

Weather: The Chaos Which Surrounds Us

INTRODUCTION TO THE AIMS TEACHING MODULE (ATM)

→ SECTION 1

Rationale	4
Organization and Management	5
Features	6

INTRODUCING WEATHER: THE CHAOS WHICH SURROUNDS US

→ SECTION 2

Themes	11
Overview	11
Objectives	11

PREPARATION FOR VIEWING

→ SECTION 3

Introduction to the Program	13
Introduction to Vocabulary	13
Discussion Ideas	13
Focus	13
Jump Right In	14

AFTER VIEWING THE PROGRAM

→ SECTION 4

Suggested Activities	15
Vocabulary	18
Checking Comprehension	19
Reverse Alphabet	20
True or False	21
Fill in the Blanks	22
Weather Phenomena	23
Word Search	24
Test	25

ADDITIONAL AIMS MULTIMEDIA PROGRAMS27

ANSWER KEYS28



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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.

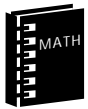
SUGGESTED ACTIVITIES

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.

Weather: The Chaos Which Surrounds Us

THEMES

Weather: The Chaos Which Surrounds Us shows students the factors that create the weather around them, including the heat of the sun, the topography of the planet, and the movement of air masses. Students also examine the composition of the atmosphere, specific storms like thunderstorms and tornadoes, and hurricanes. A great deal of attention is also given to the formation and types of clouds and their relationship to weather patterns.

OVERVIEW

All weather phenomena result from the flow of air through the Earth's atmosphere. The sun's energy is the power source behind the motion of this atmosphere. Winds are created as cold, heavy air displaces warm lighter air. Due to the Coriolis effect, winds in the Northern Hemisphere rotate counterclockwise and winds in the Southern Hemisphere rotate clockwise. The types of clouds formed can provide an indication of what kind of weather will result. Some air masses can be big enough to cover half a continent, while thunderstorms and tornadoes are smaller, more localized phenomena. Hurricanes start over open water near the equator between the months of July and November, when the heat energy in the area is at its highest.

OBJECTIVES

- ▶ To understand the major factors contributing to Earth's weather.
- ▶ To see the changes in seasonal weather and understand the reasons for these changes.
- ▶ To recognize different types of clouds and understand their relationship to particular types of weather.
- ▶ To examine particular storms, like hurricanes and tornadoes, and determine their origins.
- ▶ To identify major types of air masses and their movement.

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

Earth's weather creates an environment capable of sustaining many forms of life. From farming, to travel and communication, the weather has a tremendous effect on the every-day lives of all people. The study of weather involves physics, chemistry, biology, earth science and mathematics. During this program, students will see how various factors like the position of the Earth and sun, the temperature of the oceans, and the topology of the Earth's surface affect the weather.

INTRODUCTION TO VOCABULARY

Write the words "meteorology" and "climatology" on the board and ask students to define each word. How are the words different?

(Meteorology is the study of general weather and atmospheric patterns, while climatology is the study of individual climates and their weather phenomena. It takes many years of meteorology records before scientists can determine a region's climate)

FOCUS

Before starting the program, ask students to think about the various aspects of weather, including temperature, rainfall and wind patterns. How do each of these aspects transform our world on a daily basis? While studying the program, ask students to pay closer attention to the daily weather patterns that we often ignore.

DISCUSSION IDEAS

Ask students to talk about how the weather affects life on Earth. Encourage them to see the larger picture. For example, weather determines where humans can live, what types of houses they build, and the crops they grow. Also, ask students to see how weather affects them personally. What do they do when it's cold outside? Raining? Sunny?

JUMP RIGHT IN

HOW TO USE THE WEATHER: THE CHAOS WHICH SURROUNDS US AIMS TEACHING MODULE

Preparation

- ▶ Read *Weather: The Chaos Which Surrounds Us* **Themes, Overview,** and **Objectives** to become familiar with program content and expectations.
- ▶ Use **Preparation for Viewing** suggestions to introduce the topic to students.

Viewing WEATHER: THE CHAOS WHICH SURROUNDS US

- ▶ 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 *Weather: The Chaos Which Surrounds Us* together or in small groups.
- ▶ Some students may benefit from viewing the video more than one time.

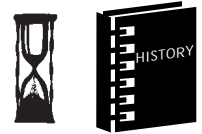
After Viewing WEATHER: THE CHAOS WHICH SURROUNDS US

- ▶ 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 History

Humans have not only tried to understand and predict the weather, they have also tried to control it. Native American tribes attempted to bring or stop rain, or to move the wind. Even into the 20th century, some believed that shooting cannons into the clouds would cause rain. Ask students to do a little research about different civilizations and their particular attempts to control the weather. Encourage each student to orally present at least one interesting story or fact to the class.



60 Minutes

Extended Activity

Hurricanes have done a great deal of damage in recent years, from South America to the east coast of the United States. Hurricanes Andrew and Hugo did particular damage to the United States. Bring a video about hurricanes into class and discuss the power of hurricanes shown in the tape.



45 Minutes

Ask students if they have ever been through a hurricane. If so, encourage them to share the experience with the class. What do they remember about the hurricane? What preparations did their family have to make before the hurricane? What kind of damage did the hurricane cause?

Connection to Language Arts

The weather is a powerful metaphor in the English language. Phrases such as “cloud an issue” or “be in a fog” are a few examples. Ask students to list as many weather analogies as they can. What weather phenomena are viewed as positive and which are viewed as negative?



20 Minutes

(Sun and warmth are typically mentioned in positive expressions, while rainy, cold and stormy weather are mentioned in negative expressions. Some common expressions are “feeling sunny,” “when the storm blows over,” “the calm before the storm,” and “a silver lining to every cloud.”)

In the Newsroom

Have students create a weather report summarizing the previous week's weather in their area. Ask them to include changes in precipitation, pressure, wind direction, wind speed, temperature, and cloud cover. Have them explain how the weather in their area was affected by the larger weather in the United States.



60 Minutes

Hands On

Have students perform the following experiment to see how wind currents move in gusts and uneven lines. Fill a small bowl with a dark liquid (coffee or soda, for example). Pour in some milk and gently stir in a uniform manner for a few seconds. What happens to the milk when you stop stirring? Can you see the liquid still moving? Is it moving in a completely uniform motion? Are there any smaller swirls in the liquid? Does any of the liquid look like it's not moving at all?



20 Minutes

(Not all of the liquid moves at a uniform rate. Even when the stirring is completed, the liquid continues to move, though not in a completely uniform motion. Smaller swirls are created in various places, and the area closest to the spoon moves faster than the area furthest away. Explain to students that these "currents" are the same as air currents, and the smaller swirls are similar to eddies or wind gusts).

Connection to Science

Throughout time, people have tried to measure the weather. Ask students to learn more about some of the most important weather tools being used today. Has weather forecasting gotten easier in recent years? How can non-meteorologists gauge the weather?



20 Minutes

(Typical weather instruments include the thermometer which measures heat, the anemometer which measures wind speed, hygrometer which measures amount of moisture in the air. In addition, radar and satellites are used to detect storm activity.

Computers and other forms of advanced technology have made the prediction of storms and severe weather a more exact science, saving millions of dollars and thousands of lives by giving advance warning of coming weather like hurricanes or tornadoes.

Many instruments, like a thermometer, a weather vane, or a windsock are common and don't require any special skills to use.)

Critical Thinking

Ask students how many hours and minutes of sunlight occur each day in their area. How does this amount change each day? Is the longest day in Alaska the same as the longest day in Florida? Why or why not?

(The amount of sunlight you get depends on the latitude of your location and the time of year. In the Northern Hemisphere the amount of sunlight grows longer from December 21 to June 21. Because of its high altitude, Alaska gets even more sunlight in the summer. In fact, some parts of Alaska get sunlight for almost 24 hours a day during the summer. Likewise, the same areas get very little sunlight at all during the winter.)

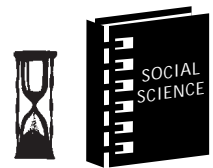


15 Minutes

Connection to Social Sciences

Many folk tales and superstitions have been associated with the weather. Ask students to name as many as they can. How do they think these folk tales became so widely believed?

(People without scientific data find other ways to explain the unknown. In some cases, these explanations have lived on, in spite of technological advances that make them inaccurate. For instance, a ground hog seeing his shadow means more cold weather. Aching bones mean a storm is coming. Crickets chirp faster as the temperature rises. Birds roost and dogs hide before a big storm.)



30 Minutes

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. Make sure they demonstrate a knowledge of the words as they apply to the program.

front - long band of changing weather between two different kinds of air masses

humidity - amount of water vapor in the air

precipitation - rain, snow or ice that falls to the Earth

pressure - force produced by air pressing down on the Earth



20 Minutes

Culminating Activity

Using what they have learned in the unit, ask each student to write a question related to the program. Collect the questions and use them to write a review quiz. After giving the quiz, ask students if they enjoyed designing the test.



60 Minutes

VOCABULARY

The following terms are from *Weather: The Chaos Which Surrounds Us*. Fill in the number of each term next to its closest definition.

- | | |
|------------------------|-------------------|
| 1. cirrus clouds | 6. squall |
| 2. front | 7. wind |
| 3. Coriolis effect | 8. surge |
| 4. inversion | 9. stratus clouds |
| 5. nimbostratus clouds | 10. cyclic flow |

- ___ a flow of air caused by the uneven heating of earth's surface
- ___ the circular flow of air produced by the Coriolis effect
- ___ dark gray clouds that usually form below 8,000 feet and produce rain or snow
- ___ clouds that appear as layers of sheets
- ___ a kind of wispy white cloud found at high altitudes
- ___ when air temperature increases with elevation
- ___ the movement of large air masses of different temperatures within a cloud formation
- ___ the effect of earth's rotation on the paths of winds around the globe
- ___ a zone formed when a cold air mass and a warm air mass meet
- ___ a narrow zone of cumulonimbus clouds that develops along a front, producing violent weather

CHECKING COMPREHENSION

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

All weather phenomena result from the __1__ in the atmosphere. The __2__ is the power source behind the motion of the Earth's atmosphere. __3__ are created as cold, heavy air displaces warmer lighter air. Due to the Coriolis effect, winds in the Northern Hemisphere rotate __4__ and winds in the Southern Hemisphere rotate __5__. The types of __6__ formed can provide an indication of what kind of weather will result. __7__ can be big enough to cover half a continent, while __8__ are much smaller, and more localized phenomena. Hurricanes start over open water near __9__ between the months of July and November, when the heat energy in the area is at its highest. The energy source of a hurricane is __10__ .

1. A. dissipation of heat
B. flow of moisture
C. flow of air
D. changes in water pressure
2. A. Coriolis effect
B. sun
C. ocean
D. cyclic flow
3. A. Cyclic flows
B. Hurricanes
C. Cirrus clouds
D. Winds
4. A. counter-clockwise
B. clockwise
C. vertically
D. horizontally
5. A. counter-clockwise
B. clockwise
C. vertically
D. horizontally
6. A. cyclones
B. light patterns
C. squalls
D. clouds
7. A. Thunderstorms
B. Tornadoes
C. Air masses
D. Hurricanes
8. A. Thunderstorms
B. Cold fronts
C. Air masses
D. Warm fronts
9. A. the south pole
B. the eastern U.S.
C. the Caribbean
D. the equator
10. A. cold ocean air
B. warm, moist ocean air
C. warm, dry air
D. cold, moist air

REVERSE ALPHABET

An important word in each sentence below is written in reverse alphabet. Reverse alphabet works like this:

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

Use Reverse Alphabet to discover the code word or words in each sentence.

1. _____ The lowest temperature ever recorded on Earth was -127° F in **ZMGZIXGRXZ**.
2. _____ In 1900, the worst **SFIIRXZMV** in U.S. history hit Galveston, Texas.
3. _____ In Iquique, **XSROV**, no rain fell during the period from 1899 to 1919.
4. _____ The hottest temperature ever recorded on Earth was 136° F in Al Aziziyah, **ORYBZ**.
5. _____ The hottest, driest place in the U.S. is **WVZGS EZOOVB**, California.
6. _____ The strongest wind gust ever measured on Earth was 231 mph in Mount Washington, **MVD SZNKHSRIV**.
7. _____ The heaviest **HMLDUZOO** recorded in the U.S. during a 24-hour period was 76 inches.
8. _____ The foggiest place in the U.S. is Cape **WRHZKKLRMGNVMG** at the mouth of the Columbia River in Washington.

TRUE OR FALSE

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

1. ___ At any moment there are approximately 2000 thunderstorms on the planet.
2. ___ A lack of cloud cover is one of the reasons the desert cools so rapidly at night.
3. ___ The cyclic flow of air caused by the Coriolis effect cannot lead to a tornado.
4. ___ The stronger the vertical movement of air, the higher cumulus clouds will rise.
5. ___ Solar energy is at its peak in the Northern Hemisphere during the winter months.
6. ___ Thunderstorms usually occur during the afternoon because it takes all day to create enough heat energy to power the vertical flow of air necessary to create them.
7. ___ Most tornadoes only last between 2 and 4 hours.
8. ___ The most common place for tornadoes on the planet is the Mississippi Valley and the Great Plains of the United States.
9. ___ The entire United States can be covered by only two or three air masses.
10. ___ As a cold front passes, winds decrease and temperatures rise briefly.

FILL IN THE BLANKS

Use the words below to fill in the blanks.

air pressure
barometer
humidity
mercury
precipitation
tornado
trade winds
trough

1. Water droplets or ice crystals that fall to Earth are called _____.
2. The force produced by the weight of air pressing down on the Earth is known as _____.
3. A _____ is the smallest and most destructive type of violent storm.
4. The amount of water vapor or moisture in the air is called **humidity** _____.
5. A low pressure area of an air mass is called a _____.
6. A _____ measures air pressure.
7. Northeast and southeast winds are often called _____ .
8. Placing a thermometer in the direct sun gives a falsely high reading because the sun heats the _____ more than it heats the air around it.

WEATHER PHENOMENA

For each phenomena listed below, describe in a few sentences how it develops and behaves.

1. Tornado _____

2. Hurricane _____

3. Hail _____

4. Lightning _____

5. Thunder _____

WORD SEARCH

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

Thunder
Front
Surges
Inversion
Lightning
Tornado
Hail
Squall
Rain
Humidity

S	T	H	U	H	S	L	L	A	U	Q	S
A	F	G	H	T	D	G	T	V	T	R	I
Q	R	U	T	H	U	N	D	E	R	I	G
H	O	L	R	O	L	U	L	G	R	N	D
U	N	I	G	H	N	G	T	L	U	V	S
M	T	G	S	L	A	N	D	T	T	E	U
I	T	H	R	U	N	I	V	H	F	R	R
D	R	T	T	E	R	H	L	U	H	S	G
I	E	N	V	R	F	G	V	N	L	I	E
T	S	I	U	T	O	R	N	A	D	O	S
Y	T	N	L	L	N	R	E	G	V	N	V
O	R	G	V	G	R	A	I	N	D	E	S

TEST

Circle the phrase which best answers each question.

1. Which of these does not affect Earth's weather?

- the heat energy of the sun
- Earth's orbit around the sun
- erosion
- the rotation of the Earth on its axis

2. Atmosphere moving very slowly in huge blocks of air is called:

- wind.
- an air mass.
- a hurricane.
- a tornado.

3. Air moves:

- horizontally
- vertically.
- electrically.
- horizontally and vertically.

4. The Coriolis effect makes air move ____ in the Northern Hemisphere.

- slowly
- quickly
- clockwise
- counterclockwise

5. The type of weather conditions that exist within an air mass after it leaves its area of origin depends on:

- moisture in the air.
- solar energy.
- the temperature of the ground or water it passes over.
- air masses.

TEST (CONTINUED)

6. When a layer of cold air is trapped beneath warmer air, the result is:

- temperature inversions.
- thunderstorms.
- tornadoes.
- hurricanes.

7. In a sloping intersection along a front, the cold air mass is always _____ the warm air mass.

- higher than
- lower than
- next to
- wedged between

8. When low pressure forms along turbulent squall lines, the result is:

- tornadoes.
- thunderstorms.
- hurricanes.
- temperature inversions.

9. A full-fledged hurricane must have winds of least _____ miles per hour.

- 54
- 64
- 74
- 84

10. Stratus clouds are associated with:

- thunderstorms.
- drizzle.
- heavy snow.
- hurricanes.

ADDITIONAL AIMS MULTIMEDIA PROGRAMS

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

Earth Science Essentials Series

Oceans: Charting the Vastness

The Solar System: Our Neighbors in Space

Geology of the Earth: Of Forces, Rocks, & Time

The Universe: The Vast Frontier

The History of the Earth: Over the Eons

ANSWER KEY for page 18

VOCABULARY

The following terms are from *Weather: The Chaos Which Surrounds Us*. Fill in the number of each term next to its closest definition.

- | | |
|------------------------|-------------------|
| 1. cirrus clouds | 6. squall |
| 2. front | 7. wind |
| 3. Coriolis effect | 8. surge |
| 4. inversion | 9. stratus clouds |
| 5. nimbostratus clouds | 10. cyclic flow |

- 7 a flow of air caused by the uneven heating of earth's surface
- 10 the circular flow of air produced by the Coriolis effect
- 5 dark gray clouds that usually form below 8,000 feet and produce rain or snow
- 9 clouds that appear as layers of sheets
- 1 a kind of wispy white cloud found at high altitudes
- 4 when air temperature increases with elevation
- 8 the movement of large air masses of different temperatures within a cloud formation
- 3 the effect of earth's rotation on the paths of winds around the globe
- 2 a zone formed when a cold air mass and a warm air mass meet
- 6 a narrow zone of cumulonimbus clouds that develops along a front, producing violent weather

ANSWER KEY for page 19

CHECKING COMPREHENSION

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

All weather phenomena result from the __1__ in the atmosphere. The __2__ is the power source behind the motion of the Earth's atmosphere. __3__ are created as cold, heavy air displaces warmer lighter air. Due to the Coriolis effect, winds in the Northern Hemisphere rotate __4__ and winds in the Southern Hemisphere rotate __5__. The types of __6__ formed can provide an indication of what kind of weather will result. __7__ can be big enough to cover half a continent, while __8__ are much smaller, and more localized phenomena. Hurricanes start over open water near __9__ between the months of July and November, when the heat energy in the area is at its highest. The energy source of a hurricane is __10__ .

1. A. dissipation of heat
B. flow of moisture
 C. flow of air
D. changes in water pressure
2. A. Coriolis effect
 B. sun
C. ocean
D. cyclic flow
3. A. Cyclic flows
B. Hurricanes
C. Cirrus clouds
 D. Winds
4. A. counter-clockwise
B. clockwise
C. vertically
D. horizontally
5. A. counter-clockwise
 B. clockwise
C. vertically
D. horizontally
6. A. cyclones
B. light patterns
C. squalls
 D. clouds
7. A. Thunderstorms
B. Tornadoes
 C. Air masses
D. Hurricanes
8. A. Thunderstorms
B. Cold fronts
C. Air masses
D. Warm fronts
9. A. the south pole
B. the eastern U.S.
C. the Caribbean
 D. the equator
10. A. cold ocean air
 B. warm, moist ocean air
C. warm, dry air
D. cold, moist air

ANSWER KEY for page 20

REVERSE ALPHABET

An important word in each sentence below is written in reverse alphabet. Reverse alphabet works like this:

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

Use Reverse Alphabet to discover the code word or words in each sentence.

1. Antarctica The lowest temperature ever recorded on Earth was -127° F in **ZMGZIXGRXZ**.
2. hurricane In 1900, the worst **SFIIRXZMV** in U.S. history hit Galveston, Texas.
3. Chile In Iquique, **XSROV**, no rain fell during the period from 1899 to 1919.
4. Libya The hottest temperature ever recorded on Earth was 136° F in Al Aziziyah, **ORYBZ**.
5. Death Valley The hottest, driest place in the U.S. is **WVZGS EZOOVB**, California.
6. New Hampshire The strongest wind gust ever measured on Earth was 231 mph in Mount Washington, **MVD SZNKHSRIV**.
7. snowfall The heaviest **HMLDUZOO** recorded in the U.S. during a 24-hour period was 76 inches.
8. Disappointment The foggiest place in the U.S. is Cape **WRHZKLRMGNVMG** at the mouth of the Columbia River in Washington.

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. T At any moment there are approximately 2000 thunderstorms on the planet.
2. T A lack of cloud cover is one of the reasons the desert cools so rapidly at night.
3. F The cyclic flow of air caused by the Coriolis effect cannot lead to a tornado.
4. T The stronger the vertical movement of air, the higher cumulus clouds will rise.
5. F Solar energy is at its peak in the Northern Hemisphere during the winter months.
6. T Thunderstorms usually occur during the afternoon because it takes all day to create enough heat energy to power the vertical flow of air necessary to create them.
7. F Most tornadoes only last between 2 and 4 hours.
8. T The most common place for tornadoes on the planet is the Mississippi Valley and the Great Plains of the United States.
9. T The entire United States can be covered by only two or three air masses.
10. F As a cold front passes, winds decrease and temperatures rise briefly.

ANSWER KEY for page 22

FILL IN THE BLANKS

Use the words below to fill in the blanks.

air pressure
barometer
humidity
mercury
precipitation
tornado
trade winds
trough

1. Water droplets or ice crystals that fall to Earth are called precipitation.
2. The force produced by the weight of air pressing down on the Earth is known as air pressure.
3. A tornado is the smallest and most destructive type of violent storm.
4. The amount of water vapor or moisture in the air is called humidity.
5. A low pressure area of an air mass is called a trough.
6. A barometer measures air pressure.
7. Northeast and southeast winds are often called trade winds.
8. Placing a thermometer in the direct sun gives a falsely high reading because the sun heats the mercury more than it heats the air around it.

ANSWER KEY for page 23

WEATHER PHENOMENA

For each phenomena listed below, describe in a few sentences how it develops and behaves.

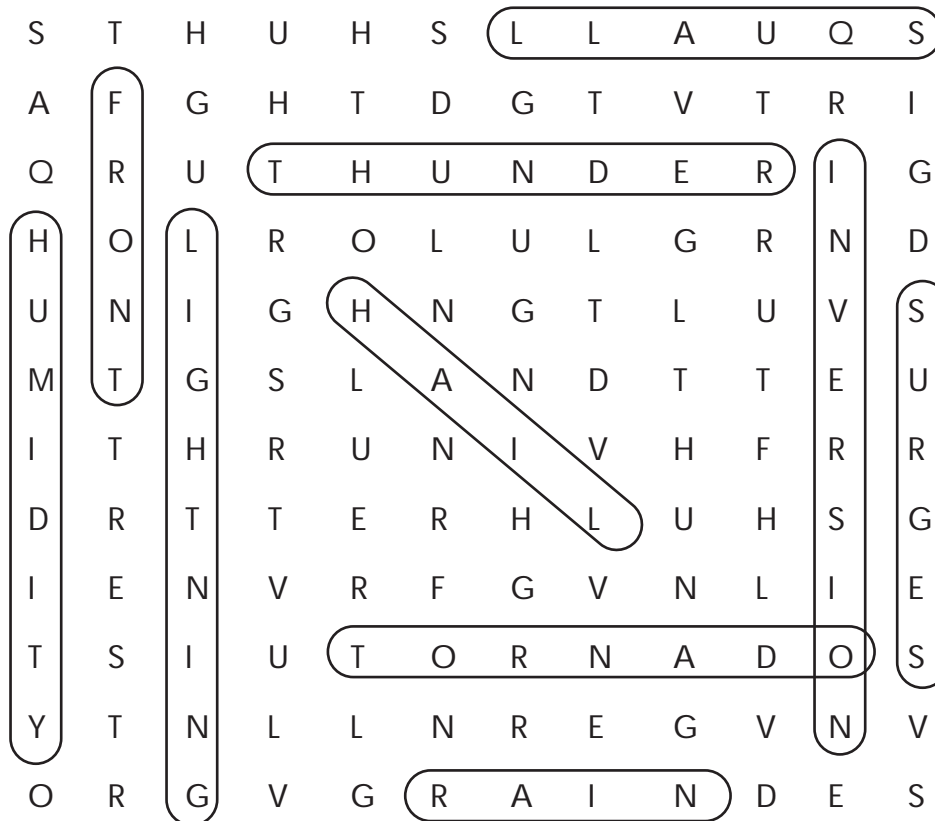
1. Tornado Tornados occur when a mass of warm, humid air rises very rapidly. More air rushes in to replace the air that rises. The intrushing air begins to rotate and forms a tornado.
2. Hurricane A hurricane is a powerful, massive storm system. Hurricanes form over warm, moist areas. Most hurricanes form over the ocean near the equator. During formation, a massive circulation of clouds begins to rotate around a low-pressure center.
3. Hail Small ice crystals strike super-cooled water that is below the freezing point but still liquid. As this water flows over the ice crystals, it freezes. This process may repeat several times, causing the hail stones to become heavy and fall to the ground.
4. Lightning The charged particles of water in a storm cloud have great electrical potential. When this cloud gets close to an object with an opposite charge, such as the ground, it creates a huge spark or a lightening bolt.
5. Thunder Lightening quickly heats the air, causing it to expand. This expansion produces sound waves that we hear as thunder.

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.

- Thunder
- Front
- Surges
- Inversion
- Lightning
- Tornado
- Hail
- Squall
- Rain
- Humidity



ANSWER KEY for page 25

TEST

Circle the phrase which best answers each question.

1. Which of these does not affect Earth's weather?

- the heat energy of the sun
- Earth's orbit around the sun
- erosion
- the rotation of the Earth on its axis

2. Atmosphere moving very slowly in huge blocks of air is called:

- wind.
- an air mass.
- a hurricane.
- a tornado.

3. Air moves:

- horizontally
- vertically.
- electrically.
- horizontally and vertically.

4. The Coriolis effect makes air move ____ in the Northern Hemisphere.

- slowly
- quickly
- clockwise
- counter-clockwise

5. The type of weather conditions that exist within an air mass after it leaves its area of origin depends on:

- moisture in the air.
- solar energy.
- the temperature of the ground or water it passes over.
- air masses.

ANSWER KEY for page 26

TEST (CONTINUED)

6. When a layer of cold air is trapped beneath warmer air, the result is:

- temperature inversions.
- thunderstorms.
- tornadoes.
- hurricanes.

7. In a sloping intersection along a front, the cold air mass is always _____ the warm air mass.

- higher than
- lower than
- next to
- wedged between

8. When low pressure forms along turbulent squall lines, the result is:

- tornadoes.
- thunderstorms.
- hurricanes.
- temperature inversions.

9. A full-fledged hurricane must have winds of least _____ miles per hour.

- 54
- 64
- 74
- 84

10. Stratus clouds are associated with:

- thunderstorms.
- drizzle.
- heavy snow.
- hurricanes.