-3-12 shows how much electricity the members of a household use.

   _____

7. A fluorescent light is filled with a 5-1-13 that 5-8-10-16-13 when electricity is added.

   _____

8. 13-10-8-1-12 batteries use light from the sun to create electrical energy.

   _____

Name

## ELECTRIC PUZZLE

**E**_____ When _____ are added to a material, the material becomes negatively charged.

**L**_____ A _____ is an output device, such as a motor or bulb.

**E**_____ The relationship between magnets and electricity is called _____ .

**C**_____ A wet cell battery uses a liquid _____ to make electricity.

**T**_____ Both _____ of a battery must be connected before a circuit is complete.

**R**_____ Objects with the same electrical charge will _____ one another.

**I**_____ An _____ is a material that does not carry electricity very well.

**C**_____ _____ electricity is the kind that travels along a path.

Name

## WORD SEARCH

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

**electricity**
**friction**
**current**
**circuit**
**conductor**
**voltage**
**ampere**
**ohm**
**insulator**
**magnetism**

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

Name

## TEST

Circle the phrase which best answers each question.

1. _____ electricity stays where it is made or makes a single jump.

   - Current
   - Magnetic
   - Solar
   - Static

2. Electrons are atomic particles with:

   - no charge.
   - a positive charge.
   - a negative charge.
   - a magnetic charge.

3. Materials that are both positively charged will:

   - attract one another.
   - repel one another.
   - have no effect on one another.
   - easily exchange electrons.

4. Aluminum and steel are both good:

   - energy sources.
   - insulators.
   - conductors.
   - terminals.

5. The kind of circuit usually found in a home is called a:

   - parallel circuit.
   - single circuit.
   - power circuit.
   - electromagnetic circuit.

Name

## TEST (CONTINUED)

6. The force needed to drive an electric current is called the:

   - electromotive force.
   - electromagnetic force.
   - ampere force.
   - conduction force.

7. Amperes are units that measure:

   - the strength of a current.
   - the rate at which an electric current flows.
   - the size of a conductor.
   - the resistance of a conductor.

8. Insulators are materials that:

   - conduct electricity well.
   - do not conduct electricity well.
   - measure electric currents.
   - close electric circuits.

9. The invisible force that makes magnets repel and attract each other is known as:

   - magnetism.
   - hydroelectric power.
   - solar energy.
   - static electricity.

10. Power plants use _____ to turn generators and make electricity.

    - water
    - steam
    - coal
    - all of the above

## 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"*
*2572-EN-VID-NR: "Real World Science: Magnetism"*
*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: Electricity*. Fill in the number of each term next to its closest definition.

1. static electricity
2. current electricity
3. friction
4. circuit
5. conductor
6. insulator
7. volt
8. ampere
9. ohm
10. electromotive force

**6** material that does not conduct electricity well

**7** unit that measures the amount of force an energy source, such as a battery, pushes out

**1** kind of energy that stays where it is made or makes a small jump

**4** path that electrons move along to produce electricity

**5** any material through which electricity can easily flow

**10** force needed to drive a current and get the electrons moving

**2** kind of energy that moves in a stream

**8** unit that measures the rate at which an electric current flows

**9** unit that measures the resistance of a material to an electrical current

**3** rubbing of two objects together

# ANSWER KEY for page 19

## CHECKING COMPREHENSION

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

Electricity is ___1___ form that has existed on the earth for many years. Static electricity is produced when two objects ___2___ . Current electricity moves in a stream or path called a ___3___ . The path must contain an energy source, such as a ___4___ . It also needs a ___5___ , like a light bulb. Materials through which electricity easily flows are called ___6___ . A path that powers more than one device at a time, even if some of the devices are not working, is called a ___7___ circuit. The force needed to drive electricity and get the electrons moving is called ___8___ force. The amount of force an energy source pushes out can be measured in ___9___ . The rate at which electricity ___10___ is measured in amps.

1. A. a material
   B. a chemical
   (C.) an energy
   D. an insulator

2. A. repel each other
   B. exchange protons
   (C.) give up or lose electrons
   D. both A and C

3. (A.) circuit
   B. solvent
   C. magnet
   D. load

4. A. bell
   B. switch
   C. wire
   (D.) battery

5. (A.) load
   B. conductor
   C. cell
   D. terminal

6. A. insulators
   (B.) conductors
   C. magnets
   D. amperes

7. (A.) parallel
   B. single
   C. wire
   D. substation

8. (A.) electromotive
   B. static
   C. chemical
   D. resistance

9. (A.) volts
   B. amps
   C. ohms
   D. EKGs

10. A. stops
    (B.) flows
    C. resists a conductor
    D. produces static

# ANSWER KEY for page 20

## TERM LINK

Write the letter of each term next to the group of words which best describes it.

A. lightening
B. electrocardiogram
C. electron
D. amber
E. static
F. proton
G. repel
H. load
I. switch
J. dry cell

E describes something that is not moving

F positive particle found in an atom

G to move away from each other

D substance that the Greeks used to conduct electricity experiments

B machine that records the small electrical pulses in our hearts

H output device such as a bell or light bulb

A kind of static electricity that occurs in clouds or between a cloud and the earth

I type of control device that opens and closes a circuit

J type of battery that uses a chemical paste to make electricity

C tiny, negatively charged particle found in an atom; when a material gains or loses the particle, an electrical charge is formed

# 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** Electricity was invented by scientists in the early 1600s.
2. **T** The word electricity comes from *electron*, the Greek word for amber.
3. **F** Static electricity moves along a current or circuit.
4. **T** When a material loses an electron, it becomes positively charged.
5. **T** Materials with the same electrical charge repel each other.
6. **F** Wood and glass are good conductors of electricity.
7. **T** In a single circuit, all components are connected in one continuous loop.
8. **T** A volt measures the amount of force a battery pushes out.
9. **F** Ohms measure the rate at which electricity flows.
10. **F** Many materials put up no resistance to electricity.

# ANSWER KEY for page 22

**NUMBER CODE**

| | | |
|---|---|---|
| A = 1 | I = 7 | S = 13 |
| C = 2 | L = 8 | T = 14 |
| E = 3 | M = 9 | U = 15 |
| F = 4 | O = 10 | W = 16 |
| G = 5 | P = 11 | Y = 17 |
| H = 6 | R = 12 | Z = 18 |

1. Tiny electric 2-6-1-12-5-3-13 make up the pictures we see on our television screens.

   **charges**

   _____

2. If the lights are out, you can see the glow of 13-14-1-14-7-2 electricity created by a sweater or socks.

   **static**

   _____

3. Electricity flows well through metals like 2-10-11-11-3-12.

   **copper**

   _____

4. A hydroelectric plant creates electricity by using moving 16-1-14-3-12.

   **water**

   _____

5. Some 4-7-13-6 make electricity in their muscles and use the energy to stun their 11-12-3-17.

   **fish, prey**

   _____

6. An electricity 9-3-14-3-12 shows how much electricity the members of a household use.

   **meter**

   _____

7. A fluorescent light is filled with a 5-1-13 that 5-8-10-16-13 when electricity is added.

   **gas, glows**

   _____

8. 13-10-8-1-12 batteries use light from the sun to create electrical energy.

   **Solar**

   _____

# ANSWER KEY for page 23

## ELECTRIC PUZZLE

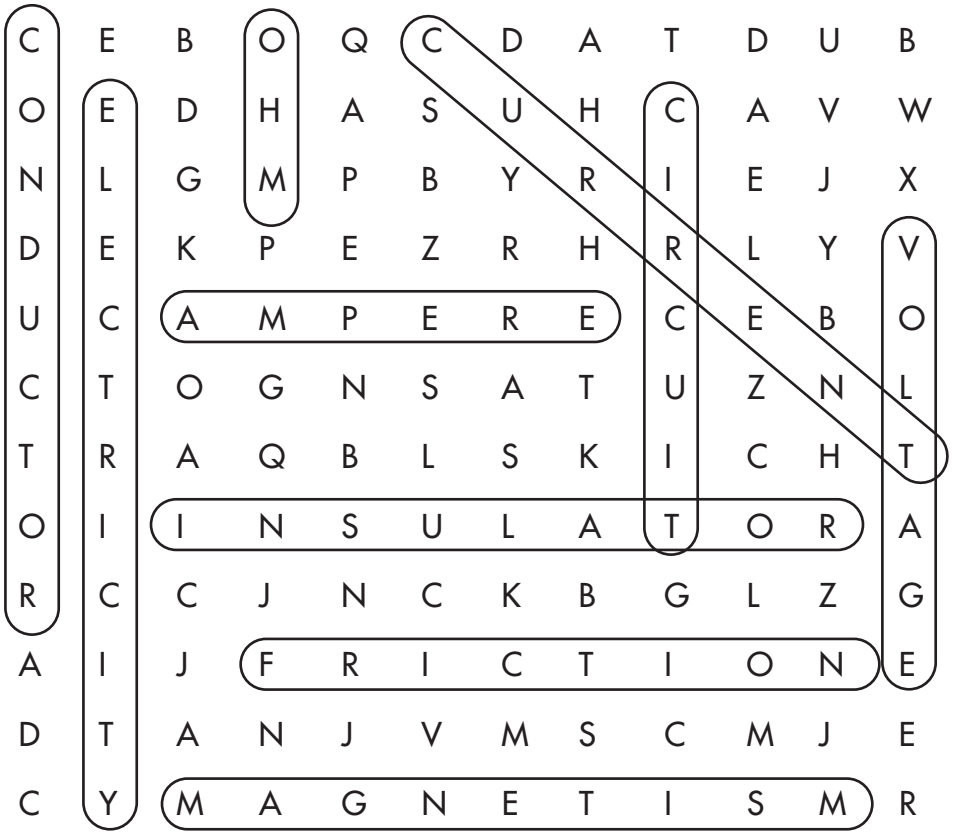
| | |
|---|---|
| E**lectrons** | When _____ are added to a material, the material becomes negatively charged. |
| L**oad** | A _____ is an output device, such as a motor or bulb. |
| E**lectromagnetism** | The relationship between magnets and electricity is called _____ . |
| C**hemical** | A wet cell battery uses a liquid _____ to make electricity. |
| T**erminals** | Both _____ of a battery must be connected before a circuit is complete. |
| R**epel** | Objects with the same electrical charge will _____ one another. |
| I**nsulator** | An _____ is a material that does not carry electricity very well. |
| C**urrent** | _____ electricity is the kind that travels along a path. |

# 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.

**electricity**
**friction**
**current**
**circuit**
**conductor**
**voltage**
**ampere**
**ohm**
**insulator**
**magnetism**



# ANSWER KEY for page 25

## TEST

Circle the phrase which best answers each question.

1. _____ electricity stays where it is made or makes a single jump.

   - Current
   - Magnetic
   - Solar
   - **Static**

2. Electrons are atomic particles with:

   - no charge.
   - a positive charge.
   - **a negative charge.**
   - a magnetic charge.

3. Materials that are both positively charged will:

   - attract one another.
   - **repel one another.**
   - have no effect on one another.
   - easily exchange electrons.

4. Aluminum and steel are both good:

   - energy sources.
   - insulators.
   - **conductors.**
   - terminals.

5. The kind of circuit usually found in a home is called a:

   - **parallel circuit.**
   - single circuit.
   - power circuit.
   - electromagnetic circuit.

# ANSWER KEY for page 26

**TEST (CONTINUED)**

6. The force needed to drive an electric current is called the:

   - electromotive force.
   - electromagnetic force.
   - ampere force.
   - conduction force.

7. Amperes are units that measure:

   - the strength of a current.
   - the rate at which an electric current flows.
   - the size of a conductor.
   - the resistance of a conductor.

8. Insulators are materials that:

   - conduct electricity well.
   - do not conduct electricity well.
   - measure electric currents.
   - close electric circuits.

9. The invisible force that makes magnets repel and attract each other is known as:

   - magnetism.
   - hydroelectric power.
   - solar energy.
   - static electricity.

10. Power plants use _____ to turn generators and make electricity.

    - water
    - steam
    - coal
    - all of the above