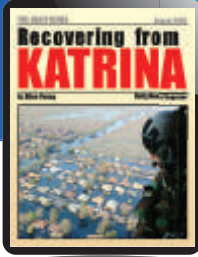


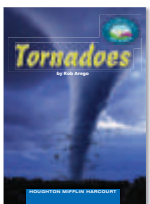
Vocabulary in Context



✓ TARGET VOCABULARY

- whirling
- rapidly
- condense
- source
- rotating
- rage
- experience
- ancient
- predict
- registered

Vocabulary Reader



Context Cards



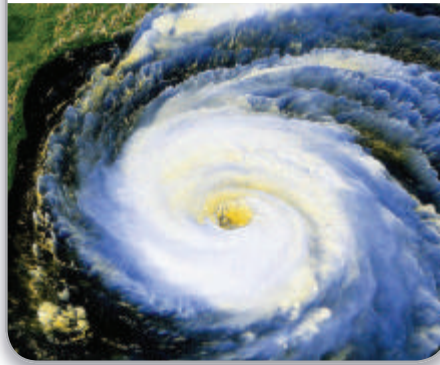
COMMON CORE

L.4.6 acquire and use general academic and domain-specific words and phrases

1

whirling

If the conditions are right, **whirling** winds can form into a hurricane.



2

rapidly

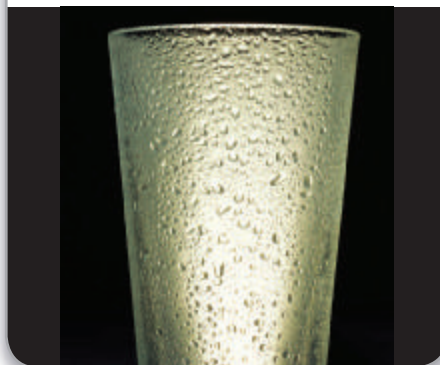
The hot air balloon rose **rapidly**, or very fast, into the air.



3

condense

Water droplets will **condense** on the outside of a cold glass on a hot day.



4

source

Tiny water droplets are the **source** for forming clouds.



- ▶ Study each **Context Card**.
- ▶ Use context clues to determine the meanings of these words.

5 **rotating**

The Earth is always **rotating**. It never stops turning.



6 **rage**

Winds **rage** during a hurricane. They never seem to stop.



7 **experience**

Some places **experience** a lot of damage from hurricanes.



8 **ancient**

The **ancient** Greeks, who lived long ago, had storms during the summer and fall.



9 **predict**

People try to **predict** the weather, but often it is hard to know what the weather will do.



10 **registered**

This anemometer recorded wind speeds near a tornado. It **registered** high winds.





Read and Comprehend



✓ TARGET SKILL

Text and Graphic Features As you read “Hurricanes: Earth’s Mightiest Storms,” look for **text features**, such as headings and captions, and for **graphic features** such as charts and diagrams. These features help you better understand the text’s topic and provide factual information to add to your knowledge. Use a graphic organizer like the one below to record each text or graphic feature, where it is located, and the information it provides.

Text or Graphic Feature	Page Number	Information
•	•	•
•	•	•
•	•	•

✓ TARGET STRATEGY

Infer/Predict When you make an **inference** or a **prediction**, you use text evidence and information from graphic features to figure out something the author does not state directly. Use facts and details in “Hurricanes” to help you make inferences and predictions about these ferocious storms and their effects.

PREVIEW THE TOPIC

Hurricanes

Hurricanes, which feature raging winds and pounding rain, are the biggest and deadliest storms on earth. The study of weather, including hurricanes, is part of earth science. Earth scientists study our planet's origin and features, including air, water, and weather.

As you read "Hurricanes: Earth's Mightiest Storms," you'll learn how wind, air temperature, and moisture interact to create one of the world's most awesome weather events.



Lesson 11

ANCHOR TEXT



✓ TARGET SKILL

Text and Graphic Features

Identify text and graphic features. Explain how they help you understand the topic and what new information they add.

✓ GENRE

Informational text gives facts and examples about a topic. As you read, look for:

- ▶ headings that begin sections of related information
- ▶ features that give specific information about the topic, such as maps, diagrams, and charts



RI.4.3 explain events/procedures/ concepts in a text; **RI.4.5** describe the overall structure of a text or part of a text; **RI.4.7** interpret

information presented visually, orally, or quantitatively

MEET THE AUTHOR

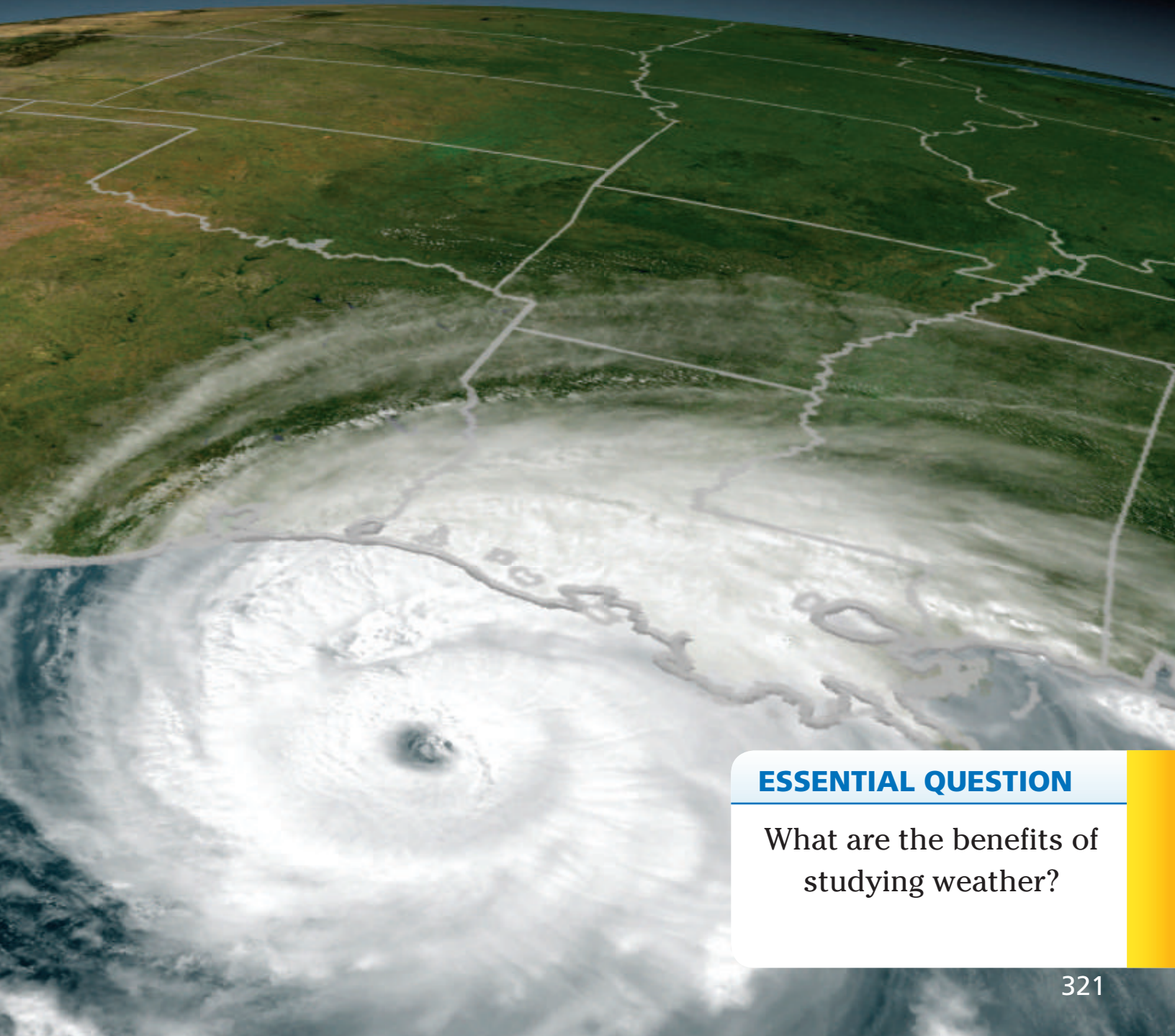
Patricia Lauber

Patricia Lauber said, "I was born wanting to write." And write she did! Patricia wrote over 125 children's books, many of them nonfiction texts on topics ranging from volcanoes to the history of eating utensils. Asked why she wrote so many science books, she said she believed that everyone, not just scientists, should know about the world around them.

HURRICANES

Earth's Mightiest Storms

by Patricia Lauber



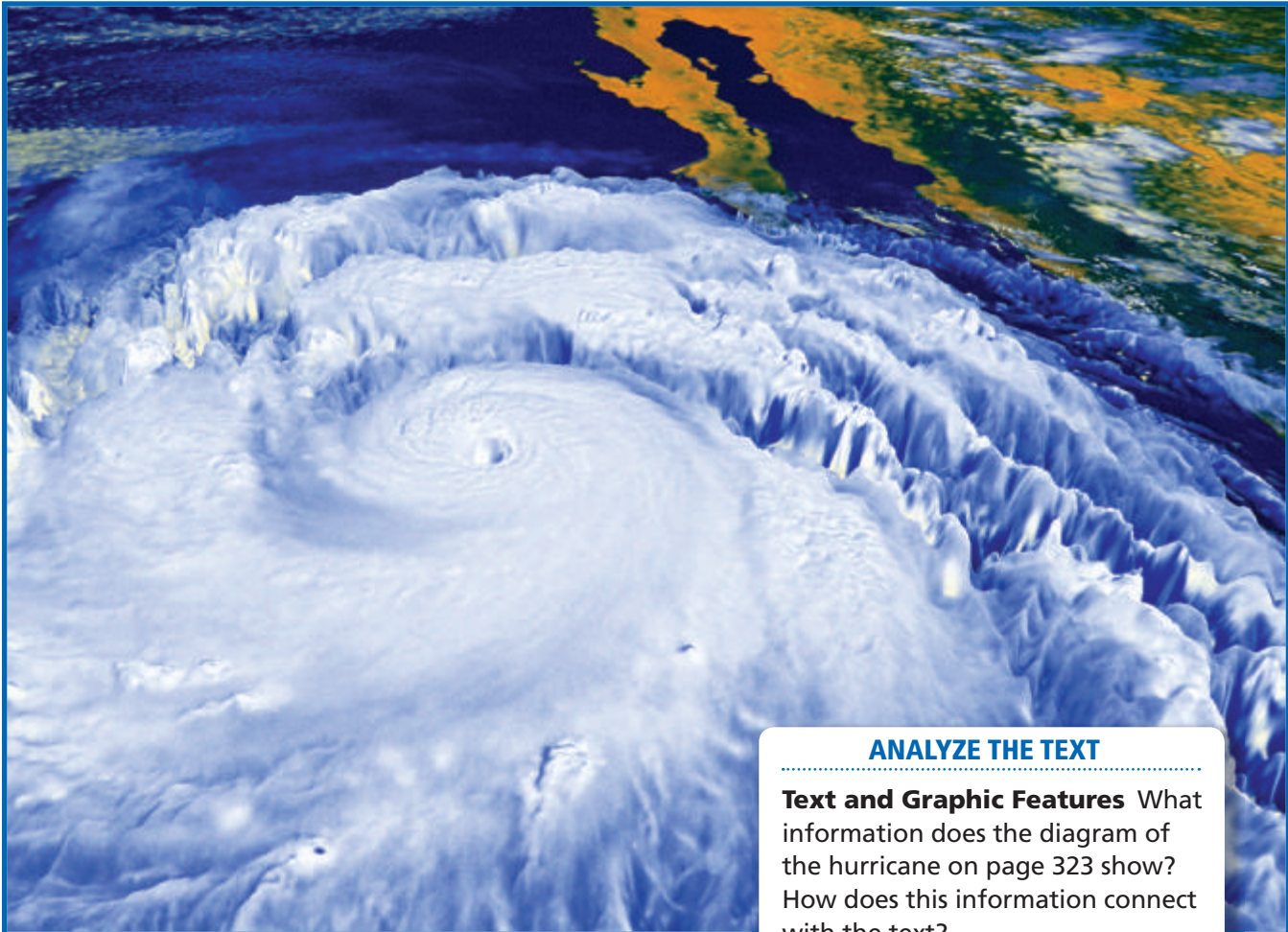
ESSENTIAL QUESTION

What are the benefits of studying weather?

The Making of a Hurricane

Great **whirling** storms roar out of the oceans in many parts of the world. They are called by several names—hurricane, typhoon, and cyclone are the three most familiar ones. But no matter what they are called, they are all the same sort of storm. They are born the same way, in tropical waters. They develop the same way, feeding on warm, moist air. And they do the same kind of damage, both ashore and at sea. Other storms may cover a bigger area or have higher winds, but none can match both the size and the fury of hurricanes. They are earth's mightiest storms.

Like all storms, they take place in the atmosphere, the envelope of air that surrounds the earth and presses on its surface. The pressure at any one place is always changing. There are days when air is sinking and the atmosphere presses harder on the surface. These are times of high pressure. There are days when a lot of air is rising and the atmosphere does not press down as hard. These are times of low pressure. Low-pressure areas over warm oceans give birth to hurricanes.



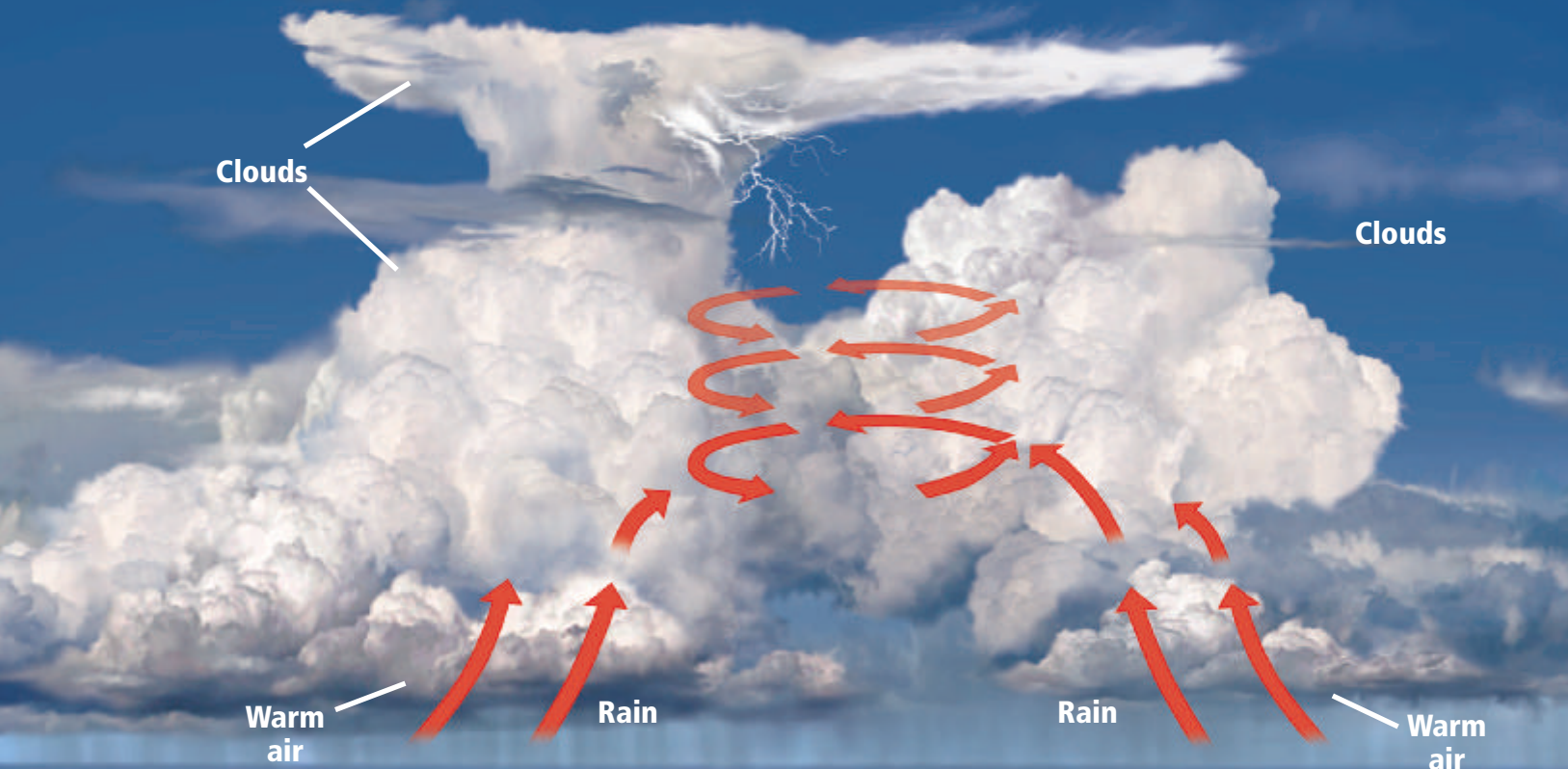
ANALYZE THE TEXT

Text and Graphic Features What information does the diagram of the hurricane on page 323 show? How does this information connect with the text?

No one knows exactly what happens to start these storms. But when conditions are right, warm, moist air is set in motion. It begins to rise **rapidly** from the surface of the ocean in a low-pressure area.

Like water in a hose, air flows from where there is more pressure to where there is less pressure. And so air over the surface of the ocean flows into the low-pressure area, picking up moisture as it travels. This warm, moist air soars upward.

As the air rises above the earth, it cools. The cooling causes moisture to **condense** into tiny droplets of water that form clouds. As the moisture condenses, it gives off heat. Heat is one kind of energy. It is the energy that powers the storm. The clouds are the **source** of the storm's rain.



Warm ocean surface

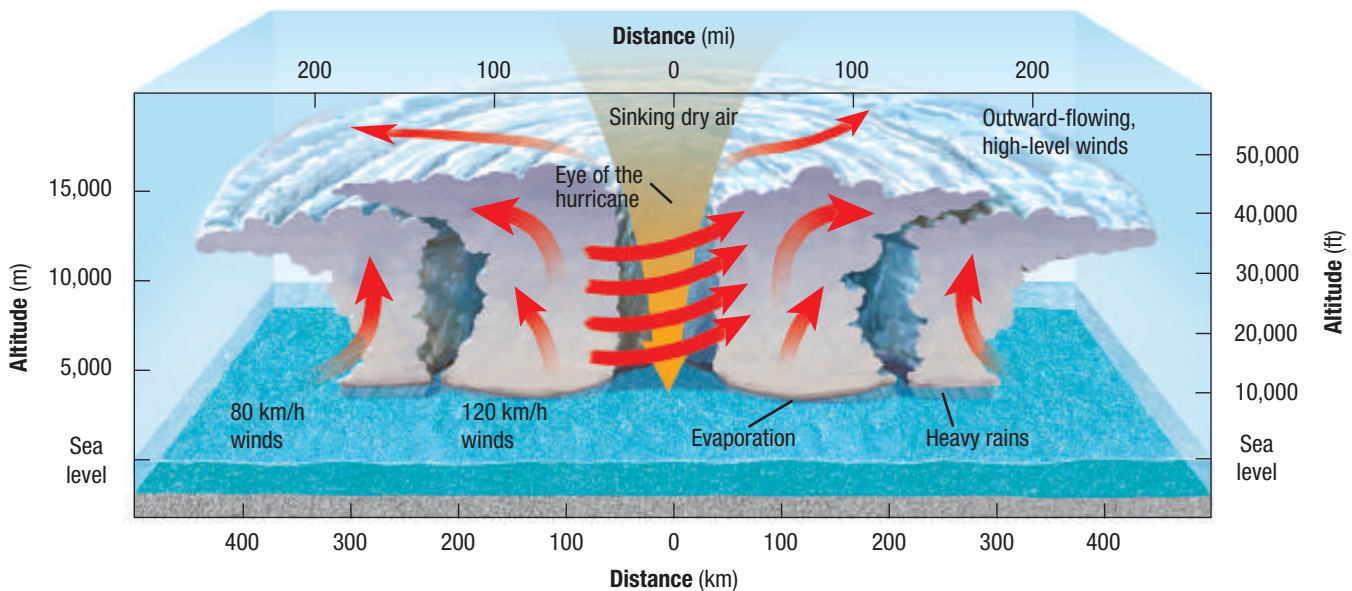
BIRTH OF A HURRICANE: Warm, moist air flows into a low-pressure area. As the air rises and condenses into clouds, more warm air is drawn over the surface of the ocean. It spirals upwards, traveling counterclockwise. Clusters of thunderstorms form.

The low-pressure area acts like a chimney—warm air is drawn in at the bottom, rises in a column, cools, and spreads out. As the air inside rises and more air is drawn in, the storm grows.

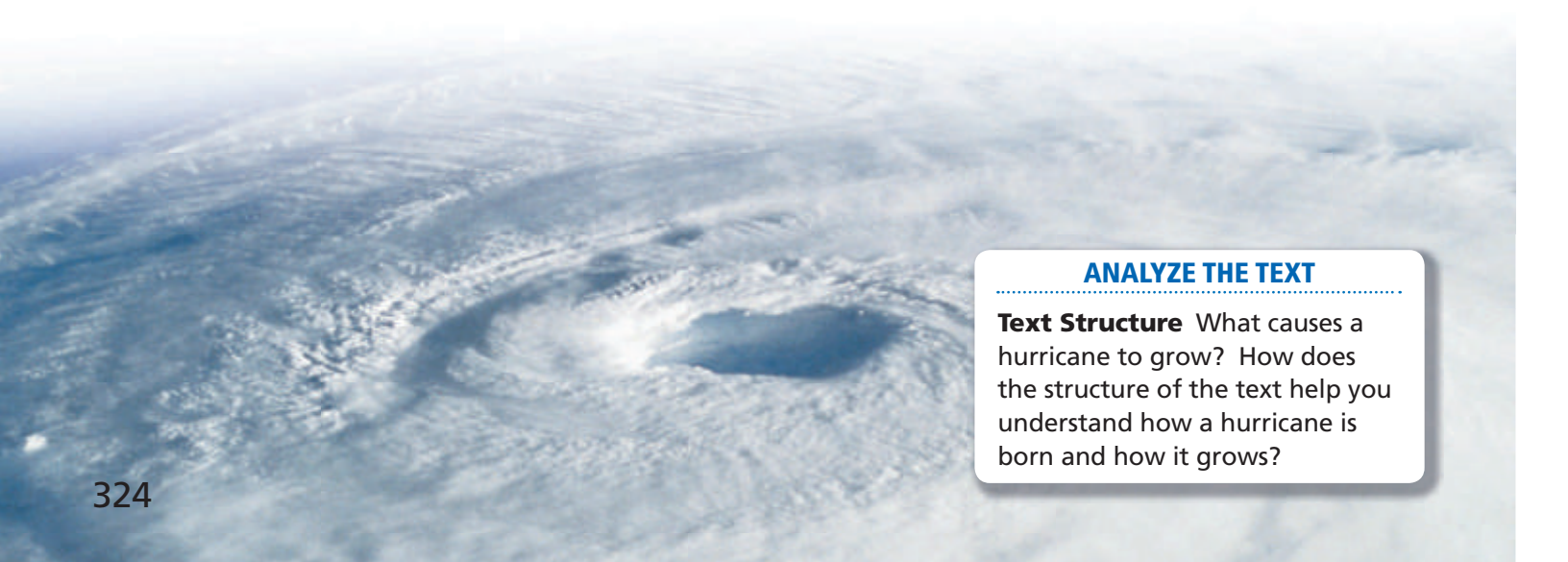
The air being drawn in, however, does not travel in a straight line. The earth's surface is **rotating**, and the rotation causes the path to curve. The air travels in a spiral

within the storm. In the Northern Hemisphere, the spiraling winds travel counterclockwise—the opposite of the way the hands on a clock move. In the Southern Hemisphere, they travel clockwise.

Most of these storms die out within hours or days of their birth. Only about one out of ten grows into a hurricane.

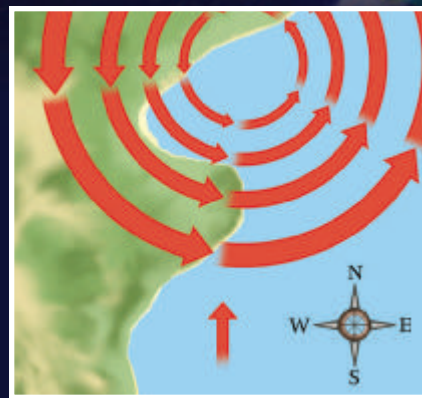


INSIDE A HURRICANE: High winds spiral around the eye, but within the eye all is calm. Air pressure within the eye is extremely low. Because there is less pressure on it than on surrounding areas, the sea under the hurricane rises in a bulge, or dome.



ANALYZE THE TEXT

Text Structure What causes a hurricane to grow? How does the structure of the text help you understand how a hurricane is born and how it grows?



If hurricane winds first blow from the east, they will blow from the west after the eye has passed.

As high winds develop, air pressure falls rapidly at the center of the storm. This low-pressure area is called the eye, and it may be ten to 20 miles across. The eye is a hole that reaches from bottom to top of the storm. Winds **rage** around the hole, but within it all is calm. Winds are light. The air is clear, with blue sky or scattered clouds and

sunshine above. People caught in a hurricane may suddenly **experience** calm air and dry skies. Sometimes they make the mistake of thinking the storm has ended, but it hasn't. The eye moves on and the second half of the storm arrives, with winds blowing from the opposite direction.

Some Weather Instruments

Ancient peoples lived through great storms. They looked for signs that would help them predict the weather. They tried to explain the weather they experienced. But no one can really study weather without measuring what is happening. The instruments to make such measurements were invented three to four hundred years ago. Modern versions of them are still used today.

BAROMETER



A barometer measures air pressure. Rising air pressure tells of fair weather, while falling air pressure tells of stormy weather. This kind of barometer is often seen in homes and schools.

HYGROMETER



A hygrometer measures the amount of moisture in the air: the humidity. Warm air can hold more moisture, or water vapor, than cool or cold air. When warm, moist air is cooled, water vapor condenses, changing from a gas to a liquid. That is why a glass of ice-cold

soda seems to sweat in the summer—warm air around the glass is chilled and water vapor condenses out of it onto the glass.

ANEMOMETER



An anemometer measures wind speed. The rate at which its blades spin outdoors is registered on a dial indoors. In the 1938 hurricane and other violent storms, anemometers have blown away, making it hard to tell what the highest wind speeds were.

THERMOMETER



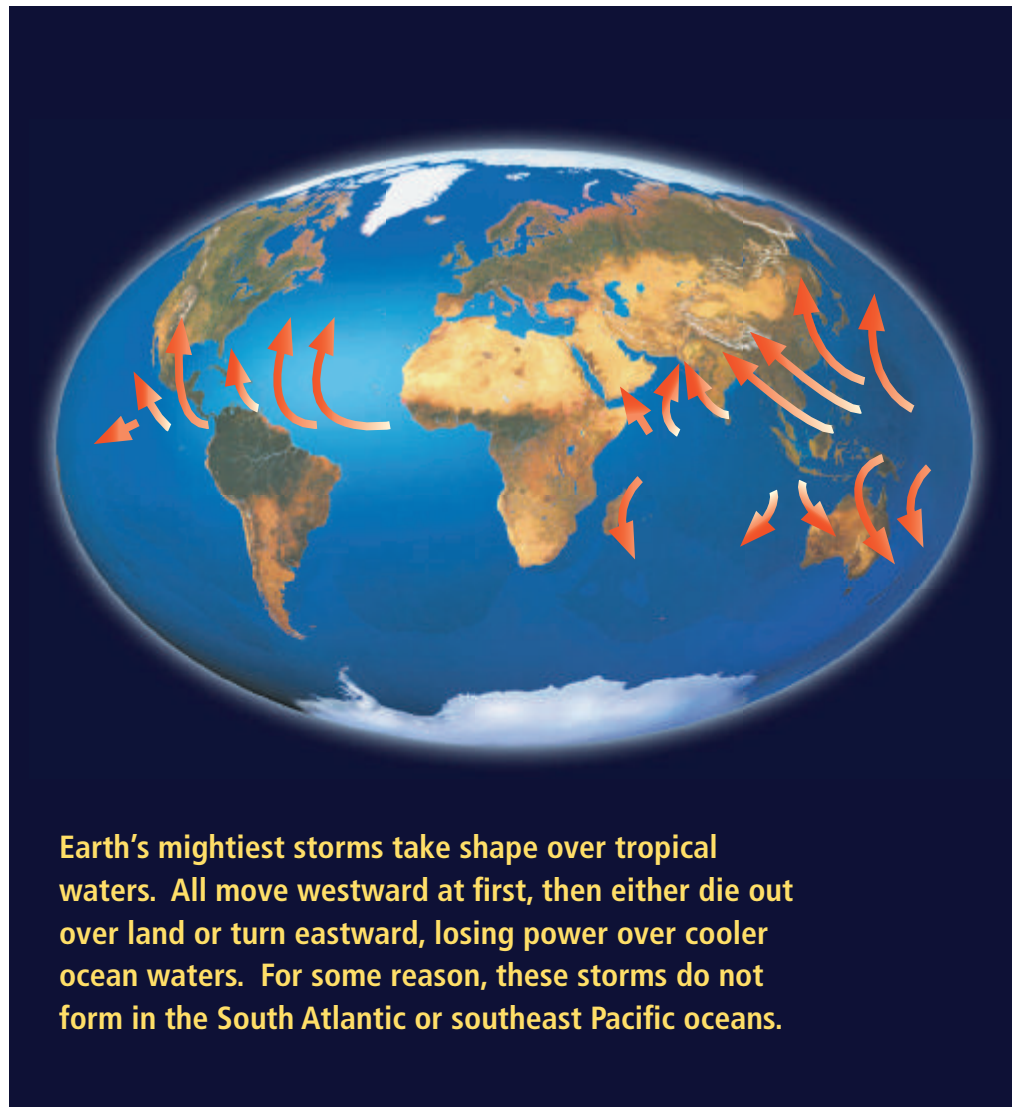
A thermometer measures temperature.



World Names

In the Caribbean Sea and North Atlantic, earth's mightiest storms are called *hurricanes*, after a Carib Indian word for "big wind." In the Pacific they are also called hurricanes if they occur east of the international dateline. West of the dateline they are called *typhoons*, from Chinese words for "great wind." In the Indian Ocean they are

called *cyclones*, an English name based on a Greek word meaning "coil," as in "coil of a snake," because of the winds that spiral within them. The storms also have a number of local names. Many Australians, for example, call them *willy-willies*. The name probably began as "whirlwind," which became "whirly-whirly," which became "willy-willy."



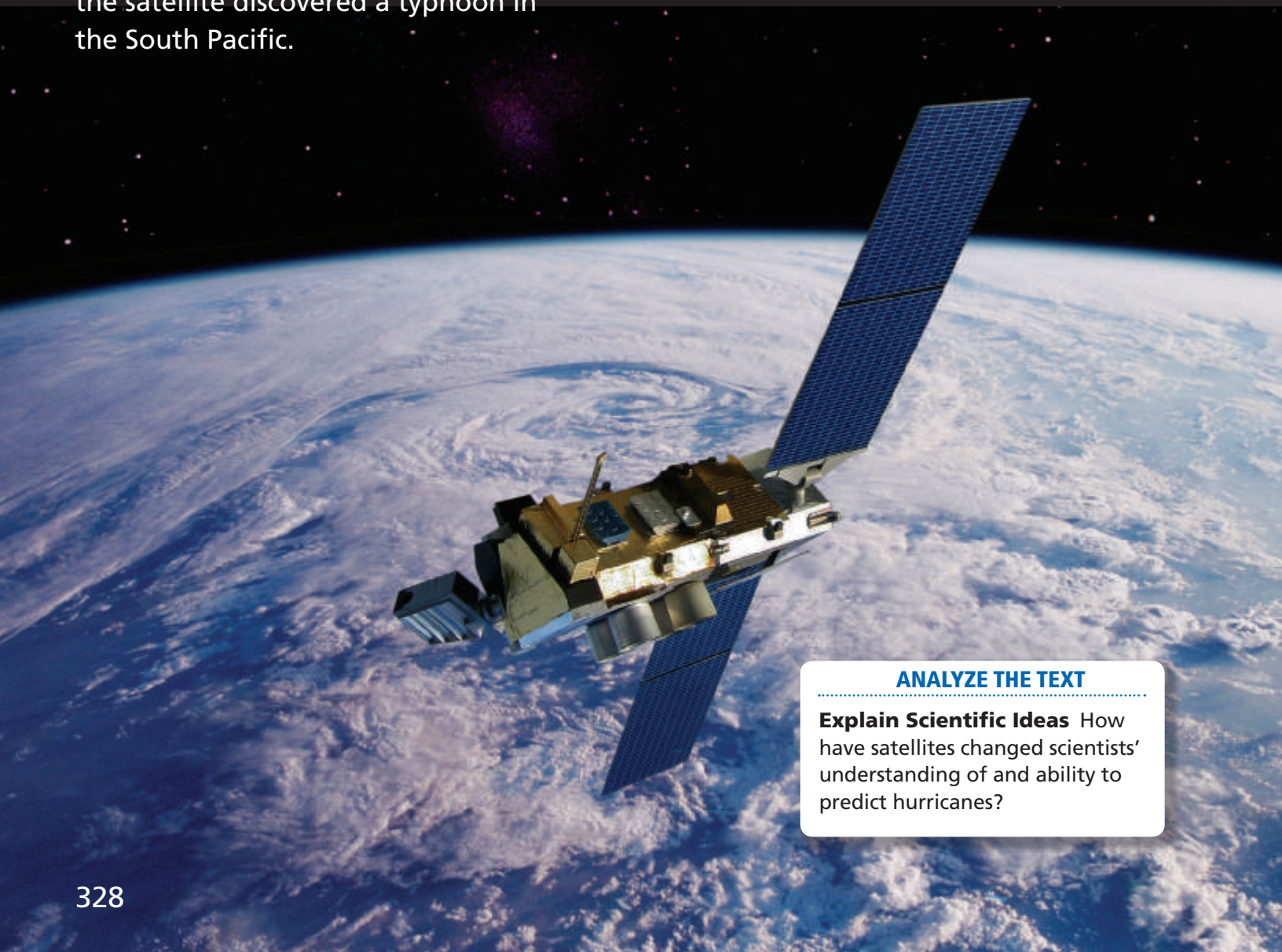
Earth's mightiest storms take shape over tropical waters. All move westward at first, then either die out over land or turn eastward, losing power over cooler ocean waters. For some reason, these storms do not form in the South Atlantic or southeast Pacific oceans.

Into the Eye of the Storm

Today rugged planes carry many instruments into hurricanes as they near land. The instruments measure winds, temperatures, and humidity. They measure the water content of clouds. They photograph the inside of hurricanes. They record radar images of the storms.

In April 1960, the first weather satellite rocketed into orbit. Now scientists hoped to find and track tropical storms before they neared land. They were rewarded almost at once. A few days after its launching, the satellite discovered a typhoon in the South Pacific.

Satellite instruments do not see into the heart of a hurricane—that work is still done by planes. Satellites show the size of the storm and its growth. They show changes in the size of the eye: if the eye is growing bigger, the storm is weakening; if it is growing smaller, the storm is strengthening. Most important, satellites can pinpoint the location of a storm, record its speed, and track it closely.



ANALYZE THE TEXT

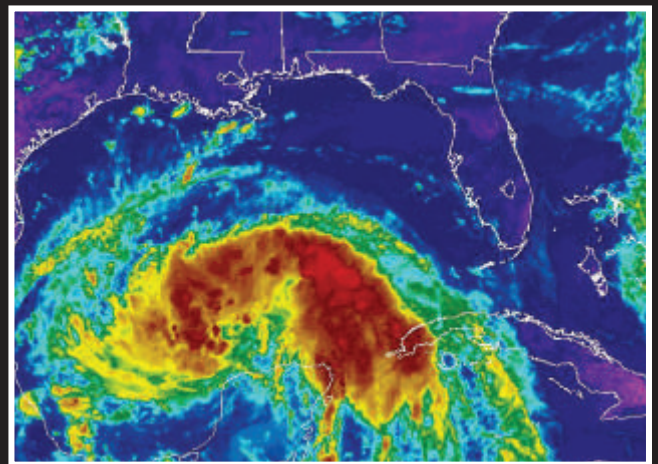
Explain Scientific Ideas How have satellites changed scientists' understanding of and ability to predict hurricanes?



Information from ground stations and ships, from hurricane-hunting planes and satellites—forecasters have more information than the human mind can grasp. But since the 1960s, they have been able to feed all this information into computers. Now they can create computer models of hurricanes. They can compare a hurricane with similar ones that occurred years earlier. Forecasting just one storm may involve several million bits of data and several billion mathematical calculations. Huge computers do the work.

Today no one who reads a newspaper, listens to radio, or watches television can be taken by surprise when a hurricane strikes. Although forecasters cannot

say exactly where a hurricane will come ashore, they do know which areas will feel the storm. They can warn people in its path, as they did with Andrew in the summer of 1992.



This satellite image shows Tropical Storm Dolly on July 21, 2008.



Dig Deeper

How to Analyze the Text

Use these pages to learn about Text and Graphic Features, Explaining Scientific Ideas, and Text Structure. Then read “Hurricanes: Earth’s Mightiest Storms” again to apply what you learned.

Text and Graphic Features

Informational texts such as “Hurricanes: Earth’s Mightiest Storms” often contain text and graphic features to help readers understand complex ideas. **Text features** include headings, captions, and special kinds of type such as boldfaced words. **Graphic features** include diagrams, charts, and maps. Diagrams are pictures that explain how things work. Charts are often lists of facts and details. Maps show where places are and where events occur.

In “Hurricanes,” the author includes a diagram in the middle of page 324. The diagram details how air moves inside a hurricane. How do winds move in relation to the eye of the hurricane? How does the diagram add to your understanding of the topic?

Text or Graphic Feature	Page Number	Information
•	•	•
•	•	•
•	•	•



RI.4.3 explain events/procedures/ideas/concepts in a text; **RI.4.5** describe the overall structure of a text or part of a text; **RI.4.7** interpret information presented visually, orally, or quantitatively



Explain Scientific Ideas

If you wanted to explain a **scientific idea** that you read about in a text, how would you begin? Start by rereading the explanation the author gives. Pay attention to the facts and details. Make sure you understand each scientific term. Then check your understanding by silently explaining the idea to yourself. Finally, explain the idea to someone else using your own words.



Text Structure

One way authors organize informational texts is by focusing on causes and effects. An author may state a **cause**, or why something happens. Then the author describes the **effect**, or what happens as a result of that cause. On page 326, the author says no one can study weather without measuring what is happening. Then she explains what happened as a result: people invented instruments to help them measure wind speed, temperature, and humidity.



Your Turn



RETURN TO THE ESSENTIAL QUESTION



Review the selection with a partner to prepare to discuss this question: *What are the benefits of studying weather?* Use evidence from both the text and the graphic features to form your answer. As you discuss your thoughts, take turns summarizing key ideas.



Classroom Conversation

Continue your discussion of “Hurricanes” by explaining your answers with text evidence:

- 1 The author calls hurricanes “earth’s mightiest storms.” Do you agree? Why or why not?
- 2 How has hurricane prediction changed over the years?
- 3 How does a better understanding of hurricanes benefit society?

ROLE-PLAY A SCIENTIST

Report on Hurricanes Imagine that you are a weather scientist appearing on TV. Work with a partner to outline key information and details that explain how hurricanes form. Then take turns role-playing a weather scientist explaining that process.



WRITE ABOUT READING

Response Write a short summary of "Hurricanes." Begin by stating the title and the author's name. Then use facts and important details as well as text evidence to tell readers about the scientific ideas in the selection.



Writing Tip

Begin your summary by stating the topic of the selection. Check to make sure that you have used pronouns correctly.

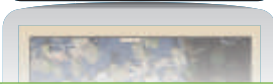


RI.4.2 determine the main idea and explain how it is supported by details/summarize; **RI.4.3** explain events/procedures/ideas/concepts in a text; **RI.4.7** interpret information presented visually, orally, or quantitatively; **W.4.9b** apply grade 4 Reading standards to informational texts; **SL.4.1a** come to discussions prepared/explicitly draw on preparation and other information about the topic;

SL.4.1d review key ideas expressed and explain own ideas and understanding

Lesson 11

INFORMATIONAL TEXT



✓ GENRE

Informational text, such as this newspaper article, gives information about a topic and usually includes visuals, such as maps and photographs with captions.

✓ TEXT FOCUS

Events in Historical Text

A newspaper article can tell about events that happened in the past. Often the reporter will tell about the events in the order they happened. The reporter may compare and contrast the particular incident with a similar incident.

What events are compared in this article?



RI.4.5 describe the overall structure of a text or part of a text; **RI.4.10** read and comprehend informational texts

Recovering from KATRINA

by Alice Young *Daily News Reporter*

Life has changed along the Gulf Coast in the past year. One year ago, Hurricane Katrina was churning in the warm, moist air of the Gulf of Mexico as a Category 5 storm. This is the strongest and most destructive rating for a hurricane. All along the Gulf Coast, residents were bracing for the impact of this mighty storm.

She was now a
Category 3 hurricane
with winds near 125
miles per hour.

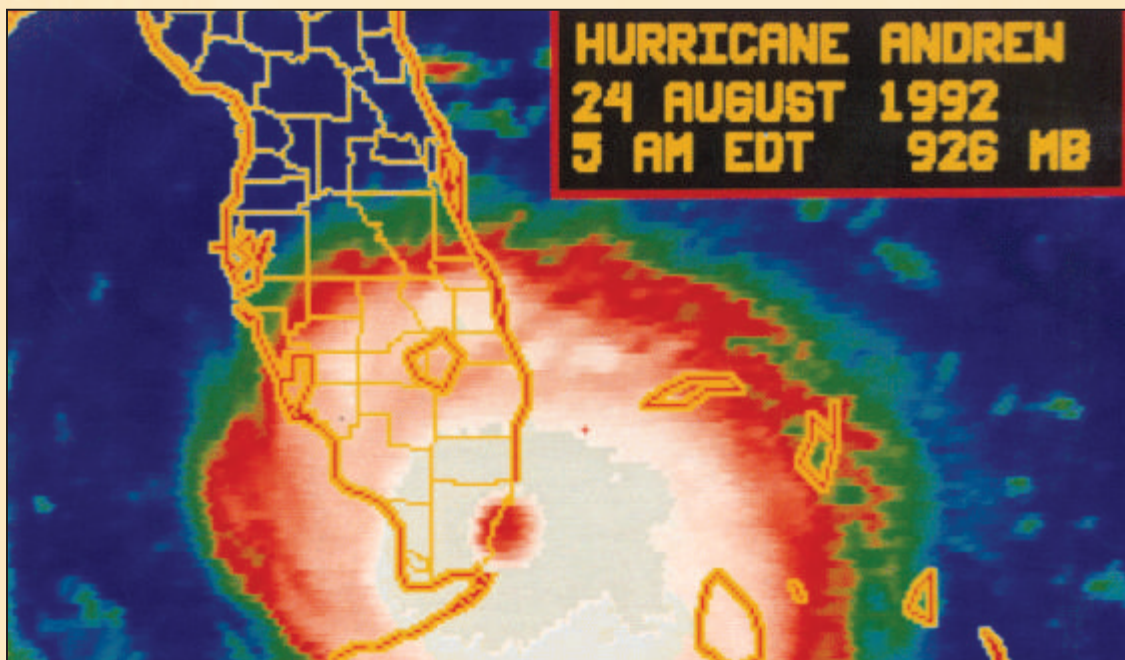
On the morning of August 29, Hurricane Katrina made landfall in southern Louisiana. She was now a Category 3 hurricane with winds near 125 miles per hour. She left behind a path of destruction in Louisiana, Mississippi, and Alabama. Damages in New Orleans and along the Gulf Coast totaled \$108 billion. This made Katrina the costliest and most destructive natural disaster in U.S. history. Most Atlantic hurricanes move north as they approach the Atlantic coast of the United States and do not land. Some storms hit Florida, and a few move into the Gulf of Mexico as Katrina did.



Even with warning, Hurricane Katrina still caused massive damage.

Before Katrina, Hurricane Andrew had been the costliest storm in U.S. history. Hurricane Andrew hit southern Florida on August 24, 1992, as a Category 5 storm. Violent winds and storm surges destroyed many homes and businesses.

Nearly 250,000 people were left homeless. Hurricane Andrew moved across Florida. Then it moved into the Gulf of Mexico. It struck south-central Louisiana as a Category 3 storm on August 26, 1992.



This infrared photo shows Hurricane Andrew hitting southern Florida in 1992.

A hurricane pulls up a dome of seawater that travels with the hurricane. The high water dome creates the storm surge. Strong winds create giant waves. The storm surge often causes the greatest damage in a hurricane.

Flooding caused much of the damage from Hurricane Katrina. Levees that separate New Orleans from surrounding lakes broke. These breaks caused most of New Orleans to lie under floodwater. Some parts of the city were covered by twenty feet of water. Huge twenty- to thirty-foot storm surges from Katrina also caused massive flooding in coastal cities of Mississippi and Alabama.

After Hurricane Katrina, hundreds of thousands of people were left homeless. They had to find temporary housing in hotels, homes of friends or family, or in shelters. Thousands of shelters were set up in schools, community centers, and various other buildings.

The Red Cross, government agencies, and other relief groups set up the shelters. One large shelter was set up at the Astrodome in Houston, Texas. In early September 2005, it housed more than 11,000 hurricane victims.



Compare this photograph of New Orleans before Hurricane Katrina with the photograph on the next page. Look for the large brown building in the center of each photo.

A year after Hurricane Katrina, many homes and other buildings still need repair. About one third of New Orleans's schools, hospitals, and libraries are still closed. Thousands of people whose homes were destroyed continue to live in trailers provided by FEMA, the Federal Emergency Management Agency. Relief agencies, such as FEMA and the Red Cross, continue to help rebuild damaged homes. They continue to relocate people whose homes were destroyed.

Recovering from such widespread destruction has been a huge task. Some people have been able to repair or rebuild their homes and businesses during the past year. Many residents have chosen to remain in the region where they grew up. They are determined to rebuild their homes, their communities, and their lives.

Recovering from such widespread destruction has been a huge task.





People from all over the United States came together to help rebuild New Orleans after Hurricane Katrina.

The volunteer response to Hurricane Katrina has been the largest in U.S. history. Hundreds of thousands of people across the country have stepped in to help in any way they can. Some come to the Gulf Coast region and volunteer for a weekend. Others stay for months at a time to help in the rebuilding effort. Much has been accomplished in the past year to rebuild the Gulf Coast. Yet much remains to be done.

Much has been accomplished in the past year to rebuild the Gulf Coast.



Compare Texts

TEXT TO TEXT

Compare Storm Texts Talk with a partner about the similarities and differences between “Hurricanes” and “Recovering from Katrina.” Answer these questions: *What information does each text provide about the creation of hurricanes? What facts does each author give about what happens during and after a hurricane?* After discussing your ideas, work together to write a paragraph that explains the life of a hurricane. Include text evidence from both selections in your response.



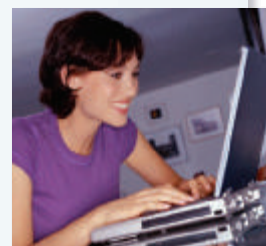
TEXT TO SELF

Write a Report Write a newspaper report about a storm or another weather-related event you have experienced. Describe what you saw, heard, and felt. Also explain what effects the event had on your family, friends, and community.



TEXT TO WORLD

Compare Perspectives Think about the authors’ perspectives in “Hurricanes” and “Recovering from Katrina.” What does each author focus on? Which text seems more scientific? Which author tells about the effects of hurricane damage? Discuss your ideas with a partner.



RI.4.6 compare and contrast a firsthand and secondhand account of the same event or topic; **RI.4.9** integrate information from two texts on the same topic; **W.4.10** write routinely over extended time frames and shorter time frames

Grammar



What Words Are Frequently Confused? Many words in English sound alike but have different spellings and meanings. For example, the words *there*, *their*, and *they're* sound the same, but they have very different meanings. Words such as these are frequently confused. It's important to use frequently confused words properly so that your ideas are clear.

Frequently Confused Words

Word	Meaning	Example
there	"in that place"	Weather scientists expect flooding there .
they're	contraction of <i>they are</i>	They're warning us to stay home.
their	"belonging to them"	Their basement is full of water.
its	"belonging to it"	The storm's wind is scarier than its rain.
it's	contraction of <i>it is</i>	It's hard to hear over the wind.
to	"in the direction of"	Winds are blowing to the north.
two	number	We've had two inches of rain.
too	"also"; "in addition"	It will probably rain tomorrow, too!

Try This!

Copy each sentence. Fill in the blank with the correct word in parentheses.

- _____ saying the hurricane will reach us tonight.
(They're / There)
- _____ winds have been clocked at over 100 mph!
(It's / Its)
- Heavy rain is expected, _____. (to / too)
- People on the coast have left _____ homes.
(their / there)

Using an incorrect word can confuse your readers. When you proofread your writing, look for words that sound like other words but have different meanings and spellings. Make sure you're using the correct word. If you're not sure, look up the word in a dictionary.

Incorrect



"Their predicting heavy winds from here too the Rocky Mountains!"

Correct



"They're predicting heavy winds from here to the Rocky Mountains!"



Connect Grammar to Writing

As you edit your persuasive paragraph, check to see that you have used the correct form of frequently confused words. Rewrite any incorrect words so that your sentences make sense.



W.4.1a introduce a topic, state an opinion, and create an organizational structure; **W.4.1b** provide reasons supported by facts and details; **W.4.1c** link opinion and reasons using words and phrases; **W.4.1d** provide a concluding statement or section; **L.4.1g** correctly use frequently confused words

Opinion Writing

Ideas A **persuasive paragraph** states your opinion and gives strong **reasons** to support it. It should include **facts and examples** to explain your reasons. Link your opinions and reasons with words or phrases such as *for example* and *another reason*. The paragraph should end with a call to action that tells readers what you want them to do or think.



Grace wrote a persuasive paragraph explaining the importance of hurricane preparedness. Later, she added words and phrases to link opinions and reasons. She also added an introduction to clearly state her opinion.



Writing Traits Checklist

Ideas

Did I state a clear opinion and support it with facts and details?

Organization

Did I organize my ideas in a way that makes sense?

Word Choice

Did I use words and phrases to link opinions and reasons?

Voice

Did I express my opinion convincingly?

Sentence Fluency

Do my sentences vary in length?

Conventions

Did I spell frequently confused words correctly?

Revised Draft

People who live in areas where hurricanes occur always need to be prepared.

^ Every year, many people are affected

by hurricanes. If you live in hurricane

country, you need a disaster plan. This

plan includes creating a disaster kit that

contains things necessary for survival.

For example,

^ When water service is cut off and stores

are boarded up, you'll be unable to get

fresh water. So, your disaster kit needs

plenty of bottled water.

Be Prepared!

by Grace Martin

People who live in areas where hurricanes occur always need to be prepared. Every year, many people are affected by hurricanes. If you live in hurricane country, you need a disaster plan. This plan includes creating a disaster kit that contains things necessary for survival. For example, when water service is cut off and stores are boarded up, you'll be unable to get fresh water. So, your disaster kit needs plenty of bottled water. Another reason you need a plan is so that you will know where you will go if your family must leave your home. For instance, if your home is flooded or the roof blows off, you'll need to find shelter. It's a good idea to know about nearby places that offer shelter during hurricanes. That way, when disaster strikes, you'll know exactly where to go. Making a disaster plan and a survival kit may seem like work, but in the end, your safety is worth the trouble!

Reading as a Writer

Which words and phrases did Grace use to link her opinions and reasons? What words and phrases can you use to link your ideas more clearly?

In my final paper, I added a conclusion that restated my opinion.

I also made sure that I used the correct form of easily confused words, such as *your*.

