The Weather Classroom's *"Elementary Weather"* Teacher Guide

Teacher Overview

Introduction

Welcome to Elementary Weather! This Guide describes activities and lesson plans for elementary school teachers to use in conjunction with The Weather Channel's Weather Classroom program entitled "*Elementary Weather."* Each lesson builds off of information presented in the program, allowing you and your students to delve more deeply into the content. The lesson ideas have all been designed as stand alone and distinct enough that you may take advantage of all of them with little overlap.

Each lesson has the science of weather at its core, but also extends into at least one other subject area for cross-curricular benefit. The lessons are geared for grades K-5, but are adaptable to meet the learning needs of your students. Each lesson includes background information, teacher steps specific to the activity, additional resources, and reproducible handouts for students. All lessons are based on National Science Education Standards.

Included in this Guide is a "Frequently Asked Questions" section that provides additional background information to help you gain a better understanding of how to use this resource. A modified version of the Guide is also available in printed version from The Weather Channel. To order a printed Guide, call 1-800-471-5544. You can also purchase The Weather Classroom videos by visiting http://twc.store.fanbuzz.com .

How to Use This Guide and the *"Elementary Weather"* Program

This Guide is designed to be used in conjunction with The Weather Channel's special Weather Classroom programming episode entitled *"Elementary Weather."* The program will air commercial-free in the Cable in the Classroom time slot (from 4:00 – 4:30 am EST) on The Weather Channel Monday, September 15 and Thursday, September 18 for you to tape and show in your classroom. The episode will also be rebroadcast throughout the rest of the year, as part of The Weather Classroom series. The program discusses basic weather concepts in a fun and engaging way. After showing the video, you can use any or all of the lesson plans included in this Guide as an enhancement and review of the concepts covered during the program.

Teacher Background Information

Before showing the Weather Classroom *"Elementary Weather"* program and selecting the best activities for your students, it is important to have a general understanding of

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weather concepts and phenomena. For some lessons you may also need more in-depth knowledge prior to starting the activity. For instance, for the lesson involving writing across the curriculum (Raindrop for a Day), you should first read about and understand the water cycle. Background information is included in each lesson plan, and can also be found on the Weather Classroom web site. Additional information on certain weather topics can also be found on-line using the links provided in the Resource section of this Guide.

Before using these lessons, you should also be familiar with the Science as Inquiry method. The National Science Education Standards lists Science as Inquiry as an important content standard at all grade levels. Since students are naturally curious, they should be encouraged to make observations and ask questions about the world in which they live, and they should try, in an organized manner using the tools of science, to explain their observations. The lessons provided in this Guide are an excellent opportunity to practice this method of teaching in your classroom.

It is also important to be comfortable using technologies such as the Internet to help plan, organize, and deliver instruction to your students. Although the lessons in this Guide may be done without use of on-line resources, the activities are designed to enhance student learning about the weather. If needed, science or media resource specialists, parents, and sometimes students may be available to assist you in using technology to help expand student learning outside the classroom.

Lesson Descriptions

Lesson 1: Weather Sense: Using Inquiry to Introduce Weather Concepts
Grades K-2
This lesson challenges students to use their senses of sight, smell, hearing, and touch to make observations about the weather. Through whole-class instruction and small group participation, students record their observations about the weather. They then communicate their findings by illustrating a weather concept and/or writing about their observations.

Lesson 2: What's the Temperature? Using the Scientific Method to Learn About Weather
Grades 3-5
This lesson introduces students to the scientific method by investigating reasons why temperature is not the same at all locations inside and outside the classroom. The lesson begins with a hands-on activity where students measure the temperature at various locations. The teacher then leads a whole-class discussion to examine the data. Students will note that temperature is not uniform and will attempt to explain why using the scientific method. An extension to this lesson is also provided. In the extension activity, students design and conduct a simple experiment to test a hypothesis as to why temperature may vary in the same location.

Lesson 3: Weather Word Games – A Collection of Assessment Activities to Help Students Gain an Understanding of Weather Concepts
Grades K-5
These activities serve as assessment tools for student understanding of the key weather concepts introduced in the program *"Elementary Weather."* Activities include crossword puzzles, word searches, word jumbles, and "Weather Word Builders." Easy Games are available for students in grades K-2; Medium Games and Challenge Games are provided for students in grades 3-4 and 4-5.

Lesson 4: WWW – World Wide Weather Exchange Project
Grades 3-5
This is a long-term project where students in different locations around the world, or within the United States, exchange information about weather and climate. The lesson provides basic guidelines, but not detailed steps, for setting up an exchange program with another classroom. Suggested activities to complete as part of the exchange program are included. The project can be managed by an individual or a team of teachers, or coordinated by a resource specialist at the school.

Lesson 5: Splish-Splash! Raindrop for a Day
Grades K-5
This lesson helps students develop literacy skills by writing about their experiences while pretending they are a raindrop. Younger students will be prompted to write words and short sentences; older students will be challenged to create short stories and/or poems. Other forms of student assessment may include concept maps, drawings, 3-D models, and mobiles. Through this activity, students gain a better understanding of the water cycle.

Important Terms

The following important terms from the video can be found at http://www.weatherclassroom.com/glossary/ .

- Air
- Atmosphere
- Climate
- Climatic Zones
- Clouds
- Flood
- Heat
- Hurricane
- Ice
- Lightning
- Meteorologist
- Polar
- Pressure
- Rain
- Scattering
- Snow
- Storm
- Sun
- Temperate
- Temperature
- Tornado
- Tropic
- Water Cycle
- Weather
- Wind

Frequently Asked Questions

Q: How can I best use the *Elementary Weather* program and teacher guide to help my students learn about weather?

A: It is best to preview the program before sharing it with your students. As you watch the video, make a list of questions that you may want to ask your students

about it. You may also jot down key weather terms you want to discuss in class. Browse the Teacher Guide to get a general idea of the lessons available. Show the program to your students and assign them a task to accomplish as the watch the video. It may be a simple task such as listen for certain key words or a more challenging task such as taking notes. Pausing the program in key spots is another Best Practice to consider. After the viewing, discuss the information from the video, emphasizing those terms that students will investigate in the lesson plans.

Q: Which lessons or activities are best for my students?

A: It depends on the grade level and type of students you teach. The lessons and activities are designed for a range of student ages and abilities. There are also suggested modifications and extensions for each lesson. State mandated curriculums might also affect your choices.

Q: Some of the lesson topics, such as science as inquiry and the scientific method, seem more appropriate for middle school and even high school students. Are these lessons too advanced for my students?

A: No. While Science as Inquiry and the scientific method are formally taught to students in higher grades, they are both Best Practices that apply to all levels and ages of learners. In fact, younger students, especially kindergarteners, are naturally curious and learn well using science as inquiry. Also, the lessons were created with the intent of introducing science as inquiry and the scientific method to elementary age students.

Q: The lessons reference the National Education Science Standards. Are these standards applicable to my students?

A: Yes. The National Education Science Standards are appropriate benchmarks for all students. Many states use the National Standards to develop curriculum guidelines for their students.

Q: As a 1st grade teacher, I need to spend most of my time helping students learn to read and write. I have limited time for science. Can these lessons help my students develop literacy skills?

A: Absolutely! All of the lessons include activities that help students become better readers, thinkers, and writers. For example, the "Splish-Splash! Raindrop for a Day" lesson challenges students to write about their imaginary experience as a raindrop.

Q: I really understand very little about weather. How can I learn more before teaching these lessons to my students?

A: You are not expected to be an expert in weather before teaching these lessons. The background information in each lesson plan includes information that is relevant to the lesson. For example, for the "Splish-Splash" lesson, general information is provided about the water cycle. Web pages are cited as references

if you need additional information about a weather topic or phenomena before using a lesson.

Q: I like the World Wide Weather Exchange lesson, but as a classroom teacher, I do not have time to organize and manage the project. Any suggestions?

A: The weather exchange project does require an investment in time to organize and monitor. Is there another teacher that you can team with to share the load? A media or a science resource specialist can also coordinate the project with you or for you. Parents may be another resource to help manage the project.

Lesson 1: Weather Sense: Using Inquiry to Introduce Weather Concepts

Audience:

Grades K-2

Activity Overview:

Students use their sense of sight, smell, hearing, and touch to make and record observations about the weather. They share their findings by either drawing pictures or writing about weather concepts.

Objective:

By completing this lesson, students will

- Observe the weather using their senses.
- Participate in the process of scientific inquiry.
- Write or draw about weather concepts.

National Standards Addressed:

This lesson addresses the following National Science Education Standards K-4 Content Standards:

- Standard A: Students develop abilities necessary to do scientific inquiry.
- Standard D: Students develop an understanding in changes in Earth and sky.
- Standard A: Students communicate investigations and explanations

Desired Outcomes:

After completing the lesson, students will:

- Recognize that they can learn about weather using their five senses.
- Begin to build an understanding of basic weather concepts.
- Gain experience in communicating results by drawing, writing, and talking about weather.
- Understand that science involves asking questions, and collecting and analyzing data.

Teacher Prep Time:

15-30 minutes

Class Time:

Video: 25 minutes
Activity: 30 – 50 minutes. May be completed over several class periods.

Materials Needed:

- flip chart, white board, or blackboard to record student comments
- handout for students to record observations
- pencils to record observations
- crayons or finger paint to illustrate weather concepts

Background:

Before beginning this lesson, you should have a general understanding of weather concepts and phenomena. It may be helpful to review some of the important vocabulary terms such as weather, wind, atmosphere, clouds, temperature, etc. However, it is not necessary to fully understand these terms before starting the lesson with your students. The goal is to predict some of the questions that students will ask and be prepared with answers. For example, "What are clouds made of?" or "What's a rainbow?"

For this lesson, it is also important to be familiar with the Science as Inquiry methodology. Science as Inquiry involves observing the world around us, asking questions, and then trying to explain our observations. This activity emphasizes the first and second steps of the science inquiry process. Science inquiry at the K-2 grade level means simply that the children should be encouraged to talk and draw and write about what they see and think.

Prior to doing this activity, it may help to make a list of your students' anticipated observations. What are they likely to see, hear, smell, or touch about the weather? Typical comments may be: "It feels hot on my skin." "I can see clouds in the sky." "Wind is blowing on my face." "The grass feels wet."

Note: We purposefully do not mention the sense of taste to give students an opportunity to ask: "Can we taste the weather?" Answers to that question can vary, but for the data collection portion of the activity, it is not advised for students to use the sense of taste for safety reasons.

Activity Steps:

1. After watching the video *"Elementary Weather"* in class, begin the lesson with a whole-group discussion and ask the question "How do people learn things?" Answers will vary, but guide the discussion to the answer that people learn new things by making observations.

2. Ask the question "How do we observe things?" A typical answer may be that we see and hear things, but be sure to tell students that we also learn new things by our sense of smell and touch. For example, touching a hot stove is painful.
3. Continue the discussion by asking for more examples of how students use the sense of sight, hearing, smell, and touch to learn. After a few minutes, tell the class that they will work together to make a list of ways we learn about the weather using our senses.
4. At this point a student may ask about the sense of taste. Praise the student for asking an excellent question and spend a few minutes discussing with the class "Can we taste weather?" Answers will vary, but inform the students that during the data collection portion of this activity, you do not want students to use the sense of taste for safety reasons.
5. Lead a brainstorming session to prompt students to think about how we can see, hear, smell and touch weather. Use a flip chart, white board or other means to record student responses. The Student Handout is another way to record student comments.
6. If time permits, proceed outside to make additional observations about the weather to add to the class list. For younger students continue as whole-group instruction and record student comments. Older students may work individually or in smaller groups to record their observations on the Student Handout.
7. To assess student understanding, younger students should select one observation from the class list and draw a picture to describe the observation. Older students can be asked to write short sentences or paragraphs about one or more of their observations. Encourage all students to talk about their selections and about their ideas of weather phenomena.

Academic Extensions/Modifications:

- If students are not familiar with the process of brainstorming, Step 5 provides an excellent opportunity to discuss the process before making the class list of ways we sense weather.
- Encourage students to make daily weather observations using their senses in a "Weather Log" or to write about their observations in a "Weather Journal."
- An extension activity may include further research into student findings. For example, why is the ground wet in the morning? Where do clouds come from? What causes wind? Students may attempt to answer these types of questions individually or with parental help. Or they may work in small groups to research a question and share their findings with the class. An excellent resource to point students toward is the Homework Help section of the www.weatherclassroom.com web site.
- Ask students to share their weather observation list with their parents and have parents add their comments to the list.

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Resources:

http://www.nap.edu/readingroom/books/nses/html/6c.html#csak4
National Science Education Standard explains and discusses science as inquiry

http://www.weatherclassroom.com/glossary/
Explains key weather terms

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Student Handout:

Weather Senses

Use this handout to record your observations about the weather.

Ways that I see weather…	**Ways that I hear weather…**
Ways that I smell weather…	**Ways that I touch weather**…

Lesson 2: What's the Temperature? An Introduction to the Scientific Method

Audience:

Grades 3-5

Activity Overview:

In this activity, students will measure the temperature at various locations inside and outside the classroom. They will then examine the data and form a hypothesis as to why temperatures may vary with location. Younger students learn about the five steps of the scientific method. Older students may design a simple scientific method experiment to test a hypothesis, collect data, analyze results, and draw conclusions.

Objective:

By completing this lesson, students will:

- Observe temperature readings at various locations.
- Use the scientific method to investigate changes in temperature.
- Collect, analyze and present scientific data.

National Standards Addressed:

This lesson addresses the following National Science Education Standards K-4 Content Standards:

- Standard A: Students develop abilities necessary to do scientific inquiry.
- Standard D: Students plan and conduct a simple investigation.
- Standard A: Students communicate scientific procedures and explanations.

Desired Outcomes:

After completing the lesson, students will:

- Recognize that temperature may vary depending on location and other factors.
- Begin to build an understanding of heat transfer by conduction and convection.
- Gain experience using a thermometer to measure temperature.
- Understand how to investigate cause and effect using the scientific method.

Teacher Prep Time:

15-30 minutes

Class Time:

Video: 25 minutes
Activity: 30 – 50 minutes — Introduction to the Scientific Method
Extension: 30 – 50 minutes — Using the Scientific Method to Investigate Changes in Temperature

Materials Needed:

- flip chart, white board, or blackboard to record student comments
- Student Data Sheet to record observations
- pencils to record observations
- thermometers to measure temperature *

* Inexpensive thermometers, shaped similar to a bookmark, are available from most scientific suppliers. Use these types of thermometers to collect initial data. For more detailed measurements for follow-up investigations, other types of thermometers are available.

Background:

Before beginning this lesson, you should understand that the scientific method involves the five basic steps of 1) making observations, 2) forming a hypothesis, 3) collecting data to test the hypothesis, 4) analyzing results, and 5) drawing conclusions. In this lesson, students make observations about temperature at various locations inside and outside of the classroom. They should note that the temperature differs depending on location and other factors. The question to pose to your students is "Why?" Explain to students that scientists answer these types of questions using the scientific method. Be prepared to explain the scientific method to your students.

Prior to collecting data with the students, place several thermometers around the classroom. Possible locations would be on the floor, on a desk, near the ceiling, in a sunny spot, on a computer, etc. Note the temperatures to verify that they do indeed differ. Repeat the process in the playground outside. Choose locations such as the asphalt, grass or wood surfaces, shady and sunny spots, and on playground equipment. The goal is to choose locations that are at different temperatures.

Analyze your data and use the information to suggest locations where students should place their thermometers. You may decide to label these locations and direct students to measure the temperature at those locations. Alternately, you may allow students to choose their own locations.

The basic objective of this lesson is to introduce the scientific method to your students via this simple activity. The beginning activity is appropriate for all grade levels. The extension activity where students actually design an experiment to test a hypothesis is more appropriate for older and/or more advanced students or honor level classes.

Activity Steps:

1. After watching the program *"Elementary Weather"* in class, divide the class into groups of 3 students and give each group a thermometer.
2. Demonstrate how to read a thermometer and allow each student to read and note the room temperature.
3. Distribute the Student Data Sheet and work with the class to fill in the first row of information. Record temperatures to nearest one-half degree. Advise/remind students how to calculate the Average Temperature.
4. Direct the students to place their thermometers at various locations around the room. Allow students to choose their own sites and/or pre-select the locations. Encourage students to select different locations such as on the floor, on a desk, near the ceiling, in a sunny location, etc.
5. Have students record information on their Student Data Sheet for at least 4 different locations. Students should wait a few minutes before reading the thermometer so the temperature can stabilize.
6. If time permits, repeat steps 4 and 5 outside on the playground. Good sites to place the thermometers include on the grass, on the concrete, on playground equipment, in the shade, etc.
7. Transition the class to whole-class discussion. Ask the question, "Is the temperature the same everywhere?" This is an open-ended question and answers will vary. Students may ask you to clarify the question. What do you mean by "everywhere?"
8. Explain that when you listen to local weather reports, you often hear "Today's temperature is 70 degrees." Ask students what that means. For example, is the temperature the same everywhere in your city? Is the temperature the same everyplace in the classroom? Is it the same everywhere on the playground?
9. Have students examine their data sheets. Record class results on the board or on a flipchart for various locations. Allow students to share their thoughts about how and why temperature may vary depending on location. After a few minutes of class discussion, inform the class that scientists have a systematic way to try to explain the world around us. It's called the scientific method.
10. List on the board the five steps of the scientific method. They are: 1) Make Observations, 2) Form a Hypothesis, 3) Test the Hypothesis, 4) Analyze Results, and 5) Draw Conclusions. Briefly explain each step.
11. Conclude the activity by asking students to explain how they might use the scientific method to explain the temperature differences they observed. (To continue this activity, refer to the Extension lesson.) You may also want to mention to students that in middle and high school they will use the scientific method often to conduct investigations and experiments to gain a better understanding of the physical world.

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Academic Extensions/Modifications:

- An obvious question that students should ask after examining their data is "why isn't the temperature the same at different locations?" Asking this question is an excellent example of students participating in the process of science inquiry. Science inquiry involves asking questions about our environment, planning investigations, and trying to explain our observations. Use the students' questions as an opportunity to briefly explain science inquiry.
- For older or advanced students, the lesson can continue by having students pose hypotheses and design experiments to test their hypothesis. The attached Extension Lesson provides an extension activity that investigates reasons why temperatures may vary at different locations.
- Students may make simple plots of their data to illustrate how temperature varies according to different factors. For example, one plot may be a bar graph of temperature versus location within the classroom. Record temperature on the vertical axis; record location on the horizontal axis.
- As a math activity, more advanced students can practice converting degrees Fahrenheit to degrees Celsius using the formula $F = 9/5C + 32$. Students may research typical temperature readings such as the freezing and boiling points of water in degrees Fahrenheit and Celsius.

Resources:

http://www.nap.edu/readingroom/books/nses/html/6c.html#csak4
National Science Education Standard explains and discusses science as inquiry

http://encarta.msn.com/encnet/refpages/refarticle.aspx?refid=761578797
Discusses the scientific method

Student Handout

Student Data Sheet
What's the Temperature? An Introduction to the Scientific Method

Using the table below, record temperature readings in each location three times. Be sure to round to the nearest one-half degree. Provide a brief description of each location, and include any special comments about each spot (for example 'placed in direct sunshine' or 'wind was blowing on thermometer').

Location	Student #1	Student #2	Student #3	Average Temperature	Comments

Lesson 2 Extension: An Experiment to Investigate Changes in Temperature

Audience

Grades 3-5

Activity Overview:

Students design and conduct a simple experiment to test a hypothesis as to why temperature may vary in the same location.

Objective:

By completing this lesson, students will:

- Use the scientific method to investigate changes in temperature.
- Collect, analyze and present scientific data.

National Standards Addressed:

This lesson addresses the following National Science Education Standards K-4 Content Standards:

- Standard A: Students develop abilities necessary to do scientific inquiry.
- Standard D: Students plan and conduct a simple investigation.
- Standard A: Students communicate scientific procedures and explanations.

Desired Outcomes:

After completing the lesson, students will:

- Begin to build an understanding of heat transfer by conduction and convection.
- Gain experience in using a thermometer to measure temperature.
- Understand how to investigate cause and effect using the scientific method.

Teacher Prep Time:

15-30 minutes

Class Time:

30 –50 minutes

Materials Needed:

- flip chart, white board or blackboard to record student comments
- Student Data Sheet to test hypothesis
- pencils to record observations
- thermometers to measure temperature *
- several clear jars or plastic containers
- stop watch or timing device.

* Inexpensive thermometers, shaped similar to a bookmark, are available from most scientific suppliers. Use these types of thermometers to collect data. For more detailed measurements for follow-up investigations, other types of thermometers are available.

Background:

This lesson is an extension activity for students who have made observations about temperature at various locations inside and outside the classroom. In Lesson 2, students recorded temperature readings and noted that the temperature is different depending on location and other factors. Through data gathering and class discussion, they gained an understanding of the first two steps of the scientific method.

In this extension activity, students gain experience in the other three steps of the scientific method. Specifically, students design a simple experiment to test a hypothesis, collect and analyze data, and draw conclusions.

This activity requires a sunny day and a location where students can place a jar of water in the sun so the water can be heated by the sun.

Activity Steps:

1. Review the five steps of the scientific method. They are: Make Observations, Form Hypothesis, Test Hypothesis, Analyze Results, and Draw Conclusions. Briefly explain each step. Emphasize that a hypothesis is an educated guess based on observations and measurements as to how something happens.
2. From the previous lesson, students should have noted that temperature is higher in some locations and lower in other locations. For example, a thermometer sitting on a metal surface such as a slide would indicate a higher temperature than a thermometer measuring the air temperature. The question is, why?!
3. Lead a whole class discussion as to why temperature may differ between a surface and air. Allow students to speculate as to what may cause the difference in temperature readings. Guide the discussion to where students start thinking about the differences between air and a metal surface.

4. Ask the leading question "Could it be that certain materials gain or lose heat better than other materials?" Allow for some discussion, but then inform the students the question they are trying to answer is called a hypothesis. Scientists make hypotheses to explain their observations about the world.
5. Divide the class into groups of 3 students and give each group a thermometer, two plastic jars, and a Student Data Sheet. Explain to the students that they will be measuring the temperature of air and the temperature of water in the jar and examining the data to try to test their hypothesis that different materials may have different temperatures.
6. Have students read their thermometers and record the readings. The readings should be the same. Then have students fill one jar with water and leave one jar empty. Place both jars in a sunny location.
7. Place a thermometer in each jar. Record the initial temperature immediately after putting the thermometer in the jar. Wait one minute and record the temperature of the water and air. Repeat readings for a period of five to fifteen minutes. Students should note that the temperature in air rises faster than the temperature of the water. This is because the sun must first heat the water and conduct energy to the thermometer, a process that takes time.
8. After a longer period of time, the temperature of the air and water will be the same. There is a basic law in physics that states that two objects with different temperatures will eventually reach the same temperature. Heat will flow from the hotter object to the cooler object until the temperature of both objects is equal. You may share this fact with students, but be sure to tell them that is a concept that they will not study until high school physics!
9. Help students analyze their data and draw conclusions regarding their hypothesis that different materials may have different temperatures. Help students draw a simple line graph of temperature versus time to help compare temperatures.

Resources:

http://encarta.msn.com/encnet/refpages/refarticle.aspx?refid=761578797
Discusses the scientific method

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Student Handout

Student Data Sheet
What's the Temperature? An Experiment to Investigate Changes in Temperature

	Thermometer in empty jar	Thermometer in jar with water	Comments
Initial temperature In air			
Temperature when first placed in jar			
Temperature after 1 minute			
Temperature after 2 minutes			
Temperature after 3 minutes			
Temperature after 4 minutes			
Temperature after 5 minutes			
Temperature after 10 minutes			
Temperature after 15 minutes			

Lesson 3: Weather Word Games: Crosswords, Word Searches, Jumbles, and More!

Audience
Grades K-5

Activity Overview:
Students complete crossword puzzles, word searches and other word games to become familiar with key weather concepts from the Weather Classroom program *"Elementary Weather."*

Objective:
By completing this lesson, students will
- Work crossword puzzles suitable for their grade levels.
- Complete word searches looking for key weather terms.
- Unscramble letters to form words related to weather concepts.
- Compete in teams to create their own word lists using letters found in common weather terms.

National Standard Addressed:
This lesson addresses the following National Science Education Standards K-4 Content Standard:

- Standard A: Students develop abilities necessary to do scientific inquiry.

Desired Outcomes:
After completing the lesson, students will:
- Recognize key vocabulary terms used to describe and explain weather.
- Develop reading skills by completing crossword puzzles.
- Increase their vocabulary by locating weather terms in word searches.
- Improve creative skills by forming new words from weather terms.

Teacher Prep Time:
15-30 minutes to select and copy puzzles

Class Time:

Video: 25 minutes
Activity: 15-30 minutes (or assign puzzles as homework)

Materials Needed:

- puzzle handouts for students
- pencils

Background:

The word games in this lesson are designed as assessment activities to gauge student understanding of key weather terms used in the Weather Channel program *"Elementary Weather."* It is assumed that students will have watched the video prior to doing these activities.

The following is a list of puzzles provided in this Guide. Solutions for puzzles are also provided.

Word Jumble: Easy, Medium, and Challenge levels (Grades K-1, 2-3, and 4-5)
Word Builder: Rounds 1, 2, and 3 (appropriate for Grades 2-5)
Word Search: Easy 1 & 2 (Grades K-1 and 2-3), Medium (Grades 3-4), and Challenge levels (Grades 4-5)
Crossword: Easy (Grades 2-3), Medium (Grades 3-4) and Challenge levels (Grades 4-5)

Activity Steps:

1. As a class, watch the program *"Elementary Weather."* After the video, make a list of key terms about weather that is appropriate for the grade level of your students. The alphabetized list below contains weather terms mentioned in the program.

Table 1 Key Terms About Weather

• Air	• Flood	• Meteorologist	• Snow	• Tornado
• Atmosphere	• Heat	• Polar	• Storm	• Tropic
• Climate	• Hurricane	• Pressure	• Sun	• Water Cycle
• Climatic Zones	• Ice	• Rain	• Temperature	• Weather
• Clouds	• Lightning	• Scattering	• Temperate	• Wind

2. Choose one or more of the word puzzles that you feel will help your students gain a better understanding of weather concepts. Students may work individually or in teams to complete the puzzles.

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Academic Extensions/Modifications:

- Puzzles are designed for various levels of students. Although a puzzle may be labeled as grades 4-5, challenge your 3rd graders to do attempt a more difficult puzzle.
- Involve the parents of younger students in the learning process by assigning a word puzzle as homework. Besides parents, younger students can ask older siblings for help completing a puzzle.

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"Elementary Weather"
Word Jumble

Directions: Unscramble groups of letters to form words related to weather concepts. Key terms are listed in the following table.

Key Word List

Air Pressure	Flood	Polar	Temperate	Weight
Atmosphere	Heat	Prism	Tornado	Wind
Climate	Hurricane	Rainbow	Tropic	Hot
Climatic Zones	Light	Scattering	Water Cycle	Cold
Clouds	Meteorology	Temperature	Weather	Ice
Rain	Snow	Hail	Air	

Easy Jumbles

DCOL	
TOH	
EIC	
RNIA	
OOLFD	

Medium Jumble

WRNOIAB	
AEEHRTW	
OARLP	
AEICTML	
DOOFL	
EEETTPMRRAU	
EEOOOYGLRTM	

Challenge Jumble

IEASGCNTRT	
THIGL	
AEEOHTRSMP	
CWYACTLEER	
RWEEHAT	
RMSIP	
OROLEOTMYEG	
SDUOLC	
AEEIURRRSSP	

"Elementary Weather"
Word Jumble Solutions

Easy Jumble

DCOL	cold
TOH	hot
EIC	ice
RNIA	rain
OOLFD	flood

Medium Jumble

WRNOIAB	rainbow
AEEHRTW	weather
OARLP	polar
AEICTML	climate
DOOFL	flood
EEETTPMRRAU	temperature
EEOOOYGLRTM	meteorology

Challenge Jumble

IEASGCNTRT	scattering
THIGL	light
AEEOHTRSMP	atmosphere
CWYACTLEER	water cycle
RWEEHAT	weather
RMSIP	prism
OROLEOTMYEG	meteorology
SDUOLC	clouds
AEEIURRRSSP	air pressure

"It's Elementary!"
Word Builder Game

Directions:

- Work in teams of two to form as many 3, 4, 5, and 6 or more letter words as you can from the words in **BOLD**.
- Earn one point for each three-letter word, 2 points for each four-letter word, 3 points for each 5-letter word, and 5 points for each word longer than 5 letters.
- There are three rounds in the game. You will have 5 minutes for each round to form new words. Your total score after three rounds is your final team score!

Round #1 ….It all's about the **WEATHER**!

3-letter words	4-letter words	5-letter words	6 or more letter words

Scoring:

3 letter words x 1pt = _____
4 letter words x 2pts = _____
5 letter words x 3pts = _____
6+ letter words x 5pts = _____

Total Score for Round #1 = _____

Round #2…. Over the **RAINBOW**

3-letter words	4-letter words	5-letter words	6 or more letter words

Scoring:

3 letter words x 1pt = _____
4 letter words x 2pts = _____
5 letter words x 3pts = _____
6+ letter words x 5pts = _____

Total Score for Round #2 = _____

Round #3 Let's learn about the **ATMOSPHERE**

3-letter words	4-letter words	5-letter words	6 or more letter words

Scoring:

3 letter words x 1pt = _____
4 letter words x 2pts = _____
5 letter words x 3pts = _____
6+ letter words x 5pts = _____

Total score for Round #3 = _____

TOTAL TEAM SCORE

Round #1 _____

Round #2 _____

Round #3 _____

Total _____

"Elementary Weather"

Word Search – Easy 1

Find the words from the list in the puzzle below!

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

AIR
COLD
HEAT
HOT
ICE
LIGHTNING
RAIN
SNOW
STORM
SUN
TEMPERATURE
WATER
WEATHER

"Elementary Weather"
Word Search – Easy 2

Find the words from the list in the puzzle below!

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

AIR
CLIMATE
CLOUDS
FLOOD
HEAT
ICE
LIGHTNING
RAIN
SNOW
STORM
SUN
TEMPERATURE
TORNADO
WEATHER
WIND

"Elementary Weather"

Word Search - Medium

Find the words from the list in the puzzle below!

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

ATMOSPHERE
CLIMATE
CLOUDS
FLOOD
HEAT
HURRICANE
ICE
LIGHTNING
POLAR
RAIN
SNOW
STORM
SUN
TEMPERATE
TEMPERATURE
TORNADO
TROPIC
WATERCYCLE
WEATHER
WIND

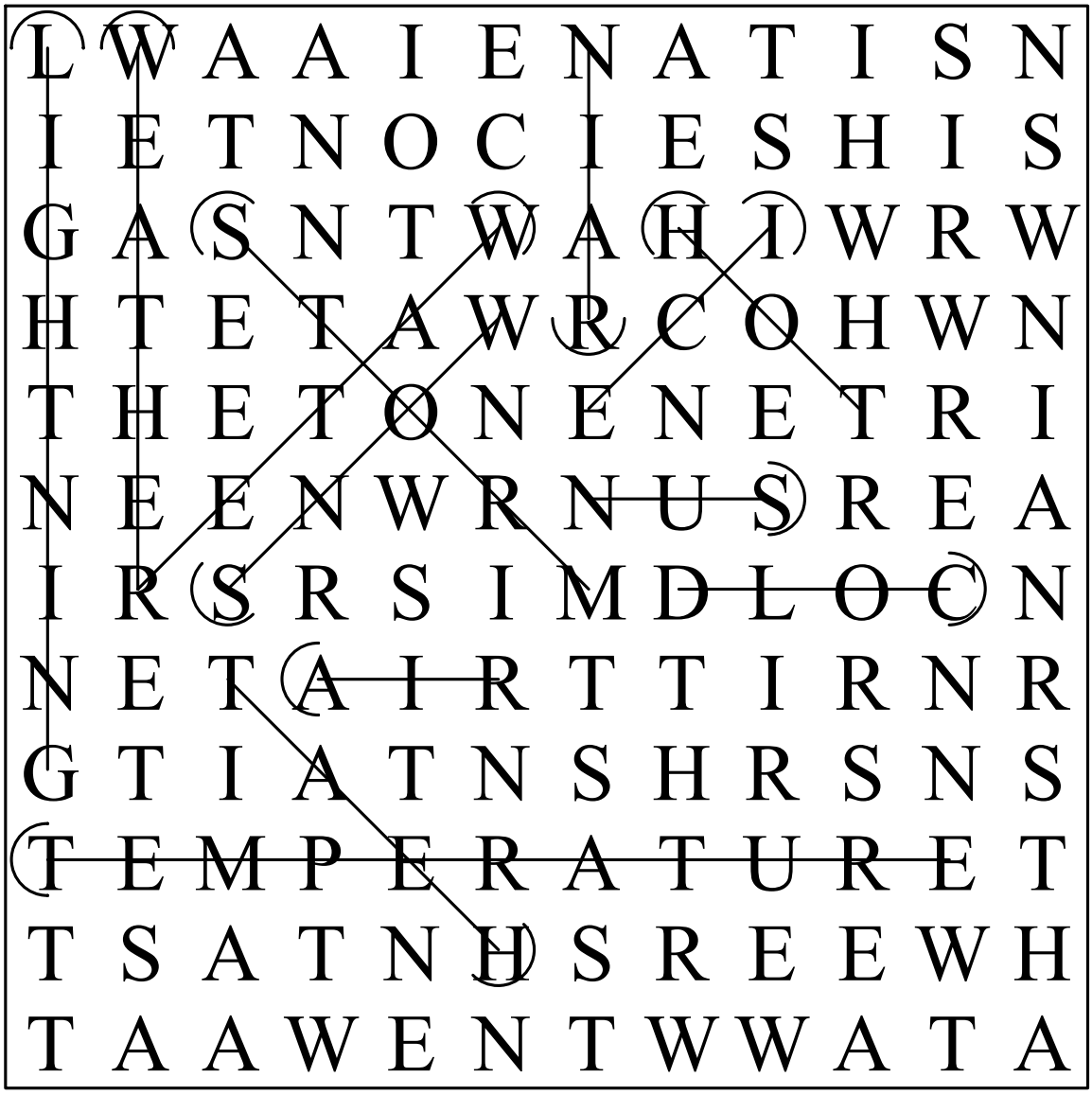
"Elementary Weather"
Word Search - Challenge

Find the words from the list in the puzzle below!

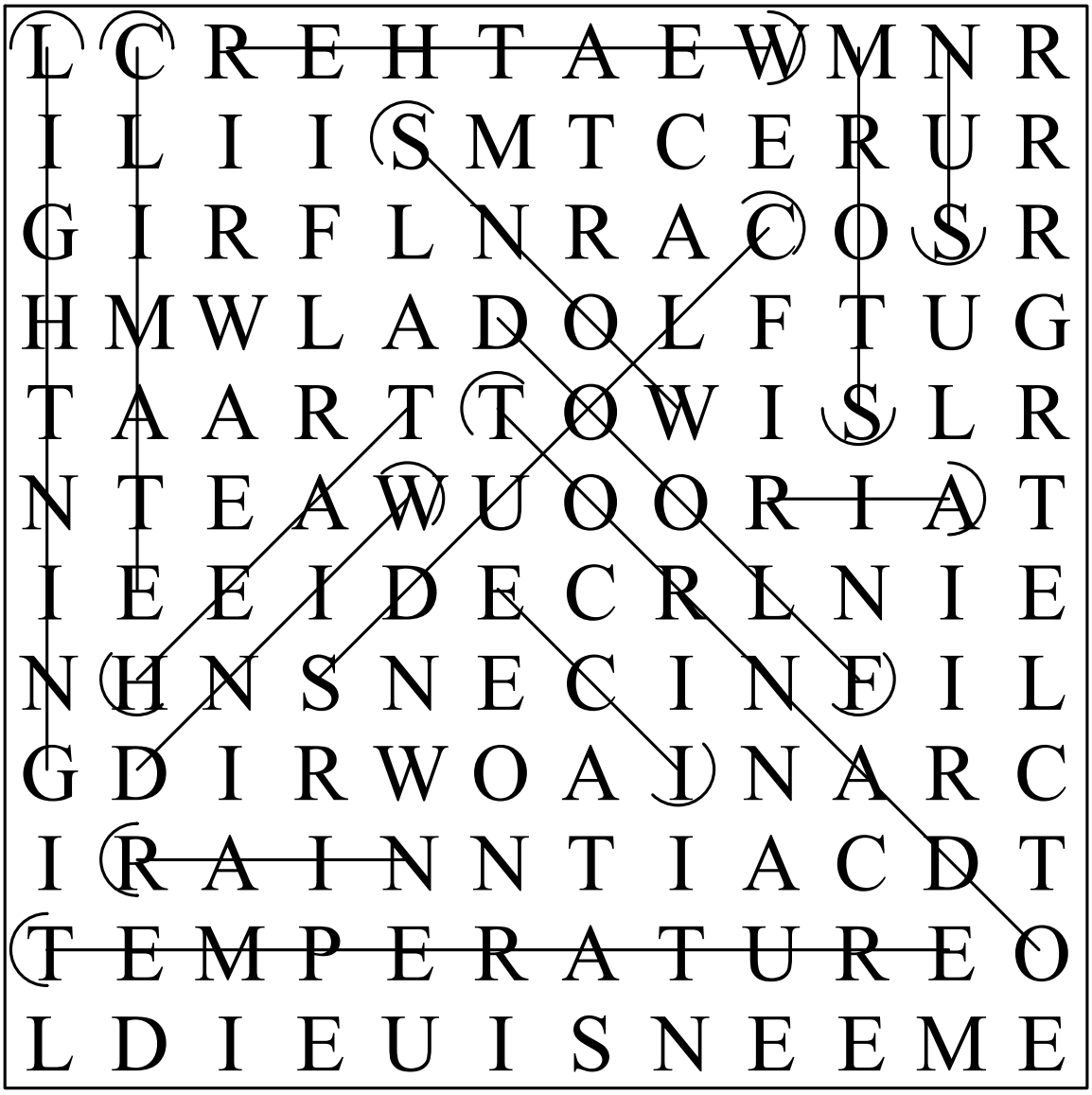
T	S	I	G	O	L	O	R	O	E	T	E	M
E	R	U	T	A	R	E	P	M	E	T	A	R
R	I	S	E	T	A	R	E	P	M	E	T	O
I	E	L	C	Y	C	R	E	T	A	W	M	T
A	t	E	N	A	C	I	R	R	U	H	O	S
s	G	N	I	N	T	H	G	I	L	E	S	l
O	D	A	N	R	O	T	R	A	L	O	P	e
m	e	E	R	U	S	S	E	R	P	n	H	t
E	T	A	M	I	L	C	a	R	T	A	E	H
R	E	H	T	A	E	W	D	N	I	W	R	r
C	L	I	M	A	T	I	C	Z	O	N	E	S
S	D	U	O	L	C	I	P	O	R	T	G	y

AIR
ATMOSPHERE
CLIMATE
CLIMATICZONES
CLOUDS
HEAT
HURRICANE
LIGHTNING
METEOROLOGIST
POLAR
PRESSURE
SCATTERING
STORM
TEMPERATE
TEMPERATURE
TORNADO
TROPIC
WATERCYCLE
WEATHER
WIND

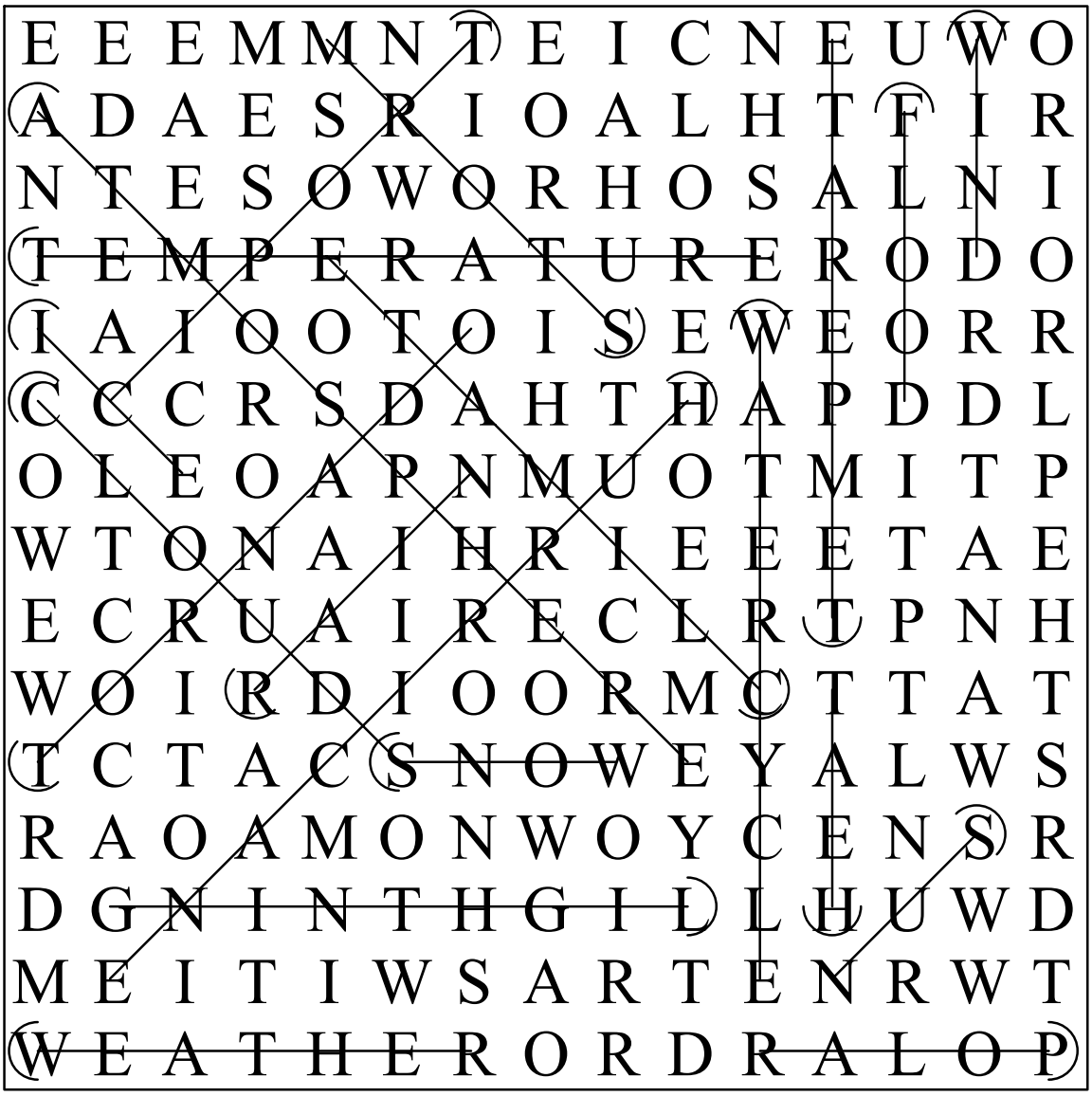
Word Search Solution – Easy 1



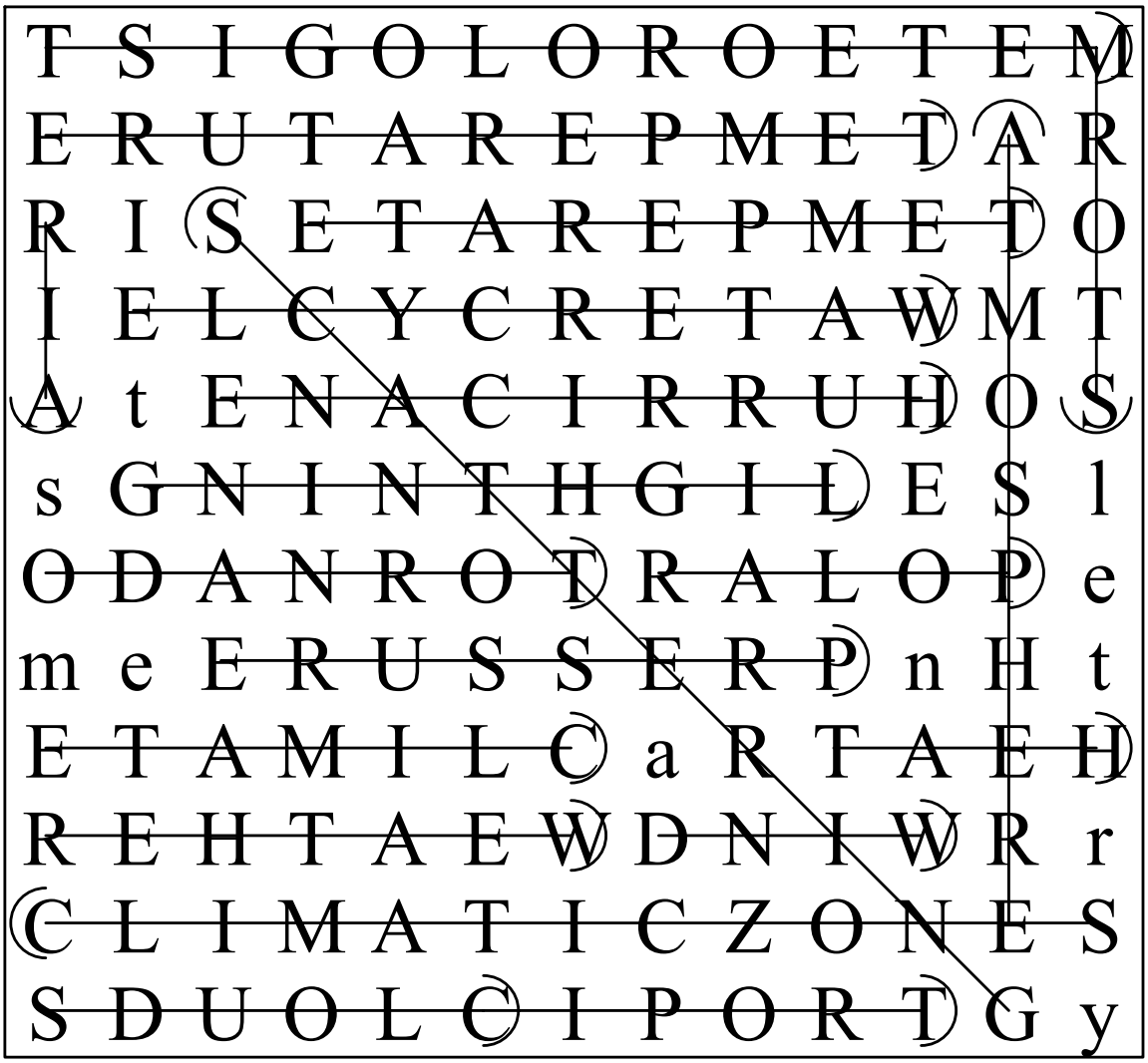
Word Search Solution –Easy 2



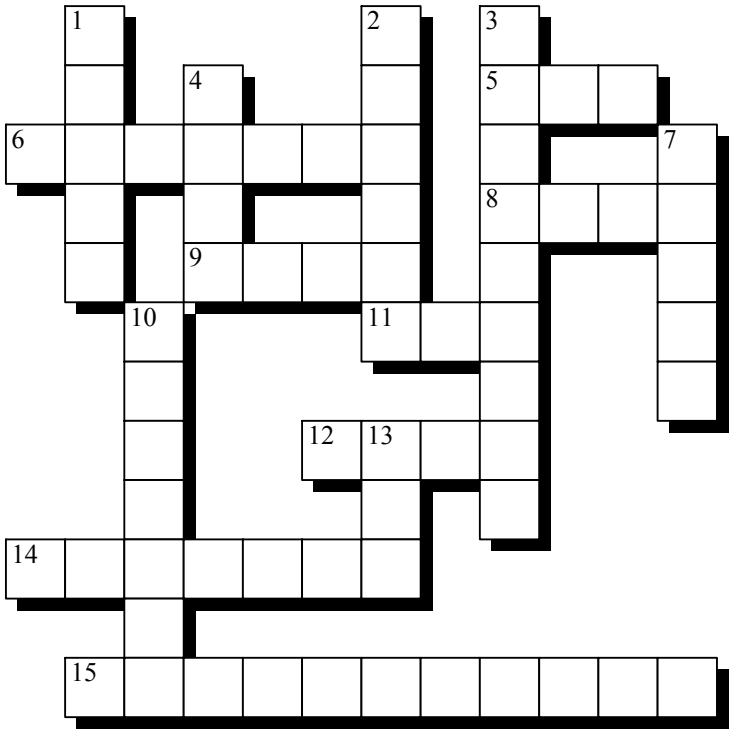
Word Search Solution – Medium



Word Search Solution – Challenge



"Elementary Weather"
Crossword Puzzle – Easy



ACROSS

5 frozen water

6 twisting winds

8 energy that flows

9 moving air

11 Source of energy that heats the earth

12 water from the clouds

14 it's always changing

15 can be hot or cold

DOWN

1 too much water!

2 they float across the sky

3 electrical flash in the sky

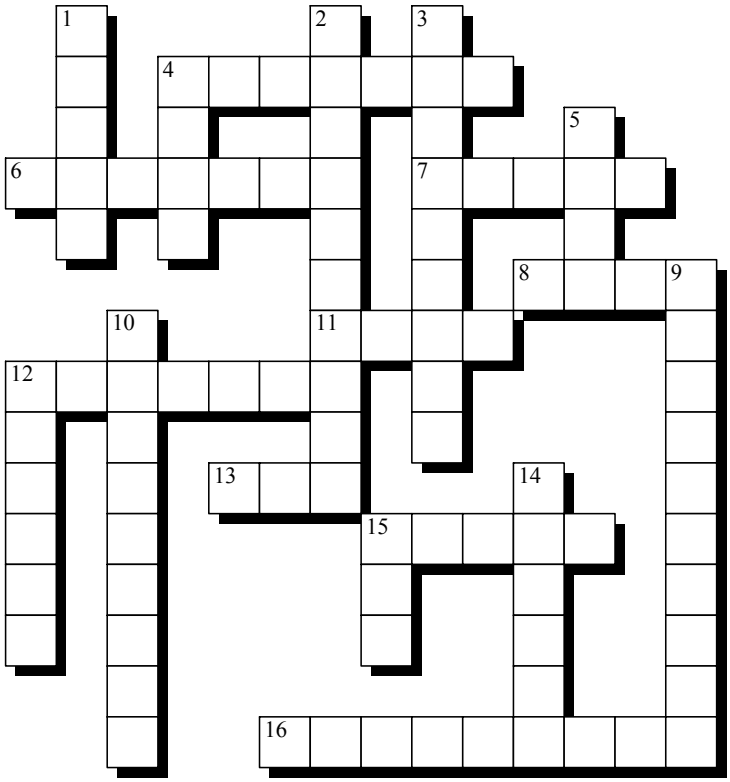
4 white and cold

7 severe weather such as heavy rain

10 average weather over a period of time

13 it's all around us!

"Elementary Weather"
Crossword Puzzle - Medium



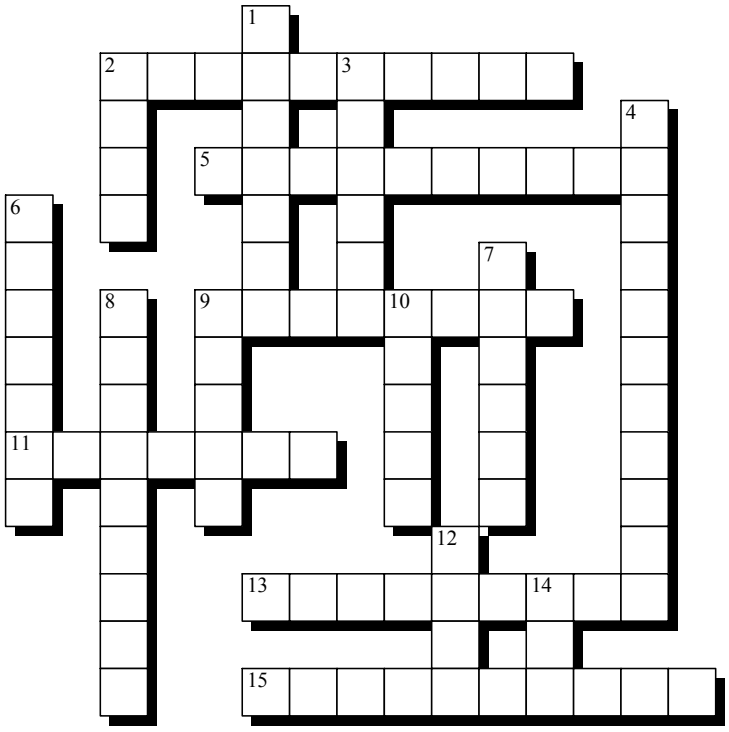
ACROSS

4 state of the atmosphere
6 twisting winds
7 a very cold region!
8 white and cold
11 energy transfered
12 average weather over a period of time
13 Solid form of water
15 severe weather such as heavy rain
16 this severe weather has a name

DOWN

1 too much water!
2 contains all our air
3 neither too hot or too cold
4 moving air
5 water from the clouds
9 involves transfer of water between earth and sky
10 electrical flash in the sky
12 made of water vapor
14 zone near the equator
15 Source of energy that heats atmosphere

"Elementary Weather"
Crossword Puzzle - Challenge



ACROSS

2 involves transfer of water between earth and sky

5 contains all our air

9 the weight of air pushing on your body

11 twisting winds

13 neither too hot or too cold

15 bouncing around of light when it enters the atmosphere

DOWN

1 state of the atmosphere

2 moving air

3 made of water vapor

4 can be hot or cold

6 average weather over a period of time

7 zone near the equator

8 this severe weather has a name

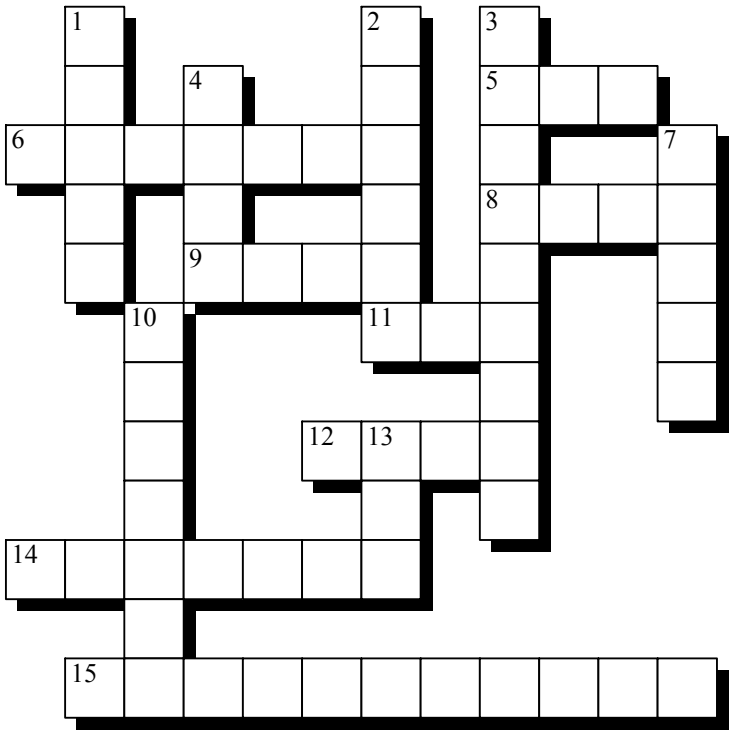
9 a very cold region

10 severe weather such as heavy rain

12 energy transfered

14 mixture of gases, mostly nitrogen

Crossword Solution – Easy



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6 twisting winds

8 energy that flows

9 moving air

11 Source of energy that heats the earth

12 water from the clouds

14 it's always changing

15 can be hot or cold

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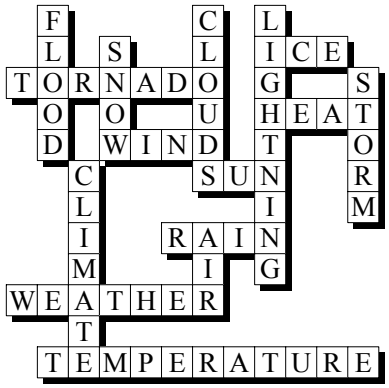
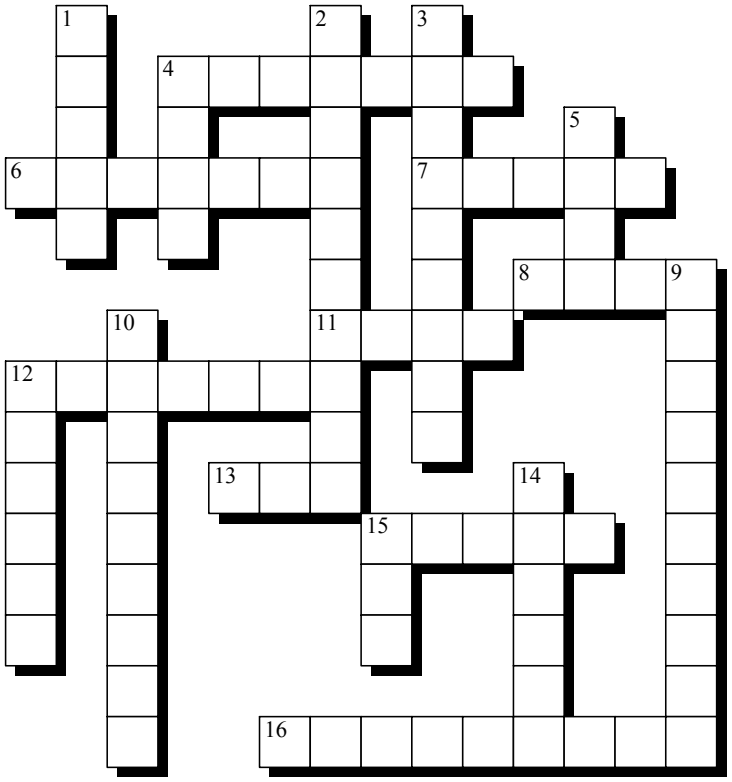


Crossword Solution – Medium



ACROSS

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6 twisting winds
7 a very cold region!
8 white and cold
11 energy transfered
12 average weather over a period of time
13 Solid form of water
15 severe weather such as heavy rain
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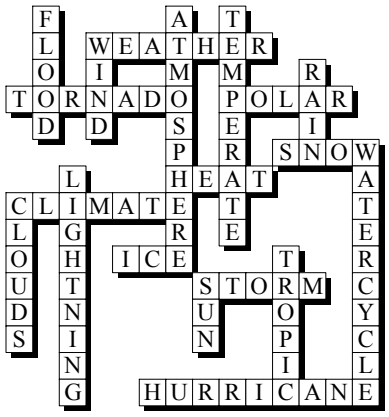
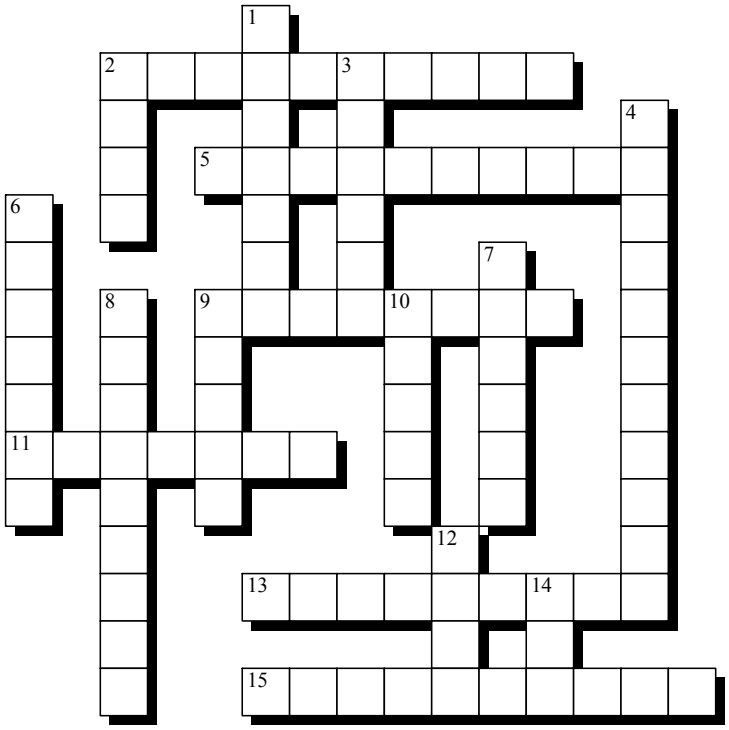
9 involves transfer of water between earth and sky
10 electrical flash in the sky
12 made of water vapor
14 zone near the equator
15 Source of energy that heats atmosphere



Crossword Solution – Challenge



ACROSS

2 involves transfer of water between earth and sky

5 contains all our air

9 the weight of air pushing on your body

11 twisting winds

13 neither too hot or too cold

15 bouncing around of light when it enters the atmosphere

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1 state of the atmosphere

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4 can be hot or cold

6 average weather over a period of time

7 zone near the equator

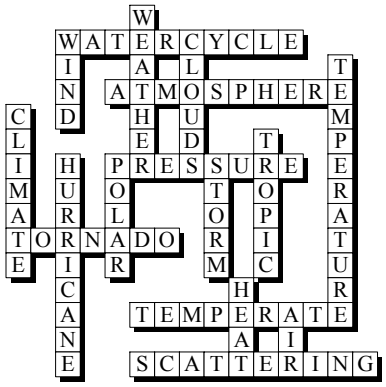
8 this severe weather has a name

9 a very cold region

10 severe weather such as heavy rain

12 energy transfered

14 mixture of gases, mostly nitrogen



Lesson 4: WWW – World Wide Weather Exchange Project

Audience:
Grades 3-5

Activity Overview:
Students establish pen pals with other students in a school located in a different climatic zone and exchange information about weather and climate using the Internet. Over a four-week period, students correspond about local weather conditions. Students maintain weather logs and compare and contrast differences in weather and climate by analyzing their data.

Objective:
By completing this lesson, students will
- Share information with other students in a different climatic zone by using the Internet.
- Observe, record, and analyze weather data.
- Note changes in weather over an extended period of time.

National Standards Addressed:
This lesson addresses the following National Science Education Standards K-4 Content Standards:
- Standard D: Students keep journals, use instruments, and record their observations and measurements.
- Standard D: Students make simple charts and graphs from data they collect.
- Standard A: Students communicate scientific procedures and explanations.

Desired Outcomes:
After completing the lesson, students will:
- Recognize that weather can vary depending on location.
- Begin to build an understanding of the difference between weather and climate.
- Gain experience using technology to collect, analyze and display scientific data.
- Understand that weather and climate influence the types of activities we do.

Teacher Prep Time:

15 minutes to register class at http://www.epals.com
30 minutes to 1 hour to research and select partner class
1- 2 hours over duration of 4-week project to select and monitor student activities

Class Time: (over the course of the long-term project)

Video: 25 minutes
Activity: 10-20 minute segments to collect and record weather data
15-30 minute segments to analyze data and share information via Internet

Materials Needed:

- flip chart, white board or blackboard
- student handouts to record weather data
- access to the Internet

Background:

This is a long-term project that can be done over several weeks: a quarter, term, semester, or year period. Prior to starting this learning adventure, you should understand characteristics of the three major climatic zones, be familiar with using the Internet to gather and share information, and locate a class in another climatic zone to be your partner for the project.

There are seven climatic zones used to describe various climates. These are tundra, temperate Continental, temperate Oceanic, Mediterranean, hot desert, savanna, and equatorial. However, at the elementary level, there are three basic zones: polar, temperate, and tropic.

You should be comfortable using the Internet to search for information and be able to exchange documents using email. If not, a media specialist, parent, and even students can assist in this important task. If computers are not available in your classroom, a science resource or technology specialist at a computer lab or media center can coordinate this project with you.

Before beginning, you must locate a partner class. It will be helpful to find a class in the same time zone, but a different climatic zone, if possible. This is not essential for the project. It just may make it easier to compare and contrast your students' weather observations. Locating a class in another country will also enhance the project, but may add complexity and confusion too! For example, if you are in Kansas and your partner class is in Brazil, you will have two systems of measurements to consider – metric and English. For this project, we suggest using epals Classroom Exchange at http://www.epals.com. Registration is free, and you can register a class in less than 15 minutes and begin searching for a partner class.

Once located, share details of this project with your partner class by asking them to visit this web site.

Activity Steps:

1. Draw a table on the board similar to Handout #1 "Climatic Zones". Or reproduce Handout #1 for each student or groups of students.
2. Lead a class discussion on the differences between climatic zones. Use Handout #1 to guide the discussion and record student comments.
3. Tell students that in this project, they will exchange emails with another class of students in a different climatic zone to learn more about worldwide weather.
4. Have students complete Handout #2 "Getting to Know You." This information can be shared individually or as class data with your partner class.
5. Use Handout #3 "Daily Weather Observation Data" to record weather for your location for Monday through Thursday. Students may collect their own data using available school resources or obtain weather data from the newspaper or on-line at www.weather.com. In the United States, a good source of past weather data is the National Weather Service.
6. On Friday, share weekly observations with your partner class via the Internet. Send Handout #3 either as an attachment to an email, as a fax, or other means of sharing electronic data. Your information resource specialist or a knowledgeable parent (or student!) can help you accomplish this task.
7. Use local and your partner class weather data to create simple charts and graphs that can be used to compare and contrast weather patterns. For example, students may plot on a line graph the average daily temperature for each location over the observation period.
8. Have students examine data for any noticeable trends in weather patterns. For example, over the 4-week period, did the average temperature rise or fall? Was the wind generally from one direction or did it vary each day? Did any severe weather occur such as tornadoes, hurricanes, blizzards, ice storms, heat waves, or flood?
9. Display students' graphs and written observations on a class or school bulletin board.

Academic Extensions/Modifications:

- When analyzing data, younger students can do easier comparisons such as total number of sunny days, rainy days, etc. and present information in simple bar graphs. Older or advanced students may do pie charts and use percentages to compare data.

- Students may add their own categories to the ones listed on Handout #1. For example, they may be interested in the geography of different climatic zones. Or they may choose to investigate different types of houses in each region. Suggest students email other students in their partner class to try to answer their questions.
- Rather than a 4-week continuous period, modify the project to collect data the first week of four consecutive months. This may provide additional insights into climatic and weather differences over an extended period of time.
- Consider exchanging information in more that one language or measurement system. For example, use metric rather than English units to record weather data. Along with the English word for sunny, rainy, etc., include the translation for the primary language of your partner class.
- Present results of project at a PSTA meeting. Write a newsletter article about your project.
- On the last week of the project, ask the parents to sponsor a party for the class using the location of your partner class as a theme for a celebration. If your class is in Charlotte, North Carolina and your partner class is in Honolulu, Hawaii, you can serve pineapples and fruit while the students in Hawaii enjoy barbeque and coleslaw.

Resources:

http://www.epals.com
Register your class at this site to locate another class willing to participate in this project

http://www.nws.noaa.gov
Enter city and state on their homepage and follow links to find weather data for past two days. Look for the link to "More Local Wx: 2 Day History".

The Weather Channel
Bringing weather to life

Student Handout #1

Climatic Zones Summary Sheet

Do you remember in the *Elementary Weather* program when they discussed the three climatic zones? They were polar, temperate, and tropic. Weather in these three zones is sometimes the same and sometimes very different. For this activity, your teacher will talk with you and help you fill in the correct information in the table. For each of the areas in the first column, you should think about and describe how it may be the same or different in each of the climatic zones. For example, in which zone do you think the temperature will usually be colder? If you said "polar" zone, you're right! Your teacher may start this activity in class and ask you to continue it with your parents' help. Have fun learning about the climatic zones!

Think About….	POLAR	TEMPERATE	TROPIC
Temperature			
Precipitation			
Types of Severe Weather			
Humidity			
Wind Direction			
Air Pressure			
Other ……..			

Student Handout #2

Getting to Know You

In this activity you will answer questions about someone you know very well --- yourself! Take a few minutes and complete the following questions. This information will be shared with students in another classroom at a different school located far away from your school. You will also be able to read about those students too and discover that they, like you, are eager learners who want to know more about worldwide weather!

Q1. What is your name? _____

Q2. Do you have a nickname? _____

Q3. What city and state and/or country do you live in? _____
_____
_____

Q4. What is your age? _____

Q5. Are you a boy or girl? _____

Q6. What is your favorite subject in school? _____

Q7. What types of games do you like to play? _____

Q8. Do you play any sports or have hobbies? Please list. _____
_____

Q9. How many brothers and/or sisters do you have? _____

Q10. What language or languages do you speak? _____

Q11. What is your favorite color? _____

Q12. What type of music do you like to listen to? _____
_____

Q13. What are some books that you have read? _____
_____
_____
_____

Q14. What types of food do you like to eat? _____

Q15. Do you have any pets? _____

Student Handout #3

Daily Weather Observation Data

Use this sheet to record weather observations for your city. You may collect data directly at your school, find information in your local newspaper, and/or use the Internet to obtain weather data. Be accurate -- you will share this information weekly with your partner school and receive their weather information to analyze.

Location where weather data was measured: _____

Table 1: Daily Weather Data

Date	Time	Wind (mph and direction)	Visibility (miles)	Weather*	Air Temp ^{o}F	Air Pressure (inches)	Precipitation (inches)
Monday							
Tuesday							
Wednesday							
Thursday							

* General description of weather. Examples: hot, humid, hazy; rained all-day; overcast with lots of clouds; sunny, no clouds, etc.

Table 2: Summary of Daily Weather Data

Date	High Temp (^{o}F)	Low Temp (^{o}F)	Humidity nearest noon (%)	Air Pressure at 8 AM (inches and trend)
Monday				
Tuesday				
Wednesday				
Thursday				

Comments:_____
_____
_____

Lesson 5: Splish-Splash! Raindrop for a Day — Writing Across the Curriculum

Audience

Grades K-5

Activity Overview:

In this activity, students review key terms about weather by focusing on different types of precipitation and the water cycle. Students use their imagination to pretend they are a raindrop for a day, and write or talk about their experiences. Younger students may draw pictures to describe themselves as raindrops; older students can create short stories explaining the water cycle. Methods to assess student learning may include concept maps, poetry, journal entries, posters, etc.

Objective:

By completing this lesson, students will

- Listen to an explanation of the water cycle.
- Review key terms about weather.
- Write stories and draw pictures about weather concepts.

National Standards Addressed:

This lesson addresses the following National Science Education Standards K-4 Content Standards:

- Standard A: Students develop abilities necessary to do scientific inquiry.
- Standard D: Students develop observation and description skills.
- Standard A: Students communicate scientific explanations.

Desired Outcomes:

After completing the lesson, students will:

- Recognize that there are different types of precipitation and that water can exist in three states: solid, liquid, and gas.
- Begin to build an understanding of the water cycle.
- Develop literacy skills by writing about weather concepts.

Teacher Prep Time:

15-30 minutes

The Weather Channel
Bringing weather to life

Class Time:

Video: 25 minutes
Activity: 30 – 50 minutes

Materials Needed:

- flip chart, white board, or blackboard to draw the water cycle
- glass jar, plate, hot water, and ice cubes to demonstrate the water cycle (optional)
- pencils, paper, crayons, finger paint for students

Background:

Before beginning this lesson, you must have a general understanding of the water cycle. In short, there are four steps: water in a liquid state, evaporation, condensation, and precipitation. Water in liquid form from the Earth is vaporized by the sun's energy, turns into the gaseous state of water vapor, forms into clouds and condenses back into water, and then returns to Earth as different forms of precipitation.

To perform a quick and easy demonstration of the water cycle for your class, complete the following steps:

1. Obtain a wide-mouth jar, such as an empty mayonnaise jar, ice cubes, hot water, a plate, and a blank index card.
2. Pour a few inches of very hot water into the jar, and cover the top with the plate. Allow the water to sit for a few minutes.
3. Place the ice cubes on the plate. Observe what happens!

The cold ice cubes cause the warm moist air inside the jar to condense and form water droplets. This is an example of what happens in the atmosphere when warm air rises and meets higher, colder air. The warm air condenses, forms clouds, and eventually falls back to the Earth as precipitation.

For more information about the water cycle, including an illustration, visit: http://www.srh.noaa.gov/lmrfc/education/school.shtml.

Activity Steps:

1. After watching the video, you can begin the lesson either with a demonstration or a guided discussion of the water cycle.
2. Write the letters WECP on the board. These stand for Water, Evaporation, Condensation, and Precipitation. Discuss each term briefly with your students using vocabulary suitable for your grade level.
3. Inform students that you will be investigating something called the "Water Cycle" which is just a fancy term to describe what happens to water as it travels back and forth between the Earth and sky.

4. Lead students through the four steps of the water cycle by drawing a picture and discussing each step of the cycle:
   a) A good place to start is by drawing a cloud. Ask students "what makes up clouds?" Answers will vary, but the scientific answer is that clouds are composed of water vapor.
   b) Continue the discussion by asking if clouds are made of water vapor, where did the water come from? Again, answers will vary, but the correct answer is water came from the ground. Draw a picture of a lake or river as an example.
   c) The next logical question is, how does water get up into the clouds? Allow students to respond, but then tell them the process of water changing from a liquid to a vapor (or gas) is called evaporation. Note "vapor" can be found in e**vapor**ation! Draw arrows up from the Earth to the cloud to represent evaporation.
   d) Now that the water vapor is in the clouds, how does it return to Earth? The most likely answer from students is that it rains. That's correct, but also mention other forms of precipitation such as hail, snow, freezing rain, sleet, fog, etc. Draw arrows from the cloud to the Earth to represent precipitation.
5. At this point, some students may notice that a step was skipped in explaining the water cycle. Before precipitation can occur, water vapor must first turn back to water. This process is called condensation. If a student does not mention the skipped step, refer the class back to the acronym WECP. Ask students if they notice a step that was not yet discussed.
6. To assess student understanding, ask the students to use their imagination to pretend they are raindrops. Using what they have learned about the water cycle, students can write about their experiences as a raindrop as they proceed through the steps of the water cycle. Younger students may write words, simple sentences or draw pictures; older students may create short stories, create a journal entry, or use word processing programs to enhance their learning. If time permits, you may decide to have students decorate their creative writing pieces.

Academic Extensions/Modifications:

- Younger students may produce a short play to act out the steps of the water cycle. With each student being a drop of water, have students hold hands in a small circle to represent water as a liquid. Then as evaporation occurs, the circle grows bigger until students let go of each other's hands and the students "float" into the sky as water vapor. Allow students to pretend to be part of a cloud, and then announce the temperature is cooling and have students "condense" back into raindrops by once again holding hands in a small circle. The activity ends with all children sitting down to represent raindrops falling to the Earth.
- For grades 3-5, use the lesson to discuss the three states of matter: solid, liquid and gas. The water cycle provides an excellent example of all three states. Starting as a liquid, water evaporates and then often condenses into a solid (ice) before returning to Earth as a liquid.

- Advanced students may extend the lesson by researching the water cycle on the Internet. Several good web sites are included in the Resource section below. For example, students will discover that the water cycle is also called the hydrologic cycle. Students will also learn that, in addition to evaporation, water enters the atmosphere by transpiration — a process where vegetation such as leaves produce water vapor.
- Artistic students may make 3-dimensional models, posters, mobiles, murals, or other forms of artistic expression of the water cycle.

Resources:

http://state.oh.us/odps/division/ema/kids_page/html/games.htm
A collection of fun games for kids related to weather

http://www.srh.noaa.gov/lmrfc/education/school.shtml
An excellent explanation of the hydrologic cycle and necessary background to teach this lesson

http://www.nws.noaa.gov/om/reachout/info.shtml
"Good Stuff" from the National Weather Service designed especially for kids and teachers

http://www.nws.noaa.gov/om/edures.htm
The "Weather Education" homepage for the National Weather Service

http://www.ucar.edu/educ_outreach/webweather/
A collection of weather related activities for kids

The Weather Channel
Bringing weather to life