

What's the Weather?

Teacher's Guide

For Grades 3-5



Text and Illustrations © 2016 TERC, Inc. All rights reserved.



What's the Weather? was funded in part by a grant from the National Science Foundation (Award #9553592). eBook versions were funded by Out-of-Budget grants from TERC, Inc.



Overview

The *What's the Weather?* unit consists of six chapters that are designed to supplement your core science curriculum. The unit encourages students to build ideas of science content and process through hands-on and online investigation of the weather in their location. Students collect data about moisture (humidity, cloud cover, and precipitation), air temperature, wind, and air pressure. Their studies lead to understanding about weather as the condition of the air at a particular place and time.

In Chapter 1, students consider what weather is. In Chapter 2, they examine the water cycle and collect data for cloud cover, precipitation, and humidity of the air. In Chapter 3, they decide on a location in the school to measure the temperature of the air and collect temperature data. In Chapter 4, they consider changing air pressure as an indicator of changing weather and collect data for air pressure. In Chapter 5, they describe wind as the movement of the air and collect data for wind. In Chapter 6, students collect weather data and discover what they can learn from displays of the data.

Chapters can be done individually or grouped together with one or more chapters. This flexibility allows you to fit the unit into your core science curriculum however and whenever you would like.

Teacher's Guide

Each chapter includes the following components:

- **Description** — summarizes what students will do.
- **Goals** — lists the intended results.
- **The Activity** — provides procedures for doing the activity and incorporates a written component that can be assigned for homework.
- **Assessment** — provides guidelines for evaluating the extent to which students have accomplished the goals.
- **Alignment with the NGSS** — lists the standards that are supported.
- **Reading** — provides text for finding out about the content that is the focus of the chapter. Terms found in the **glossary** are listed at the beginning of the reading. They include a definition and, often, an illustration.
- **Activity Sheet** — provides the procedures for the activity and space for writing.

The guide is available as a free download from the Apple iBooks StoreSM. You'll need to download it to a computer, iPhone®, or iPad®. Go to <https://www.apple.com/support/ios/ibooks/> to download the *What's the Weather?* unit and for additional information about iBooks®.

Student Packet of Readings and Activity Sheets

The Student Packet contains copies of the activity sheets and readings included in the Teacher's Guide. For students to take advantage of the glossary and links to Web sites and to make notes, they must each have a Student Packet. You'll need to download the packet to the computers, iPhones®, or iPads® students will use when they do the unit. The device must also be configured for Internet access. The packet is available as a free download from <https://www.apple.com/support/ios/ibooks/>.

PDFs of the Teacher's Guide and Student Packet

A PDF version of the Teacher's Guide is available from https://wtw-ibook.terc.edu/WtW_TeachersGuide.pdf.
A PDF of the Student Packet is available from https://wtw-ibook.terc.edu/WtW_StudentPacket.pdf.

Implementation Tips

Navigation — Swiping the top of a page brings up a toolbar that includes these icons.



- A click/tap on the first icon shows your iBooks® library.
- A click/tap on the second icon shows the unit Table of Contents with links to Thumbnails, Chapters, and Sections. A click/tap on Thumbnails enables navigation to sections from images that appear at the bottom of the page. A click/tap on a chapter or section brings it up. Use the Table of Contents or Thumbnails to move about the unit.
- Swiping the right-hand center of a page brings up an arrow that enables navigation forward from page to page. Swiping the left-hand center of a page brings up an arrow that enables navigation backward. Clicking/tapping the arrow and page number icon at the bottom of the page enables you to return to a previous page.
- Swiping with two fingers to the right results in pages turning forward. Swiping to the left results in pages turning backward (Macintosh® computer users only).
- A click anywhere on the page you are on activates the hyperlinks on that page.

Notes, Highlighting, and Underlining — Select the text you would like to annotate, highlight, or underline, then move to the area at end of the text. A pop-up menu will appear. Select a color, and/or select underline. To annotate text, choose Add Note and type in the box. To delete an item, click on Remove.... Select the Notes icon (shown) on the toolbar to view items that have been saved.



Web Resources — You must have an active Internet connection to access the Web resources that have been incorporated into activities and readings. Clicking/tapping on a link will take you to the site. You can go back and forth between the Web page and a chapter page to make notes and copy and paste text and images as many times as you'd like.

Glossary Terms — Readings include chapter specific Glossary Terms that provide definitions in context. Click/tap on the spot to the lower right of the chapter number to see its Glossary definition and, usually, an illustration. Chapter specific Glossary terms can also be accessed by selecting Glossary from the Table of Contents and selecting a term from the master list.

Study Cards — Open a chapter, click the Notes icon to open the note panel. Click on STUDY and a flashcard will pop up with the first Glossary term for the chapter. Click on Flip Card and its definition appears. Click on the forward arrow for the next term and on the back arrow for previous terms.

Dictionary Terms — Dictionary definitions and synonyms that may not represent the context in which terms are used in readings can be accessed as follows: Select a term, then move to the area at end of the text for the pop-up menu. Select More and Look Up.... A dictionary definition and Thesaurus-list of synonyms will appear.

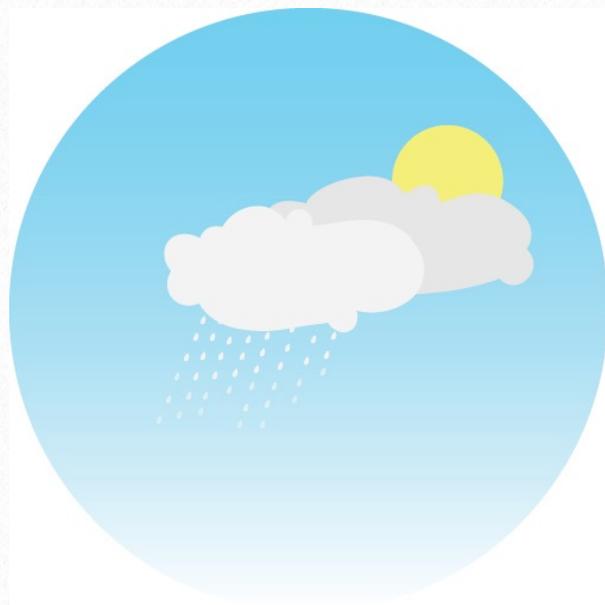
Image Gallery — Readings include links to chapter-specific Image Galleries that provide photos and illustrations of content. The Image Galleries can also be accessed by selecting Image Galleries from the Table of Contents and then using the page forward arrows to navigate to images for specific chapters.

Accessibility Options — The accessibility features that are available to your students depend on the type of computer or mobile device you are using. Go to <https://www.apple.com/support/accessibility/vision/here> to find out how to turn on and manage accessibility features that are built into the operating system for students who are blind or have low vision; are deaf or hard of hearing; have physical, motor, or attention challenges; or other learning disabilities. For example, you need a screen reader to listen to the video descriptions that accompany images and illustrations.

- This icon can be used to access ASL videos of glossary terms. 
- This icon can be used to access narrated versions of readings and activity sheets.

CHAPTER 1

What Is Weather?



Description

Students begin to consider weather as the condition of the air outside at any place or time. They use the National Weather Service (NOAA) site to select a location and see what they can find out about the weather there. They use the data from this location and the session reading to help them define what weather is. For homework, they write a paragraph that explains their ideas about what weather is.

Goals

Students will

- describe weather as the condition of the air outside at any place or time;
- begin to consider weather as the sum of moisture, air temperature, air pressure, and wind.

The Activity

Part 1

Have students use their knowledge of weather to brainstorm what they think weather is. Use students' responses to describe weather as the condition of the air at a particular time and place. Ask:

- What is the condition of the air outside right now?

Give students time to share ideas. Then explain that meteorologists—scientists who study weather—describe the condition of the air in their weather reports. For the *What's the Weather?* unit, you'll become amateur meteorologists and collect and display data about the condition of the air outside.

Part 2

Explain that students will start to take a close look at what the weather is. Go over the procedure from the activity sheet or use your own variation.

Procedure for Considering What Weather Is

1. Go to <http://www.weather.gov/> Select a location and find out about the weather there.

2. Record the location, date, and weather data that you collected below.

Location _____

Date _____

Temperature (how hot or cold the air is) _____

Humidity (amount of water in the air) _____

Precipitation (water falling to Earth's surface as rain, sleet, snow, hail) _____

Sky Conditions (sunny, partly cloudy, cloudy, overcast, haze, mist, fog) _____

3. Use Reading 1: Weather to look for information to help you define what weather is. Note the main points you'd like to remember.

4. What do you think weather is? Write a paragraph that explains your ideas.

- Give your paragraph a title. Be sure the first sentence answers the question. Be sure the next sentences give reasons for your answer to the question. Be sure the last sentence sums up your ideas.

Assessment

Look for students' ability to explain weather as the condition of the air at a given place and time. See if they can describe weather in terms of moisture, air temperature, air pressure, and wind. Look for paragraphs that include a topic sentence, supporting sentences, a concluding sentence, a title, and correct spelling, use of vocabulary, punctuation, and grammar.

Next Generation Science Standards (NGSS) Alignment

Earth and Space Sciences (Earth's Systems, Weather and Climate): Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather [ESS 2.D](#).

Science and Engineering Practices (Obtaining, Evaluating, and Communicating Information): Obtain and combine information from books and other reliable media to explain phenomena [Practice 8](#).

Activity Sheet 1: What Is Weather?



Procedure for Considering What Weather Is

1. Go to <http://www.weather.gov/> Select a location and find out about the weather there.
2. Record the location, date, and weather data that you collected below.

Location _____

Date _____

Temperature (how hot or cold the air is) _____

Humidity (amount of water in the air) _____

Precipitation (water falling to Earth's surface as rain, sleet, snow, hail) _____

Sky Conditions (sunny, partly cloudy, cloudy, haze, mist, fog) _____

3. Read about weather. Look for information to help you define what weather is. Note the main points you'd like to remember.
4. What do you think weather is? Write a paragraph that explains your ideas.
 - Give your paragraph a title.
 - Be sure the first sentence answers the question.
 - Be sure the next sentences give reasons for your answer to the question.
 - Be sure the last sentence sums up your ideas.

Reading 1: Weather



Glossary Terms

1: air	1: Earth	1: moisture	1: temperature	1: weight
1: atmosphere	1: heat	1: pressure	1: troposphere	1: wind
1: cold	1: hot	1: rain	1: water	
1: condition	1: move	1: surface	1: weather	

Weather is the heat we feel on a summer day. It's the rain that delays our ball game. It's the wind that blows leaves off trees. It's all these things and more. Weather is the condition of the air around us.

Layers of air form the atmosphere that surrounds Earth. The atmosphere has five layers, but almost all our weather occurs in the lowest layer. This layer is called the troposphere. The troposphere starts at Earth's surface and goes up to a height of 4 to 12 miles or 23,000 to 65,000 feet above sea level.

We use moisture, air temperature, air pressure, and wind to describe the weather in a particular location.

- Moisture is the amount of water in the air.
- Air temperature is how hot or cold the air is.
- Air pressure is the weight of the air above a spot on the surface of Earth.
- Wind is moving air.

Weather, good and bad, affects the lives of everybody. It affects you, your family and friends.

[Go to the Chapter 1 Image Gallery to find out more.](#)

CHAPTER 2

What Is the Moisture of the Air?



Description

Students are introduced to moisture (water in the air) as the first of four major items to consider in a description of weather. They use resources and observe a demonstration to study the water cycle and the National Weather Service (NOAA) site to collect moisture data. For homework, they draw two diagrams. One is a diagram of the water cycle to show and explain how water moves between Earth's surface and the air. The second is a diagram of the water cycle to show and explain the amount of moisture in the air on a particular day in the location of the school.

Goals

Students will

- use the water cycle to explain how water passes between Earth's surface and the atmosphere;
- use the water cycle to describe the processes of evaporation, condensation, and precipitation;
- collect and record moisture data.

The Activity

Challenge students to use their knowledge of what weather is to describe today's weather. Use students' responses to indicate that moisture refers to the water in the air and is one of four major items to include in a description of weather. Explain that students will study the water cycle to discover how water ends up in the air and returns to Earth. Go over the procedure from the activity sheet or use your own variation.

Part 1: A Demonstration of Cloud Formation

Materials

- wide-mouth, clear glass jar (such as a tall drinking glass or jam, juice, or mayonnaise jar);
- thermos, kettle, or pan filled with very hot water;
- book of matches;
- piece of plastic wrap (large enough to cover the opening of the glass jar);
- rubber band (large enough to go around the opening of the glass jar);
- safety goggles.

Procedure

1. Fill one-third of a glass jar with very hot water.
2. Light a match and drop it into the water.
3. Cover the jar with a piece of plastic wrap and secure it with a rubber band.
4. Place two or three ice cubes on the plastic.
5. Use your observations of what happened inside the jar to explain how clouds form.

Part 2

1. Go to the links listed below to find out how water ends up in the air, forms clouds, and falls back to Earth.

- http://www.epa.gov/safewater/kids/flash/flash_watercycle.html
- <http://water.usgs.gov/edu/watercycle-kids-beg.html>
- <https://eo.ucar.edu/kids/green/cycles3.htm>

2. Draw a diagram of the water cycle that shows how water moves from Earth to the atmosphere and back to Earth. Label the parts of your diagram. Include information to explain what is happening.

Part 3

1. Use Reading 2: The Water Cycle to see what else you can find out about how water moves.
2. Add information from the reading to your diagram to make it better show the movement of water.

Part 4

1. Go to <http://www.weather.gov/> and find out how much water is in the air in your location.

Location _____

Date _____

2. Record moisture data for your location below:

Humidity (water vapor in the air)

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover (drops of water floating in the air)

____ (sunny=a cloudless sky, or sky with very few clouds)

____ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

____ (cloudy=a sky entirely filled with clouds)

Precipitation (water falling to Earth)

___ None

___ Rain

___ Snow

___ Sleet

___ Hail

3. Draw a diagram of a water cycle that shows the moisture data for your location on the day of data collection. Incorporate the data you recorded into the diagram. Use your moisture data to write a description of the weather on that day.

Assessment

Look for students' ability to use the water cycle to explain how water changes form as it moves continuously between Earth's surface and the air. Also look for their ability to describe moisture as the amount of water in the air and one of the major items to include in a description of weather.

Next Generation Science Standards (NGSS) Alignment

Physical Sciences (Matter and Its Interactions, Structure and Properties of Matter):

Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature [PS1.A](#).

Earth and Space Sciences (Earth's Systems, The Roles of Water in Earth's Surface Processes):

Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation [ESS2.C](#).

Science and Engineering Practices (Planning and Carrying Out Investigations): Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence [Practice 3](#).

Science and Engineering Practices (Constructing Explanations and Designing Solutions): Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena [Practice 6](#).

Science and Engineering Practices (Obtaining, Evaluating, and Communicating Information): Obtain and combine information from books and other reliable media to explain phenomena [Practice 8](#).

Activity Sheet 2: What Is the Moisture of the Air?



Procedure for Finding Out About the Moisture of the Air

Part 1

1. Observe a demonstration of cloud formation.
2. Use your observations of what happened inside the jar to explain how clouds form.

Part 2

1. Go to the links listed below to find out how water ends up in the air, forms clouds, and falls back to Earth.

- http://www.epa.gov/safewater/kids/flash/flash_watercycle.html
- <http://water.usgs.gov/edu/watercycle-kids-beg.html>
- <https://eo.ucar.edu/kids/green/cycles3.htm>

2. Draw a diagram of the water cycle that shows how water moves from Earth to the atmosphere and back to Earth. Label the parts of your diagram. Include information to explain what is happening.

Part 3

1. Read about the water cycle.
2. Add information from the reading to your diagram to make it better show how water moves about.

Part 4

1. Go to <http://www.weather.gov/> and find out how much water is in the air in your location.

Location _____

Date _____

2. Record moisture data for your location below:

Humidity (water vapor in the air)

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover (drops of water floating in the air)

____ (sunny=a cloudless sky, or sky with very few clouds)

____ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

____ (cloudy=a sky entirely filled with clouds)

Precipitation (water falling to Earth)

____ None

____ Rain

____ Snow

____ Sleet

____ Hail

3. Draw a diagram of a water cycle that shows the moisture data for your location on the day of data collection. Incorporate the data you recorded into the diagram. Use your moisture data to write a description of the weather on that day.

Reading 2: The Water Cycle



Glossary Terms

2: big

2: bit

2: cloud

2: condensation

2: cool

2: drizzle

2: drop

2: dust

2: evaporation

2: float

2: fog

2: freeze

2: gas

2: ground

2: hail

2: heavy

2: invisible

2: join

2: particle

2: precipitation

2: rain

2: sleet

2: snow

2: sun

2: tiny

2: water

2: water cycle

2: water vapor

Water moves continuously from the surface of Earth into the atmosphere and back again to its surface. This continuous process is called the water cycle. It includes the stages of evaporation, condensation, and precipitation.

Evaporation: Water on the surface of Earth evaporates, or turns into an invisible gas called water vapor. Heat from the sun and wind help water evaporate. This water vapor then rises into the atmosphere.

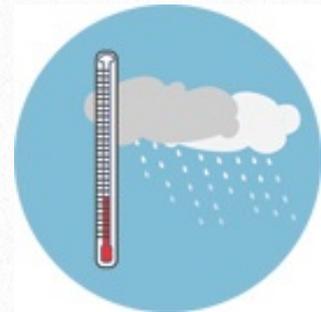
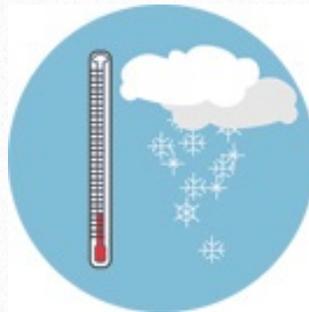
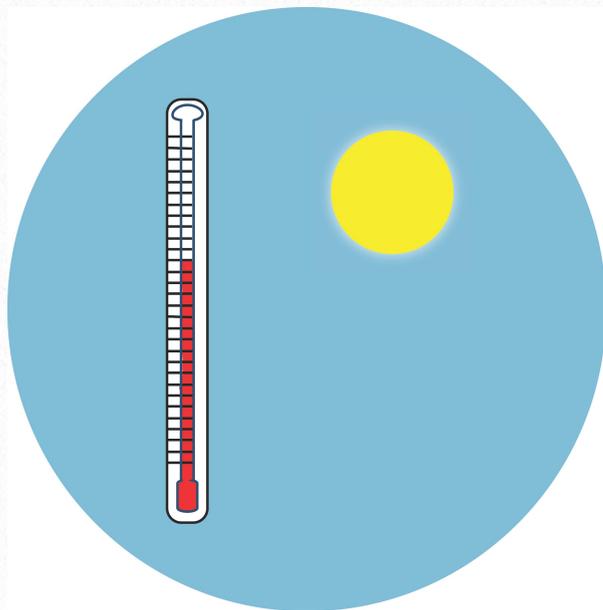
Condensation: As water vapor rises into the atmosphere, it cools and condenses, changing back into tiny drops of water that form around bits of dust or other particles in the air. These water drops join together to form clouds. The water drops in clouds are so tiny and lightweight that they float in the air. When condensation takes place very close to Earth, we see fog — a cloud on the ground.

Precipitation: Often, tiny water drops in a cloud come together to form larger drops, and those drops join to become even bigger drops. The drops may get so big and heavy that they fall to Earth as rain. Water falling to Earth in any form is called precipitation. If the air temperature where the precipitation forms is at or below freezing, the water may fall as freezing rain, snow, sleet, or hail. If the air temperature is above freezing, the water will fall as drizzle or rain.

[Go to the Chapter 2 Image Gallery to find out more.](#)

CHAPTER 3

What Is the Temperature of the Air?



Description

Students are introduced to temperature (how hot or cold the air is) as the second of four major items that they will consider in a description of weather. They choose a location to measure the outside air temperature. They use this location to collect temperature data and the National Weather Service (NOAA) site to collect moisture data (the first major weather item they considered in Chapter 2). For homework, they create displays of their temperature and moisture data and use the displays to explain discrepancies between their data and the NOAA data and to summarize what the weather is.

Goals

Students will

- explain air temperature as how hot or cold the air is as measured with a thermometer;
- describe air temperature as the second of four major items to include in a description of weather;
- collect, record, and create displays of temperature and moisture data.

The Activity

Challenge students to use their knowledge of what weather is to describe today's weather. Use their responses to indicate that air temperature refers to how hot or cold the air is as measured with a thermometer. It is the second of four major items to include in a description of weather. Explain that students will collect temperature and moisture data. They will create displays of their data and use them to explain discrepancies between their estimates and the NOAA data and to summarize what the weather is. Go over the procedure from the activity sheet or use your own variation.

Part 1: Measure the Outside Air Temperature

Materials

- thermometers
- sticks such as meter sticks or yardsticks for use as holders to keep the thermometer in the air
- tape for attaching thermometers to the sticks
- shoeboxes or cardboard to shade thermometers from the sun (optional)

Procedure

1. Decide on a location to measure outside air temperature.
2. Use tape to attach a thermometer to a stick.
3. Go to the location and set up the thermometers.
4. Leave the thermometers in place for several minutes.
5. Read and record the temperature.

Part 2

1. Go to <http://www.weather.gov/> and collect air temperature data for your location.

Location _____

Date _____

Air Temperature _____

2. Collect and record moisture data for your location below:

Humidity (water vapor in the air)

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover (drops of water floating in the air)

____ (sunny=a cloudless sky, or sky with very few clouds)

____ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

____ (cloudy=a sky entirely filled with clouds)

Precipitation (water falling to Earth)

___ None

___ Rain

___ Snow

___ Sleet

___ Hail

Part 3

1. Use Reading 3: Air Temperature to look for information to help you explain what weather is. Note the main points you'd like to remember.
2. Use your air temperature and moisture data to create a display of the weather in your location on the day you collected data.
 - Be sure your display shows what the weather is.

Assessment

Look for students' ability to explain air temperature as how hot or cold the air is, as measured with a thermometer. Also look for their ability to describe air temperature as one of four major items to include in a description of weather. See if they know how to collect and record accurate data and the degree to which they are able to explain discrepancies between their data and the data on the NOAA site.

Next Generation Science Standards (NGSS) Alignment

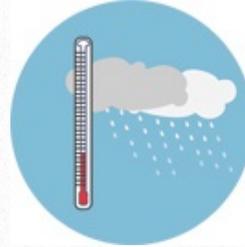
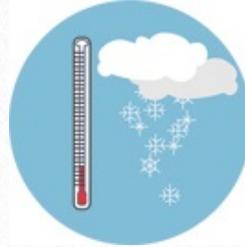
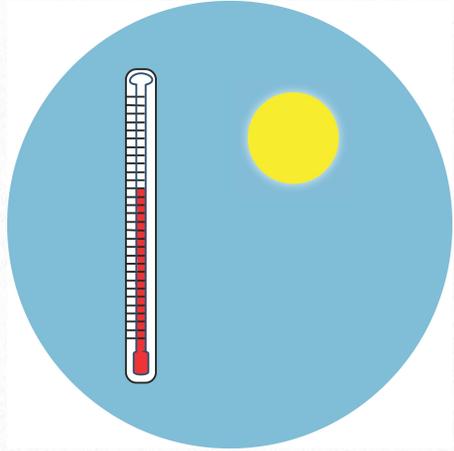
Earth and Space Sciences (Earth's Systems, Weather and Climate): Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather [ESS 2.D](#).

Science and Engineering Practices (Planning and Carrying Out Investigations): Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence [Practice 3](#).

Science and Engineering Practices (Constructing Explanations and Designing Solutions): Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena [Practice 6](#).

Science and Engineering Practices (Obtaining, Evaluating, and Communicating Information): Obtain and combine information from books and other reliable media to explain phenomena [Practice 8](#).

Activity Sheet 3: What Is the Temperature of the Air?



Procedure for Finding Out About the Temperature of the Air

Part 1

1. Decide on a location to measure outside air temperature.
2. Use tape to attach a thermometer to a stick.
3. Go to the location and set up the thermometers.
4. Leave the thermometers in place for several minutes.
5. Read and record the temperature.

Part 2

1. Go to <http://www.weather.gov/> and collect air temperature data for your location.

Location _____

Date _____

Air Temperature _____

2. Collect and record moisture data below:

Humidity (water vapor in the air)

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover (drops of water floating in the air)

___ (sunny=a cloudless sky, or sky with very few clouds)

___ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

___ (cloudy=a sky entirely filled with clouds)

Precipitation (water falling to Earth)

___ None

___ Rain

___ Snow

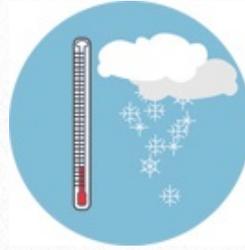
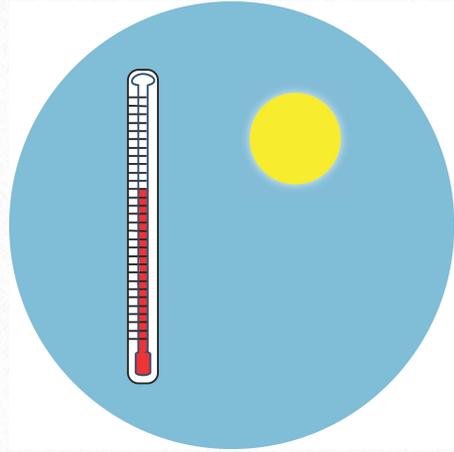
___ Sleet

___ Hail

Part 3

1. Read about air temperature. Look for information to help you explain what weather is. Note the main points you'd like to remember.
2. Use your air temperature and moisture data to create a display of the weather in your location on the day you collected data.
 - Be sure your display shows what the weather is.

Reading 3: Air Temperature



Glossary Terms

3: above

3: air

3: cold

3: Earth

3: heat

3: hot

3: land

3: measure

3: planet

3: ray

3: source

3: sun

3: sunlight

3: surface

3: temperature

3: warm

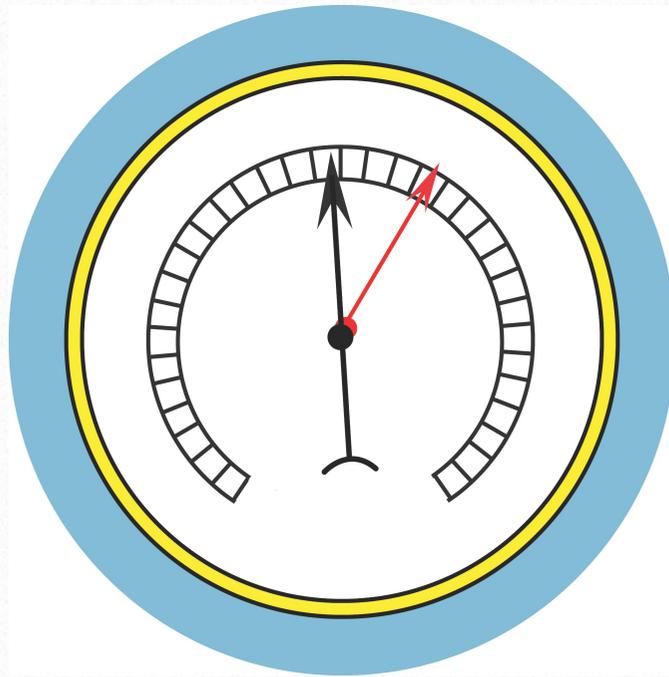
3: water

Temperature is how hot or cold something is. When we measure air temperature, we are measuring how hot or cold the air is. The sun is the primary source of heat on Earth. The temperature of the air depends mainly on the amount of sunlight that reaches the planet's surface. But the air isn't heated directly by sunlight. The sun's rays pass through the air, warming the land and water on Earth's surface. The heat in the water and land warms the air above.

[Go to the Chapter 3 Image Gallery to find out more.](#)

CHAPTER 4

What Is the Pressure of the Air?



Description

Students are introduced to air pressure (the weight of the air above a spot on Earth) as the third of four major items that they will consider in a description of weather. They find out about air pressure and use the National Weather Service (NOAA) site to collect data for air pressure, moisture (the first major weather item they considered in Chapter 2), and temperature data (the second major weather item they considered in Chapter 3). For homework, they create displays of their weather data and use the displays to explain what the weather is.

Goals

Students will

- explain air pressure as the weight of the air above a spot on Earth as measured with a barometer;
- describe air pressure as the third of four major items to include in a description of weather;
- collect, record, and create displays of air pressure, moisture, and temperature data.

The Activity

Challenge students to use their knowledge of what weather is to describe today's weather. Use their responses to indicate that air pressure refers to the weight of the air above a spot on Earth and is measured with a barometer. It is the third of four major items to include in a description of weather. Explain that students will collect data for: air pressure, temperature (data that describes how hot or cold the air is) and moisture (data that describes the water in the air). They will create displays of their data and use them to explain what the weather is. Go over the procedure from the activity sheet or use your own variation.

Part 1

1. Use Reading 4: Air Pressure to look for information to help you explain what the weather is. Note the main points you'd like to remember.

- Be sure you find out how a change in air pressure often indicates the weather that is on the way. Use these questions to help you:

- 1) What does **rising air pressure** often mean?
- 2) What does **falling air pressure** often mean?
- 3) What does **steady air pressure** often mean?

Part 2

1. Go to <http://www.weather.gov/> and go to "3-day history" to collect air pressure data for your location.

Location _____

Date _____

Air Pressure _____ (rising, falling, or steady)

2. Collect and record air temperature and moisture data for your location below:

Air Temperature _____

Humidity (water vapor in the air)

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover (drops of water floating in the air)

____ (sunny=a cloudless sky, or sky with very few clouds)

____ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

____ (cloudy=a sky entirely filled with clouds)

Precipitation (water falling to Earth)

___ None

___ Rain

___ Snow

___ Sleet

___ Hail

Part 3

1. [Go here](#) and see what else you can find out more about air pressure.

2. Use your air pressure, air temperature, and moisture data to create a display of the weather in your location on the day you collected data.

- Be sure your display shows what the weather is.

Assessment

Look for students' ability to explain air pressure as the weight of air above a spot on Earth as measured with a barometer. Also look for their ability to describe air pressure as one of four major items to include in a description of weather. See if they know how to collect and record accurate data and the degree to which they are able to use their data displays to explain what the weather is.

Next Generation Science Standards (NGSS) Alignment

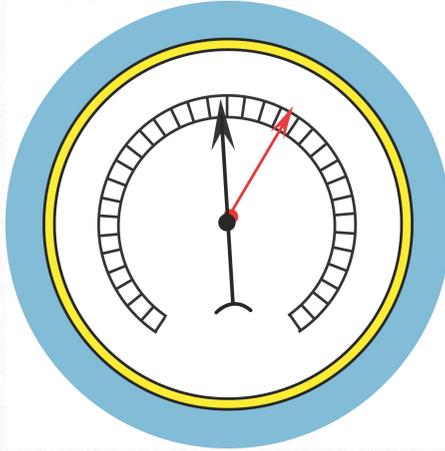
Earth and Space Sciences (Earth's Systems, Weather and Climate): Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather [ESS 2.D](#).

Science and Engineering Practices (Planning and Carrying Out Investigations): Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence [Practice 3](#).

Science and Engineering Practices (Constructing Explanations and Designing Solutions): Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena [Practice 6](#).

Science and Engineering Practices (Obtaining, Evaluating, and Communicating Information): Obtain and combine information from books and other reliable media to explain phenomena [Practice 8](#).

Activity Sheet 4: What Is the Pressure of the Air?



Procedure for Finding Out About the Pressure of the Air

Part 1

1. Read about air pressure. Look for information to help you explain what weather is. Note the main points you'd like to remember.

Be sure you find out how a change in air pressure often indicates the weather that is on the way. Use these questions to help you:

- 1) What does **rising air pressure** often mean?
- 2) What does **falling air pressure** often mean?
- 3) What does **steady air pressure** often mean?

Part 2

1. Go to <http://www.weather.gov/> and go to “3-day history” to collect air pressure data for your location.

Location _____

Date _____

Air Pressure _____ (rising, falling, or steady)

2. Collect and record air temperature and moisture data for your location below:

Air Temperature _____

Humidity (water vapor in the air)

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover (drops of water floating in the air)

____ (sunny=a cloudless sky, or sky with very few clouds)

____ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

____ (cloudy=a sky entirely filled with clouds)

Precipitation (water falling to Earth)

____ None

____ Rain

____ Snow

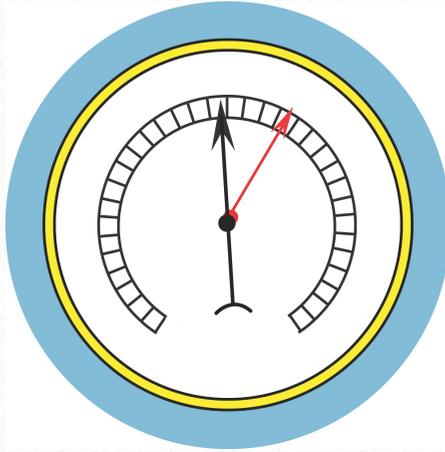
____ Sleet

____ Hail

2. Use your air pressure, air temperature, and moisture data to create a display of the weather in your location on the day you collected data.

- Be sure your display shows what the weather is.

Reading 4: Air Pressure



Glossary Terms

4: air
4: air pressure
4: airplane
4: change

4: difference
4: ear
4: Earth
4: feel

4: inside
4: storm
4: surface
4: weather

4: weight

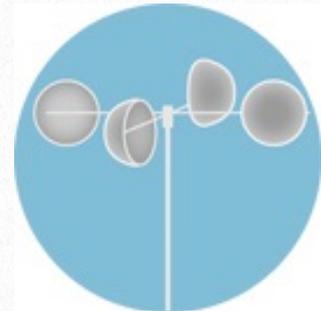
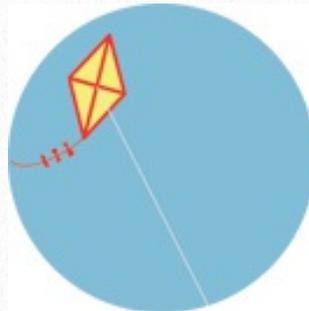
Air pressure is the weight of the air above a place on Earth's surface. Most of the time, we don't feel air pressure. However, we can notice differences in air pressure. For example, the air pressure inside an airplane changes as the plane takes off and lands. Our ears sometimes "pop" as they adjust to the difference inside our ears and the air pressure in the cabin of the plane.

A change in air pressure often indicates the weather that is on the way. Rising air pressure usually means that fair weather is coming. Falling air pressure usually means a storm is coming. Steady air pressure usually means the weather will stay the way it is.

[Go to the Chapter 4 Image Gallery to find out more.](#)

CHAPTER 5

What Is the Speed of the Wind?



Description

Students are introduced to wind (the movement of air) as the fourth of four major items that they will consider in a description of weather. They choose an outside location to observe the strength of the wind and estimate wind speed (how fast the air is moving). They use this location to collect wind speed data and the National Weather Service (NOAA) site to collect data for: moisture (the first major weather item they considered in Chapter 2), temperature (the second major weather item they considered in Chapter 3), and air pressure (the third major weather item they considered in Chapter 4). For homework, they create displays of their weather data and use the displays to explain discrepancies between their estimates of wind speed and the NOAA data and to summarize what the weather is.

Goals

Students will

- describe wind as the movement of air and an anemometer as the instrument used to measure wind speed;
- describe wind as the fourth of four major items to include in a description of weather;
- collect, record, and create displays of wind speed, moisture, temperature, and air pressure data.

The Activity

Challenge students to use their knowledge of what weather is to describe today's weather. Use their responses to indicate that wind refers to movement of the air and is measured with an anemometer. It is the fourth of four major items to include in a description of weather. Explain that students will go outside and estimate the wind speed (how fast the air is moving). They will use the National Weather Service (NOAA) site to collect data for: wind speed, changing air pressure (data that describe the direction of change of the weight of the air above them, temperature (data that describes how hot or cold the air is) and moisture (data that describes the water in the air). They will create displays of their data and use them to explain discrepancies between their estimates of wind speed and the NOAA data and to summarize what the weather is. Go over the procedure from the activity sheet or use your own variation.

Part 1: Go Outside and Estimate Wind Speed

1. Decide on an outside location to observe the strength of the wind.
2. Go to the location and record your observations by answering *yes* or *no* to each of the following questions.
 - Do you feel wind on your face? _____
 - Is the wind moving leaves or trash a little? _____
 - Is the wind blowing leaves or trash along the ground? _____
 - Are the branches of small trees moving? _____
 - Are large branches in large trees moving? _____
 - Is it so windy that it is hard to walk? _____
3. Use **Reading 5: Wind and Wind Speed** to find a number that represents the strength of the wind on the day you made your observations?

wind speed = _____ mph

4. Go to <http://www.weather.gov/> and collect wind speed data for your location on the day you made your observations.

wind speed = _____ mph

5. Explain differences between your estimates of wind speed and the actual wind speed.

Part 2

1. Go to <http://www.weather.gov/> and collect wind speed data for your location.

Location _____

Date _____

Wind Speed _____ mph

2. Collect and record air temperature, air pressure, and moisture data for your location:

Air Temperature _____

Air Pressure _____ (rising, falling, or steady)

Humidity (water vapor in the air)

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover (drops of water floating in the air)

___ (sunny=a cloudless sky, or sky with very few clouds)

___ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

___ (cloudy=a sky entirely filled with clouds)

Precipitation (water falling to Earth)

___ None

___ Rain

___ Snow

___ Sleet

___ Hail

Part 3

1. [Go here](#) to find out more about wind.

- What is wind?
- What is an anemometer?
- What is the Beaufort scale?

2. Use your wind speed, air pressure, air temperature, and moisture data to create a display of the weather in your location on the day you collected data.

- Be sure your display shows what the weather is.

Assessment

Look for students' ability to explain wind as moving air and wind speed as how fast the air is moving as measured with an anemometer. Also look for their ability to describe wind as one of four major items to include in a description of weather. See if they know how to collect and record accurate data and the degree to which they are able to use their data displays to explain what the weather is.

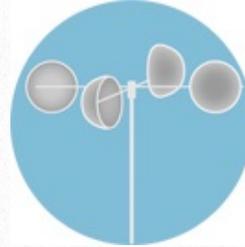
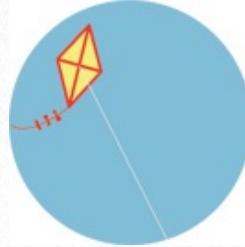
Next Generation Science Standards (NGSS) Alignment

Earth and Space Sciences (Earth's Systems, Weather and Climate): Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather [ESS 2.D](#).

Science and Engineering Practices (Constructing Explanations and Designing Solutions): Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena [Practice 6](#).

Science and Engineering Practices (Obtaining, Evaluating, and Communicating Information): Obtain and combine information from books and other reliable media to explain phenomena [Practice 8](#).

Activity Sheet 5: What Is the Speed of the Wind?



Procedure for Finding Out About Wind and Wind Speed

1. Decide on an outside location to observe the strength of the wind.
2. Go to the location and record your observations by answering *yes* or *no* to each of the following questions.
 - Do you feel wind on your face? _____
 - Is the wind moving leaves or trash a little? _____
 - Is the wind blowing leaves or trash along the ground? _____
 - Are the branches of small trees moving? _____
 - Are large branches in large trees moving? _____
 - Is it so windy that it is hard to walk? _____

3. Use **Reading 5: Wind and Wind Speed** to find a number that represents the strength of the wind on the day you made your observations?

wind speed = _____ mph

4. Go to <http://www.weather.gov/> and collect wind speed data for your location on the day you made your observations.

wind speed = _____ mph

5. Explain differences between your estimates of wind speed and the actual wind speed.

Part 2

1. Go to <http://www.weather.gov/> and collect wind speed data for your location for air temperature, air pressure, and moisture.

Location _____

Date _____

2. Collect and record air temperature, air pressure, and moisture data for your location below:

Air Temperature _____

Air Pressure _____ (rising, falling, or steady)

Humidity (water vapor in the air)

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover (drops of water floating in the air)

____ (sunny=a cloudless sky, or sky with very few clouds)

____ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

____ (cloudy=a sky entirely filled with clouds)

Precipitation (water falling to Earth)

____ None

____ Rain

____ Snow

____ Sleet

____ Hail

Part 3

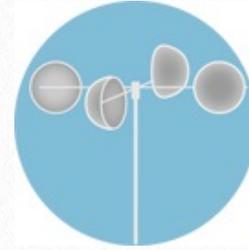
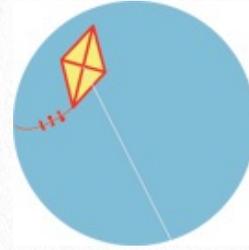
1. [Go here](#) to find out more about wind.

- What is wind?
- What is an anemometer?
- What is the Beaufort scale?

2. Use your wind speed, air pressure, air temperature, and moisture data to create a display of the weather in your location on the day you collected data.

- Be sure your display shows what the weather is.

Reading 5: Wind and Wind Speed



Glossary Terms

5: above

5: boat

5: face

5: surface

5: air

5: branch

5: feel

5: tree

5: area

5: cool

5: heat

5: warm

5: blow

5: Earth

5: sunlight

5: wind

You can feel wind on your face. You can watch it lift a kite, blow tree branches, and fill the sails on a boat.

What causes wind? Sunlight warms the surface of Earth unevenly. The heat from warm areas of Earth's surface warms the air above. The warmer air rises and cooler air moves in to take its place. This movement of air is called wind.

Wind Speed and Effects of Wind

Less than 1 mph Leaves don't move; smoke rises straight up.

1-3 mph Leaves don't move; smoke drifts gently; the sea is lightly rippled.

4-7 mph Leaves rustle; wind felt on face; flags wave slightly.

8-12 mph Leaves and twigs on trees move; small flags extended.

13-18 mph Small branches sway; dust and paper rise from ground; flags flap.

19-24 mph Small trees start to sway; flags flap and ripple.

25-31 mph Large branches move; flags beat and snap; umbrellas are difficult to keep under control.

32-38 mph Whole trees sway; difficult to walk into wind.

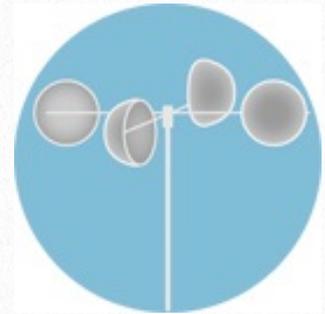
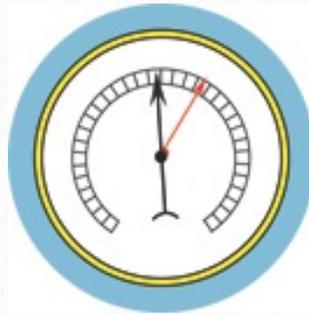
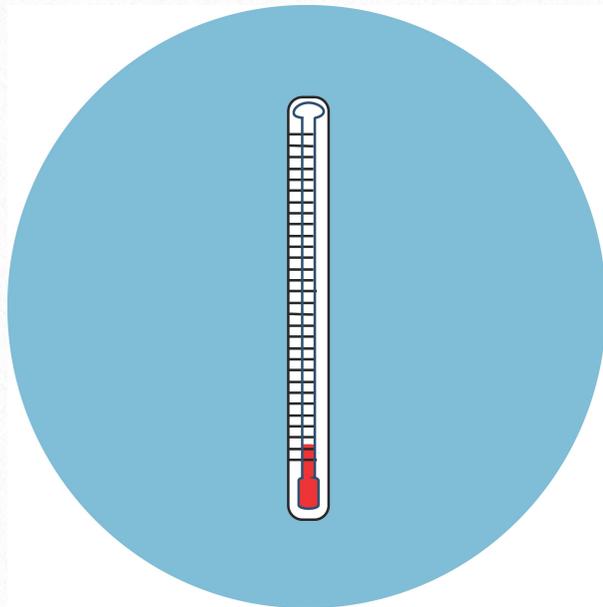
39-46 mph Twigs break off trees; very difficult to walk into wind.

47-54 mph Branches break; shingles are blown off roofs.

[Go to the Chapter 5 Image Gallery to find out more.](#)

CHAPTER 6

Collect and Display Weather Data



Description

Students review how moisture, air temperature, change in air pressure, and wind can be used to describe weather. They decide on the locations they will use for collecting weather and how many days they will collect data such as several days, a week, or several weeks. They then use the National Weather Service (NOAA) site to collect and record data for each of the four major weather items in the locations they have selected. For homework, they create charts of their weather data and use the displays to write research reports describing what the weather is in the locations they have selected and how or if it might be about to change.

Goals

Students will

- collect, record, and create charts of the weather data for each of the four items that can be used to describe weather in the locations they have selected;
- use their charts to describe the weather in the selected locations and to explain how or if it might be about to change.

The Activity

Have students select locations to use for data collection. They might pick a place they would like to go for vacation, like to live, or where a relative or someone they know lives. Also have them decide how long they will collect data. They will then use the National Weather Service (NOAA) site to collect, record, and create charts of the data

for: wind speed; changing air pressure; air temperature; and moisture. They will create charts of their data and use them to write research reports that describe the weather in their location and how or if it might be about to change. Go over the procedure from the activity sheet or use your own variation.

Part 1: Decide on a Location to Use for Data Collection and on a Number of Days to Collect Data

1. Decide on a location to use for data collection.

Location _____

2. Decide how long you will collect weather data.

• Number of Days I'll collect data _____

3. Go to <http://www.weather.gov/> and collect wind speed data for your location on the day you made your observations.

wind speed = _____ mph

4. Explain differences between your estimates of wind speed and the actual wind speed.

Part 2

1. Go to <http://www.weather.gov/> and collect air temperature, air pressure, wind, and moisture data for your location.

Location _____

Date _____

Air Temperature _____

Air Pressure _____ (rising, falling, or steady)

Humidity

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover

____ (sunny=a cloudless sky, or sky with very few clouds)

____ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

____ (cloudy=a sky entirely filled with clouds)

Precipitation

____ None

____ Rain

____ Snow

____ Sleet

_____ Hail

Part 3

1. Make charts of your data. Try going to <http://nces.ed.gov/nceskids/createagraph/> to make displays of your air temperature, air pressure, humidity, and wind speed data. Try taking pictures, making drawings or using one of these apps to make displays of cloud cover and precipitation data: [handPaint](#), [Draw Free for iPad](#), or [Doodle Buddy](#).
2. Share one thing that you discovered from looking at the charts.
3. Summarize your discoveries in a written research report. Your report should include answers to the following:
 - What were your questions?
 - What did you do?
 - What did you learn?

Assessment

Look for students' ability to discover relationships in the data and to describe their findings in written research reports.

Next Generation Science Standards (NGSS) Alignment

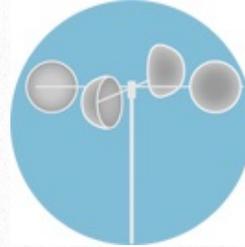
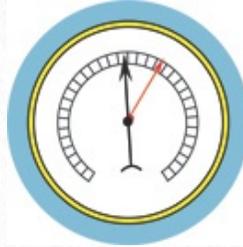
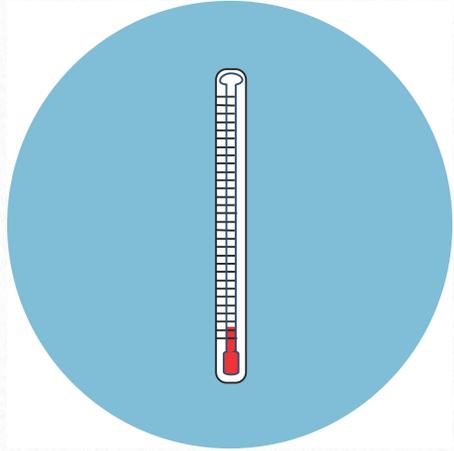
Earth and Space Sciences (Earth's Systems, Weather and Climate): Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather [ESS 2.D](#).

Science and Engineering Practices (Analyzing and Interpreting Data): Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions [Practice 4](#).

Science and Engineering Practices (Constructing Explanations and Designing Solutions): Make observations (first-hand or from media) to construct an evidence-based account for natural phenomena [Practice 6](#).

Science and Engineering Practices (Obtaining, Evaluating, and Communicating Information): Obtain and combine information from books and other reliable media to explain phenomena [Practice 8](#).

Activity Sheet 6: Collect and Display Weather Data



Procedure for Collecting Weather Data and Creating Charts of the Data

Part 1: Decide on a Location to Use for Data Collection and on a Number of Days to Collect Data

1. Decide on a location to use for data collection.

Location _____

2. Decide how long you will collect weather data.

Number of Days I'll collect data _____

3. Go to <http://www.weather.gov/> and collect wind speed data for your location on the day you made your observations.

wind speed = _____ mph

4. Explain differences between your estimates of wind speed and the actual wind speed.

Part 2

1. Go to <http://www.weather.gov/> and collect air temperature, air pressure, wind, and moisture data for your location.

Location _____

Date _____

Air Temperature _____

Air Pressure _____ (rising, falling, or steady)

Humidity

____ (0-39%=low)

____ (40-60%=medium)

____ (61-100%=high)

Cloud Cover

____ (sunny=a cloudless sky, or sky with very few clouds)

____ (partly cloudy=a sky in which many clouds are present, but blue sky is still visible)

____ (cloudy=a sky entirely filled with clouds)

Precipitation

____ None

____ Rain

____ Snow

____ Sleet

____ Hail

Part 3

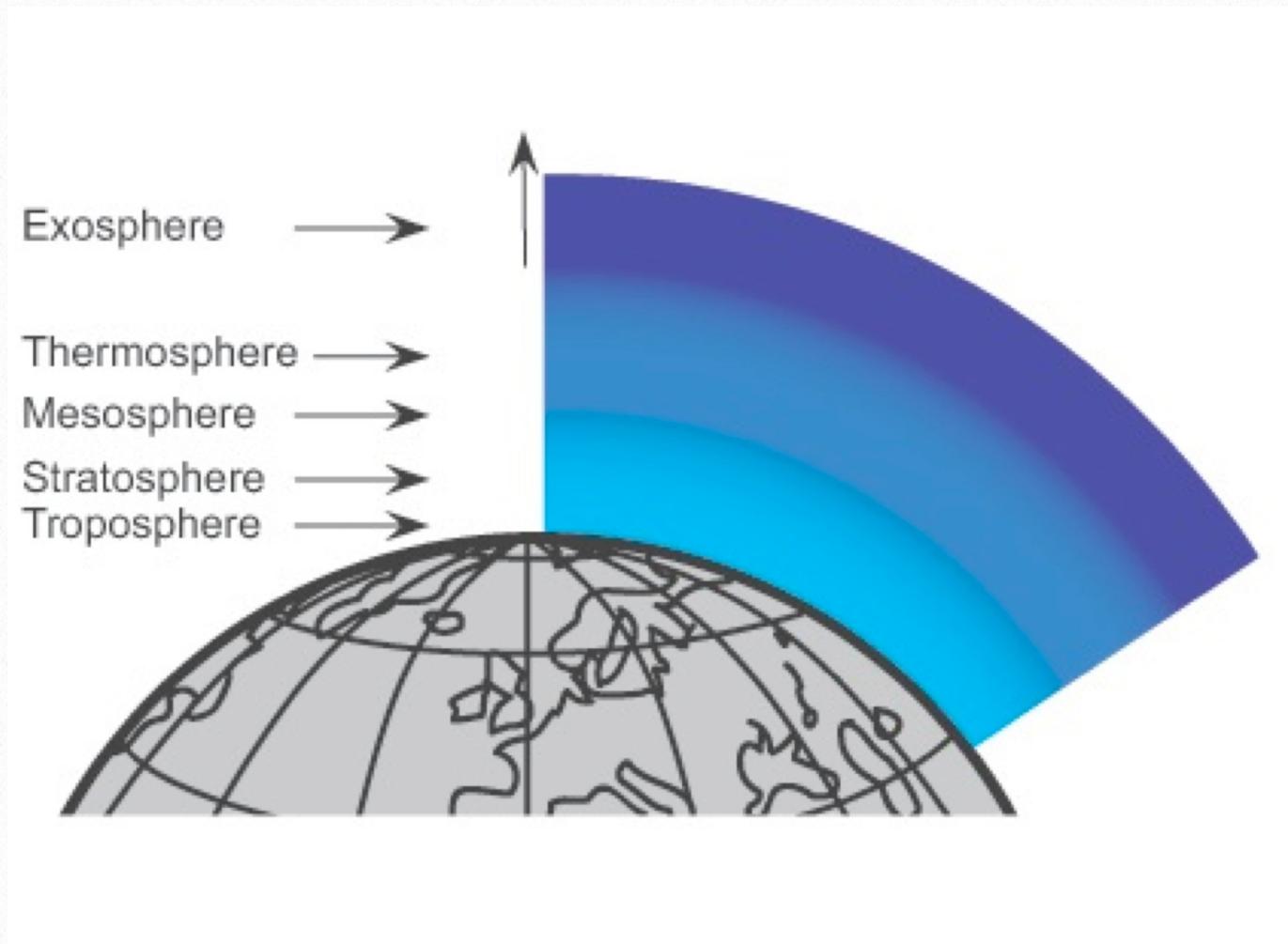
1. Make charts of your data. Try going to <http://nces.ed.gov/nceskids/createagraph/> to make displays of your air temperature, air pressure, humidity, and wind speed data. Try taking pictures, making drawings or using one of these apps to make displays of cloud cover and precipitation data: [handPaint](#), [Draw Free for iPad](#), or [Doodle Buddy](#).
2. Share one thing that you discovered from looking at the charts.
3. Summarize your discoveries in a written research report. Your report should include answers to the following:
 - What were your questions?
 - What did you do?
 - What did you learn?

[Go to the Chapter 6 Image Gallery to view charts of weather data.](#)

Image Galleries

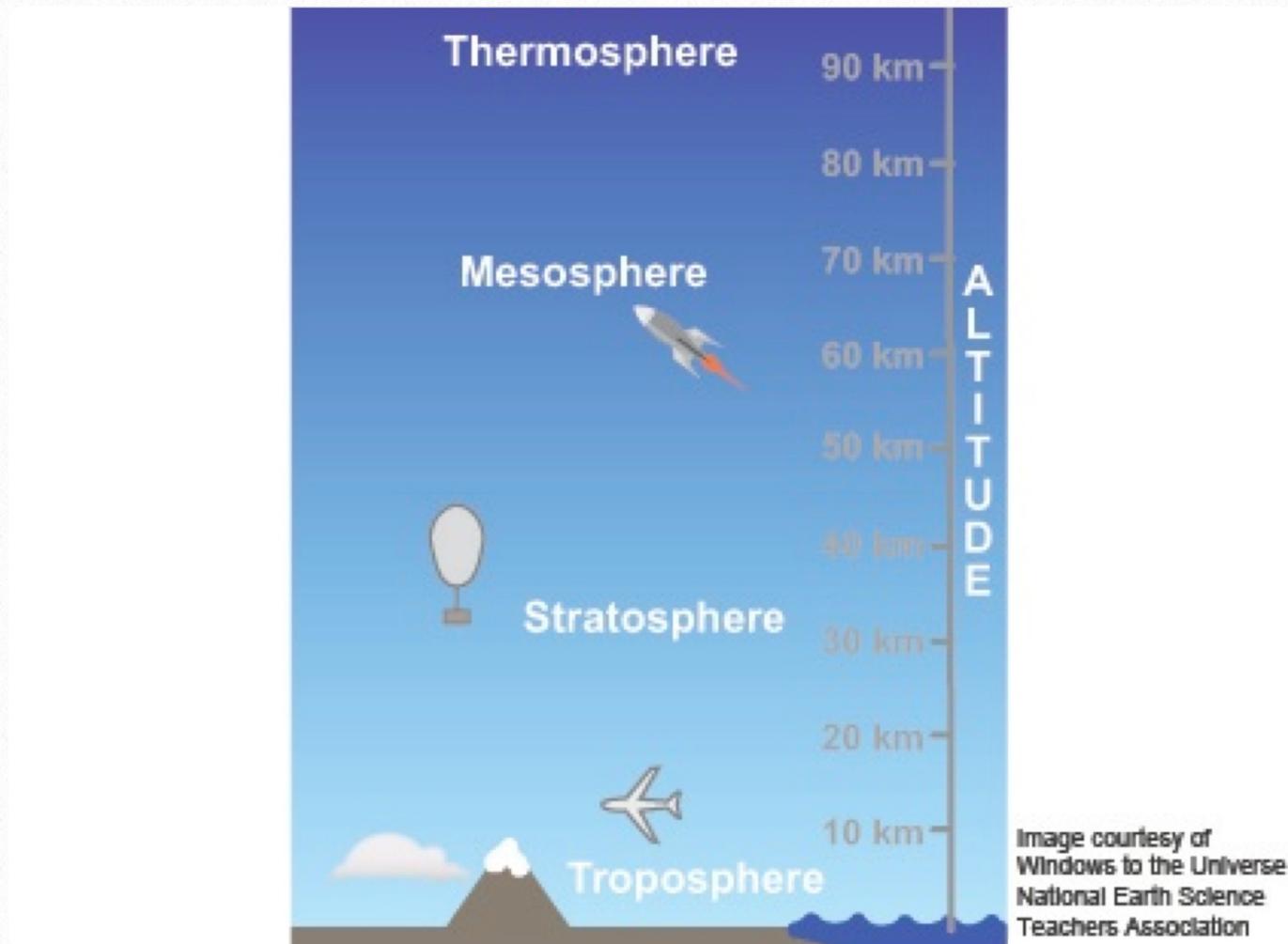


Chapter 1 Image Gallery



Layers of air form the atmosphere that surrounds Earth. The atmosphere has five layers.

[Back to Chapter 1 Reading](#)



Almost all our weather occurs in the lowest layer of the atmosphere. This layer is called the troposphere. The troposphere starts at Earth's surface and goes up to a height of 10 kilometers (km) above sea level.

[Back to Chapter 1 Reading](#)



Light Rain

30.21 inches **FALLING**
Air Pressure



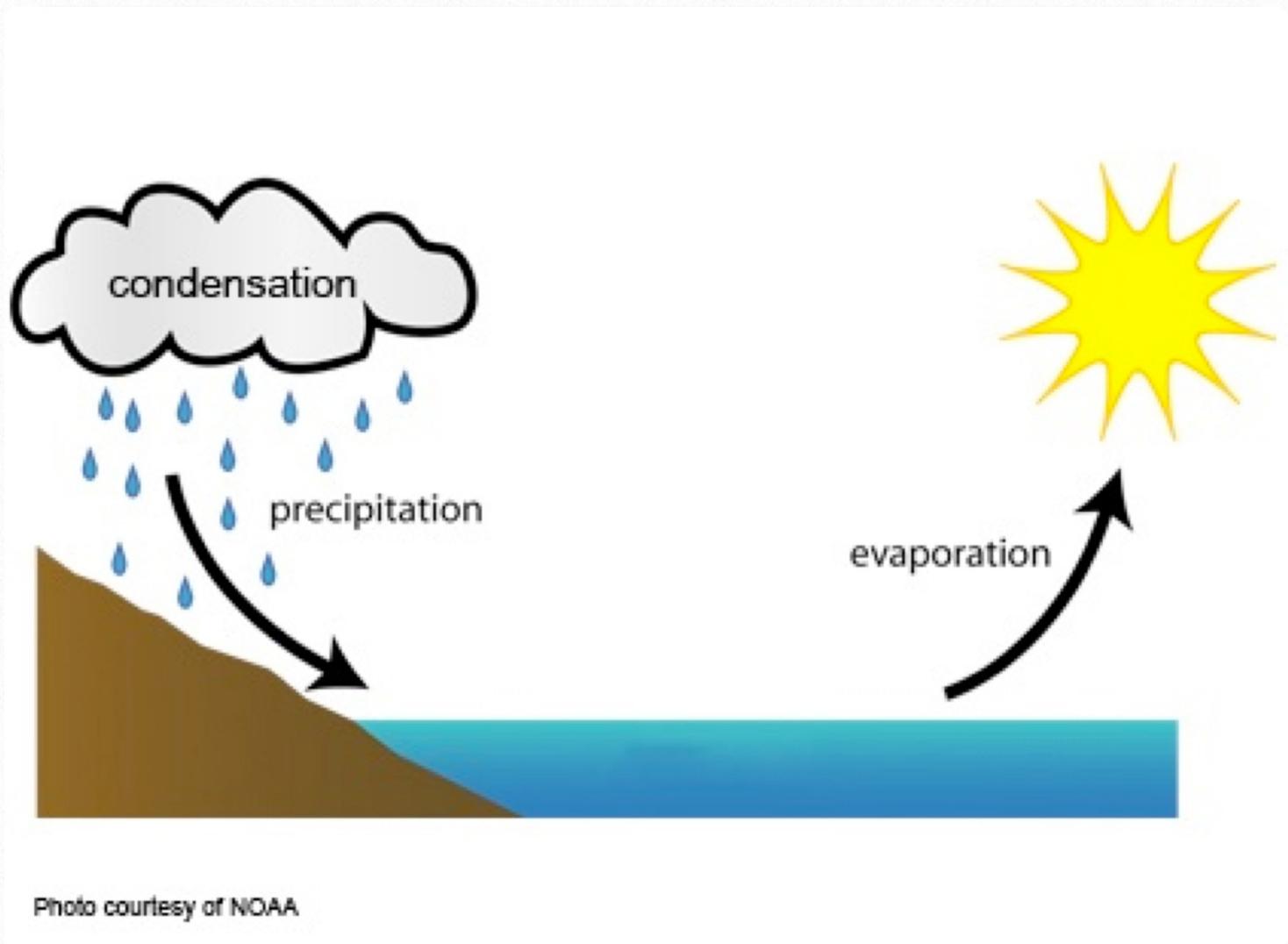
North Variable Wind

37.2 °F

We use moisture, air temperature, air pressure, and wind to describe the weather in a particular location.

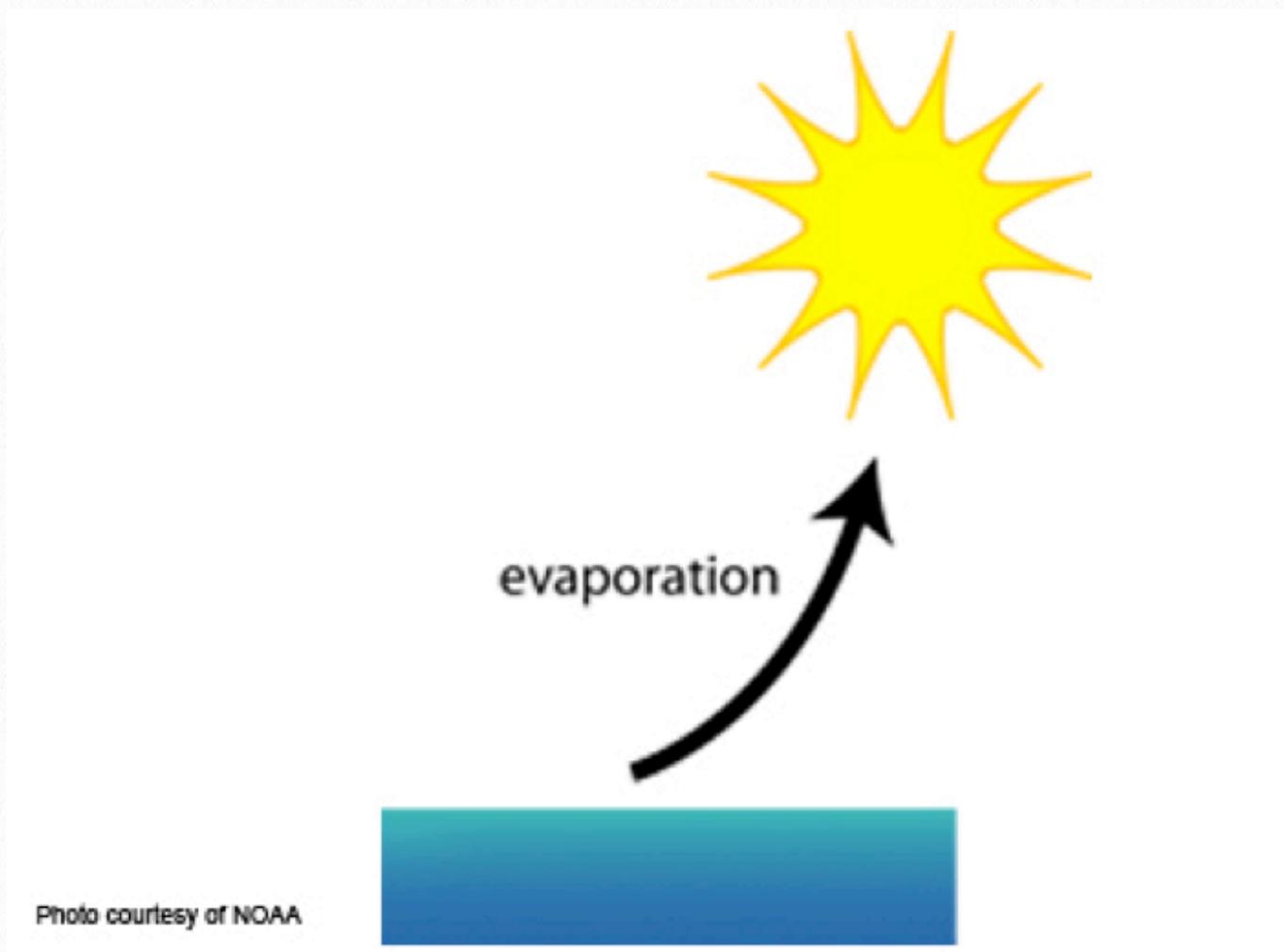
[Back to Chapter 1 Reading](#)

Chapter 2 Image Gallery



Water moves continuously from the surface of Earth into the atmosphere and back again to its surface. This continuous process is called the water cycle.

[Back to Chapter 2 Reading](#)



Water on the surface of Earth evaporates, or turns into an invisible gas called water vapor. Heat from the sun and wind help water evaporate. This water vapor then rises into the atmosphere.

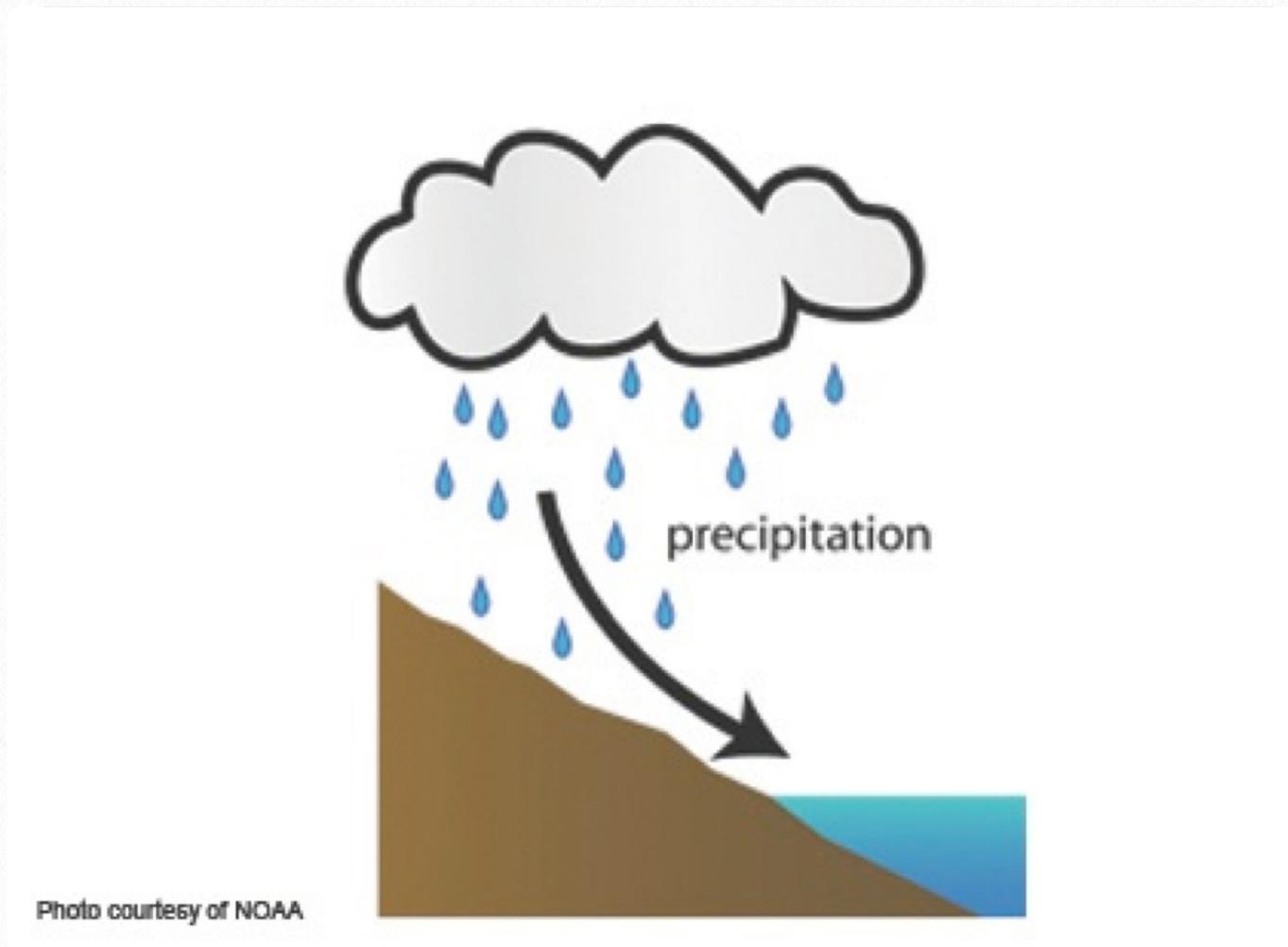
[Back to Chapter 2 Reading](#)



Photo courtesy of NOAA.

As water vapor rises into the atmosphere, it cools and condenses, changing back into tiny drops of water that form around bits of dust or other particles in the air. These water drops join together to form clouds.

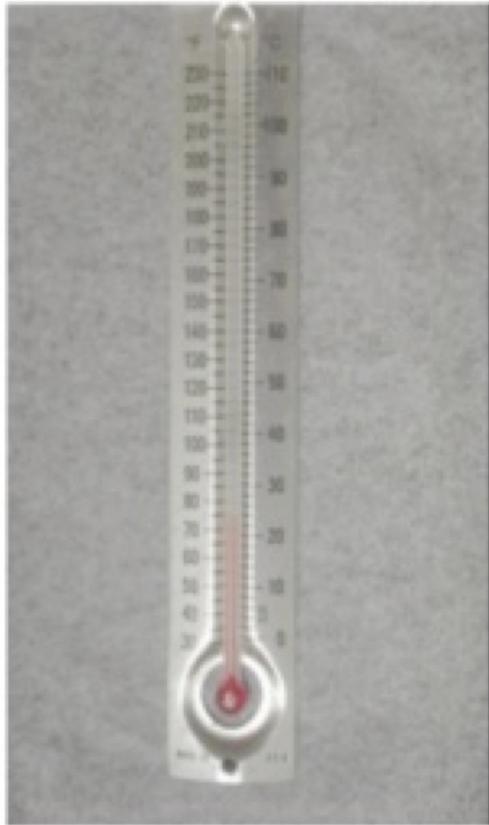
[Back to Chapter 2 Reading](#)



Water falling to Earth in any form is called precipitation. If the air temperature where the precipitation forms is at or below freezing, the water may fall as freezing rain, snow, sleet, or hail. If the air temperature is above freezing, the water will fall as drizzle or rain.

[Back to Chapter 2 Reading](#)

Chapter 3 Image Gallery



Alcohol Thermometer

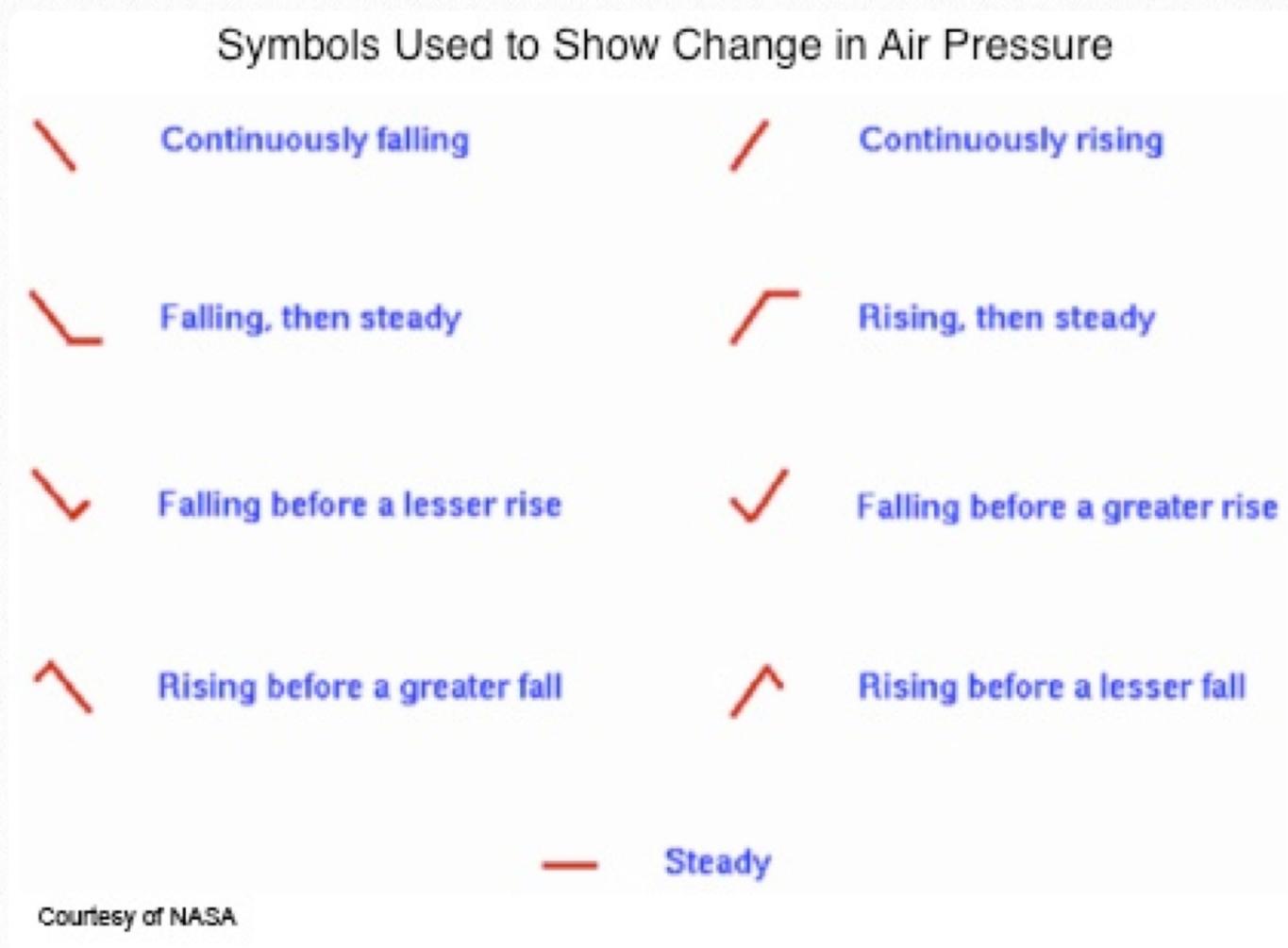


Digital Thermometer

Temperature is how hot or cold something is. When we measure air temperature, we are measuring how hot or cold the air is. A thermometer is an instrument used to measure temperature.

[Back to Chapter 3 Reading](#)

Chapter 4 Image Gallery



A change in air pressure often indicates the weather that is on the way. Rising air pressure usually means that fair weather is coming. Falling air pressure usually means a storm is coming. Steady air pressure usually means the weather will stay the way it is.

[Back to Chapter 4 Reading](#)

NOAA/NOS/CO-OPS
Barometric Pressure Plot
8656483 Beaufort, NC
from 2011/08/26 - 2011/08/27

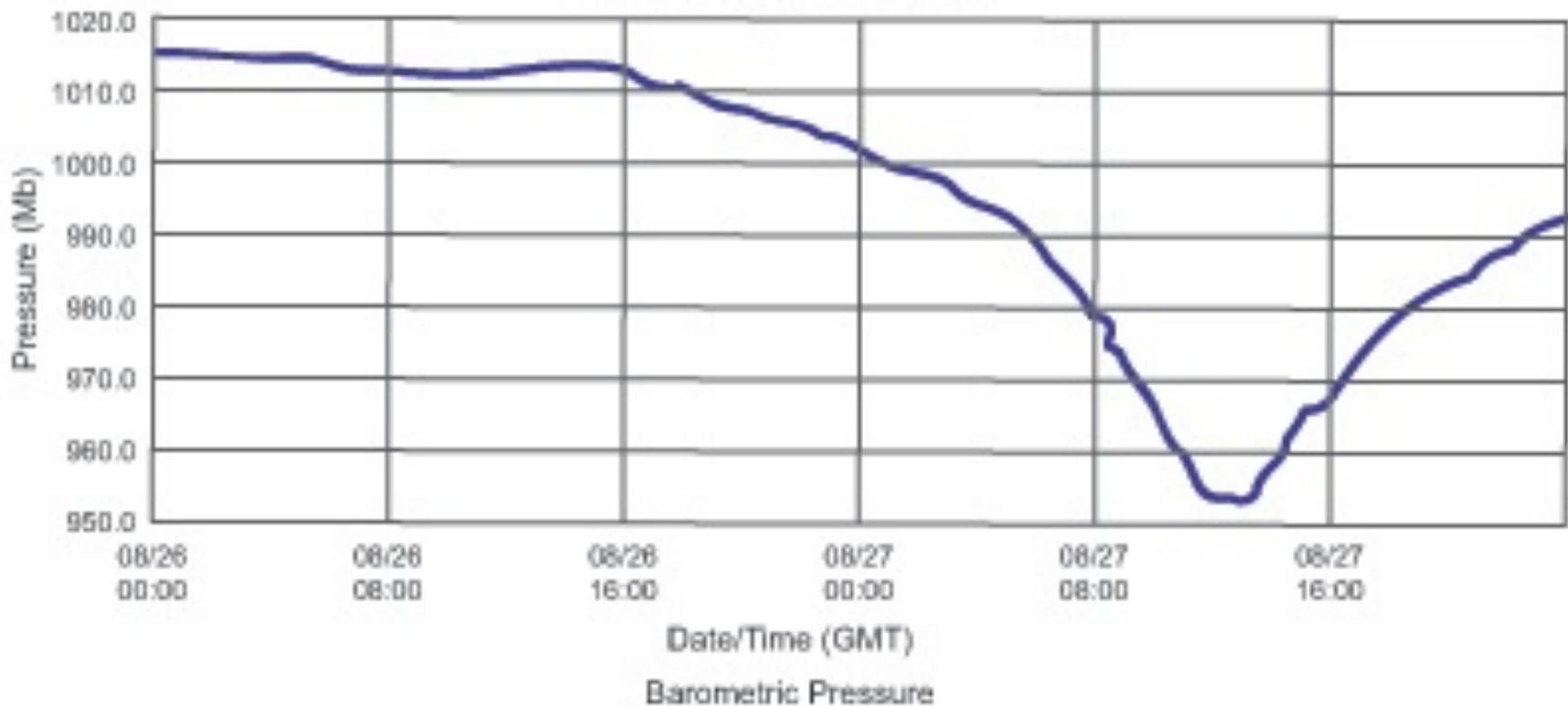
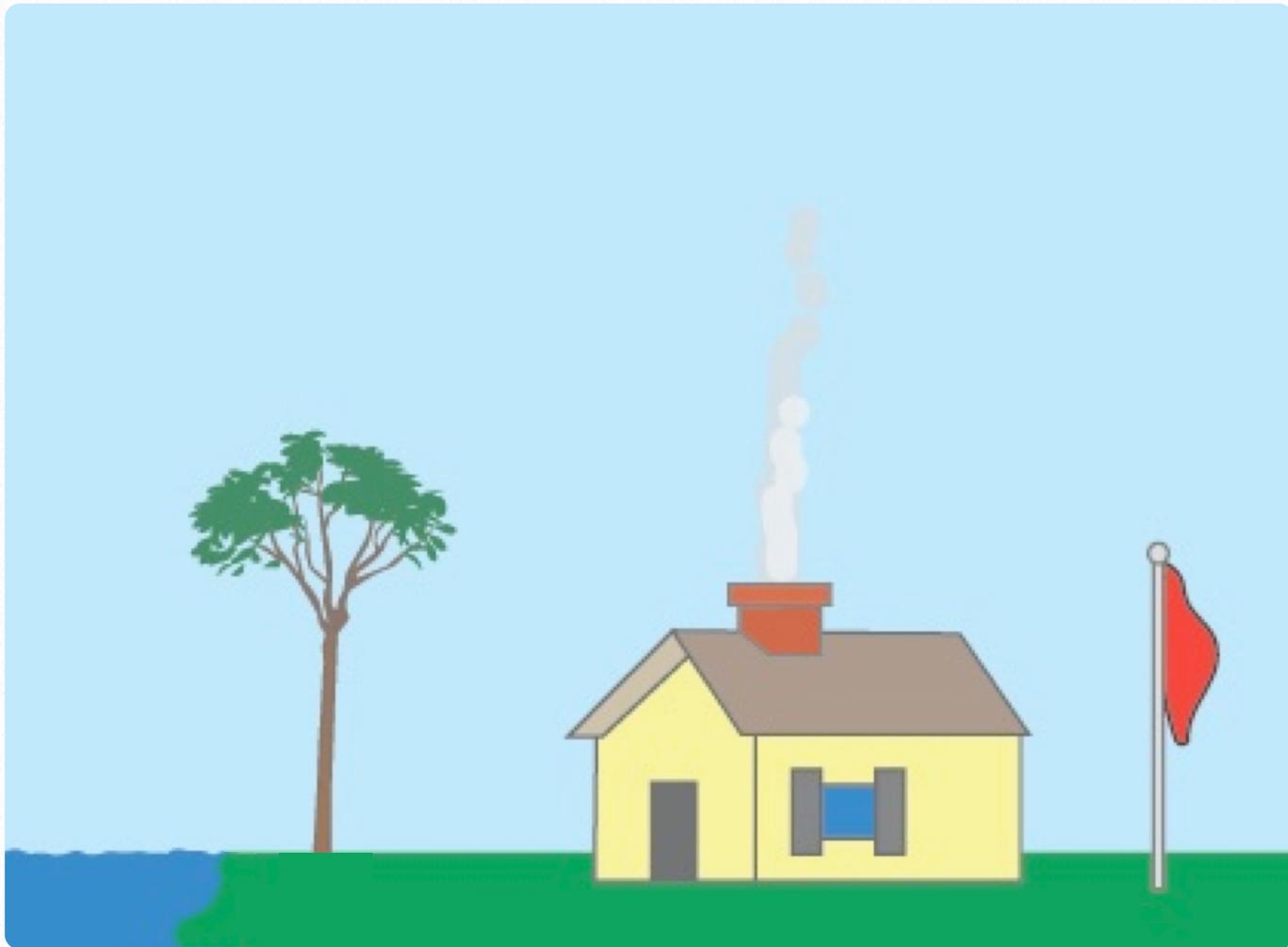


Image Courtesy of National Ocean Service

This graph shows the changes in air pressure before and after hurricane Irene made landfall on the coast of North Carolina on August 27th, 2011. The air pressure decreased as the storm approached, remained very low during the storm, and then rose as the weather cleared.

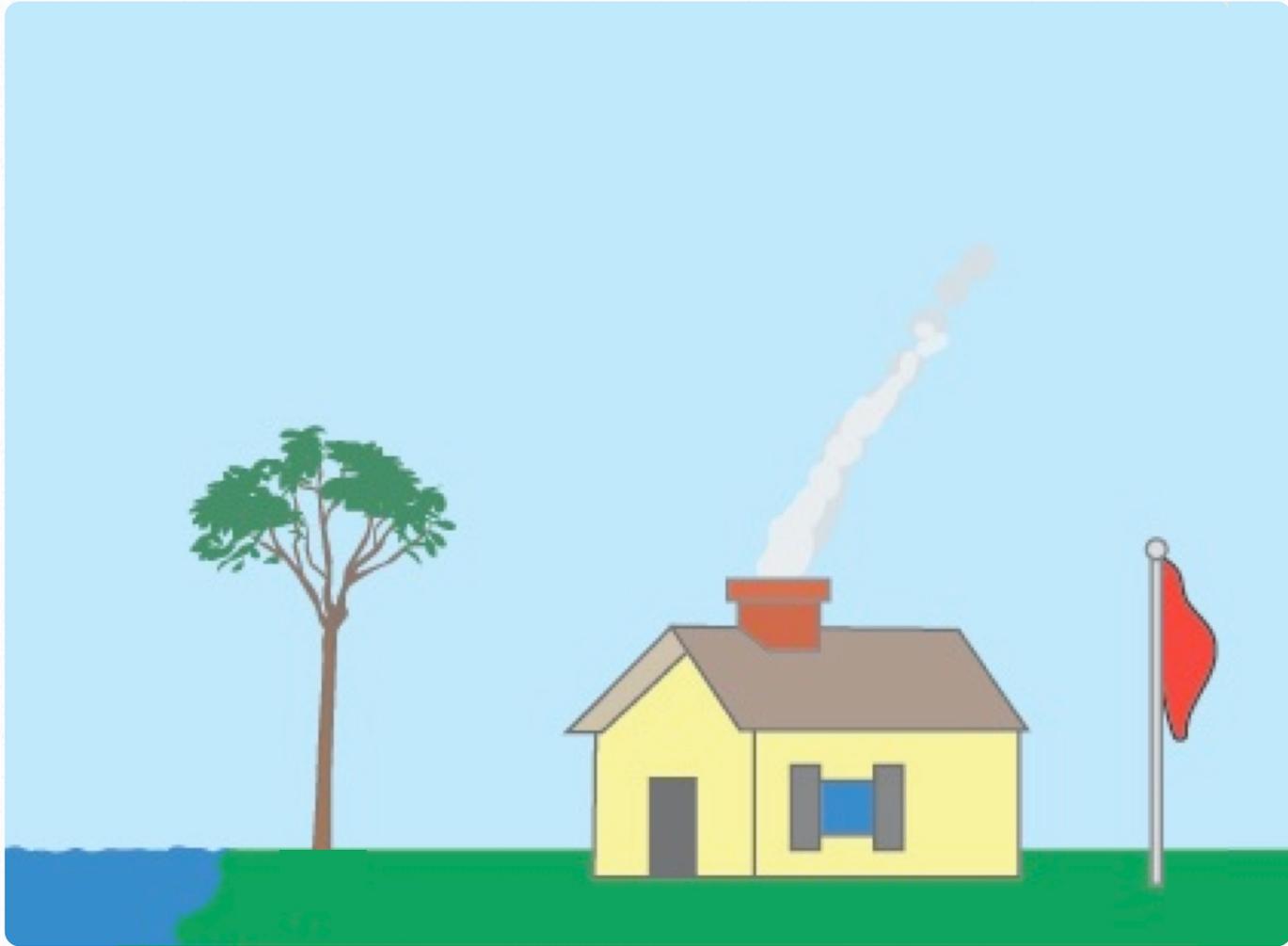
[Back to Chapter 4 Reading](#)

Chapter 5 Image Gallery



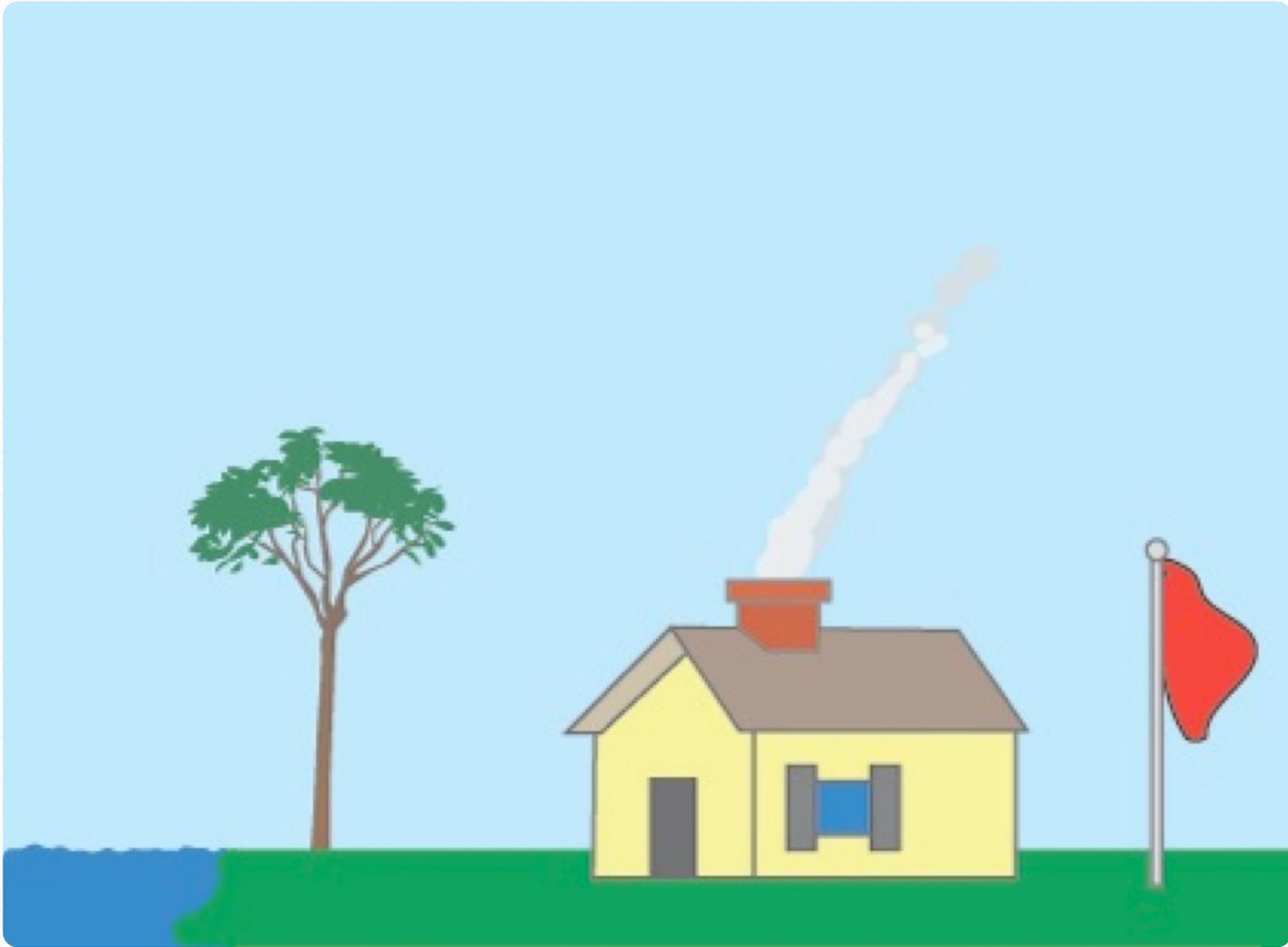
Wind speed less than 1 mile per hour: Leaves don't move; smoke rises straight up.

[Back to Chapter 5 Reading](#)



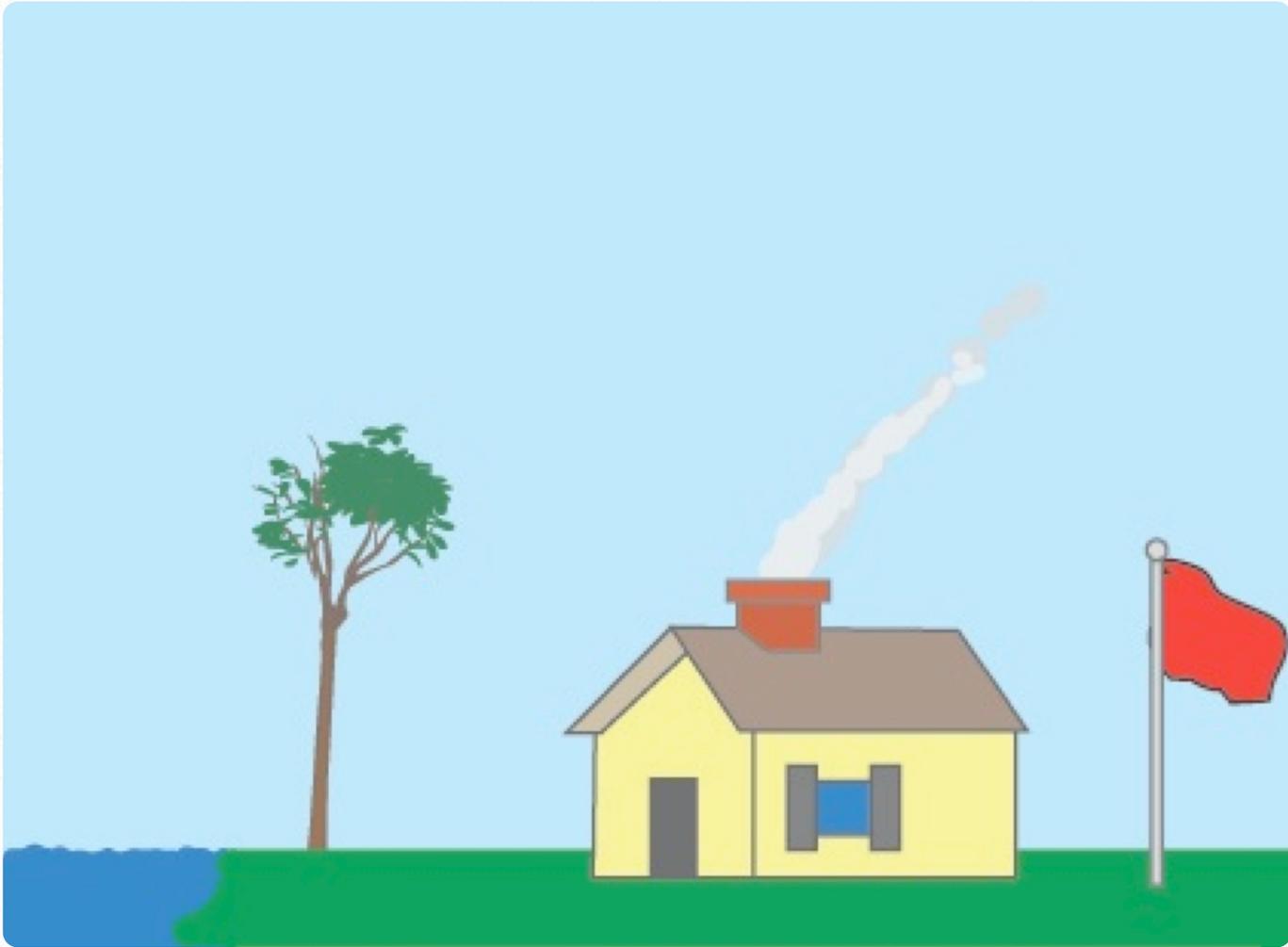
Wind speed 1 to 3 miles per hour: Leaves don't move; smoke drifts gently; the sea is lightly rippled.

[Back to Chapter 5 Reading](#)



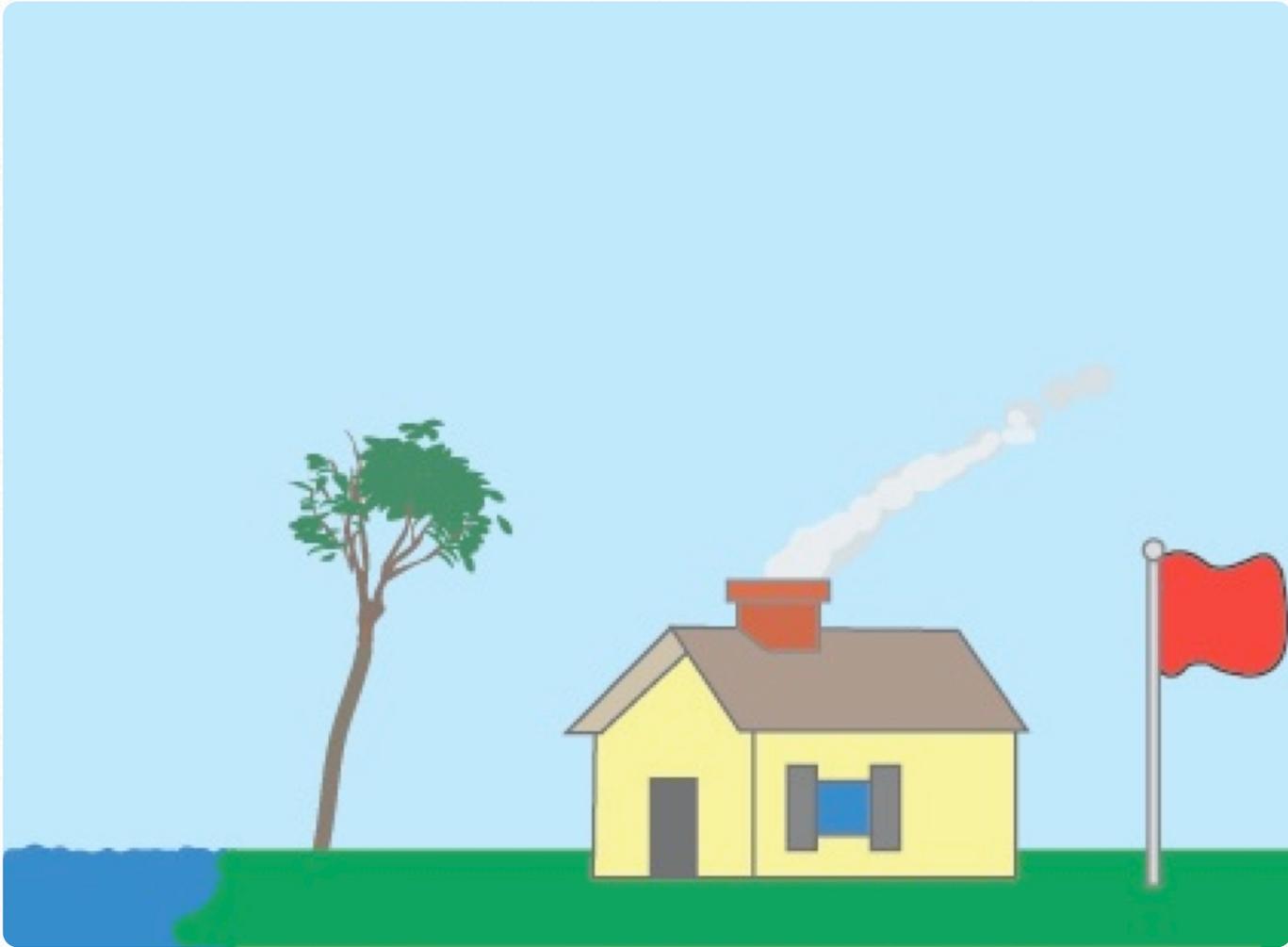
Wind speed 4 to 7 miles per hour: Leaves rustle; wind felt on face; flags wave slightly.

[Back to Chapter 5 Reading](#)



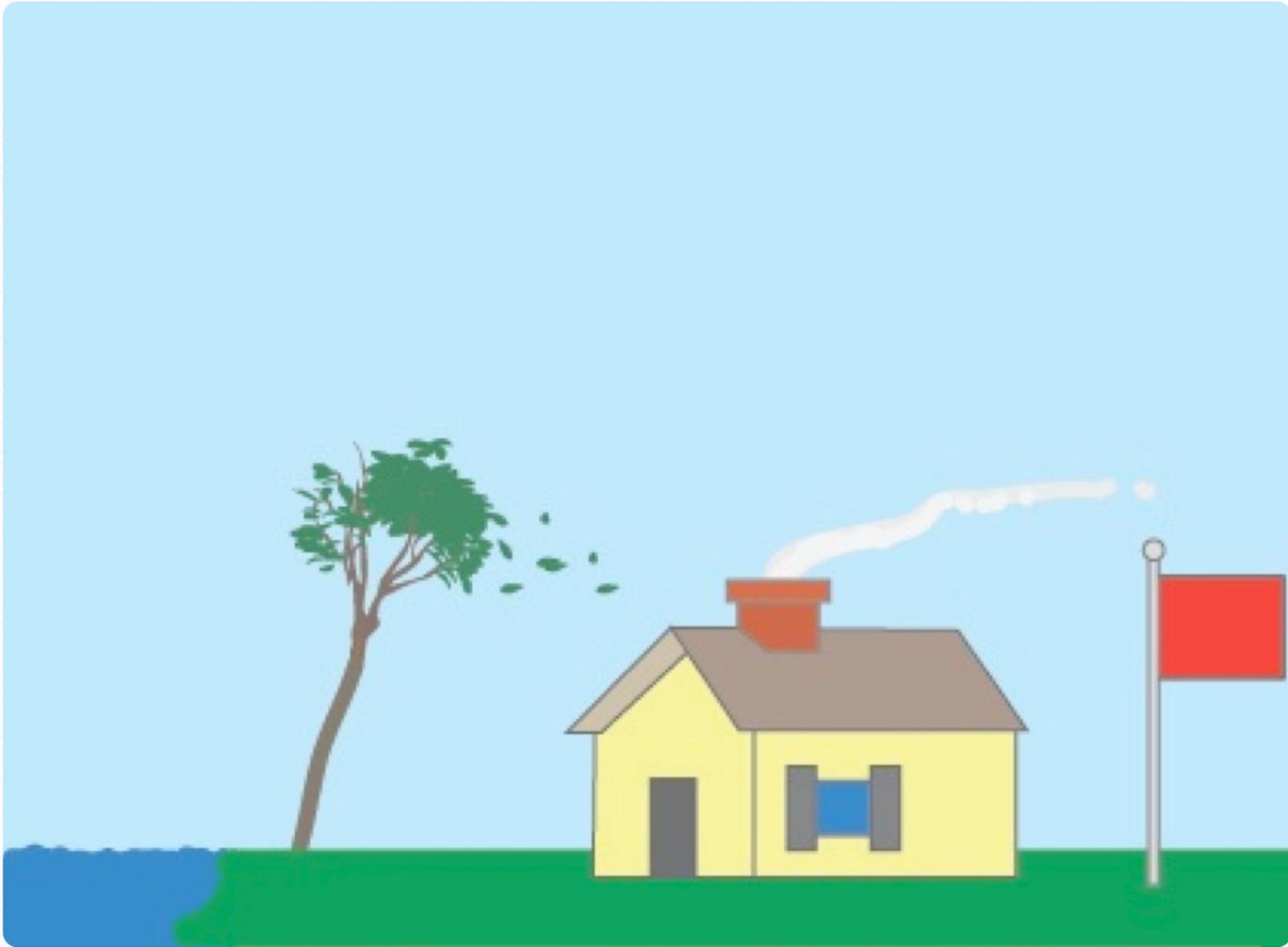
Wind speed 8 to 12 miles per hour: Leaves and twigs on trees move; small flags extended.

[Back to Chapter 5 Reading](#)



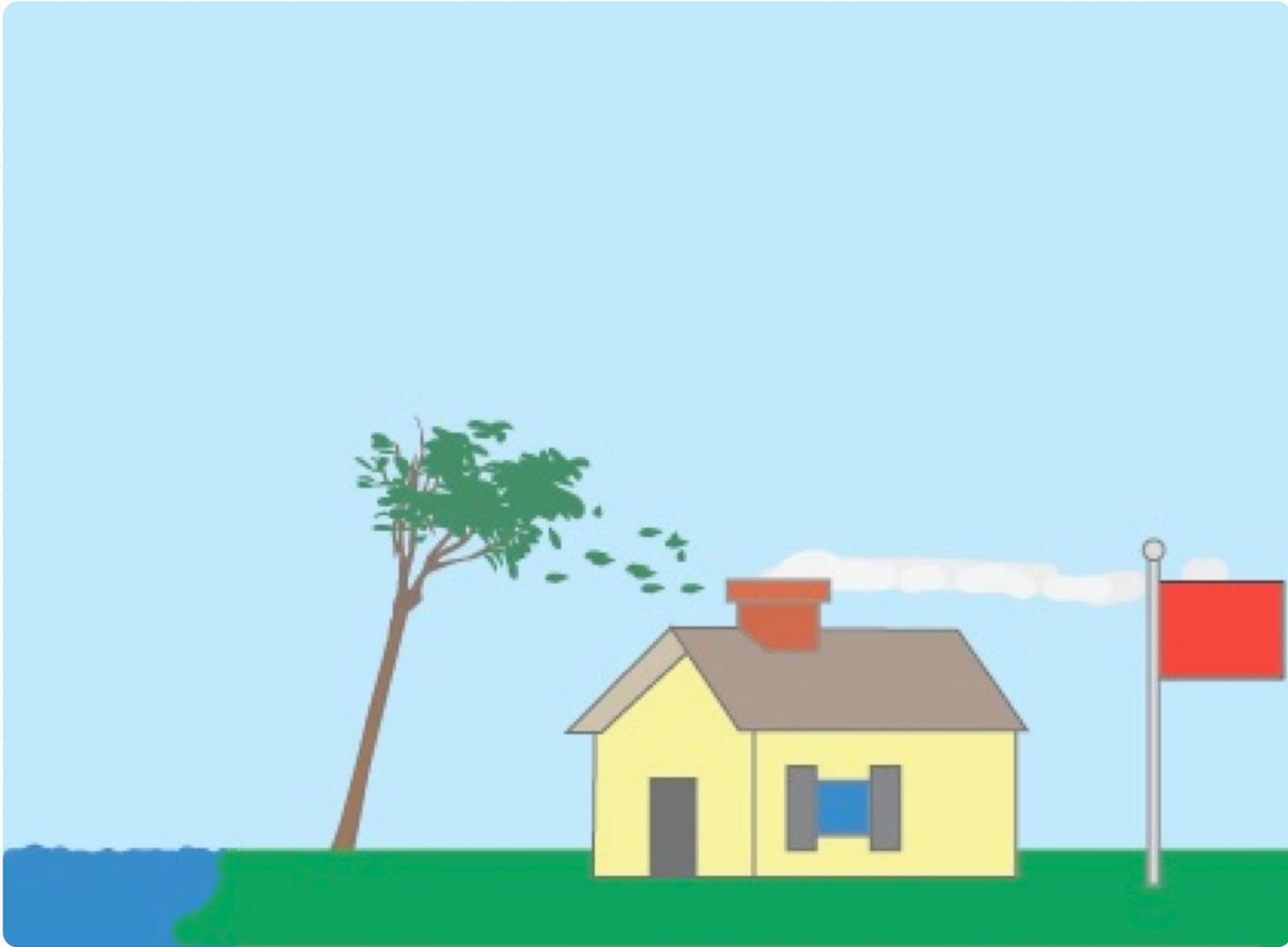
Wind speed 13 to 18 miles per hour: Small branches sway; dust and paper rise from ground; flags flap.

[Back to Chapter 5 Reading](#)



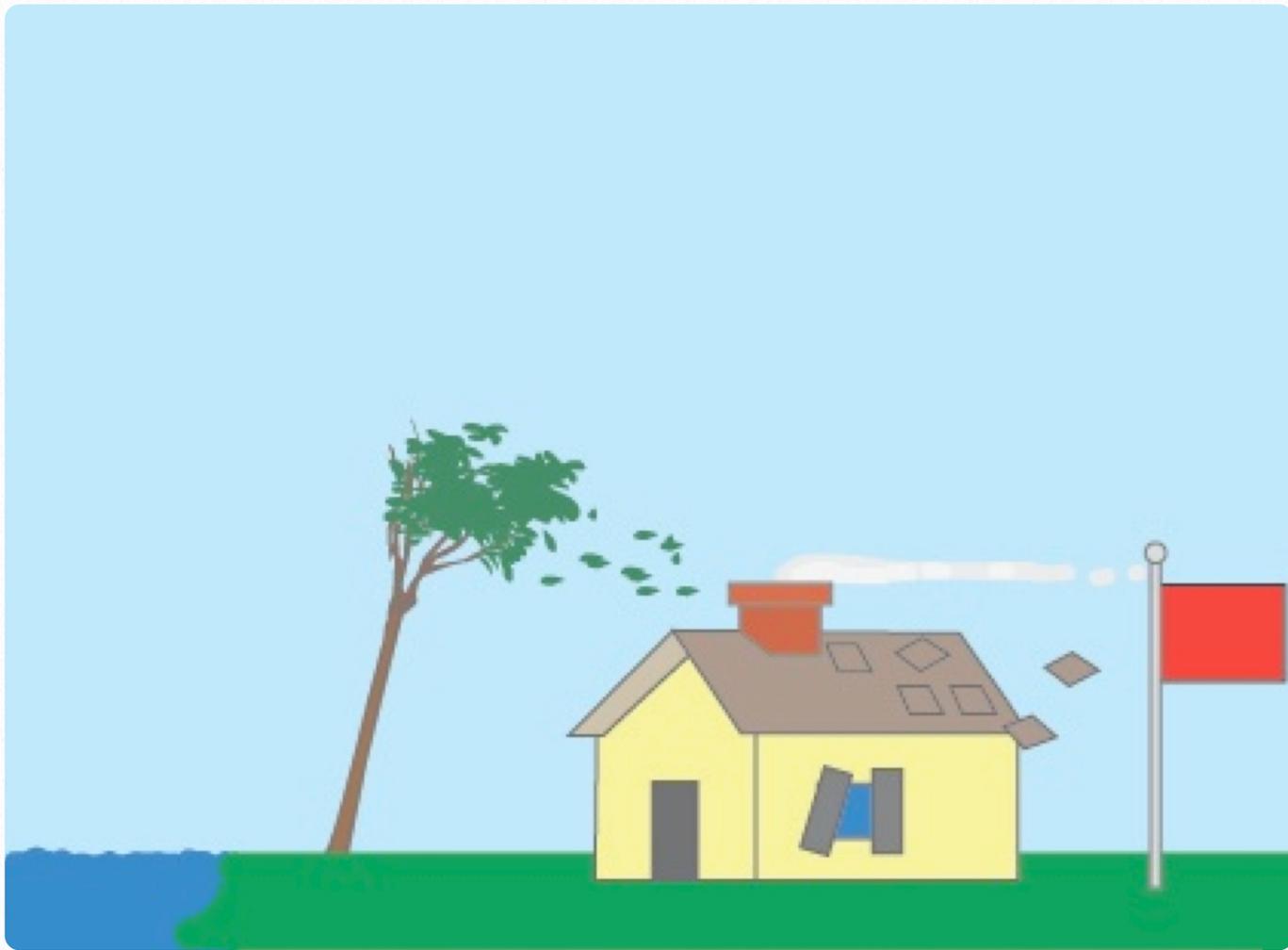
Wind speed 19 to 24 miles per hour: Small trees start to sway; flags flap and ripple.

[Back to Chapter 5 Reading](#)



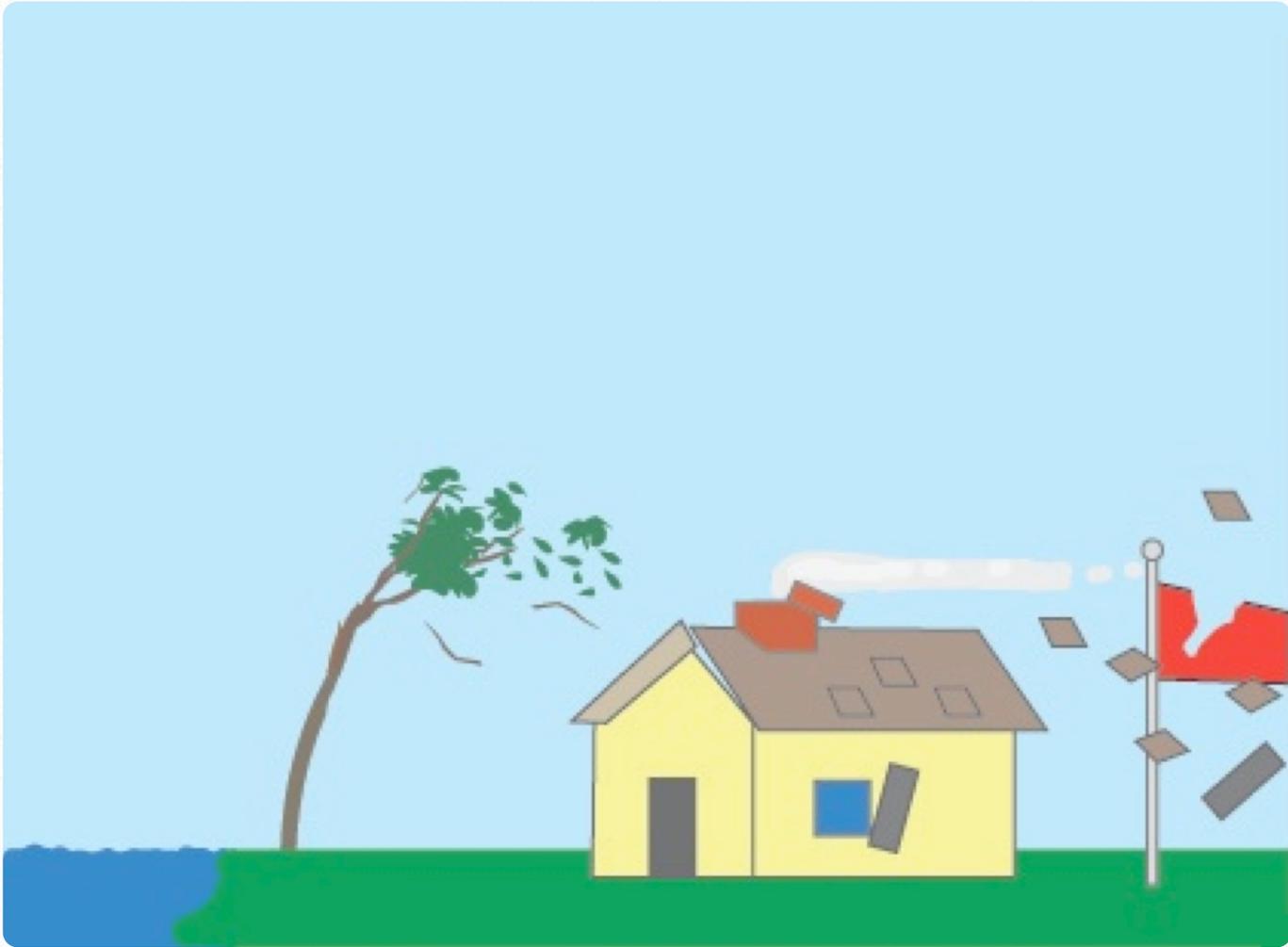
Wind speed 25 to 31 miles per hour: Large branches move; flags beat and snap; umbrellas are difficult to keep under control.

[Back to Chapter 5 Reading](#)



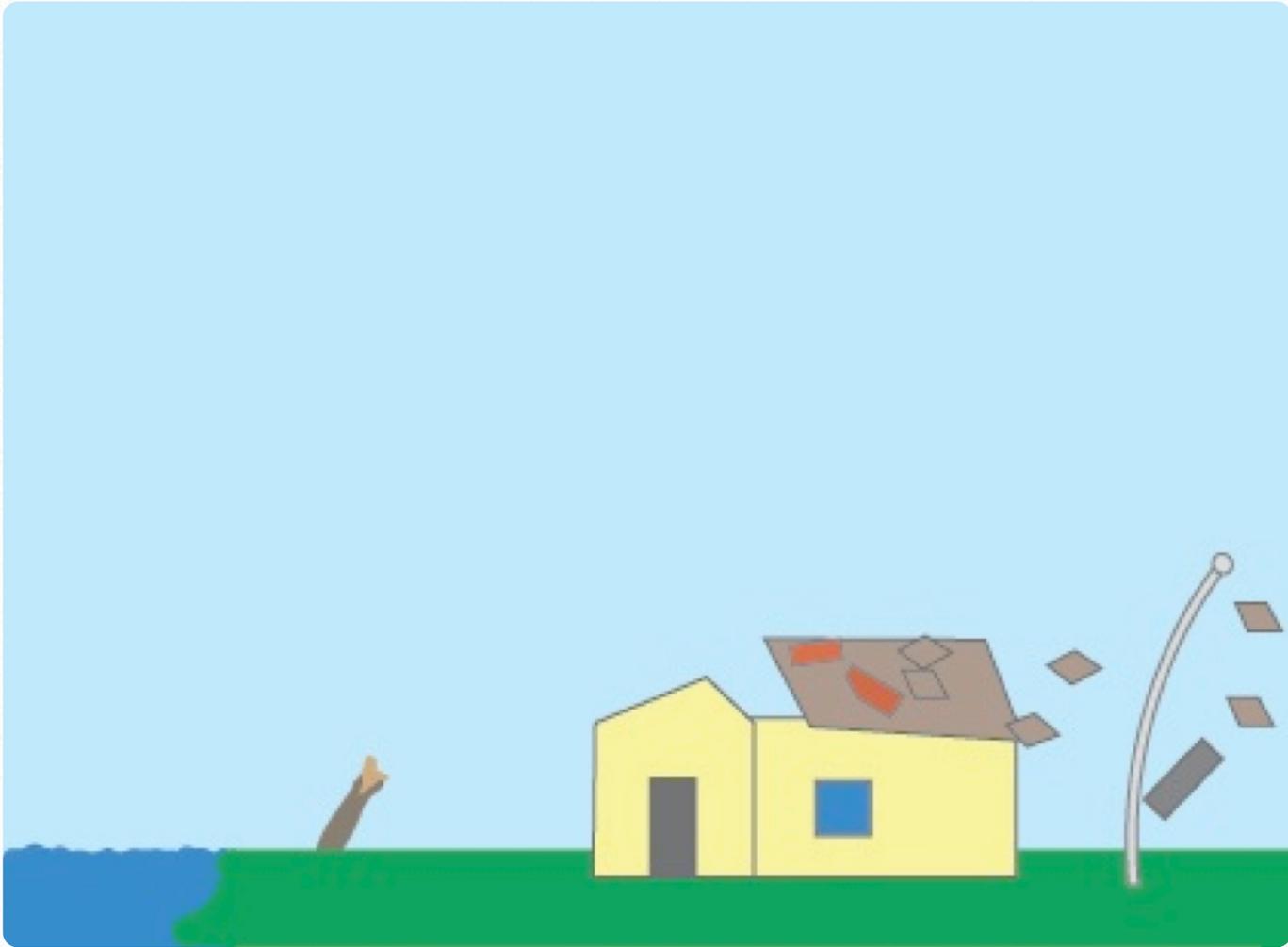
Wind speed 32 to 38 miles per hour: Whole trees sway; difficult to walk into wind.

[Back to Chapter 5 Reading](#)



Wind speed 39 to 46 miles per hour: Twigs break off trees; very difficult to walk into wind.

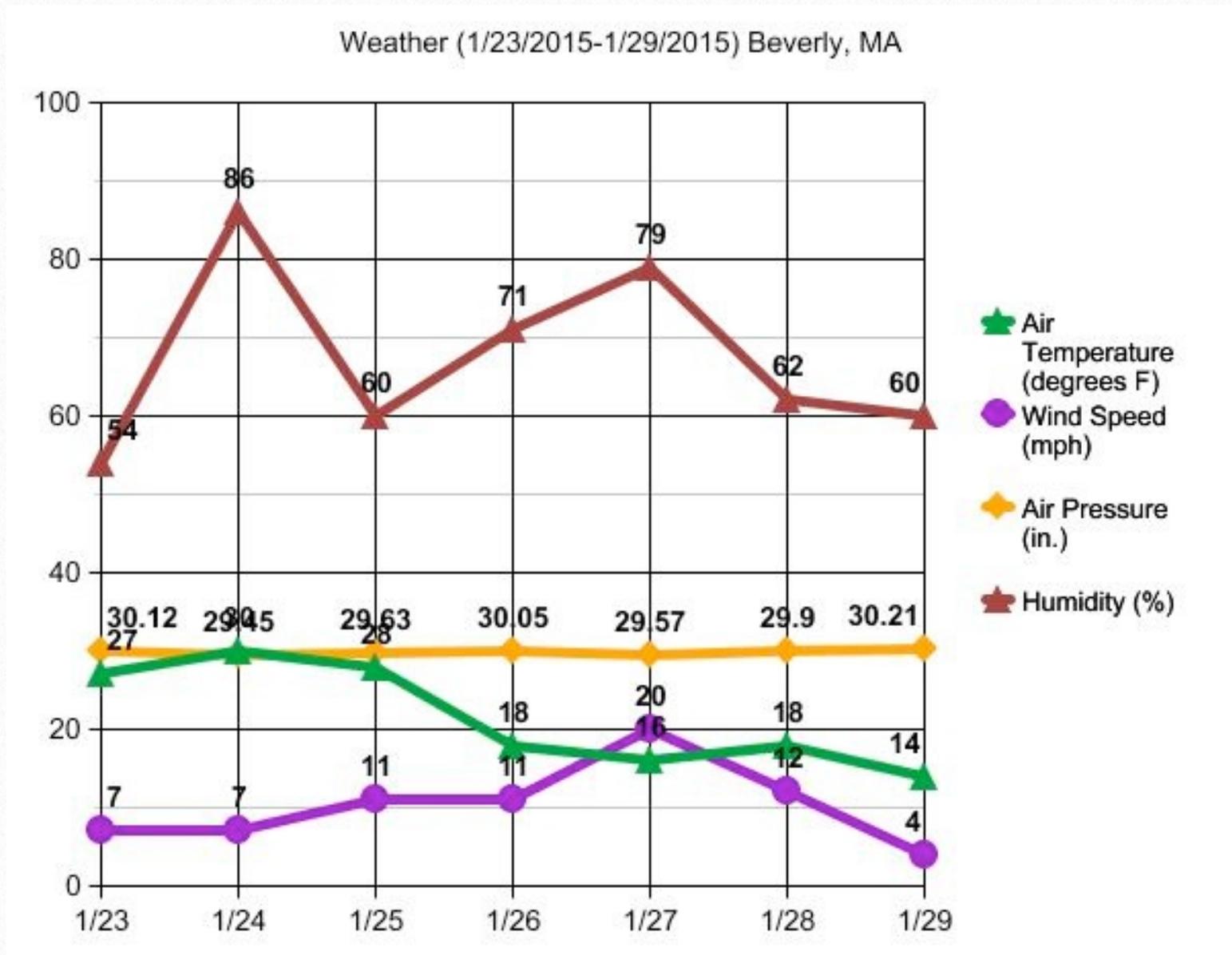
[Back to Chapter 5 Reading](#)



Wind speed 47 to 54 miles per hour: Branches break; shingles are blown off roofs.

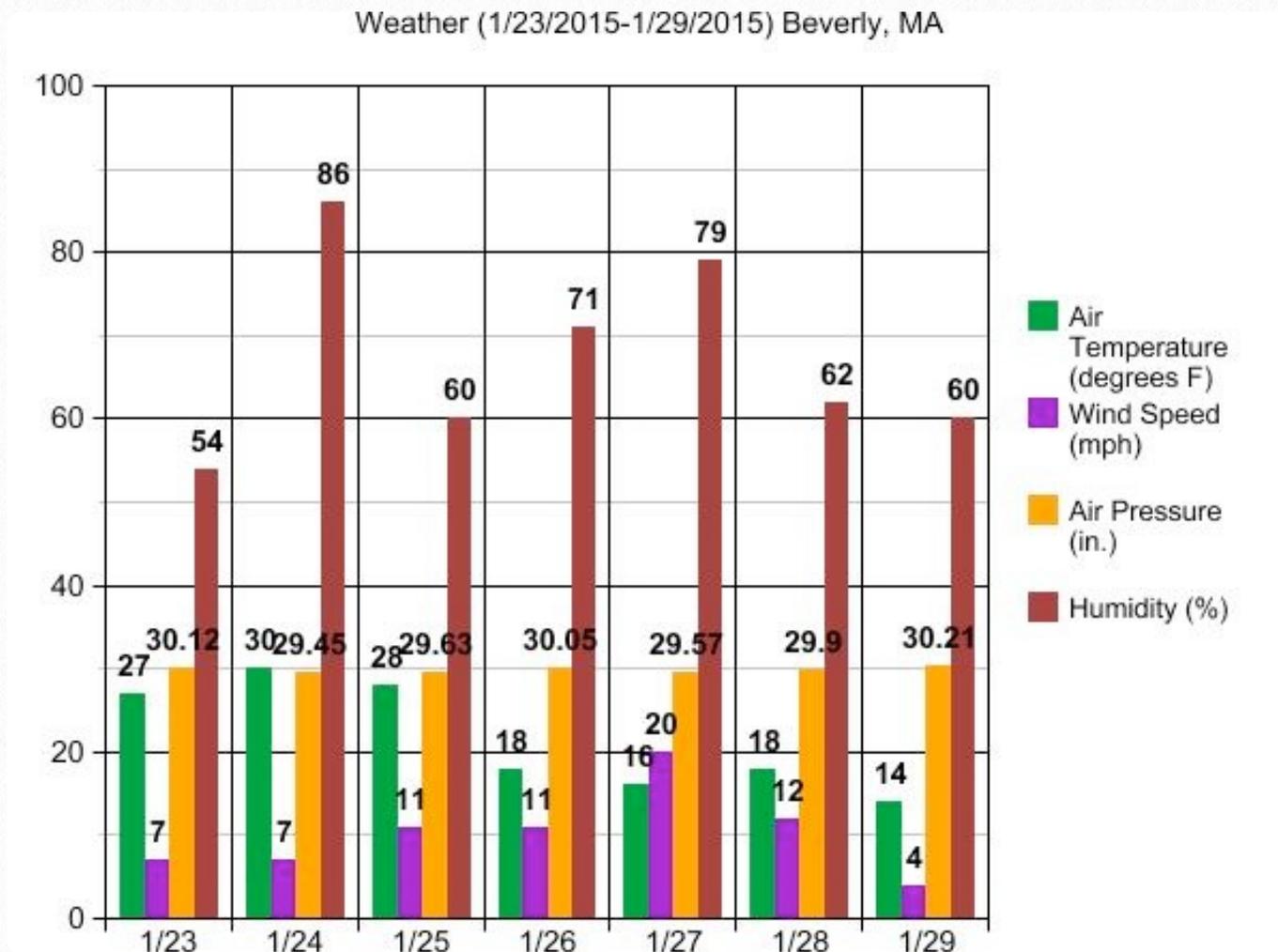
[Back to Chapter 5 Reading](#)

Chapter 6 Image Gallery



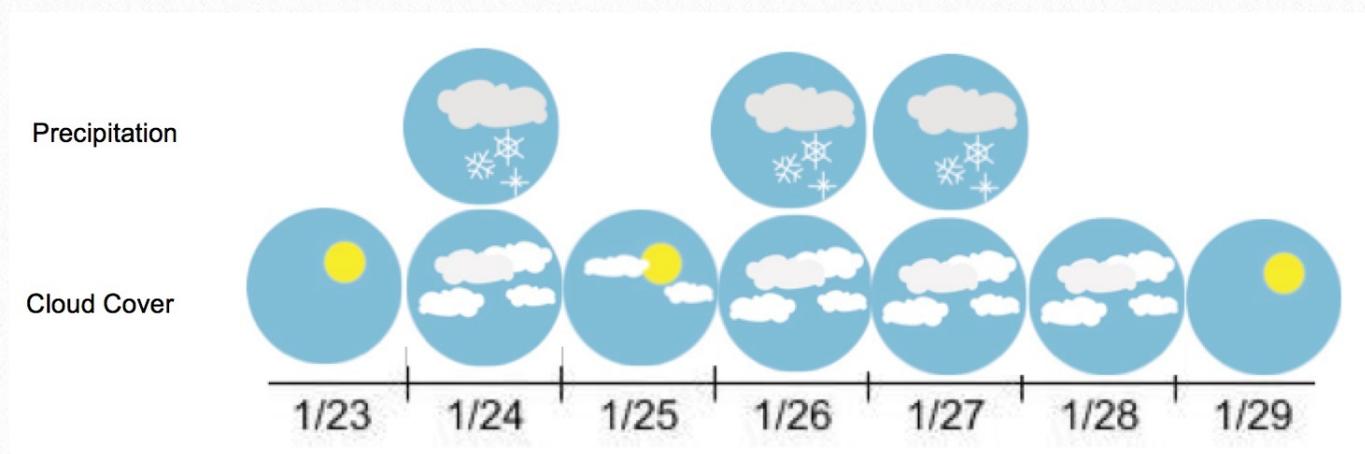
This chart shows information for a location in Massachusetts during a week in January that was measured using instruments such as a thermometer and barometer. You can use it to find out about the weather at this time in this place. Take a look at the chart and see what you can discover. How is the data the same or different from the weather data you just collected for your location?

[Back to Chapter 6 Reading](#)



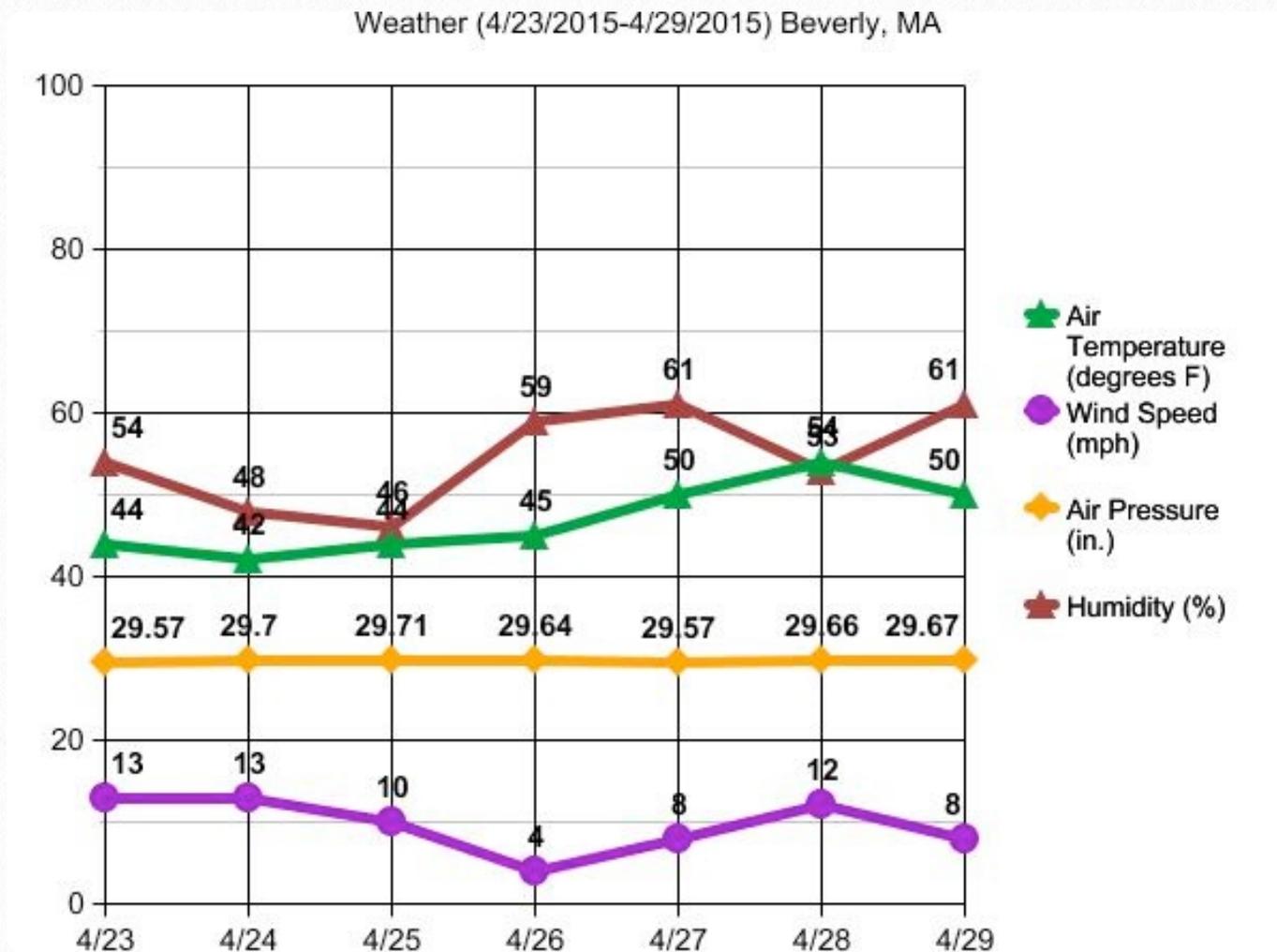
This chart shows the same information as the chart on page 57, but is displayed differently. Take a look at this chart and see if you can find out anything new or different about the weather there.

[Back to Chapter 6 Reading](#)



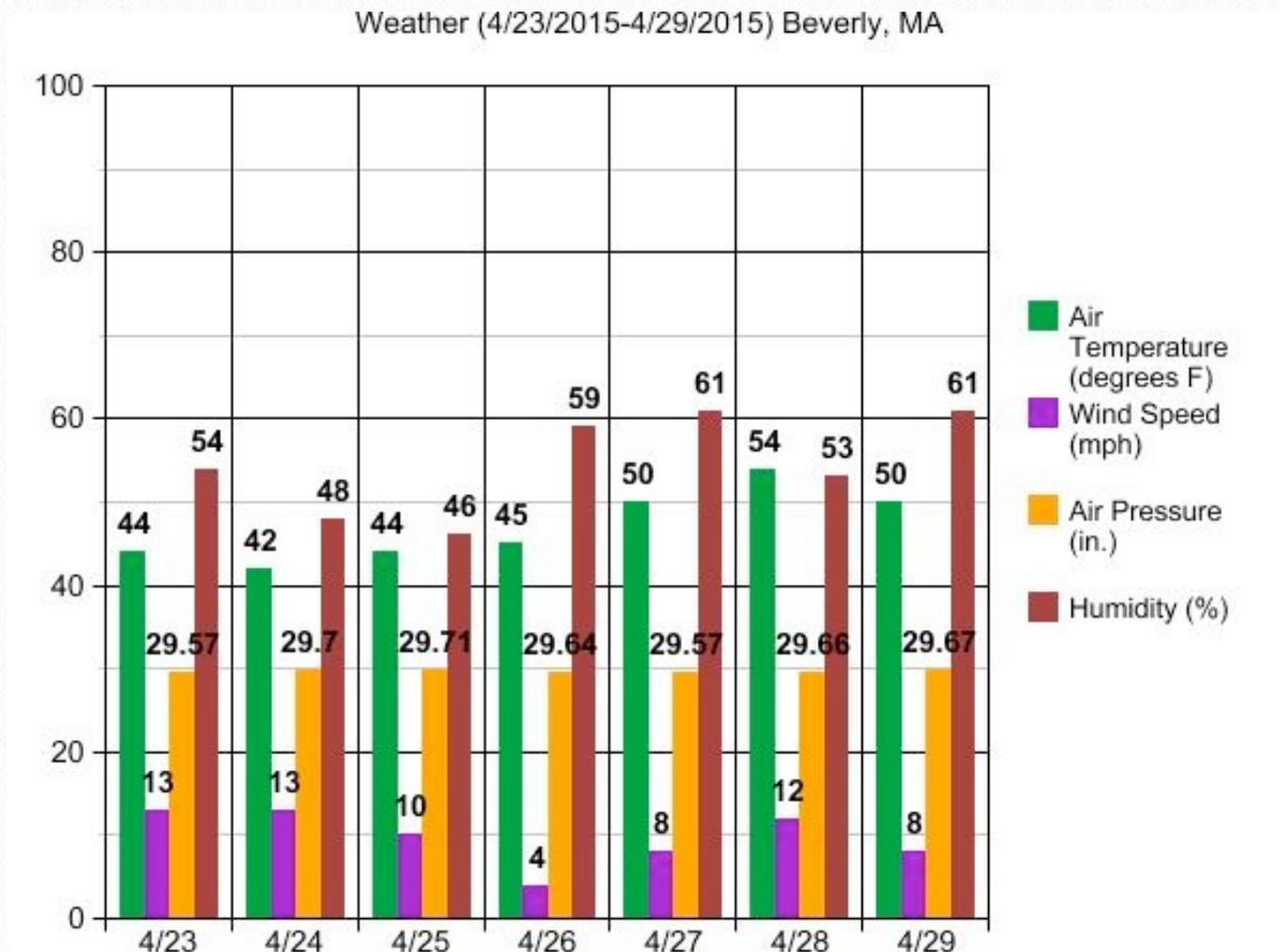
This chart shows information that was observed in the same location in Massachusetts during the same week in January as shown on pages 57 and 58. Take a look at it and see what else you can discover about the weather there. How does it compare to the cloud cover and precipitation that you observed in your location?

[Back to Chapter 6 Reading](#)



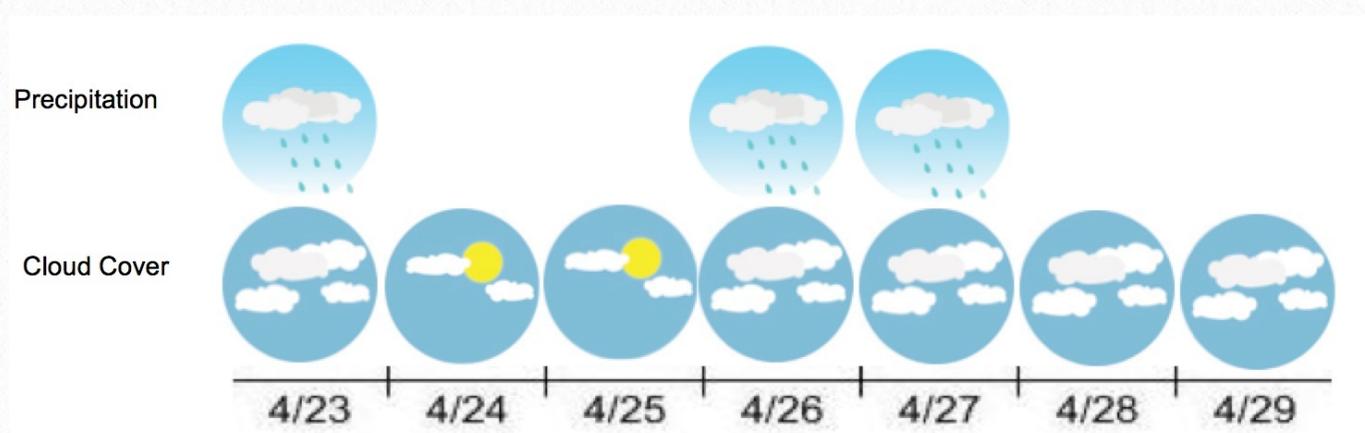
This chart shows information for a location in Massachusetts during a week in April that was measured using instruments such as a thermometer and barometer. You can use it to find out about the weather at this time in this place. Take a look at the chart and see what you can discover. How is the data the same or different from the weather data you just collected for your location?

[Back to Chapter 6 Reading](#)



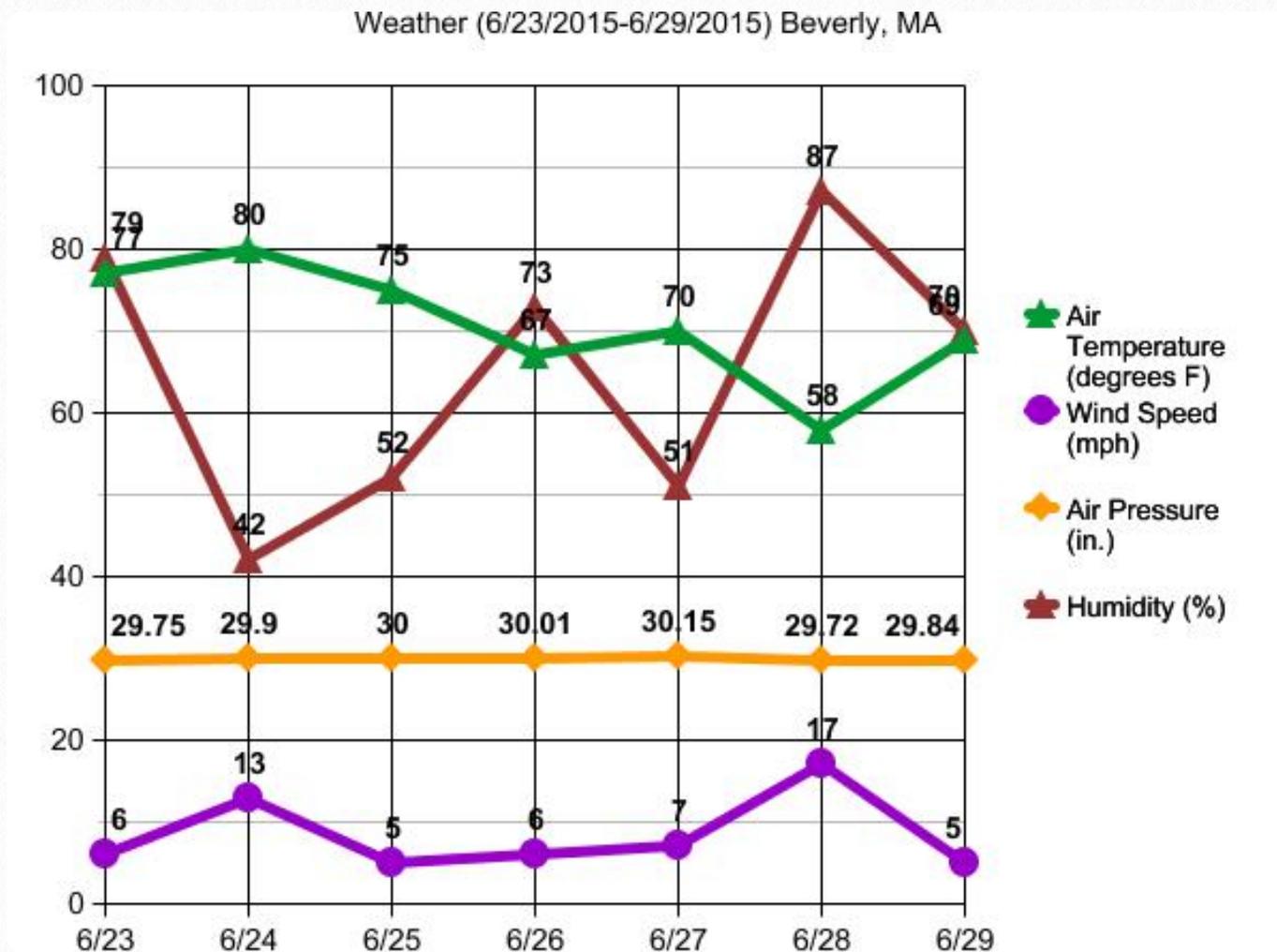
This chart shows the same information as the chart on page 60, but is displayed differently. Take a look at this chart and see if you can find out anything new or different about the weather there.

[Back to Chapter 6 Reading](#)



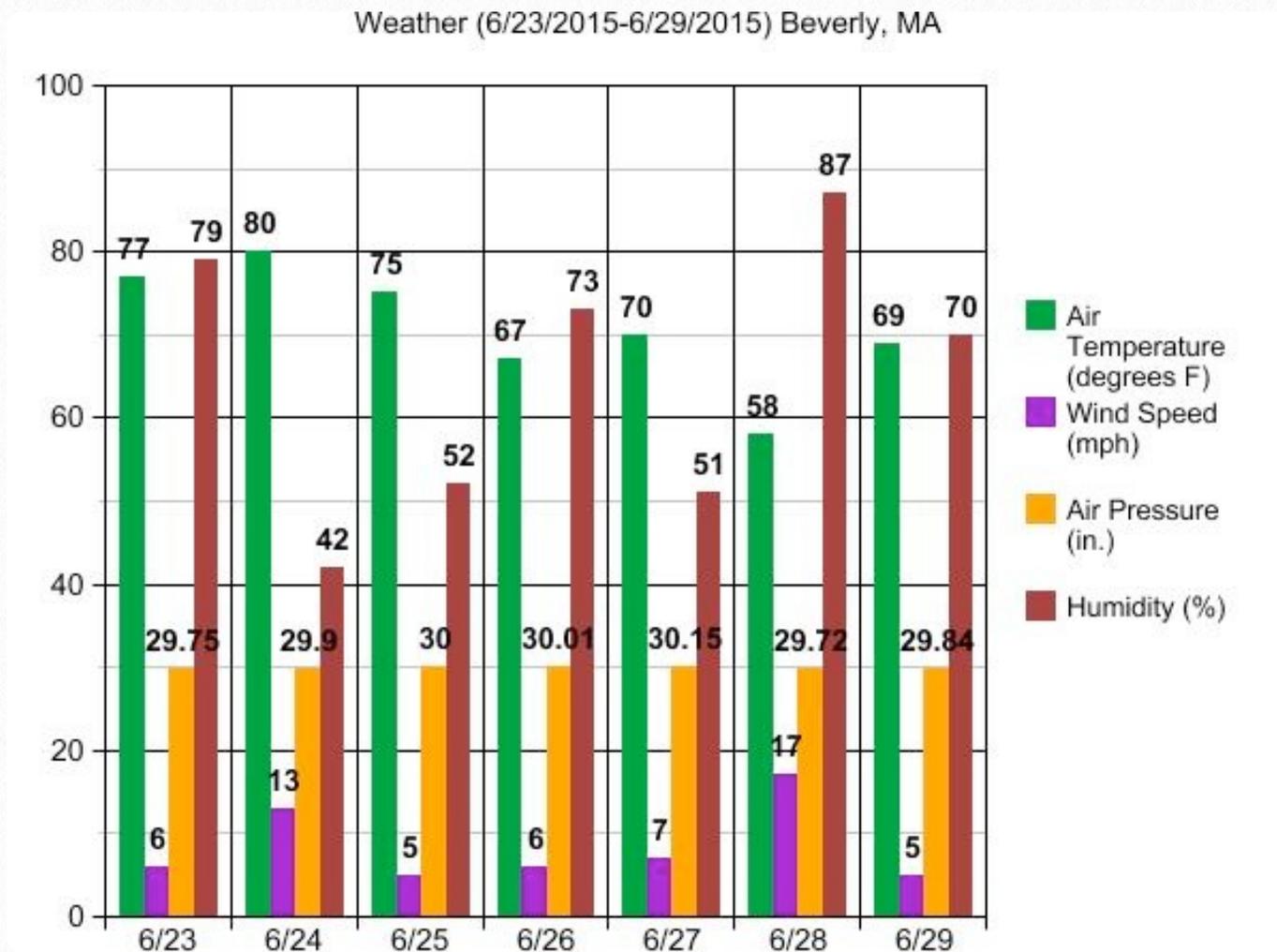
This chart shows information that was observed in the same location in Massachusetts during the same week in April as shown on pages 60 and 61. Take a look at it and see what else you can discover about the weather there. How does it compare to the cloud cover and precipitation that you observed in your location?

[Back to Chapter 6 Reading](#)



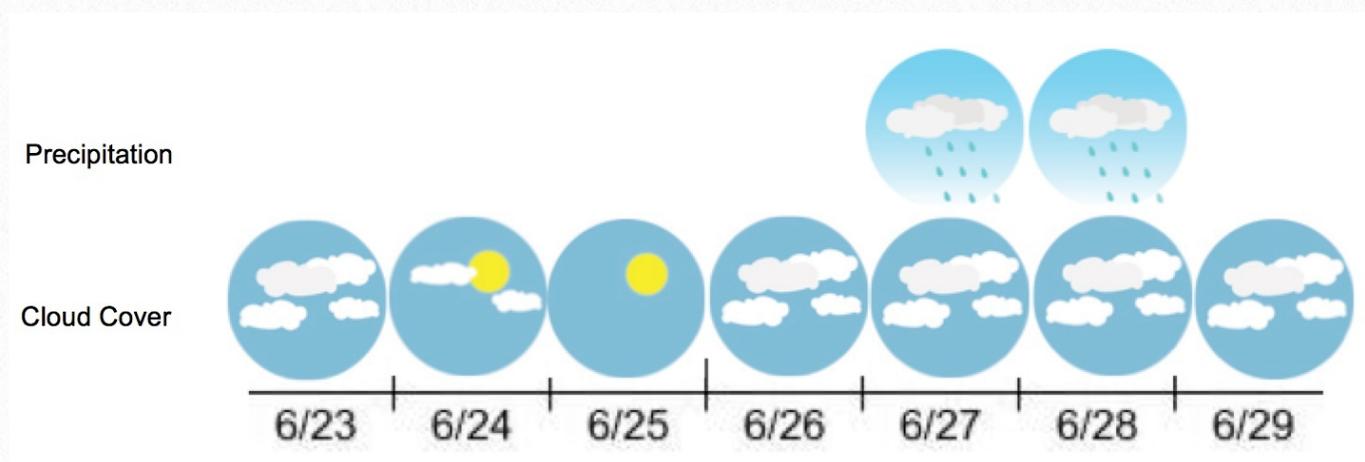
This chart shows information for a location in Massachusetts during a week in June that was measured using instruments such as a thermometer and barometer. You can use it to find out about the weather at this time in this place. Take a look at the chart and see what you can discover. How is the data the same or different from the weather data you just collected for your location?

[Back to Chapter 6 Reading](#)



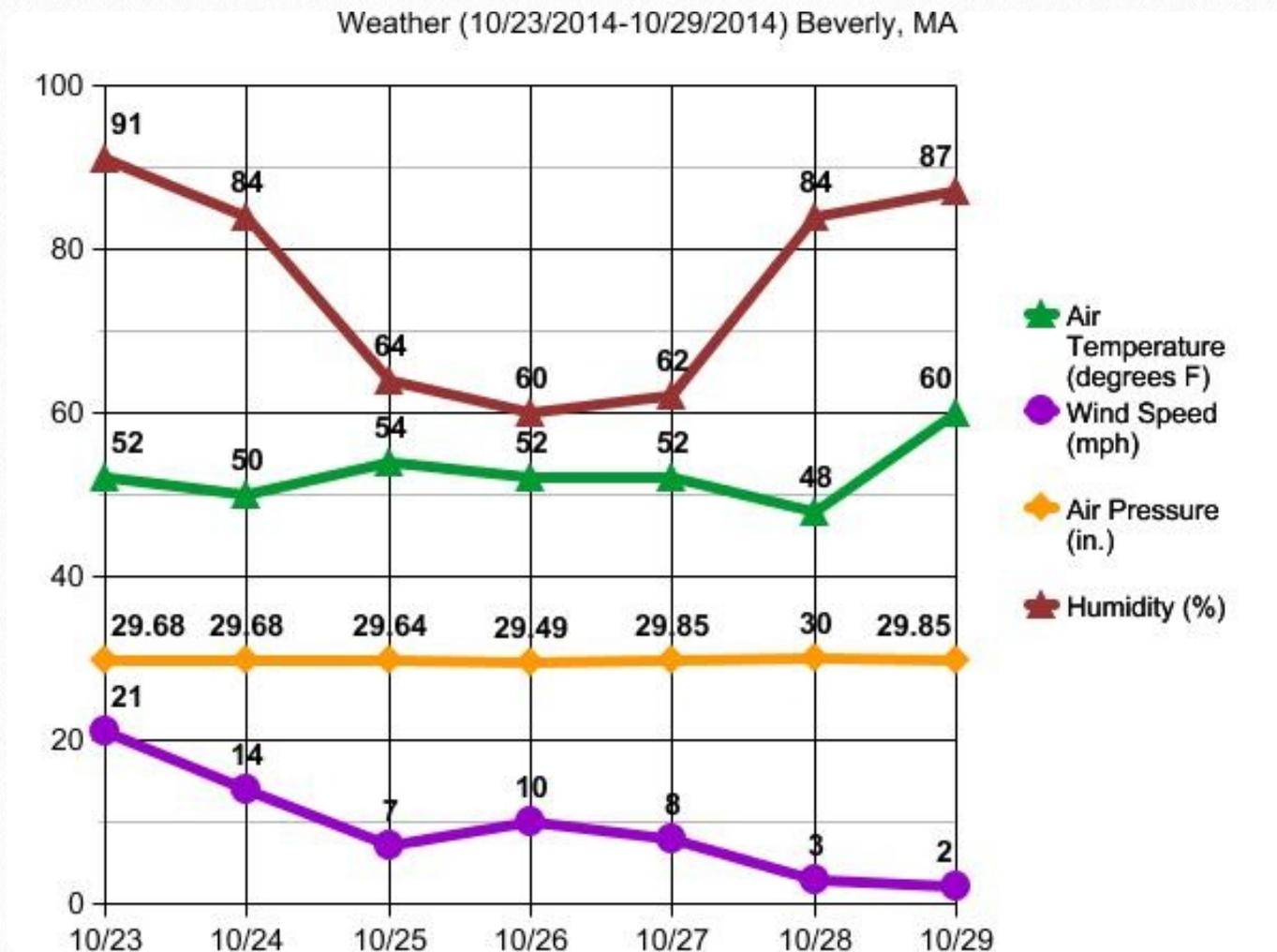
This chart shows the same information as the graph on page 63, but is displayed differently. Take a look at this chart and see if you can find out anything new or different about the weather there.

[Back to Chapter 6 Reading](#)



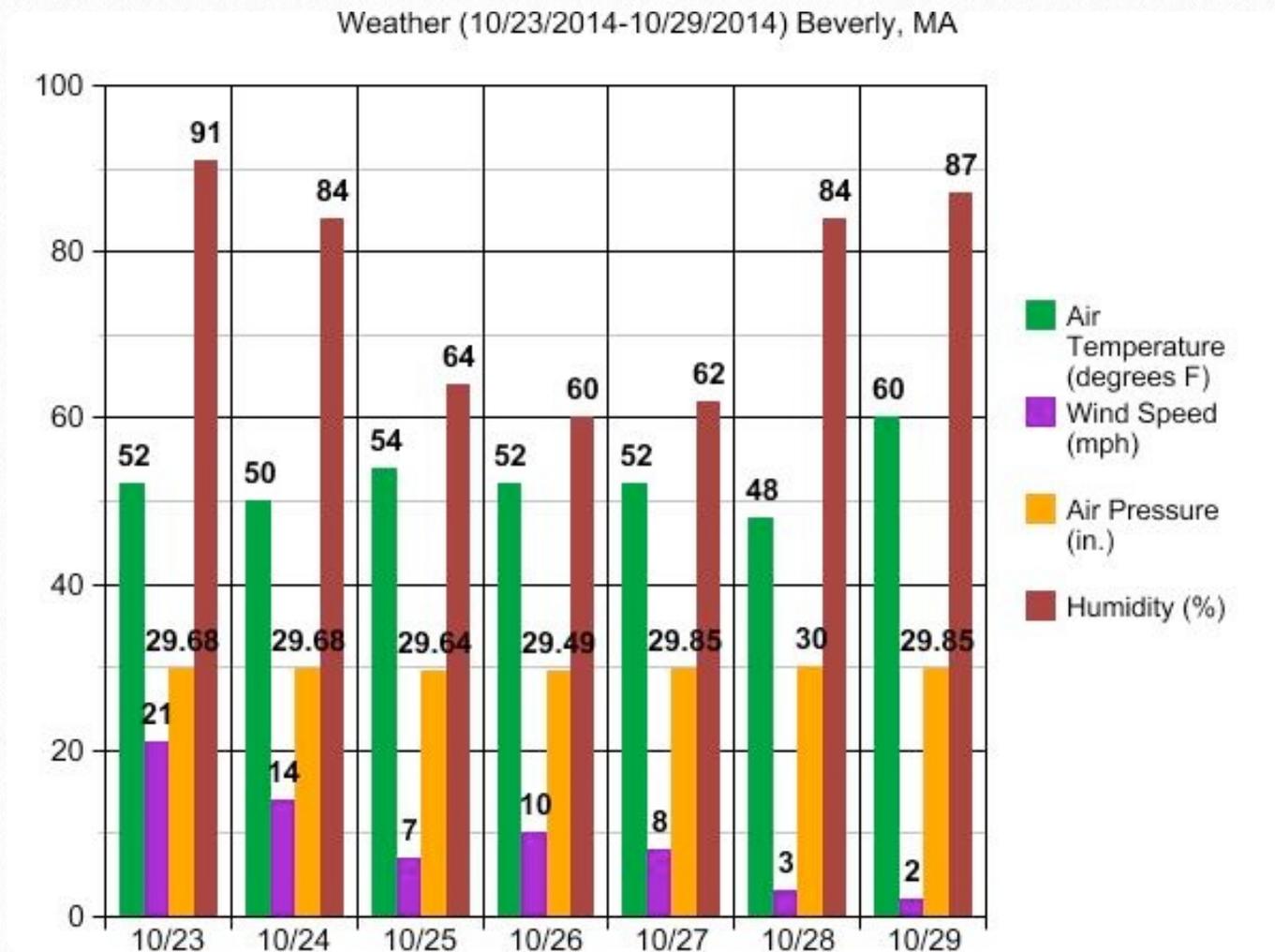
This chart shows information that was observed in the same location in Massachusetts during the same week in June as shown on pages 63 and 64. Take a look at it and see what else you can discover about the weather there. How does it compare to the cloud cover and precipitation that you observed in your location?

[Back to Chapter 6 Reading](#)



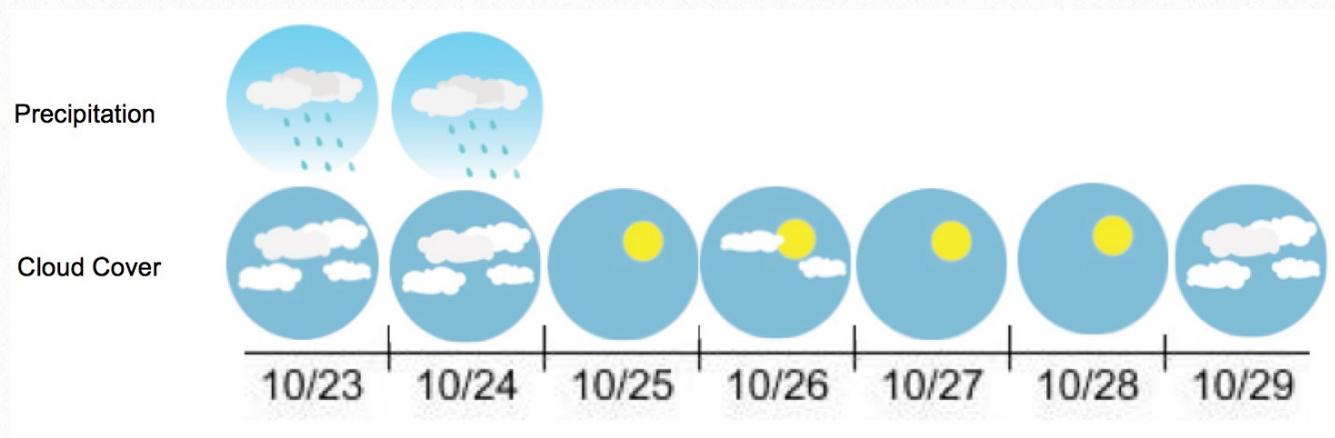
This chart shows information for a location in Massachusetts during a week in October that was measured using instruments such as a thermometer and barometer. You can use it to find out about the weather at this time in this place. Take a look at the chart and see what you can discover. How is the data the same or different from the weather data you just collected for your location?

[Back to Chapter 6 Reading](#)



This chart shows the same information as the graph on page 66, but is displayed differently. Take a look at this chart and see if you can find out anything new or different about the weather there.

[Back to Chapter 6 Reading](#)



This chart shows information that was observed in the same location in Massachusetts during the same week in October as shown on pages 66 and 67. Take a look at it and see what else you can discover about the weather there. How does it compare to the cloud cover and precipitation that you observed in your location?

[Back to Chapter 6 Reading](#)

1: air

Air is the mixture of invisible, odorless, tasteless gases all around us. Some of these gases are nitrogen, oxygen, carbon dioxide, and water vapor

[See this glossary term in](#) **ASL**

Related Glossary Terms

1: moisture, 1: water, 1: weather, 1: wind, 2: cloud, 2: float

[Back to Chapter 1 Reading](#)

1: atmosphere

The atmosphere describes the layers of air that surround Earth.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: Earth, 1: rain, 1: troposphere, 2: rain, 2: water, 2: water cycle

[Back to Chapter 1 Reading](#)

1: cold

Cold means having a low temperature or lack of warmth.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: hot, 1: temperature, 1: weather, 4: weather

[Back to Chapter 1 Reading](#)

1: condition

A condition is the state of something at a particular time.

[See this glossary term in](#) **ASL**

Related Glossary Terms

1: weather, 4: weather

[Back to Chapter 1 Reading](#)

1: Earth

Earth is the planet on which we live. Earth's orbit is the third closest to the sun.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: atmosphere, 1: troposphere, 2: precipitation, 2: water cycle

[Back to Chapter 1 Reading](#)

1: heat

Heat is a form of energy.

[See this glossary term in](#) **ASL**

Related Glossary Terms

2: freeze

[Back to Chapter 1 Reading](#)

1: hot

Something that is hot has a high temperature. For example, the sun and a fire are hot.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: cold, 1: temperature

[Back to Chapter 1 Reading](#)

1: moisture

Moisture refers to wetness. For example, the moisture of the air is its wetness. Moisture is one of the four major weather elements.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: air, 1: water, 1: weather

[Back to Chapter 1 Reading](#)

1: move

To move is to go from one place to another.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: wind

[Back to Chapter 1 Reading](#)

1: pressure

Pressure is the amount of force pushing on a given area.

[See this glossary term in ASL](#)



Related Glossary Terms

[Back to Chapter 1 Reading](#)

1: rain

Rain is a form of precipitation. Rain is water falling in drops from water vapor that has condensed in the atmosphere.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: atmosphere, 1: water, 1: weather, 4: weather

[Back to Chapter 1 Reading](#)

1: surface

A surface is the outside of an object.

[See this glossary term in](#) **ASL**



Related Glossary Terms

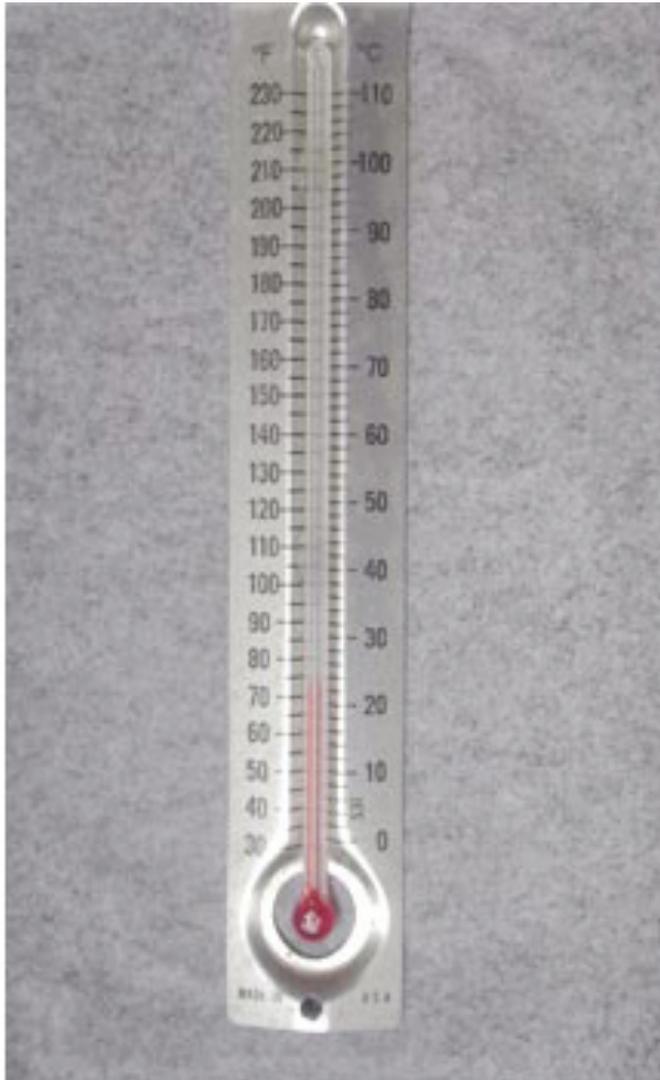
1: troposphere, 2: water cycle

[Back to Chapter 1 Reading](#)

1: temperature

The temperature is how hot or cold a substance is as measured with a thermometer.

[See this glossary term in ASL](#)



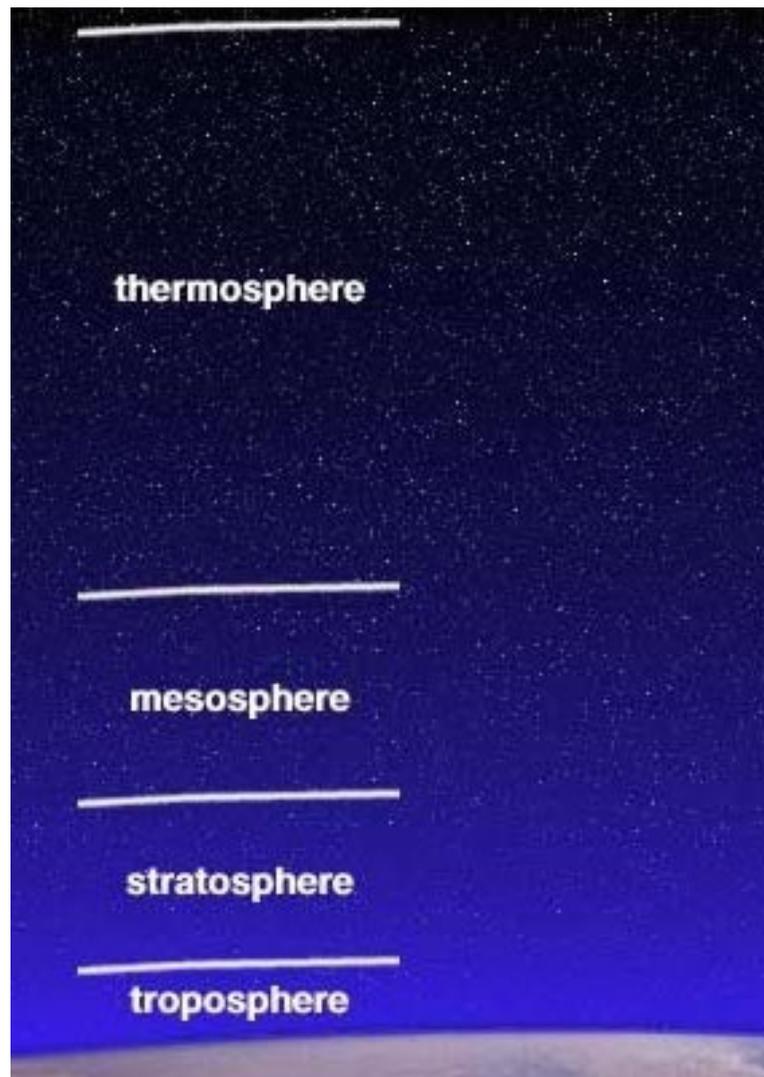
Related Glossary Terms

[Back to Chapter 1 Reading](#)

1: troposphere

The troposphere is the layer of the atmosphere closest to Earth's surface.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: atmosphere, 1: Earth, 1: surface

[Back to Chapter 1 Reading](#)

1: water

Pure water (H₂O) is a colorless, odorless, tasteless liquid. It is made up of hydrogen and oxygen, freezes at 0 degrees Celsius, and boils at 100 degrees Celsius.

[See this glossary term in](#) [ASL](#)



Related Glossary Terms

1: air, 1: moisture, 1: rain

[Back to Chapter 1 Reading](#)

1: weather

Weather is the term meteorologists use for the condition of the air around us at a particular time and place. For example, if you cannot go outside today because it is very cold and raining and there is a lot of wind, you are describing today's weather.

[See this glossary term in](#) **ASL**

Related Glossary Terms

1: air, 1: cold, 1: condition, 1: moisture, 1: rain, 1: wind

[Back to Chapter 1 Reading](#)

1: weight

The weight of an object is how heavy the object is.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: heavy

[Back to Chapter 1 Reading](#)

1: wind

Wind is the movement of air.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: air, 1: move, 1: weather, 4: storm, 4: weather

[Back to Chapter 1 Reading](#)

2: big

Something that is big is large. Things that are big are not small.
For exam ple, a whale is big.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 2 Reading](#)

2: bit

A bit is a very small amount of something. For example, the girl only had a tiny bit of chalk left.

[See this glossary term in ASL](#)



Related Glossary Terms

2: tiny

[Back to Chapter 2 Reading](#)

2: cloud

A cloud is a large group of very tiny drops of water that float in the air.

[See this glossary term in](#) **ASL**



Related Glossary Terms

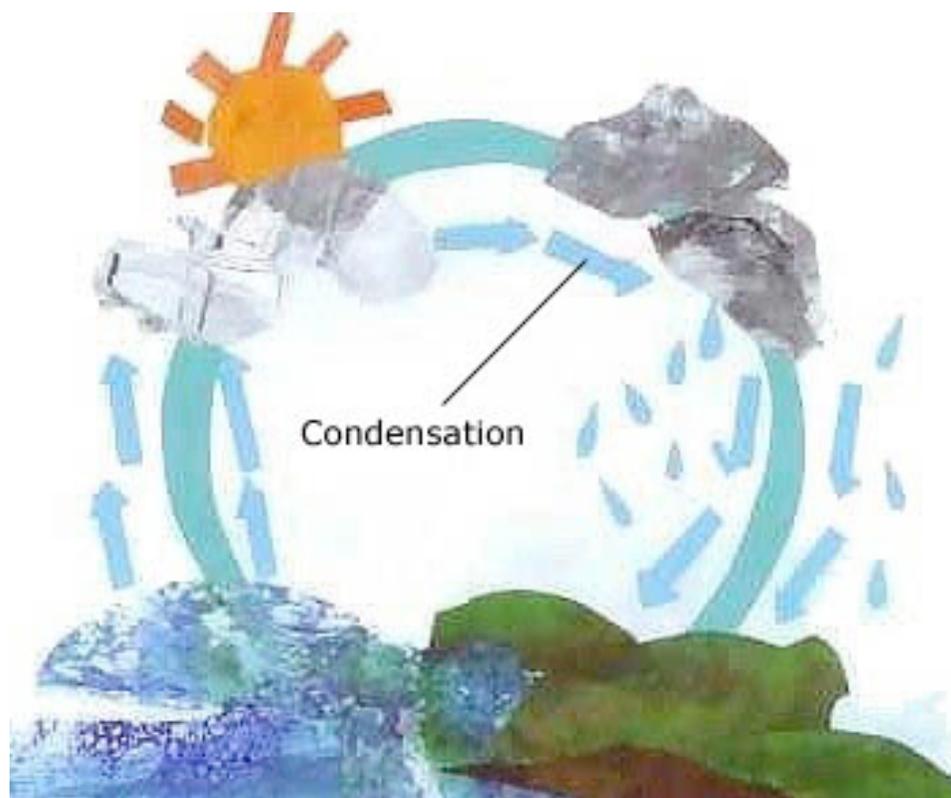
1: air, 2: float, 2: fog, 2: tiny, 2: water

[Back to Chapter 2 Reading](#)

2: condensation

Condensation is the process that occurs when water vapor changes from gas into tiny droplets of water. The change from a gas to a liquid is called "condensation." Condensation is the second stage of the water cycle.

[See this glossary term in ASL](#)



Related Glossary Terms

2: drop, 2: gas, 2: rain, 2: tiny, 2: water, 2: water cycle, 2: water vapor

[Back to Chapter 2 Reading](#)

2: cool

To cool is to make less warm.

[See this glossary term in ASL](#)



Related Glossary Terms

[Back to Chapter 2 Reading](#)

2: drizzle

Drizzle is precipitation in the form of light rain.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: precipitation, 2: rain

[Back to Chapter 2 Reading](#)

2: drop

A drop is a very small amount of liquid.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: condensation, 2: rain

[Back to Chapter 2 Reading](#)

2: dust

Dust is small bits of dry dirt that look like powder.

[See this glossary term in](#) **ASL**



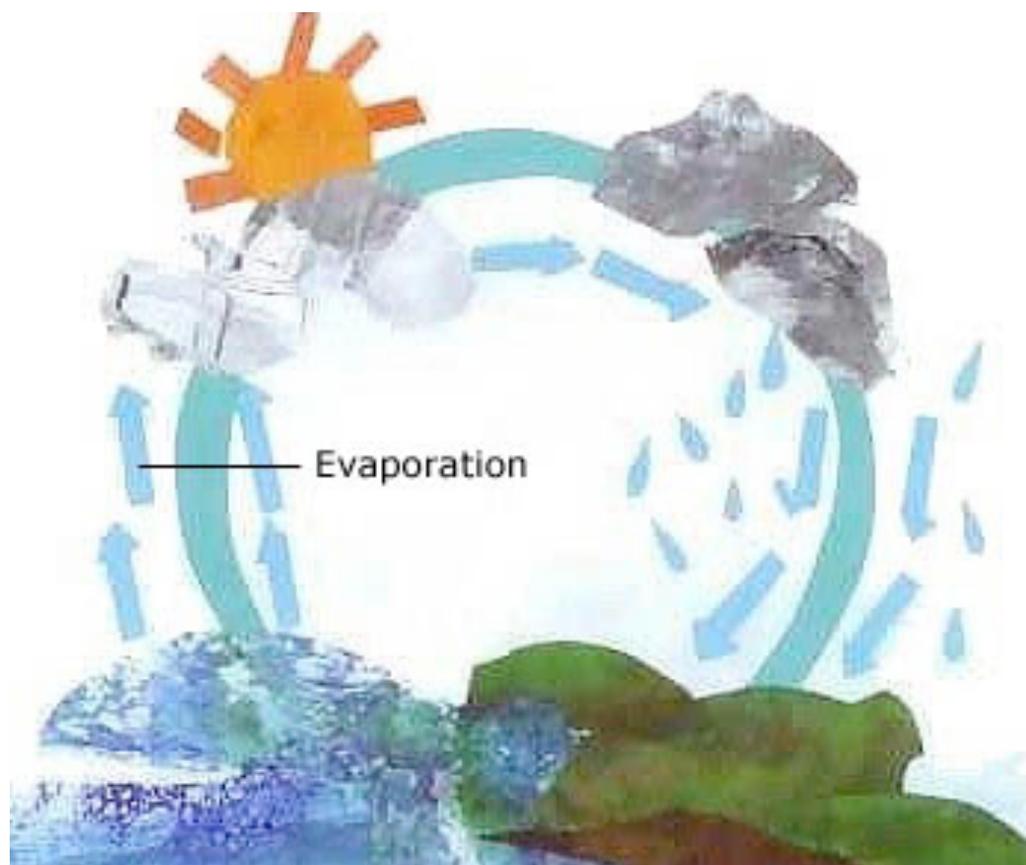
Related Glossary Terms

[Back to Chapter 2 Reading](#)

2: evaporation

Evaporation is the process that occurs when water changes from a liquid to an invisible gas (water vapor). The change is called "evaporation". Evaporation is the first stage of the water cycle.

[See this glossary term in ASL](#)



Related Glossary Terms

2: gas, 2: invisible, 2: water, 2: water cycle

[Back to Chapter 2 Reading](#)

2: float

To float is to stay on top of a liquid or in the air.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: air, 2: cloud

[Back to Chapter 2 Reading](#)

2: fog

Fog is a cloud near the ground.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: cloud, 2: ground

[Back to Chapter 2 Reading](#)

2: freeze

To freeze is to change from the liquid state to the solid state by loss of heat.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: heat, 2: sleet

[Back to Chapter 2 Reading](#)

2: gas

A gas is a substance that does not have an independent shape or volume and tends to expand indefinitely. A gas takes on the shape and volume of the container it is in. For example, oxygen and carbon dioxide are gases. A gas is one of the three states of matter. The other two states of matter are liquids and solids.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: condensation, 2: evaporation, 2: water vapor, 3: air, 4: air, 5: air

[Back to Chapter 2 Reading](#)

2: ground

The ground is the earth or soil under our feet. Plants grow out of the ground and we walk on the ground.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: fog

[Back to Chapter 2 Reading](#)

2: hail

Hail refers to precipitation in the form of balls of ice. Hail forms when rain freezes in the air above Earth. Instead of falling, the small pieces of frozen rain are blown up into the air by strong winds. As they travel upward, ice is added to them. The pieces of hail keep getting bigger and bigger. When they get too heavy to stay in the air, they fall to Earth.

[See this glossary term in](#) **ASL**



Related Glossary Terms

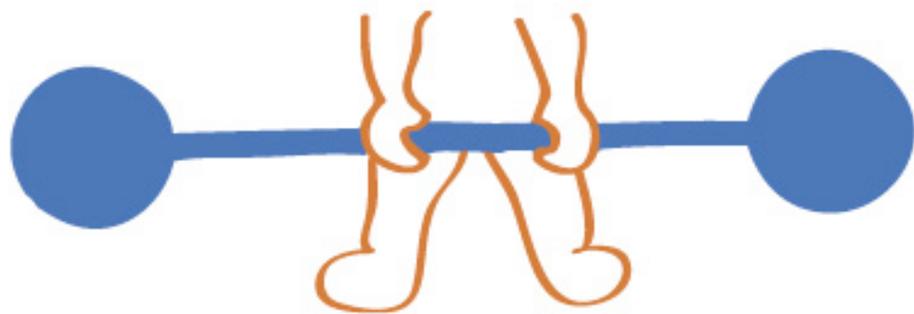
2: precipitation

[Back to Chapter 2 Reading](#)

2: heavy

Something that is heavy weighs a lot.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: weight

[Back to Chapter 2 Reading](#)

2: invisible

When something is invisible, it cannot be seen.

[See this glossary term in](#) **ASL**

Related Glossary Terms

2: evaporation, 3: air, 4: air, 5: air

[Back to Chapter 2 Reading](#)

2: join

To join is to put things together.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 2 Reading](#)

2: particle

A particle is a very small piece of matter.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 2 Reading](#)

2: rain

Rain is a form of precipitation. Rain is water falling in drops from water vapor that has condensed in the atmosphere.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: atmosphere, 2: condensation, 2: drizzle, 2: drop, 2: precipitation,
2: sleet, 2: water vapor, 4: storm

[Back to Chapter 2 Reading](#)

2: sleet

Sleet is precipitation in the form of frozen rain that falls as tiny pieces of ice.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: freeze, 2: precipitation, 2: rain

[Back to Chapter 2 Reading](#)

2: snow

Snow is precipitation in the form of very tiny ice crystals.

[See this glossary term in ASL](#)



Related Glossary Terms

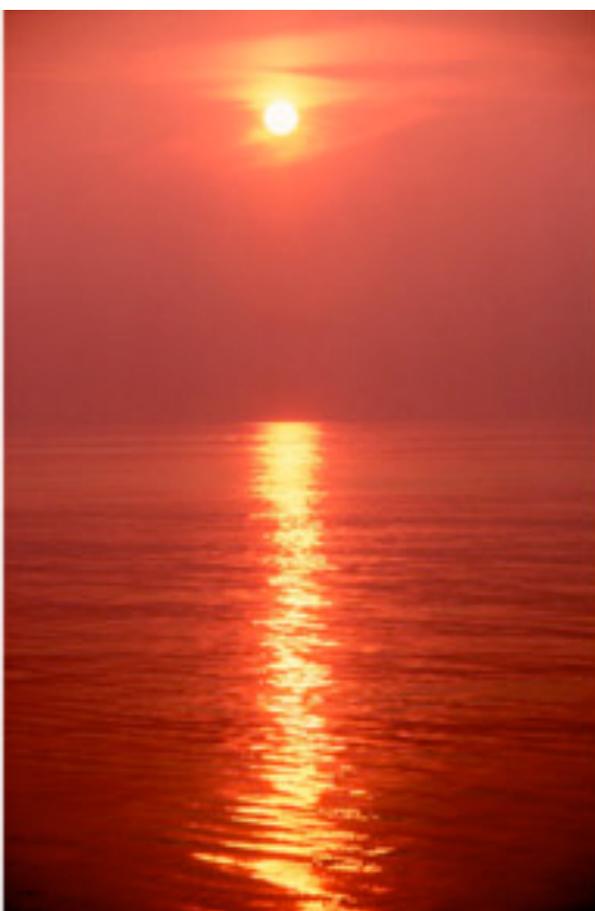
2: precipitation, 2: tiny, 4: storm

[Back to Chapter 2 Reading](#)

2: sun

The sun is a big, bright star that we can see in the sky during the day. The sun gives us light and keeps us warm.

[See this glossary term in](#) **ASL**



Related Glossary Terms

4: Earth

[Back to Chapter 2 Reading](#)

2: tiny

Something that is tiny is very, very small. For example, an ant is a tiny in-sect.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: bit, 2: cloud, 2: condensation, 2: snow

[Back to Chapter 2 Reading](#)

2: water

Pure water (H₂O) is a colorless, odorless, tasteless liquid. It is made up of hydrogen and oxygen, freezes at 0 degrees Celsius, and boils at 100 degrees Celsius.

[See this glossary term in ASL](#)



Related Glossary Terms

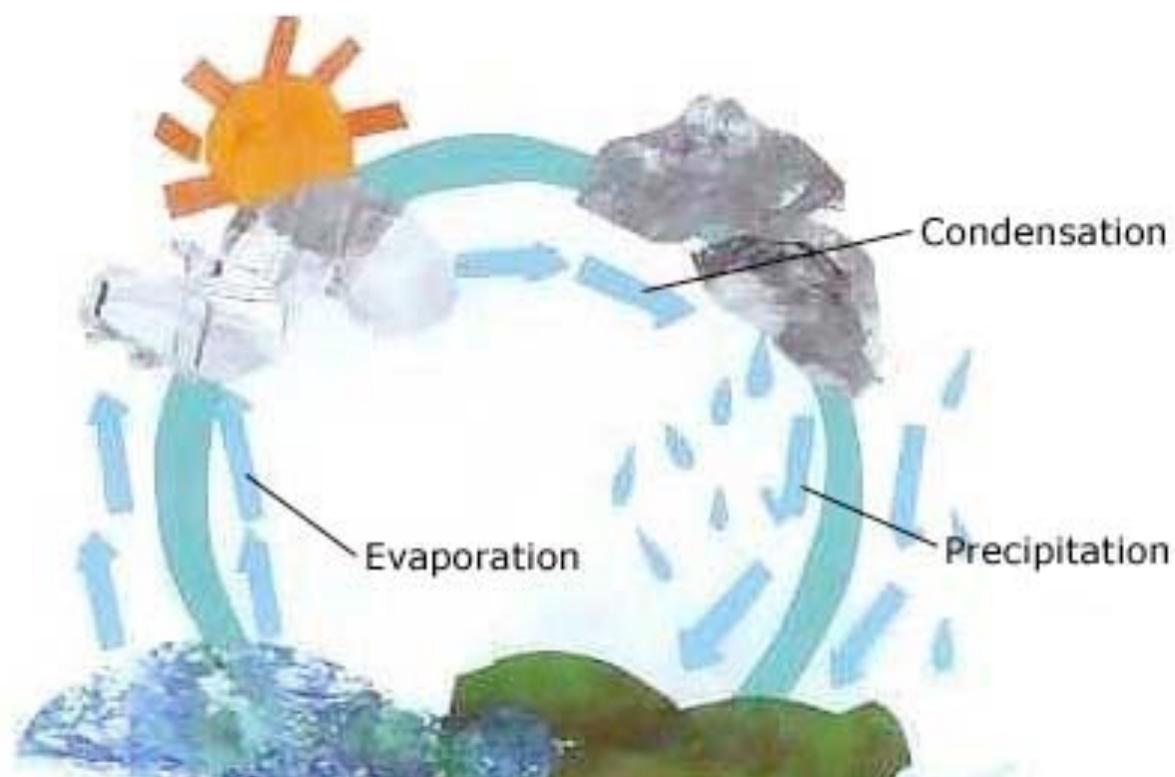
1: atmosphere, 2: cloud, 2: condensation, 2: evaporation, 2: precipitation, 2: rain,
2: water cycle, 2: water vapor

[Back to Chapter 2 Reading](#)

2: water cycle

The water cycle is another name for the hydrologic cycle. This cycle explains how huge amounts of water move or cycle from Earth's surface to the atmosphere and back to Earth. The cycle has three stages- evaporation, condensation, precipitation. Together, they make the water cycle.

[See this glossary term in ASL](#)



Related Glossary Terms

1: atmosphere, 1: Earth, 1: surface, 2: condensation, 2: evaporation, 2: precipitation,
2: water, 2: water vapor

[Back to Chapter 2 Reading](#)

2: water vapor

Water vapor is water in the form of a gas.

[See this glossary term in](#) **ASL**

Related Glossary Terms

2: condensation, 2: gas, 2: rain, 2: water, 2: water cycle, 4: air, 5: air

[Back to Chapter 2 Reading](#)

3: above

Above means higher than something. For example, our eyes are above our mouth.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 3 Reading](#)

3: air

Air is the mixture of invisible, odorless, tasteless gases all around us. Some of these gases are nitrogen, oxygen, carbon dioxide, and water vapor.

[See this glossary term in](#) 

Related Glossary Terms

2: gas, 2: invisible, 3: measure

[Back to Chapter 3 Reading](#)

3: cold

Cold means having a low temperature or lack of warmth.

[See this glossary term in ASL](#)



Related Glossary Terms

3: temperature, 3: warm

[Back to Chapter 3 Reading](#)

3: Earth

Earth is the planet on which we live. Earth's orbit is the third closest to the sun.

[See this glossary term in](#) **ASL**



Related Glossary Terms

3: land, 3: planet, 3: sun

[Back to Chapter 3 Reading](#)

3: heat

Heat is a form of energy.

[See this glossary term in](#) **ASL**

Related Glossary Terms

[Back to Chapter 3 Reading](#)

3: hot

Something that is hot has a high temperature. For example, the sun and a fire are hot.

[See this glossary term in](#) **ASL**



Related Glossary Terms

3: sun, 3: temperature, 5: warm

[Back to Chapter 3 Reading](#)

3: land

Land is the part of Earth's surface that is not covered by water. Land is usually made of rocks and soil.

[See this glossary term in](#) **ASL**



Related Glossary Terms

3: Earth, 3: surface, 3: water

[Back to Chapter 3 Reading](#)

3: measure

To measure is to determine the dimensions, amount, or capacity of an object. For example, a thermometer is used to measure the temperature of the air.

[See this glossary term in](#) **ASL**



Related Glossary Terms

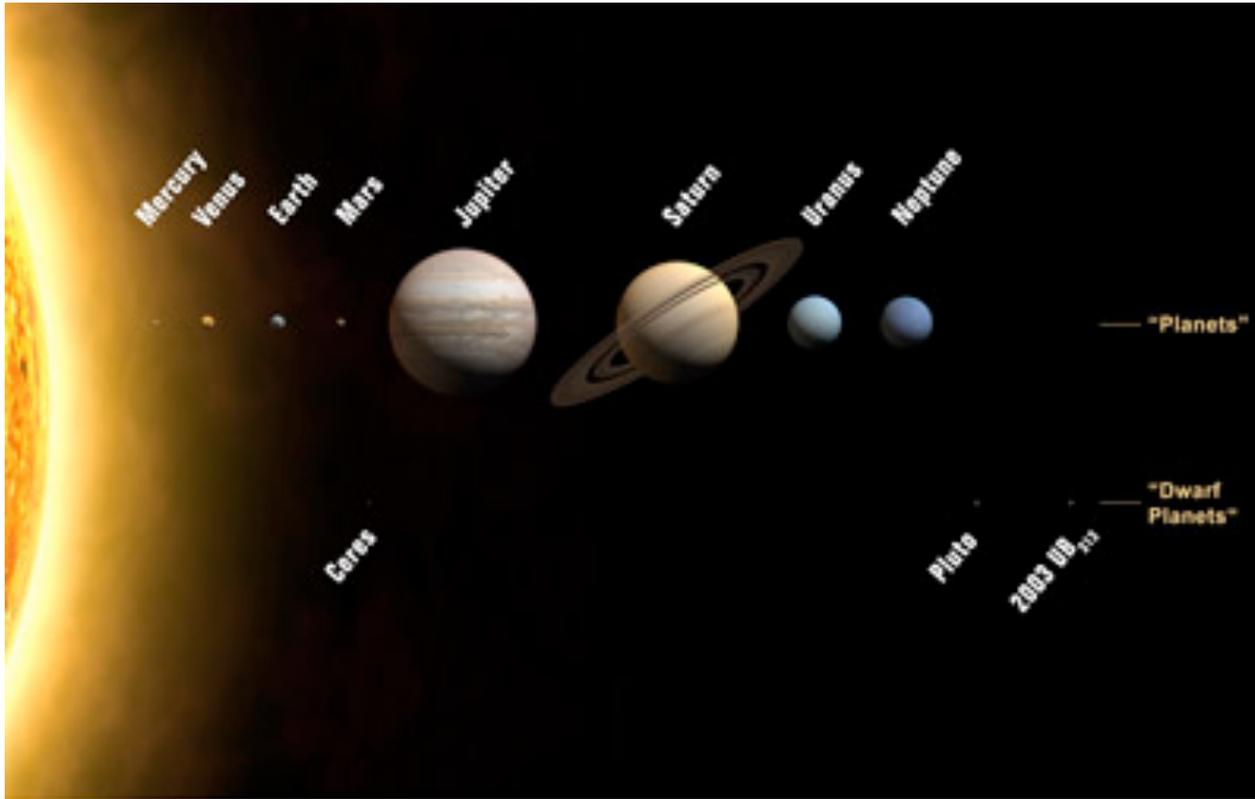
3: air, 3: temperature

[Back to Chapter 3 Reading](#)

3: planet

A planet is a huge, round object in space that moves around a star. Earth is one of the planets that travels around the sun.

[See this glossary term in ASL](#)



Related Glossary Terms

3: Earth, 3: sun, 5: Earth

[Back to Chapter 3 Reading](#)

3: ray

A ray is a thin line or narrow beam of light or other radiation.

[See this glossary term in](#) **ASL**



Related Glossary Terms

3: sunlight, 5: sunlight

[Back to Chapter 3 Reading](#)

3: source

A source is the place from which something originates. For example, a battery is a source of energy.

[See this glossary term in](#) **ASL**

Related Glossary Terms

[Back to Chapter 3 Reading](#)

3: sun

The sun is a big, bright star that we can see in the sky during the day. The sun gives us light and keeps us warm.

[See this glossary term in](#) **ASL**



Related Glossary Terms

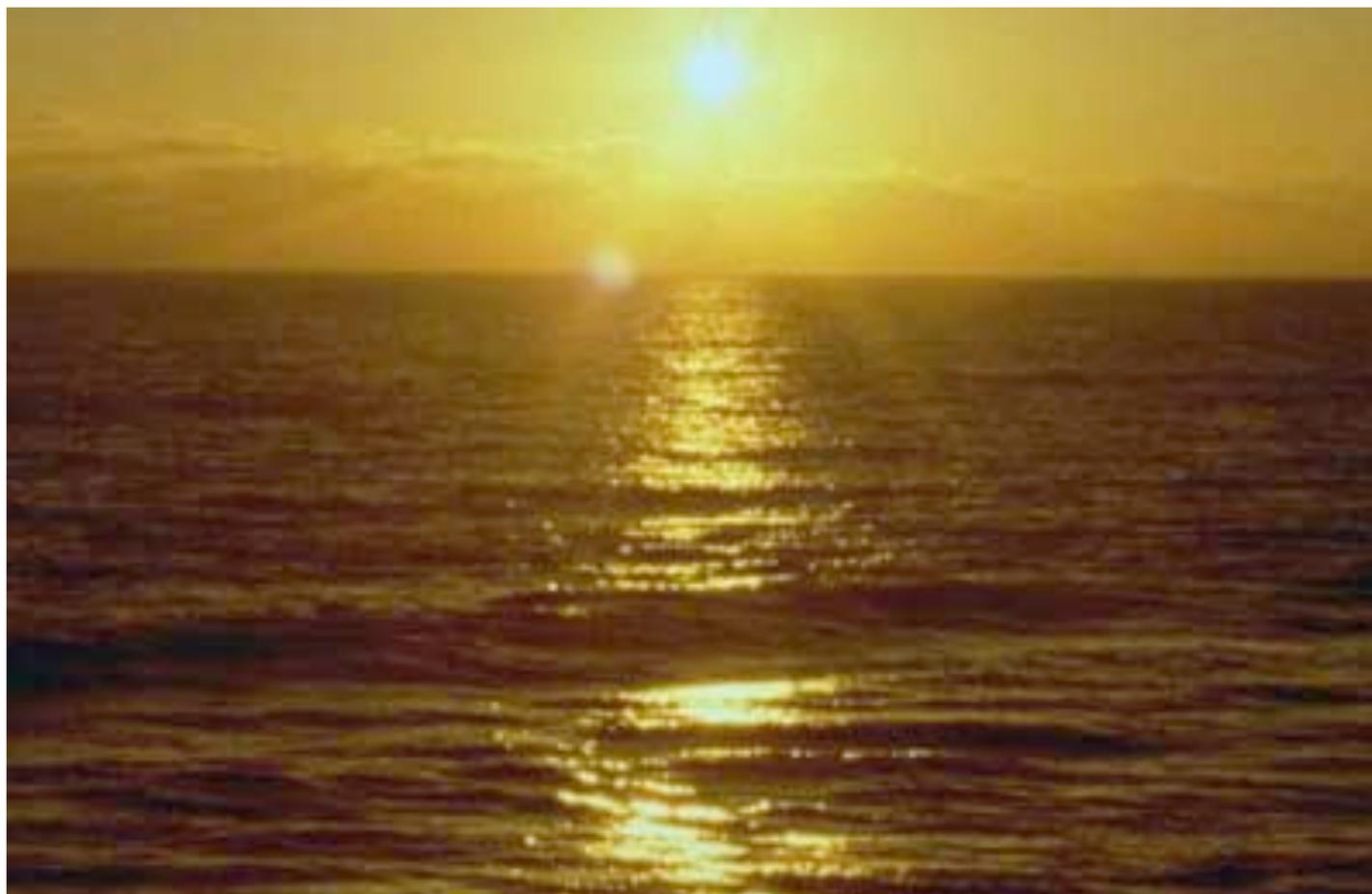
3: Earth, 3: hot, 3: planet, 3: sunlight, 3: warm, 5: Earth, 5: sunlight

[Back to Chapter 3 Reading](#)

3: sunlight

Sunlight refers to the rays of the sun. Sunlight is often called sunshine.

[See this glossary term in](#) **ASL**



Related Glossary Terms

3: ray, 3: sun

[Back to Chapter 3 Reading](#)

3: surface

A surface is the outside of an object.

[See this glossary term in](#) **ASL**



Related Glossary Terms

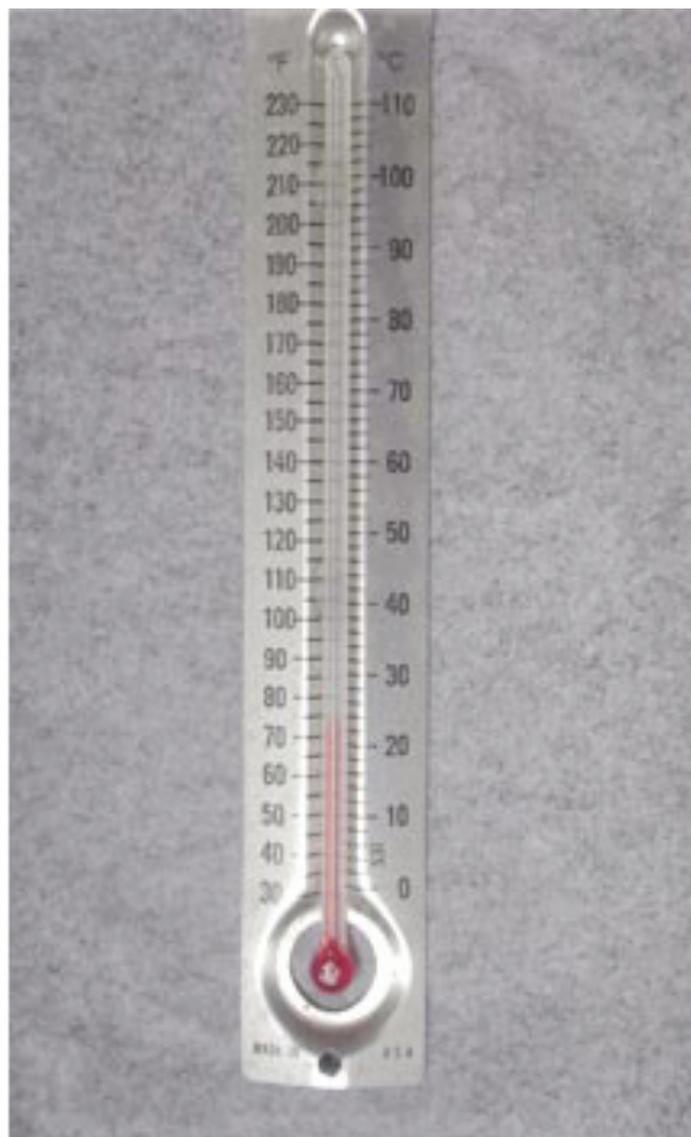
3: land

[Back to Chapter 3 Reading](#)

3: temperature

The temperature is how hot or cold a substance is as measured with a thermometer.

[See this glossary term in](#) **ASL**



Related Glossary Terms

3: cold, 3: hot, 3: measure

[Back to Chapter 3 Reading](#)

3: warm

Something that is warm is not very hot. The opposite of warm is cool. For example, it starts to get warm outside when spring comes.

[See this glossary term in](#) **ASL**

Related Glossary Terms

3: cold, 3: sun

[Back to Chapter 3 Reading](#)

3: water

Pure water (H₂O) is a colorless, odorless, tasteless liquid. It is made up of hydrogen and oxygen, freezes at 0 degrees Celsius, and boils at 100 degrees Celsius.

[See this glossary term in](#) [ASL](#)



Related Glossary Terms

3: land, 5: boat

[Back to Chapter 3 Reading](#)

4: air

Air is the mixture of invisible, odorless, tasteless gases all around us. Some of these gases are nitrogen, oxygen, carbon dioxide, and water vapor.

[See this glossary term in](#) **ASL**

Related Glossary Terms

2: gas, 2: invisible, 2: water vapor, 4: air pressure, 4: airplane

[Back to Chapter 4 Reading](#)

4: air pressure

Air pressure is the pressing down on Earth of the layer of air that surrounds it.

[See this glossary term in](#) **ASL**



Related Glossary Terms

4: air, 4: Earth

[Back to Chapter 4 Reading](#)

4: airplane

An airplane is a vehicle for transportation of people and other things in the air. Air planes fly. They have wings and engines.

[See this glossary term in](#) **ASL**



Related Glossary Terms

4: air

[Back to Chapter 4 Reading](#)

4: change

To change is to become different.

[See this glossary term in](#) **ASL**



Related Glossary Terms

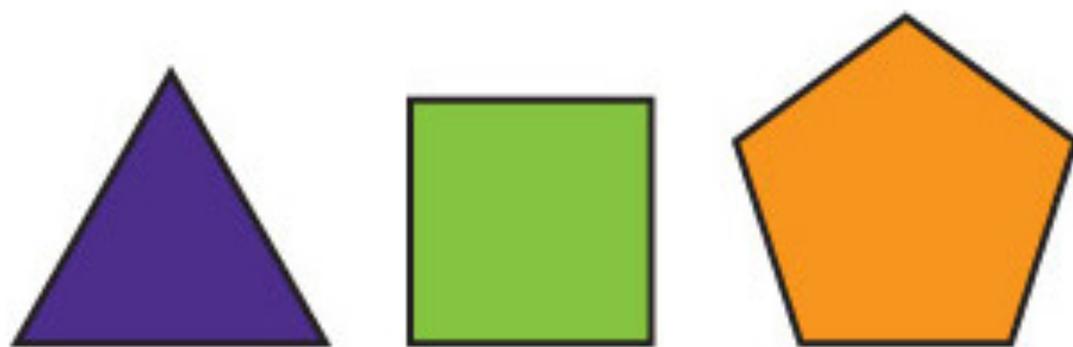
4: difference

[Back to Chapter 4 Reading](#)

4: difference

A difference shows that something is not alike or not similar to something else. For example, the difference between the two shapes was that one was r and the other was square.

[See this glossary term in ASL](#)



Related Glossary Terms

4: change

[Back to Chapter 4 Reading](#)

4: ear

An ear is a part of the body. There is one ear on each side of the head. Humans and animals hear with their ears.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 4 Reading](#)

4: Earth

Earth is the planet on which we live. Earth's orbit is the third closest to the sun.

[See this glossary term in](#) **ASL**



Related Glossary Terms

2: sun, 4: air pressure

[Back to Chapter 4 Reading](#)

4: feel

To feel is to touch something to find out what it is like.

[See this glossary term in ASL](#)



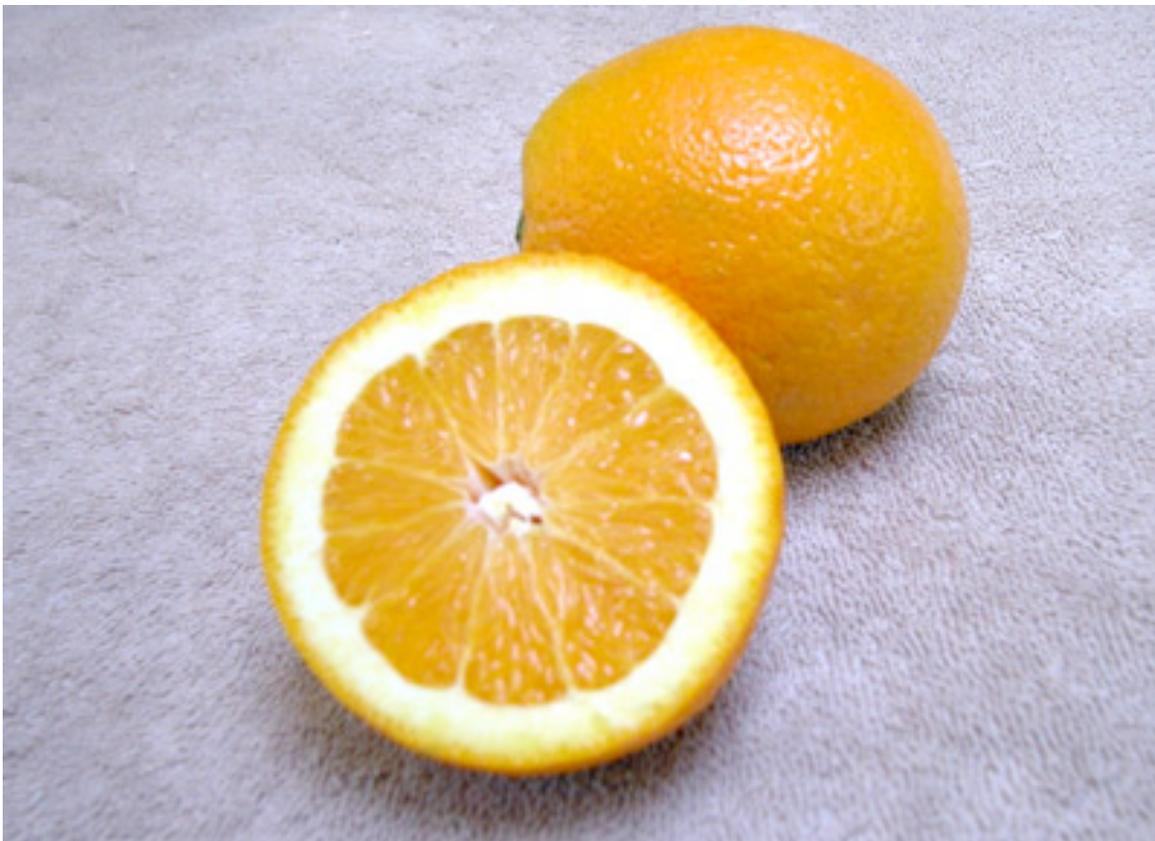
Related Glossary Terms

[Back to Chapter 4 Reading](#)

4: inside

Inside means in something. For example, our heart is inside our body. Inside is the opposite of outside.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 4 Reading](#)

4: storm

A storm is very bad weather with a lot of wind and rain or snow. Some storms also have thunder and lightning.

[See this glossary term in](#) **ASL**



Related Glossary Terms

1: wind, 2: rain, 2: snow, 4: weather

[Back to Chapter 4 Reading](#)

4: surface

A surface is the outside of an object.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 4 Reading](#)

4: weather

Weather is the term meteorologists use for the condition of the air around us at a particular time and place. For example, if you cannot go outside today because it is very cold and raining and there is a lot of wind, you are describing today's weather.

[See this glossary term in](#) **ASL**

Related Glossary Terms

1: cold, 1: condition, 1: rain, 1: wind, 4: storm

[Back to Chapter 4 Reading](#)

4: weight

The weight of an object is how heavy the object is.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 4 Reading](#)

5: above

Above means higher than something. For example, our eyes are above our mouth.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 5 Reading](#)

5: air

Air is the mixture of invisible, odorless, tasteless gases all around us. Some of these gases are nitrogen, oxygen, carbon dioxide, and water vapor.

[See this glossary term in](#) 

Related Glossary Terms

2: gas, 2: invisible, 2: water vapor, 5: blow, 5: wind

[Back to Chapter 5 Reading](#)

5: area

An area can be a geographical region, such as a mountainous area. It is also a quantity used to express the size of a region of space, such as the area of a classroom.

[See this glossary term in](#) **ASL**

Related Glossary Terms

[Back to Chapter 5 Reading](#)

5: blow

To blow is to push with air.

[See this glossary term in](#) [ASL](#)



Related Glossary Terms

5: air

[Back to Chapter 5 Reading](#)

5: boat

A boat is a vehicle for transportation of people and other things on water. Some boats have engines and some boats have sails to make them move.

[See this glossary term in](#) **ASL**



Related Glossary Terms

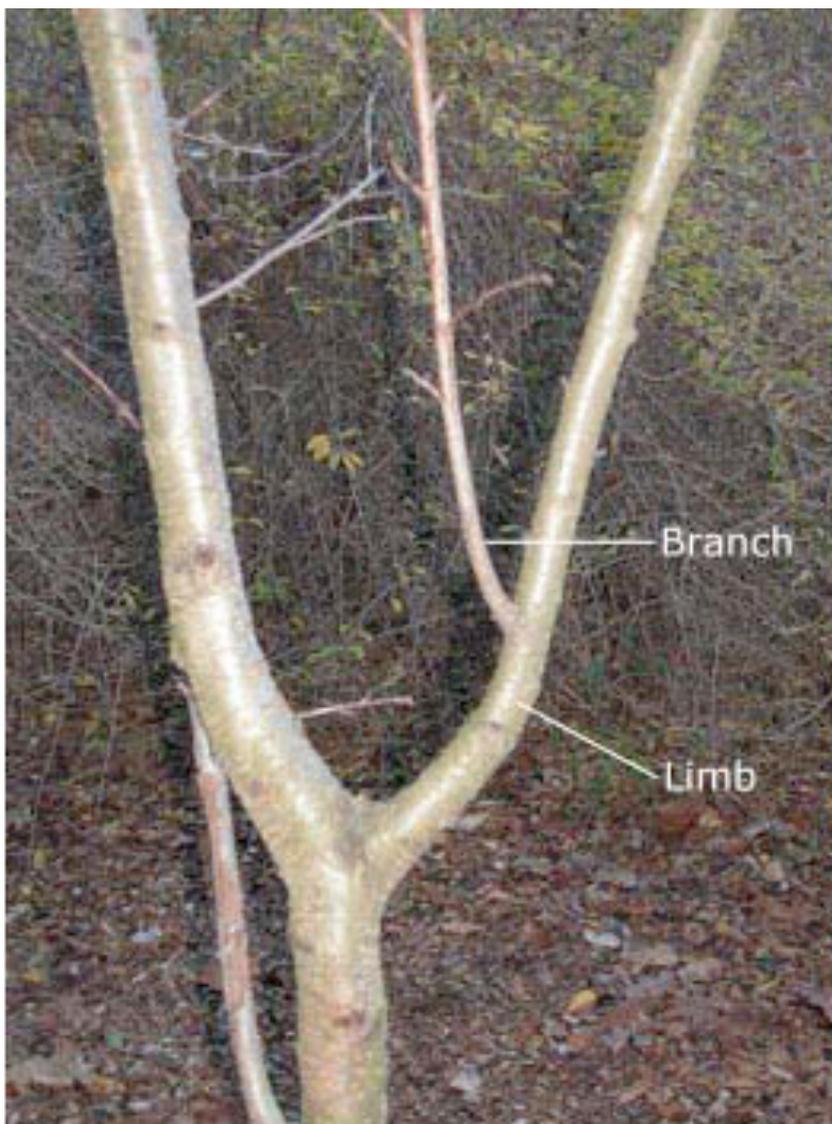
3: water

[Back to Chapter 5 Reading](#)

5: branch

In plants, a branch is an offshoot of a main stem or trunk.

[See this glossary term in](#) **ASL**



Related Glossary Terms

5: tree

[Back to Chapter 5 Reading](#)

5: cool

To cool is to make less warm.

[See this glossary term in ASL](#)



Related Glossary Terms

5: warm

[Back to Chapter 5 Reading](#)

5: Earth

Earth is the planet on which we live. Earth's orbit is the third closest to the sun.

[See this glossary term in](#) **ASL**



Related Glossary Terms

3: planet, 3: sun

[Back to Chapter 5 Reading](#)

5: face

A face is the front of the head. The eyes, nose, and mouth are on the face.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 5 Reading](#)

5: feel

To feel is to touch something to find out what it is like.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 5 Reading](#)

5: heat

Heat is a form of energy.

[See this glossary term in](#) **ASL**

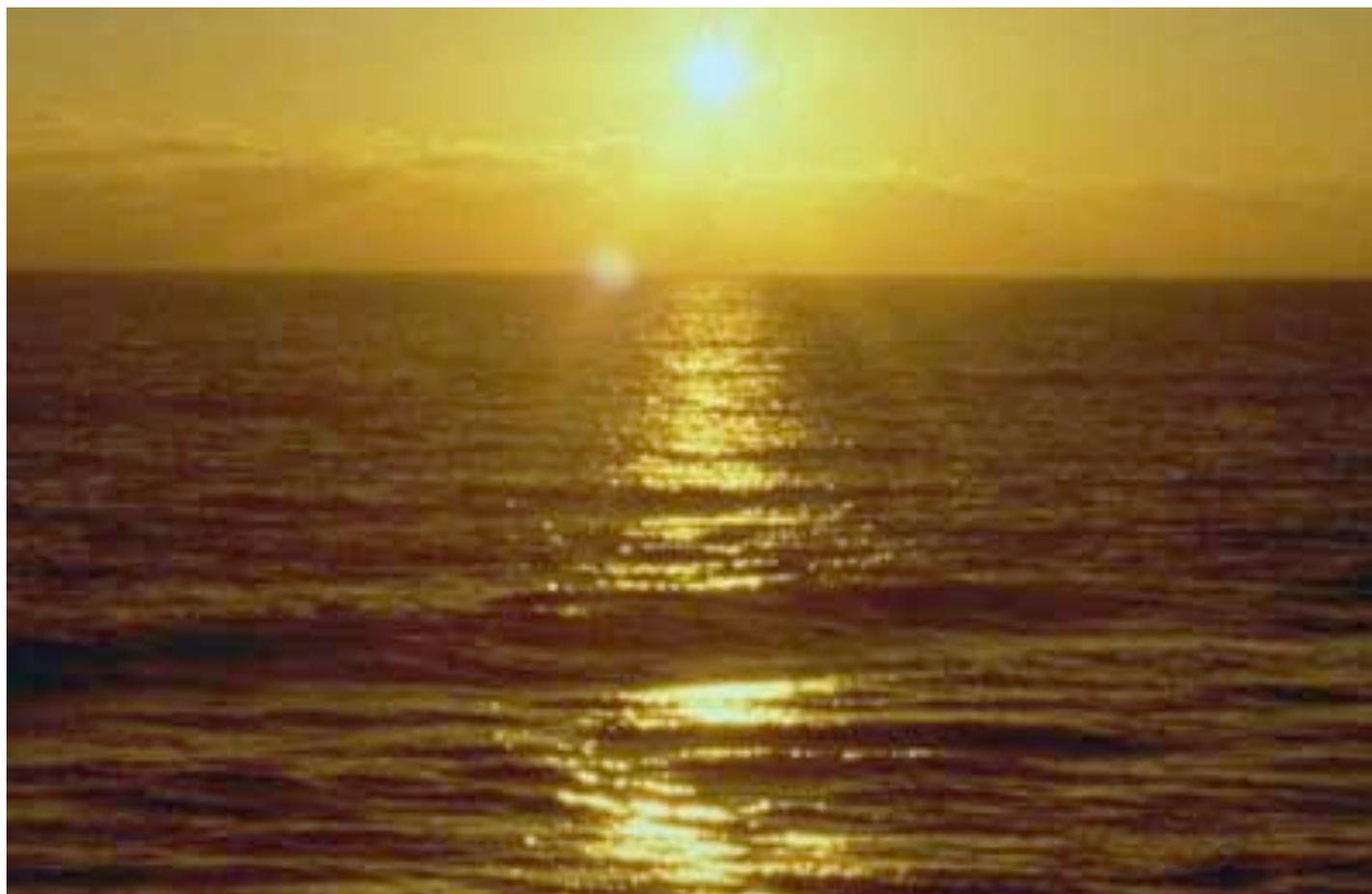
Related Glossary Terms

[Back to Chapter 5 Reading](#)

5: sunlight

Sunlight refers to the rays of the sun. Sunlight is often called sunshine.

[See this glossary term in](#) **ASL**



Related Glossary Terms

3: ray, 3: sun

[Back to Chapter 5 Reading](#)

5: surface

A surface is the outside of an object.

[See this glossary term in](#) **ASL**



Related Glossary Terms

[Back to Chapter 5 Reading](#)

5: tree

A tree is a plant with leaves, branches, and a thick stem that is called a trunk. Trees can grow to be very tall. Oaks, redwoods, and palms are kinds of trees.

[See this glossary term in](#) **ASL**



Related Glossary Terms

5: branch

[Back to Chapter 5 Reading](#)

5: warm

Something that is warm is not very hot. The opposite of warm is cool. For example, it starts to get warm outside when spring comes.

[See this glossary term in](#) **ASL**

Related Glossary Terms

3: hot, 5: cool

[Back to Chapter 5 Reading](#)

5: wind

Wind is the movement of air.

[See this glossary term in](#) **ASL**



Related Glossary Terms

5: air

[Back to Chapter 5 Reading](#)

Credits

Staff for *What's the Weather?*

Judy Vesel, Project Director and Author

Jana Borgen, Graphic Designer

Tara Robillard, Lead Researcher and Author

Wes Fleming, Senior eBook Developer/Designer