

## UNIT OVERVIEW

Everywhere on Earth, all the time, some type of weather is occurring. The Clouds, Wind, and Storms unit helps students understand what causes different types of weather. It addresses how air masses mix to create clouds, wind, and precipitation, as well as the conditions that produce severe weather.

Certain reading resources are provided at three reading levels within the unit to support differentiated instruction. Other resources are provided as a set, with different titles offered at each reading level. Dots on student resources indicate the reading level as follows:

- low reading level
- middle reading level
- high reading level

## THE BIG IDEA

This unit provides opportunities for students to learn more about natural weather phenomena they observe in their own lives. Students will develop a greater understanding of why it may be clear one day but cloudy the next, or why it can be snowing in one place while it is warm and sunny elsewhere. Experts are now able to better predict the weather in advance, which gives us information we need to plan our activities. We often select activities, clothing, and a place to live based upon weather. Understanding the weather can also prepare us to take precautions that will keep us safe in the event of severe weather.

### Other topics

This unit also addresses topics such as: weather forecasting, fog, ice storms, storm chasing, and how to stay safe during severe weather.

## SPARK

The spark is designed to get students thinking about the unit's topics and to generate curiosity and discussion.

### Materials

- comb
- wool cloth
- paper lunch bags
- metal doorknob or similar metal object



### Activity

Ask students to tell stories about storms they have experienced. Discuss what they experienced through each of their senses. Invite students to draw the shape of lightning in the air using their pointer finger. Then, on the count of three, allow volunteers to mimic the sound of thunder. Tell students that you are going to create lightning and thunder in the classroom!

Below are questions to spark discussion.

*What is lightning?*

*What is thunder?*

*Which do you notice first during a storm—thunder or lightning? Why do you think this is?*

*Have you ever seen lightning without hearing thunder? Why do you think this is?*

*Have you ever heard thunder without seeing lightning? Why do you think this is?*

*Is there a certain time of year when you see lightning and hear thunder more than any other time of year? When? Why do you think this is?*

Demonstrate lightning on a small scale by rubbing the comb several times across the wool. Immediately hold the comb up to the doorknob or another metal object and let students observe the electric discharge. Explain that this spark is similar to the flash seen when electricity passes between the ground and a cloud or from one cloud to another. Let several volunteers try reproducing the effect.

Now demonstrate thunder by inflating a paper lunch bag, twisting the open end shut, and then popping it between your hands. Like thunder, this sudden movement of air creates strong vibrations and thus makes a loud sound. Provide several volunteers with bags to make their own thunder.

Ask students to explain how each demonstration is similar to and different from real lightning and thunder. Challenge students to do more research about the science behind these and other weather-related phenomena. Use this activity to begin an introductory discussion about weather. Explain that lightning and thunder are examples of dramatic weather. But unlike this activity, real storms occur on a very large scale. Throughout the unit, students will learn more about clouds, wind, and storms.

Many of the unit's vocabulary terms are related to the spark activity and can be introduced during the spark. For vocabulary work, see the Vocabulary section in this *Unit Guide*.

**PRIOR KNOWLEDGE**

Invite students to explain their understanding of how clouds, wind, and storms each occur and to identify any familiar types of weather.

**Probing Questions to Think About**

Use the following questions to have students begin thinking of what they know about clouds, wind, and storms.

- Where do clouds exist? Why?
- How do clouds form?
- What causes wind to blow?
- Why does it rain sometimes and snow at other times?
- What are some kinds of storms?
- Why does a storm start? Why does a storm end?
- Which do you think is the most dangerous kind of storm? Why?

Tell students they will learn more about these topics soon.

**UNIT MATERIALS**

Each unit provides a wide variety of resources related to the unit topic. Students may read books and other passages, work in groups to complete hands-on experiments and investigations, discuss science ideas as a class, watch videos, complete writing tasks, and take assessments.

Resources are available for printing or projecting, and many student resources are also available for students to access digitally on [Kids A-Z](#).

Selected unit resources are available in more than one language.

For a complete list of materials provided with the unit, see the Clouds, Wind, and Storms unit page on the Science A–Z website.

**VOCABULARY**

Use the terms below for vocabulary development throughout the unit. They can be found in boldface in the *Nonfiction Book*, the *Quick Reads*, and/or other unit resources. These terms and definitions are available on *Vocabulary Cards* for student practice. Additional vocabulary lists are provided in the teaching tips for *Investigation Packs* and *FOCUS Books*.

**Core Science Terms**

These terms are crucial to understanding the unit.

<b>atmosphere</b>	a layer of gases surrounding a planet, star, or moon
<b>blizzard</b>	a severe snowstorm with cold temperatures, high winds, and heavy snow
<b>cloud</b>	a visible group of water or ice particles in the atmosphere from which precipitation may fall
<b>condense</b>	to change from a gaseous to a liquid state

<b>evaporate</b>	to change from a liquid to a gaseous state
<b>front</b>	the line where two air masses meet
<b>hurricane</b>	a strong, spinning rainstorm with high winds that starts over an ocean
<b>lightning</b>	a flash of light in the sky made when electricity passes from one cloud to another or between a cloud and the ground
<b>moisture</b>	a small amount of water
<b>precipitation</b>	water that falls from clouds in the form of rain, snow, sleet, or hail
<b>thunderstorm</b>	a storm with thunder, lightning, heavy precipitation, and sometimes hail
<b>tornado</b>	a fast-spinning, funnel-shaped column of air that touches Earth's surface
<b>water vapor</b>	the gaseous state of water
<b>wind</b>	moving air

### Other Key Science Terms

The following vocabulary is not essential for comprehending the unit but may enrich students' vocabulary.

<b>air pressure</b>	the force that air puts on an object
<b>cirrus</b>	a thin, wispy kind of cloud made of ice crystals
<b>cumulus</b>	a white, puffy kind of cloud that sometimes turns into a storm cloud
<b>forecast</b>	a prediction of expected weather conditions
<b>gas</b>	a substance with no fixed volume or shape, which can spread out
<b>hail</b>	rain that falls from a cloud, then is blown upward and freezes, before falling as ice
<b>humid</b>	having a lot of moisture in the air
<b>liquid</b>	a substance that flows and takes the shape of the container it is in
<b>rain</b>	liquid water that falls from clouds to Earth
<b>sleet</b>	partly frozen rain
<b>snow</b>	water vapor in the atmosphere that has frozen into ice crystals and falls to the ground in flakes

<b>solid</b>	a substance that keeps its size and shape
<b>stratus</b>	a solid, gray kind of cloud that often covers the sky
<b>temperature</b>	the measurement of how hot or cold something is
<b>thermometer</b>	a tool used for measuring temperature

### Vocabulary Activities

You may choose to introduce all the terms that will be encountered in the unit before assigning any of the reading components. *Vocabulary Cards* with the key science terms and definitions are provided. Dots on the cards indicate the reading levels of the *Nonfiction Book* or the *Quick Reads* in which each term can be found. If all level dots appear, the term may come from another resource in the unit. Students can use these cards to review and practice the terms in small groups or pairs. The cards can also be used for center activity games such as Concentration.

The *Word Work* activity sheets offer fun puzzles and practice with key vocabulary terms from the unit. For further vocabulary practice and reinforcement, you can choose from the vocabulary *Graphic Organizers*. To build customized vocabulary lessons with terms related to the topic, see [Vocabulary A-Z](#).

Students can use the *Word Smart* vocabulary *Graphic Organizer* to organize information on the science terms. You may want to assign each student one to three words to share his or her *Word Smart* knowledge with classmates. Students who have the same word should first compare their *Word Smart* sheets with each other and then report to the larger group.

The science terms can be used in oral practice. Have students use each term in a spoken sentence.

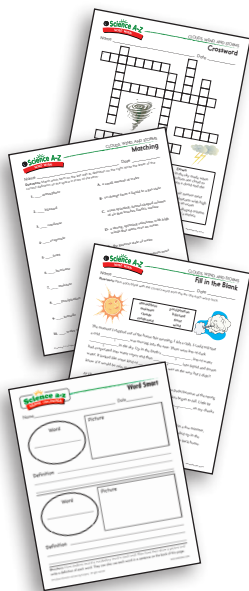
As students read, encourage them to create a science dictionary by recording new vocabulary terms and definitions in their *SAZ Journal*.

### BACKGROUND AND MISCONCEPTIONS

Use this section as a resource for more background knowledge on unit content and to clarify the content for students if misconceptions arise. Refer to Using the Internet below for more ways to extend the learning.

**Q:** *Are clouds made of water vapor?*

**A:** No. While it's true that clouds are formed by invisible water vapor, the term *cloud* describes the visible liquid water droplets and ice crystals suspended in the air once water vapor rises, cools, and condenses.



*Q: Isn't snow just rain that freezes on the way down?*

**A:** No. When rain freezes as it falls to Earth, sleet can form. But snow is precipitation in the form of ice crystals that froze within the cloud and remained frozen all the way to the ground.

*Q: Are raindrops shaped like teardrops?*

**A:** No. Small raindrops are very close to spherical in shape, while larger ones take on a shape similar to an open parachute as they fall.

*Q: Lightning once struck our tree, so it'll never strike there again, right?*

**A:** The notion that lightning never strikes the same place twice is a myth. In fact, lightning can and does often hit the same place more than once. Immediately after the first strike, minor strikes may follow. Also, objects that "attract" lightning in one storm are likely to do the same in another storm.

*Q: Do tornadoes happen over the ocean? Do hurricanes happen over land?*

**A:** Tornadoes, by definition, occur over land. But similar storms, with a fast-swirling column of air, do occur over water. An example is a waterspout (see *Process Activities*). Hurricanes (or cyclones) form over tropical oceans but often make landfall and cause great damage to lives and property. But once over land, hurricanes eventually die out because they lack the heat and moisture that power them.

*Q: Do seasons occur because the distance between the Sun and Earth changes?*

**A:** No. If the Earth's distance from the Sun varied significantly, the entire planet would warm and cool at the same time. Seasons occur because our planet is tilted on its axis. During one part of the year, the Northern Hemisphere is tilted toward the Sun and gets the Sun's energy at a more direct angle, causing summer. At the same time, the Southern Hemisphere receives the Sun's energy at a lower angle, causing winter. Six months later, Earth is on the opposite side of the Sun, but the tilt has not changed, so the seasons are reversed.

*Q: Why can't meteorologists predict the weather correctly all the time?*

**A:** Modern technology allows scientists to research past weather trends and, using current data, forecast upcoming weather. However, as with many things in nature, there are variations. The best that meteorologists can do at this point is to tell the population what is most likely to happen and to prepare us for any severe weather that could be on the way.

EXTENSION  
ACTIVITIES

## Using the Internet

Most search engines will yield many results when the term *cloud*, *wind*, or *storm* is entered. You can also search for more on a specific type of cloud or storm, such as cirrus or hurricane. Be aware that some sites may not be educational or intended for the elementary classroom. More specific inquiries are recommended, such as:

- cumulonimbus photographs
- What causes thunder?
- Maryland weather data
- compare sleet and hail
- tropical storm names
- Alabama hurricane



## Projects and Activities

- **Project/Research:** Have students each choose a country, state, or city. Make copies of the weather page from a newspaper or provide access to online weather data. Have each student track the temperature and precipitation for his or her location over a week, then present the findings in a report, chart, or oral presentation.
- **Project/Home Connection:** Have students keep a weather journal. Also have them ask a friend or relative who lives in another area to provide information on the weather in their area. Then have students present a comparison of the two areas.
- **Math:** Have students use temperatures to create word problems for their classmates. For example, students could ask how much warmer the high temperature was than the low, or students can ask for the average temperature over a certain number of days. Then have students exchange questions and solve them.
- **Arts:** Create a class mural showing various types of weather.
- **Arts:** Invite groups of students to write and act out a short play in which the characters are clouds, wind, and storms.
- **Guest:** Invite a meteorologist to speak with students about his or her career and to explain how understanding weather can help students in their daily lives.
- **Field Trip:** Arrange a field trip to a local television station to observe how the weather forecast and report occur, including the technology used to research weather and to present it to the public.
- **Community Service:** Provide students with opportunities to help people who have been negatively affected by bad weather.
- **Research/Home Connection:** Students can conduct research as a family/home project or in the library/media center to extend the learning about a topic in one of the *Quick Reads* or other unit resources.

