

The Geology of the Earth: Of Forces, Rocks, and Time

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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.

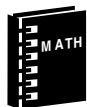
SUGGESTED ACTIVITIES

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.

The Geology of the Earth: Of Forces, Rocks, and Time

THEMES

Geology of the Earth: Of Forces, Rocks, & Time discusses the physical makeup of the planet Earth, including the three major types of rocks—sedimentary, igneous, and metamorphic. It also discusses the major influences on the topographic geology of the Earth, including the weathering of rocks through wind, water, and gravity. In addition, the program covers major geologic events like earthquakes, volcanoes, and glacial movement.

OVERVIEW

The Earth hasn't always looked the way it does today. In fact, the process of weathering is constantly changing the face of Earth. The movement of wind and water plays an important role in the changing landscape. All of the rocks on Earth originated as magma. There are various types of sedimentary rocks, like sandstone, shale, and conglomerates. The three major types of rocks, igneous, metamorphic, and sedimentary, represent different stages of the rock cycle. Humanity has also played a role in the geology of the Earth by burning fossil fuels which have caused acid rain, a particularly bad kind of chemical weathering. The geology of Earth is dynamic and varied.

OBJECTIVES

- ▶ To better understand the rock cycle and the makeup of different types of rocks.
- ▶ To examine different types of weathering and their effects on the topology of the Earth.
- ▶ To explore the effects of gravity on different types of rocks and different regions of the planet.
- ▶ To look at different climates and their geologic makeup.
- ▶ To determine the effect that glacial movement has had on the Earth.

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

The study of geology, or “earth science,” encompasses many different sciences—mineralogy, meteorology, paleontology, volcanology and countless others. But in one manner or another, all of these fields are concerned with the structure and composition of the Earth. Traditionally, the study of the Earth has been broken down into two major areas: physical geology, the study of the materials and forces that make up the Earth, and historical geology, the history of the Earth. Some geology can be tedious and minute, like determining the chemical composition of rocks, while other areas, like studying earthquakes, volcanoes, and glaciers can be dramatic and exciting.

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.

geology - the study of the Earth

fossil - evidence of plant or animal life found on the surface of rocks or minerals

rock - solid mineral matter found in or on the ground or the ocean's surface

FOCUS

Ask students to consider the importance of studying the history, formation and behavior of the Earth. How can learning about the Earth make our lives better and safer? How can we use geology to help future generations of humans, plants and animals?

DISCUSSION IDEAS

Geology can be broken down into two major branches: physical geology and historical geology. Ask students what some possible differences between the two could be. What might a physical geologist do that a historical geologist would not do, and vice versa? (Physical geology is the study of materials that make up the Earth and forces that shape the Earth. Historical geology is the study of the Earth's history.)

JUMP RIGHT IN

HOW TO USE THE GEOLOGY OF THE EARTH: OF FORCES, ROCKS, AND TIME AIMS TEACHING MODULE

Preparation

- ▶ Read *The Geology of the Earth: Of Forces, Rocks, and Time* **Themes, Overview, and Objectives** to become familiar with program content and expectations.
- ▶ Use **Preparation for Viewing** suggestions to introduce the topic to students.

Viewing THE GEOLOGY OF THE EARTH: OF FORCES, ROCKS, AND TIME

- ▶ 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 *The Geology of the Earth: Of Forces, Rocks, and Time* together or in small groups.
- ▶ Some students may benefit from viewing the video more than one time.

After Viewing THE GEOLOGY OF THE EARTH: OF FORCES, ROCKS, AND TIME

- ▶ 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

Connection to Geography

Write the words “volcano” and “earthquake” on the board and ask students to list several places on the planet where each exists. Is there some pattern? What do volcanoes and earthquakes have in common?



20 Minutes

(Many earthquakes and volcanoes take place on what is known as the “ring of fire,” an area that borders the Pacific tectonic plate. Areas where volcanoes and earthquakes exist border active tectonic plates, and the eruption of lava or the movement of the earth are both common occurrences for these areas.)

Hands On

Ice wedges are an important part of mechanical weathering. Allow students to watch as you perform the following experiment. Fill a shoebox with soil, then firmly pack down the soil. Make a small crack with a knife and line the crack with plastic so it will hold water. Place water in the lined crack. Freeze the box. Did the soil move? Melt the ice, add more water to fill the plastic lining, and then refreeze the water. What happened?



Extended Time

(The size of the space will increase, as it does in the case of an ice wedge.)

Connection to Language Arts

Ask students to explain the literal meaning of the word “geology.” What is the origin of the word? Ask students if they know other words that contain the prefix *geo-* or the suffix *-ology*. What do these words mean?



30 Minutes

(The word geology literally means the study of the earth. It comes from the Greek words *ge*, meaning Earth, and *logos*, meaning study. Other terms originating from the word *ge* include geography, or the study of Earth as it relates to life; geometry, or the branch of mathematics concerned with measuring various elements; and geomorphic, or that which relates to the form of the Earth. Words originating from the word *logos* include psychology, or the study of human behavior; sociology, or the study of human relationships and interaction; and biology, or the study of life.)

Link to the World

Geology can be divided into two basic subgroups: physical geology and historical geology. Within these two subgroups, there are many different branches of geological study. Ask students to discover as many of these branches as they can. What does each branch study? Is it a branch of physical or historical geology, or both?



30 Minutes

(Branches of physical geology include meteorology, or the study of weather; limnology, or the study of inland bodies of water; oceanography, or the study of the oceans; climatology, or the study of Earth's climate; geophysics, or the study of the structure and development of the Earth; mineralogy, or the study of rocks. Branches of historical geology include paleontology, or the study of fossils; and stratigraphy, or the study of the layers of rock in the Earth's crust. Branches that cover both physical and historical geology include sedimentology, or the study of sediment; and geochronology, or the study of geologic time.)

Connection to History

Humans have always been curious about the Earth. Since the time of the ancient Greeks, they have wondered about the behavior of rocks, minerals and water. Ask each student to learn more about one of the subjects listed below. Using the Internet, library books and other resources, encourage them to write a short paper describing their findings.



Extended Time

The Agassiz Family
Georgius Agricola
Baron Cuvier
James D. Dana
Empedocles
Galileo
James Hall
Adolph Knopf
Sir Charles Lyell
Strabo
Eduard Suess

Writing

Ask students to imagine that they are sent to another universe to meet extraterrestrial beings. How would the students describe Earth? What would they say about its history, its form and its physical behavior. Encourage them to describe Earth as thoroughly as they can in a two-page summary. Remind them to include information about the Earth's size, weather, atmosphere and surface.



Extended Time

Connection to Science

Much of geology is concerned with the study of rocks. There are three basic types of rock found on Earth: igneous rock, sedimentary rock and metamorphic rock. Ask students to describe how each type of rock was formed. Encourage them to use dictionaries and encyclopedias if they need help. Next, ask them to provide an example of each type of rock.



20 Minutes

(Igneous rocks were formed when melted rock deep inside the Earth's crust cooled and hardened. An example of igneous rock is granite. Sedimentary rocks were formed when pieces of the Earth's crust were worn away by water and weather. An example of a sedimentary rock is sandstone. Metamorphic rocks were formed when igneous and sedimentary rocks deep inside the Earth's crust were changed by heat and the weight of the crust.)

Meeting Individual Needs

Ask students to make sentences using the following words. Encourage them to use a dictionary if they are uncertain of the meanings.



20 Minutes

- petroleum - deposits of oil found underground or beneath the ocean floor
- gravitation - a force manifested by movement of two objects toward each other
- paleontology - the study of the past geography of the Earth
- mineral - a solid crystalline element or compound that results from the inorganic processes of nature

Culminating Activity

During the late 1700s and early 1800s a great geological debate occurred concerning the formation of rocks. Neptunists, such as Abraham Gottlob Werner, believed that an ocean had once covered the Earth. They believed that chemicals in the water settled to the bottom and formed rocks. Plutonists, such as James Hutton, believed that hot lava from volcanoes formed rocks when it cooled. Since volcanoes continued to occur, Plutonists claimed that the Earth was still changing.



60 Minutes

Divide students into two groups, with one group being Plutonists and the other being Neptunists. Using what they have learned in the unit, ask members of each side to continue the great Rock Debate. Wait until after the debate to tell students which side eventually prevailed.

VOCABULARY

The following terms are from *The Geology of the Earth: Of Forces, Rocks, and Time*. Fill in the number of each term next to its closest definition.

- | | |
|-------------------|--------------------------|
| 1. delta | 6. mechanical weathering |
| 2. extrusive rock | 7. stalactites |
| 3. intrusive rock | 8. stalagmites |
| 4. gorge | 9. chemical weathering |
| 5. magma | 10. igneous rock |

- ___ stone formations that usually hang from the roofs of limestone caves
- ___ rock formed by the cooling of magma
- ___ the breaking down of rock by the effects of chemicals on the rock
- ___ formed when magma solidifies into rock beneath the Earth's surface
- ___ a build up of sedimentary particles, usually occurring at the mouth of a river
- ___ stone formations that usually rise from the floors of some limestone caves
- ___ the molten material beneath the Earth's crust
- ___ formed when magma from beneath the Earth's surface flows onto the surface, cools, and hardens into rock
- ___ the splitting of rocks by the expansion of water in cracks of the rock
- ___ a narrow cut-out made through hard rock, usually the result of a rapidly descending mountain river

CHECKING COMPREHENSION

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

The Earth hasn't always looked the way it does today. In fact, the process of __1__ is constantly changing the face of Earth. The movement of __2__ plays an important role in the changing landscape. All of the rocks on Earth originated as __3__. There are various types of __4__ rocks, like sandstone, shale, and conglomerates. Sedimentary rocks are generally formed by __5__. The three major types of rocks—igneous, metamorphic, and sedimentary—represent different stages of the __6__. Humanity has also played a role in the geology of the Earth by burning fossil fuels which have caused __7__, a particularly bad kind of chemical weathering. Landslides, mudslides and __8__ are all caused by gravity. The __9__ capacity of a river refers to the amount of sediment, sand, and rocks it can carry. There are two types of glaciers: valley glaciers, like those in Alaska, and __10__ glaciers, like those in Antarctica.

1. A. gravity
B. sedimentation
C. weathering
D. magma
2. A. wind
B. glaciers
C. water
D. all of the above
3. A. sedimentary rocks
B. igneous rocks
C. magma
D. metamorphic rocks
4. A. sedimentary
B. basalt
C. igneous
D. metamorphic
5. A. glaciers
B. lava
C. wind and water
D. gravity
6. A. Earth's crust
B. rock cycle
C. intrusive cycle
D. stalactite cycle
7. A. magma
B. stalagmites
C. acid rain
D. erosion
8. A. creep
B. sand dunes
C. geysers
D. extrusive rock formations
9. A. flood bearing
B. speed
C. discharge
D. load carrying
10. A. sedimentary
B. continental
C. plate
D. mountain

GEOLOGY LOCATIONS

Place the letter of each location next to the phrase which best applies to it.

- A. Alaska
- B. Mississippi delta
- C. Grand Canyon
- D. Himalayan Mountains
- E. Anasazi Indian caves
- F. California coast
- G. Great Sand Dunes
- H. Bridalveil falls

___ formed over thousands of years because of the thawing and freezing of water

___ the sight of frequent mudslides and landslides

___ valley glaciers are located here

___ an area which contains large deposits of river sediment

___ created by wind moving small particles of sediment

___ caused by slow moving glaciers

___ an example of sedimentary rock showing clear lines of stratification

___ the result of colliding plates beneath the Earth's surface

TRUE OR FALSE

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

1. ___ Rocks formed by the cooling of lava are called sedimentary rocks.
2. ___ Most mountain ranges are made up of intrusive rocks like granite.
3. ___ The rocks of the Grand Canyon show layers of stratification.
4. ___ Coal is an example of metamorphic rock.
5. ___ Mechanical weathering occurs when the roots of a tree invade a rock and break it apart.
6. ___ Mountain rivers typically flow slower than lowland rivers.
7. ___ Glaciers never existed as far south as Yosemite National Park.
8. ___ Sand dunes are caused by wind.
9. ___ Marble is limestone that was heated and pressurized by natural forces.
10. ___ Originally, the only types of rock on Earth were igneous and extrusive.

NUMBER CODE

Use the code below to read the following facts about Earth.

A = 1	H = 5	N = 9	S = 13
C = 2	I = 6	O = 10	T = 14
E = 3	K = 7	P = 11	U = 15
F = 4	L = 8	R = 12	W = 16

1. The Earth ranks 4-6-4-14-5 in size among the planets.

2. The Earth is not perfectly round, but slightly flattened at the 11-10-8-3-12.

3. Seventy percent of the Earth's 13-15-12-4-1-2-3 is comprised of water.

4. All bodies of 16-1-14-3-12 make a portion of the Earth known as the hydrosphere.

5. Almost half of the Earth's 2-12-15-13-14 is comprised of oxygen.

6. The core of the Earth is probably made of solid iron and 9-6-2-7-8-3.

7. 12-1-6-9 is one of the most common forms of chemical weathering.

8. Wind and water are primary causes of 3-12-10-13-6-10-9.

EARTH AT A GLANCE

Use an encyclopedia and other texts to fill in the blanks below.

1. The Earth's weight in tons:

2. Polar Diameter in miles (distance through the Earth from the North Pole to the South Pole):

3. Equatorial Diameter in miles (distance through the Earth at the equator):

4. Polar Circumference in miles (distance around the Earth through the poles):

5. Equatorial Circumference in miles (distance around the Earth at the equator):

6. Total Surface Area in square miles:

7. Land Area in square miles:

8. Water Area in square miles:

9. Highest Point on Land in feet:

10. Deepest Part of the Ocean in feet:

WORD SEARCH

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

Mantle
Polar
Diamond
Basalt
Glacier
Limestone
Fossil
Acid rain
Himalaya
Crust

C	H	S	R	H	F	D	R	A	L	O	P
H	M	F	O	S	G	I	D	I	A	M	N
L	A	H	I	M	A	L	A	Y	A	L	D
I	C	S	T	N	N	C	Y	B	S	T	I
M	E	L	T	N	A	M	L	I	M	S	A
E	D	F	O	G	L	N	E	B	E	S	M
S	G	B	N	S	T	O	F	T	F	Y	O
T	T	L	B	G	L	N	B	Y	O	A	N
O	N	I	A	L	F	C	R	U	S	T	D
N	A	Y	S	C	B	S	E	O	S	T	E
E	S	B	A	C	I	D	R	A	I	N	T
L	B	S	L	I	A	E	B	R	L	E	F
M	I	S	T	B	Y	A	R	A	T	Y	A

TEST

Circle the phrase which best answers each question.

1. Oxidation is an example of:

- mechanical weathering.
- chemical weathering.
- wind action.
- erosion.

2. The point at which a glacier's rate of movement is equal to its rate of melting is the:

- ice front.
- terminal moraine.
- lateral moraine.
- medial moraine.

3. Which of these does not shape the Earth's surface?

- glaciers
- forces below the Earth's crust
- waves
- basalt

4. Conglomerates, sandstone, and shale are examples of:

- intrusive rocks.
- lava.
- igneous rocks.
- sedimentary rocks.

5. The areas where plates come together and move apart are prone to:

- wind and rain storms.
- glacial movement and melting.
- high waves and tides.
- the most geologic activity on Earth.

TEST (CONTINUED)

6. The sand dunes at Death Valley are an example of shaping the Earth through:

- earthquakes.
- wind.
- volcanic activity.
- chemical weathering.

7. "Acid Rain" is an example of:

- chemical weathering.
- industrial pollution.
- a threat to plants and animals.
- all of the above.

8. Igneous rocks are formed by:

- blowing wind.
- erosion of the Earth's crust.
- cooling of the Earth's crust.
- cooling of magma.

9. Diamond is an example of:

- sedimentary rock.
- igneous rock.
- metamorphic rock.
- a moraine.

10. Landslides, mudslides, and creep are caused by:

- wind.
- gravity.
- volcanic activity.
- glacial moraines.

ADDITIONAL AIMS MULTIMEDIA PROGRAMS

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

Earth Science Essentials Series

The Universe: The Vast Frontier

The Solar System: Our Neighbors in Space

Oceans: Charting the Vastness

Weather: The Chaos Which Surrounds Us

The History of the Earth: Over the Eons

ANSWER KEY for page 18

VOCABULARY

The following terms are from *The Geology of the Earth: Of Forces, Rocks, and Time*. Fill in the number of each term next to its closest definition.

- | | |
|-------------------|--------------------------|
| 1. delta | 6. mechanical weathering |
| 2. extrusive rock | 7. stalactites |
| 3. intrusive rock | 8. stalagmites |
| 4. gorge | 9. chemical weathering |
| 5. magma | 10. igneous rock |

7 stone formations that usually hang from the roofs of limestone caves

10 rock formed by the cooling of magma

9 the breaking down of rock by the effects of chemicals on the rock

3 formed when magma solidifies into rock beneath the Earth's surface

1 a build up of sedimentary particles, usually occurring at the mouth of a river

8 stone formations that usually rise from the floors of some limestone caves

5 the molten material beneath the Earth's crust

2 formed when magma from beneath the Earth's surface flows onto the surface, cools, and hardens into rock

6 the splitting of rocks by the expansion of water in cracks of the rock

4 a narrow cut-out made through hard rock, usually the result of a rapidly descending mountain river

ANSWER KEY for page 19

CHECKING COMPREHENSION

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

The Earth hasn't always looked the way it does today. In fact, the process of __1__ is constantly changing the face of Earth. The movement of __2__ plays an important role in the changing landscape. All of the rocks on Earth originated as __3__. There are various types of __4__ rocks, like sandstone, shale, and conglomerates. Sedimentary rocks are generally formed by __5__. The three major types of rocks—igneous, metamorphic, and sedimentary—represent different stages of the __6__. Humanity has also played a role in the geology of the Earth by burning fossil fuels which have caused __7__, a particularly bad kind of chemical weathering. Landslides, mudslides and __8__ are all caused by gravity. The __9__ capacity of a river refers to the amount of sediment, sand, and rocks it can carry. There are two types of glaciers: valley glaciers, like those in Alaska, and __10__ glaciers, like those in Antarctica.

1. A. gravity
B. sedimentation
 C. weathering
D. magma
2. A. wind
B. glaciers
C. water
 D. all of the above
3. A. sedimentary rocks
B. igneous rocks
 C. magma
D. metamorphic rocks
4. A. sedimentary
B. basalt
C. igneous
D. metamorphic
5. A. glaciers
B. lava
 C. wind and water
D. gravity
6. A. Earth's crust
 B. rock cycle
C. intrusive cycle
D. stalactite cycle
7. A. magma
B. stalagmites
 C. acid rain
D. erosion
8. A. creep
B. sand dunes
C. geysers
D. extrusive rock formations
9. A. flood bearing
B. speed
C. discharge
 D. load carrying
10. A. sedimentary
 B. continental
C. plate
D. mountain

ANSWER KEY for page 20

GEOLOGY LOCATIONS

Place the letter of each location next to the phrase which best applies to it.

- A. Alaska
- B. Mississippi delta
- C. Grand Canyon
- D. Himalayan Mountains
- E. Anasazi Indian caves
- F. California coast
- G. Great Sand Dunes
- H. Bridalveil falls

E formed over thousands of years because of the thawing and freezing of water

F the sight of frequent mudslides and landslides

A valley glaciers are located here

B an area which contains large deposits of river sediment

G created by wind moving small particles of sediment

H caused by slow moving glaciers

C an example of sedimentary rock showing clear lines of stratification

D the result of colliding plates beneath the Earth's surface

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 Rocks formed by the cooling of lava are called sedimentary rocks.
2. T Most mountain ranges are made up of intrusive rocks like granite.
3. T The rocks of the Grand Canyon show layers of stratification.
4. F Coal is an example of metamorphic rock.
5. T Mechanical weathering occurs when the roots of a tree invade a rock and break it apart.
6. F Mountain rivers typically flow slower than lowland rivers.
7. F Glaciers never existed as far south as Yosemite National Park.
8. T Sand dunes are caused by wind.
9. T Marble is limestone that was heated and pressurized by natural forces.
10. F Originally, the only types of rock on Earth were igneous and extrusive.

ANSWER KEY for page 22

NUMBER CODE

Use the code below to read the following facts about Earth.

A = 1	H = 5	N = 9
C = 2	I = 6	O = 10
E = 3	K = 7	P = 11
F = 4	L = 8	R = 12

1. The Earth ranks 4-6-4-14-5 in size among the planets.

fifth

2. The Earth is not perfectly round, but slightly flattened at the 11-10-8-3-12.

poles

3. Seventy percent of the Earth's 13-15-12-4-1-2-3 is comprised of water.

surface

4. All bodies of 16-1-14-3-12 make a portion of the Earth known as the hydrosphere.

water

5. Almost half of the Earth's 2-12-15-13-14 is comprised of oxygen.

crust

6. The core of the Earth is probably made of solid iron and 9-6-2-7-8-3.

nickel

7. 12-1-6-9 is one of the most common forms of chemical weathering.

Rain

8. Wind and water are primary causes of 3-12-10-13-6-10-9.

erosion

ANSWER KEY for page 23

EARTH AT A GLANCE

Use an encyclopedia and other texts to fill in the blanks below.

1. The Earth's weight in tons:
6,600,000,000,000,000,000
2. Polar Diameter in miles (distance through the Earth from the North Pole to the South Pole):
7,899.83 miles
3. Equatorial Diameter in miles (distance through the Earth at the equator):
7,926.41
4. Polar Circumference in miles (distance around the Earth through the poles):
24,859.82
5. Equatorial Circumference in miles (distance around the Earth at the equator):
24,901.55
6. Total Surface Area in square miles:
196,940,400
7. Land Area in square miles:
57,280,000
8. Water Area in square miles:
139,660,400
9. Highest Point on Land in feet:
29,028 - Mt. Everest
10. Deepest Part of the Ocean in feet:
36,198 - Challenger Deep in the Pacific Ocean

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.

- Mantle
- Polar
- Diamond
- Basalt
- Glacier
- Limestone
- Fossil
- Acid rain
- Himalaya
- Crust

C	H	S	R	H	F	D	R	A	L	O	P
H	M	F	O	S	G	I	D	I	A	M	N
L	A	H	I	M	A	L	A	Y	A	L	D
I	C	S	T	N	N	C	Y	B	S	T	I
M	E	L	T	N	A	M	L	I	M	S	A
E	D	F	O	G	L	N	E	B	E	S	M
S	G	B	N	S	T	O	F	T	F	Y	O
T	T	L	B	G	L	N	B	Y	O	A	N
O	N	I	A	L	F	C	R	U	S	T	D
N	A	Y	S	C	B	S	E	O	S	T	E
E	S	B	A	C	I	D	R	A	I	N	T
L	B	S	L	I	A	E	B	R	L	E	F
M	I	S	T	B	Y	A	R	A	T	Y	A

ANSWER KEY for page 25

TEST

Circle the phrase which best answers each question.

1. Oxidation is an example of:

- mechanical weathering.
- chemical weathering.
- wind action.
- erosion.

2. The point at which a glacier's rate of movement is equal to its rate of melting is the:

- ice front.
- terminal moraine.
- lateral moraine.
- medial moraine.

3. Which of these does not shape the Earth's surface?

- glaciers
- forces below the Earth's crust
- waves
- basalt

4. Conglomerates, sandstone, and shale are examples of:

- intrusive rocks.
- lava.
- igneous rocks.
- sedimentary rocks.

5. The areas where plates come together and move apart are prone to:

- wind and rain storms.
- glacial movement and melting.
- high waves and tides.
- the most geologic activity on Earth.

ANSWER KEY for page 26

TEST (CONTINUED)

6. The sand dunes at Death Valley are an example of shaping the Earth through:

- earthquakes.
- wind.
- volcanic activity.
- chemical weathering.

7. "Acid Rain" is an example of:

- chemical weathering.
- industrial pollution.
- a threat to plants and animals.
- all of the above.

8. Igneous rocks are formed by:

- blowing wind.
- erosion of the Earth's crust.
- cooling of the Earth's crust.
- cooling of magma.

9. Diamond is an example of:

- sedimentary rock.
- igneous rock.
- metamorphic rock.
- a moraine.

10. Landslides, mudslides, and creep are caused by:

- wind.
- gravity.
- volcanic activity.
- glacial moraines.