

On Level



SCIENCE • GRADE 5

Science Content Standards

Earth Sciences: 4.C

Earth Sciences: 4.D

# Tracking Weather Patterns

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FOR:

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Content Standards  
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•  
Reproducible  
Student Book

•  
Reproducible  
English-language  
Arts Activities

# Tracking Weather Patterns

## California's Content Standards Met

### GRADE 5 SCIENCE

**EARTH SCIENCES: 4**—Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns. As a basis for understanding this concept:

- c. Students know the causes and effects of different types of severe weather.
- d. Students know how to use weather maps and data to predict local weather and know that weather forecasts depend on many variables.

### GRADE 5 ENGLISH LANGUAGE ARTS

#### 2.0 READING COMPREHENSION

***Structural Features of Informational Materials 2.1***—Understand how text features (e.g., format, graphics, sequence, diagrams, illustrations, charts, maps) make information accessible and usable.

***Structural Features of Informational Materials 2.2***—Analyze text that is organized in sequential or chronological order.

***Comprehension and Analysis of Grade-Level-Appropriate Text 2.3***—Discern main ideas and concepts presented in texts, identifying and assessing evidence that supports those ideas.

***Expository Critique 2.5***—Distinguish facts, supported inferences, and opinions in text.

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# Student Book

*Tracking Weather Patterns*

Print pages 5 – 18 of this PDF for the student book.

# How to Make the Student Book

- The student book is contained on pages 5–18 of this PDF. It begins on the next page.
- To make one student book, or a two-sided master copy that can be photocopied, you will print on both sides of seven sheets of 8.5" x 11" paper.
- Do a test printout of one book first to familiarize yourself with the procedure.
- Follow these instructions carefully.

## First—Select the Paper

Since you will be printing on both sides of the sheets of paper, select a good quality white paper. We recommend using at least a 22lb sheet.

## Second—Check Printer Settings

Be sure you have the correct page setup settings for your computer and printer. You will print these pages in landscape format.

## Third—Print EVEN Pages

Open the PDF of the book you want to print. Select print from your file menu. In your printer's dialogue box enter pages 5–18 to print. Then select EVEN pages only. It is important to print only the EVEN pages first. Click "Print" to print the even pages. (**Important note:** The first page that prints will be blank. DO NOT discard this page. It will be needed to print the cover in the next step.)

## Forth—Print ODD Pages

When the even pages have printed, flip the stack of pages over to print the odd pages. Place the stack back in your printer. Select print from the file menu again. In your printer's dialogue box, select ODD pages. Click "Print" to print the odd the pages.

## Fifth—Fold the Book

You now have a complete book. Check to be sure the pages are in the correct order with the book's cover as the top page. Then fold the stack of paper in half.

## Sixth—Staple the Book

Use an extended-length stapler to staple the pages together. Place three staples in the spine of the book.

Please note that printers vary in how they output pages. Do a test printing with one book and adjust the procedure as necessary.

If you want to make a one-sided master copy, print ALL pages 5–18 at once. Then select "one-sided to two-sided" on the copy machine.

# Tracking Weather Patterns California's Content Standards Met

## GRADE 5 SCIENCE

**EARTH SCIENCES: 4**—Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns. As a basis for understanding this concept:

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SCIENCE • GRADE 5

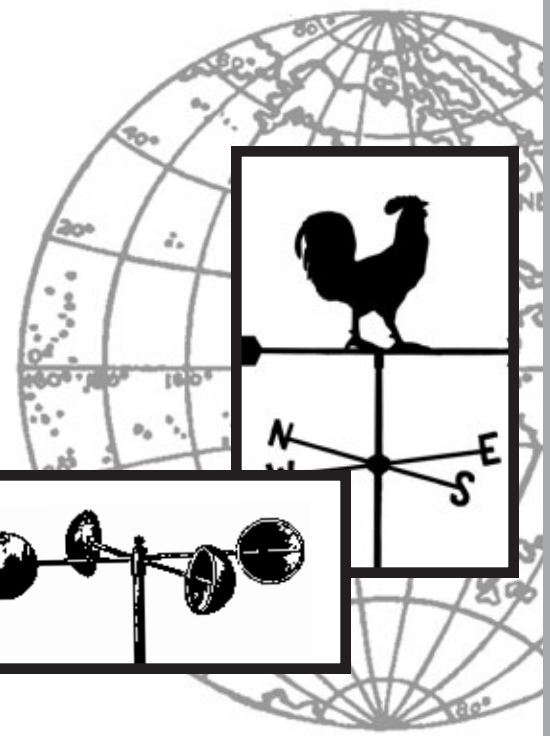
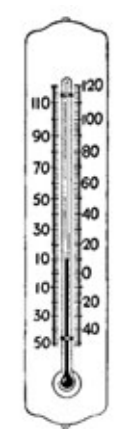
California Content Standards

Earth Sciences: 4.C

Earth Sciences: 4.D

# Tracking Weather Patterns

by Caitlin Scott





SCIENCE • GRADE 5

California Content Standards

Earth Sciences: 4.A

Earth Sciences: 4.B

# Tracking Weather Patterns

by  
Caitlin Scott

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## Table of Contents

### Introduction:

Who Tracks Weather? . . . . . 4

### Chapter 1:

Meteorologists . . . . . 5

    A Meteorologist's Tools . . . . . 6

    Recording and

    Presenting Data . . . . . 8

    Weather Maps . . . . . 10

    Weather Is Global . . . . . 14

### Chapter 2:

Studying Severe Weather . . . . . 16

    Floods . . . . . 17

    Tornados . . . . . 18

    Hurricanes . . . . . 19

### Chapter 3:

Investigate Your Weather . . . . . 20

Glossary . . . . . 22

To Find Out More . . . . . 23

Index . . . . . 24

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## INTRODUCTION

# Who Tracks Weather?

What will the weather be like tomorrow? Will farmers have enough rain for their crops this year? Who should **evacuate** if a hurricane is out in the ocean? Where is the best place to build a wind farm?

These are all questions that scientists can answer by tracking weather patterns. These scientists are called meteorologists.

There are about 7,400 meteorologists in the United States. This number will grow in the future. Are you interested in a **career** studying weather? If so, you should study science in school. You will also need to get a college degree. Later, you might even get a more advanced degree.

**evacuate:** to leave in a time of emergency  
**career:** the work or job a person does

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## CHAPTER 1

# Meteorologists

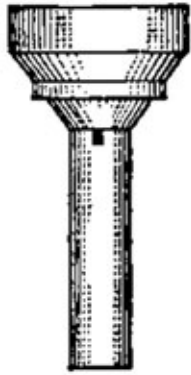
A meteorologist has an exciting job. Weather happens all the time. Many of these scientists work at night or on weekends. Sometimes, they work in an office recording data. They also work outdoors watching the weather. Sometimes, they fly in planes to track the weather. Some work alone to study the weather. Others work in large teams.

All this work is very important. These scientists help people by predicting the weather. They also study changes in weather patterns that might affect Earth. Still, others invent new instruments to help study the weather.

*What might you like about being a meteorologist?*

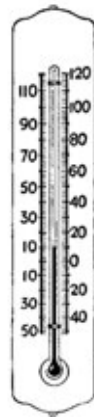
# A Meteorologist's Tools

Scientists gather at weather stations to study the weather. They have many tools to help them. Here are some of these tools.



## ***Rain Gauge***

*A rain gauge measures how many inches of rain has fallen. Average rainfall in the United States is about 76 inches per year.*



## ***Thermometer***

*A thermometer measures how hot or cold the air is. It is colder in winter than in summer. It is also colder further from the equator and in the mountains.*

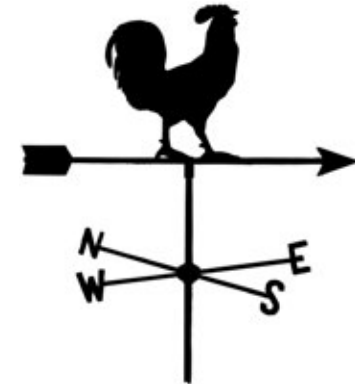
## ***Barometer***

*A barometer measures air pressure. Rising air pressure usually means fair weather. Falling air pressure often means bad weather or stormy skies.*



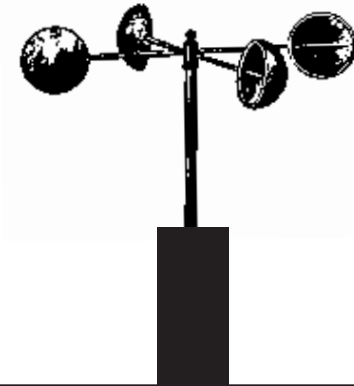
## ***Weather vane***

*A weather vane shows which direction the wind is blowing. Weather typically moves in the direction of the wind.*



## ***Anemometer***

*An anemometer measures wind speed or how hard the wind is blowing. Storm winds can blow many miles per hour. In good weather, the wind is typically gentle.*





# Recording and Presenting Data

Scientists carefully record, or write down, the information they gather about the weather. This helps them make predictions based on the **data**.

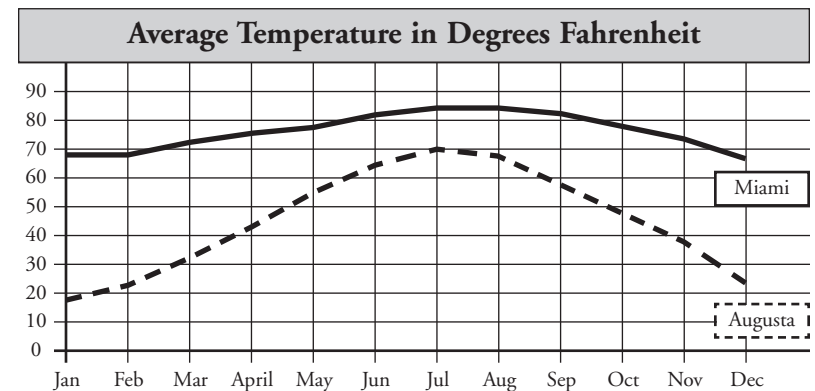
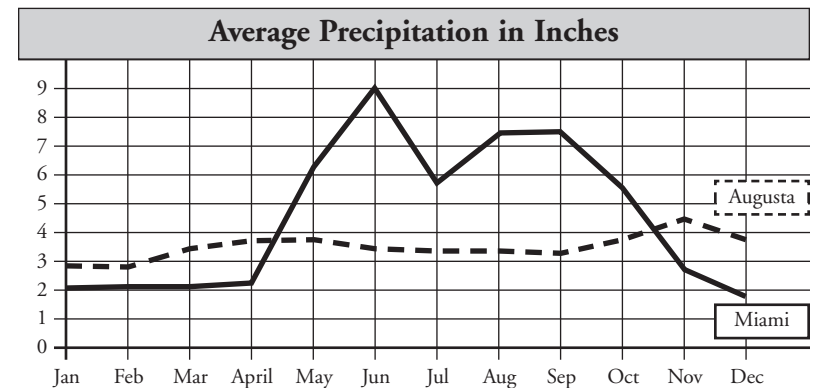
For example, here are two tables that show average **precipitation** and average **temperature** for two different cities.

Weather in Miami, Florida												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature in Degrees Fahrenheit	67°	68°	72°	75°	78°	81°	84°	84°	82°	78°	74°	68°
Average Precipitation in Inches	2.0	2.1	2.4	2.9	6.3	9.3	5.7	7.6	7.6	5.6	2.7	1.8

Weather in Augusta, Maine												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature in Degrees Fahrenheit	18°	22°	32°	44°	55°	64°	70°	68°	58°	48°	38°	24°
Average Precipitation in Inches	2.9	2.8	3.3	3.7	3.8	3.3	3.3	3.3	3.1	3.9	4.5	3.8

**data:** information  
**precipitation:** rain, ice, sleet, snow, and hail  
**temperature:** a measure of the effect of heat energy

Scientists sometimes use line graphs to record data. Here is the same information about average precipitation and temperature in Augusta, Maine, and in Miami, Florida. Compare the two graphics. Which one do you think presents the data the best?



*What conclusions can you draw about the weather in these two cities from these two graphs?*

---

## Weather Maps

Scientists need to show other people about what they have learned. Sometimes they do this by using graphs and tables. They also use weather maps.

Weather maps show a place such as a state within the United States. Then, scientists use symbols to represent weather conditions. For example, a symbol of the sun means it is currently sunny or it is **forecasted** to be sunny in the future.

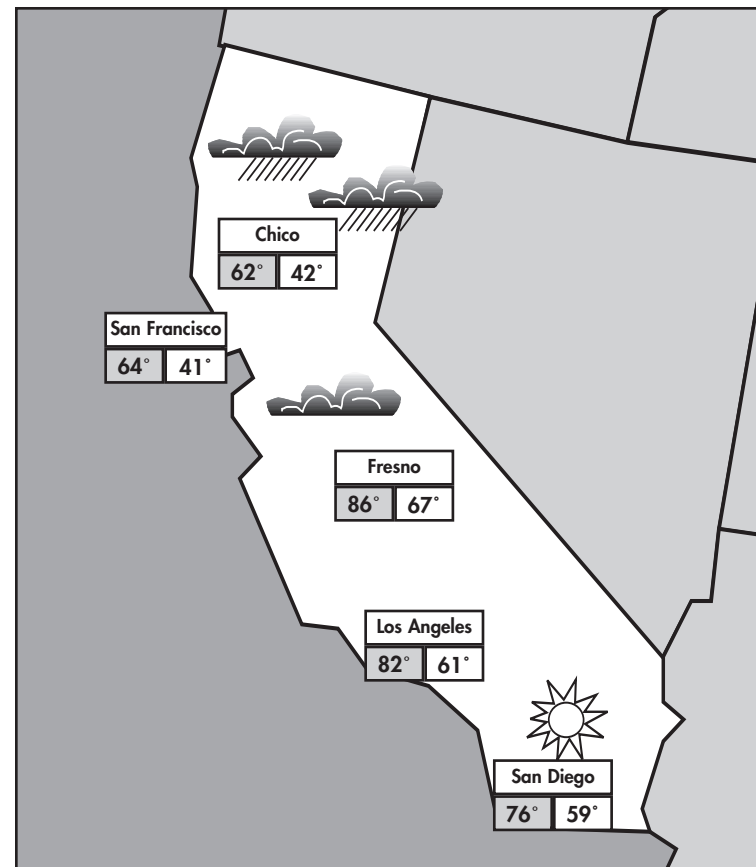
A cloud symbol means cloudy weather in the area. A cloud symbol with a raindrop means it is raining or likely to rain soon. A symbol of a snowflake means snow. A lightning bolt means a thunderstorm.

Scientists also show temperatures on weather maps. Again, they may be the current temperature or a forecast for the high and low temperatures for the day.

**forecast:** to try to tell how something will turn out; to predict

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## Weather Map of California



*Describe the weather in California based on this map.*

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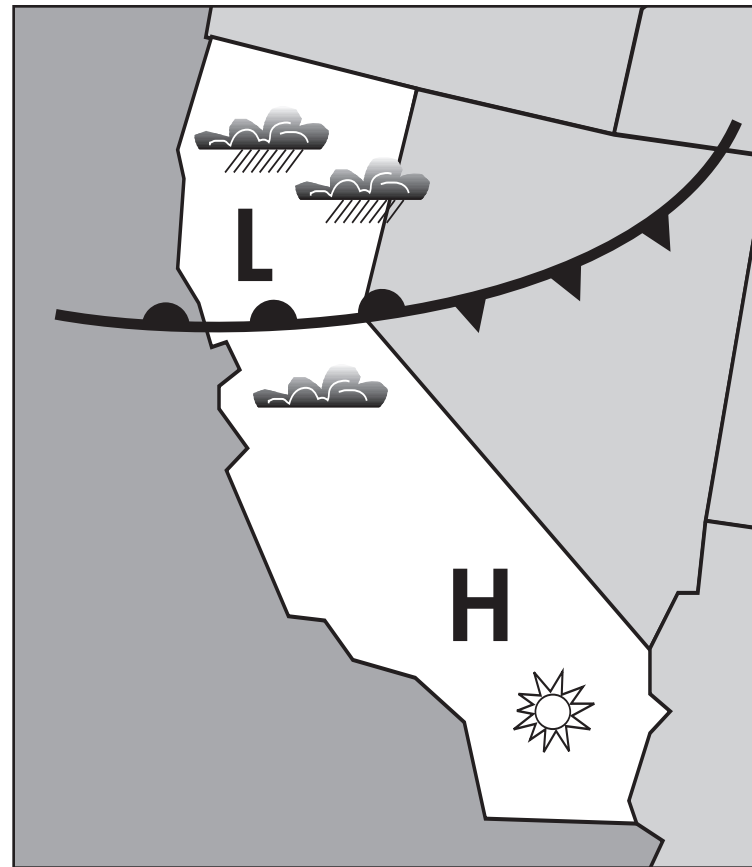
Meteorologists also study changes in air pressure. They discovered that air pressure can help us predict the weather. When the weather changes, air pressure typically changes at the same time. A drop in air pressure usually means stormy or rainy weather. Rising air pressure often means fair weather. To learn more about how air pressure affects our weather, read *The Air Around Us* in this series.

Meteorologists record air pressure and use symbols to display areas of high and low pressure on weather maps. An “H” means high pressure, usually indicating clear skies and fair weather. An “L” means low pressure, which typically indicates stormy skies and rough or rainy weather.

Scientists also create maps using images taken from satellites. These weather satellites have special cameras that take pictures of Earth. Scientists use these pictures to make weather maps. They show areas of sunshine, cloud cover, rain, as well as severe weather.

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## Weather Map of California



*How does air pressure affect the weather?*

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## Weather Is Global

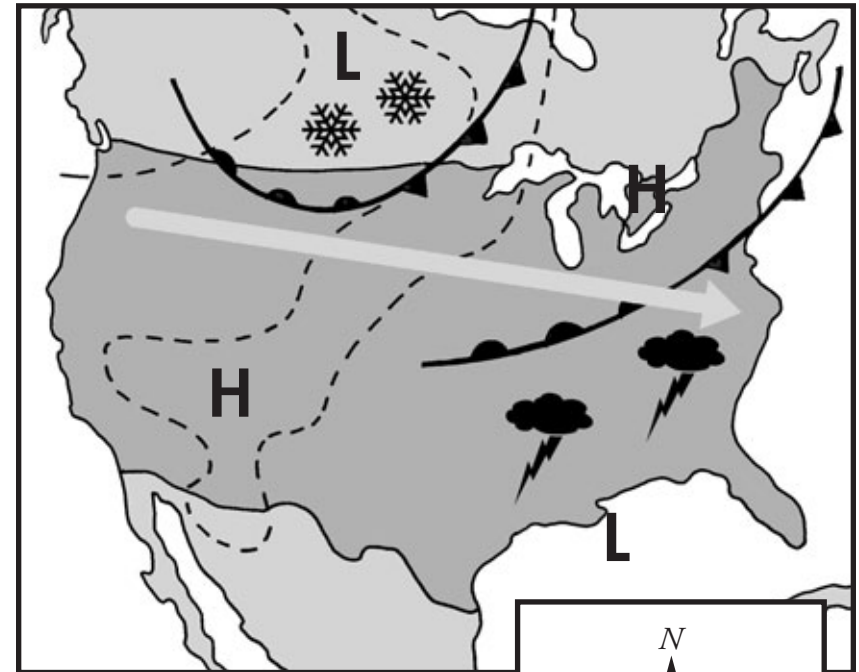
You may have noticed that the wind does not stop at the end of your town, and rain doesn't quit at the border of your state. Furthermore, clouds don't disappear where the coasts of the United States meet the ocean waters.

Instead, weather moves over the surface of our entire planet. What happens in one place changes the weather in another. Why is this? Weather patterns move across the globe.

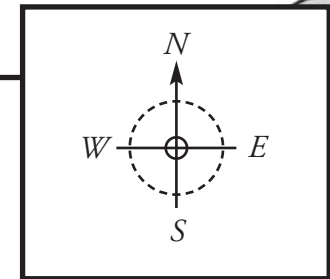
In the United States, most weather moves from west to east. For example, if a rain cloud forms over the Pacific Ocean, wind can blow it inland causing rain on the west coast. Then, it rains in states in the middle of the country, like Iowa. In a few days, rain might fall on the east coast in the mid-Atlantic states such as Virginia.

---

## Weather Map of the United States



*Weather moves across the United States from west to east.*



*Describe the weather in the United States based on this map. What areas of the country will experience high pressure a few days from now?*

## Studying Severe Weather

One important thing, a meteorologist does is study severe weather. One reason to study severe weather is to better predict it. Meteorologists can then help people know what to do to stay safe in a storm. By predicting storms, scientists can save lives.

Tornados and hurricanes are examples of severe weather. Floods can also be bad. They can cause large amounts of rain. Scientists can tell the public if one of these storms is in the area. Then, they can tell people what they can do to escape the storm. Or, if people can't get away from the storm in time, scientists can tell people what to do to stay safe and wait out the storm.

---

## Floods

Floods are caused by heavy rains that can damage property and cause drowning. These safety tips may help save you and your home. First, find out whether or not you live in an area that floods frequently. If you do, keep important things out of the basement or ground floor.

Second, have an escape plan. Know how to get to higher ground quickly. Make sure everyone in your family knows the plan.

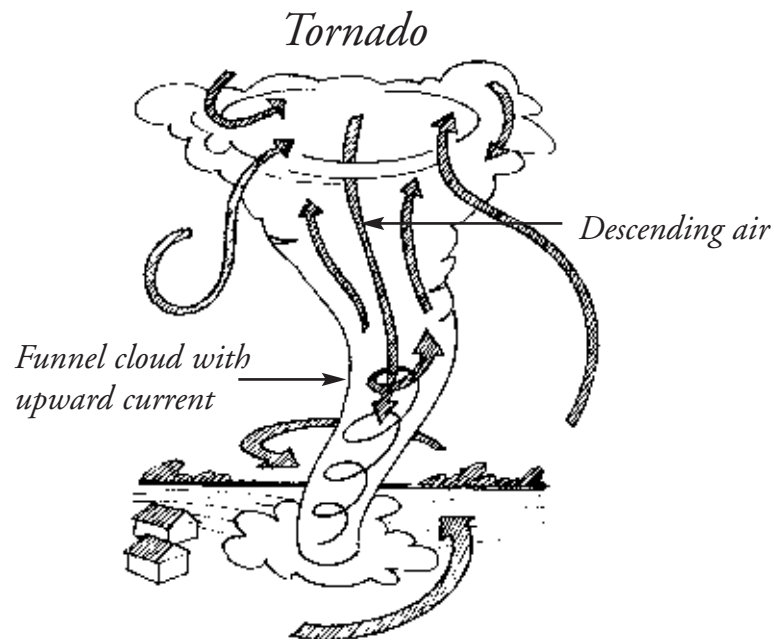
What if you can't escape before a flood strikes? Be prepared ahead of time. Have canned food and plenty of bottled water in your house. You can eat this food and drink the water because it is protected from the dirty flood water. Other water and food in your house may get dirty or damaged during the flood.

Finally, you should listen to the news for flood warnings when it is raining hard. Learning about a flood early can help you act quickly.

---

## Tornados

Tornados form over land when a mass of cold air hits a mass of warm air. This makes the air begin to spin. This spinning can cause winds of more than 100 miles per hour. These winds can tear the roofs off buildings and uproot trees. Towns that have many tornados usually have a tornado warning siren. If you hear a tornado siren, move quickly to a basement, a storm cellar, or a room with no windows.

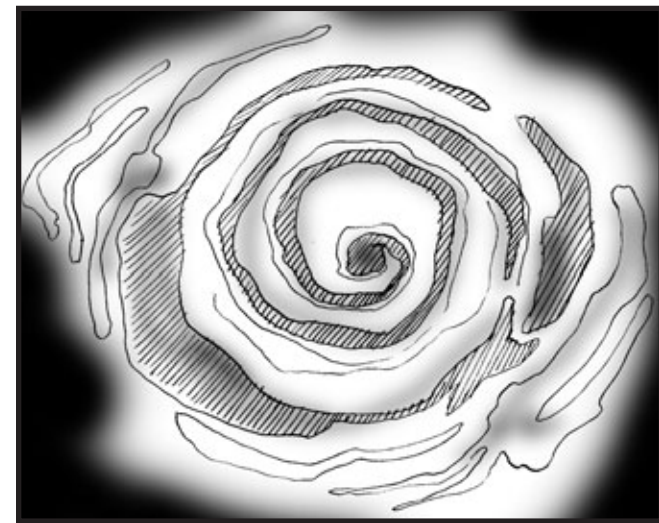


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## Hurricanes

Hurricanes are severe storms. They begin over the ocean. Like tornados, hurricanes form when cold and warm air masses meet and start spinning. Unlike tornados, people know when a hurricane is coming.

When hurricanes are on the way, people usually have time to get away. Still, if you are told to leave, you need to leave right away. Don't wait until the last minute. You might get caught in the storm.



*Hurricanes are large storms that form over the ocean and have winds of at least 74 miles per hour.*

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CHAPTER 3

**Investigate Your Weather**

In this book, you learned about weather patterns and tools for studying weather. You also learned about weather maps.

If you watch the weather and weather reports, you can stay safe in storms. You can also predict a sunny day for a fun outdoor game. Tracking and recording weather is an important part of our lives.

Create a chart in a notebook such as the one on the next page to record data about weather you observe. Record your observations for at least four weeks—longer if you wish. Then write a description of the changes in weather patterns you observed. Use tables and line graphs to present your information.

---

**Weather Observations**

**D A T E :**

Temperature

---

Wind Direction

---

Wind Speed

---

Precipitation

---

Barometric Pressure

---

**D A T E :**

Temperature

---

Wind Direction

---

Wind Speed

---

Precipitation

---

Barometric Pressure

---

---

## Glossary

**career**—the work or job a person does

**data**—information

**forecast**—to try to tell how something will turn out; to predict

**evacuate**—to leave in a time of emergency

**precipitation**—rain, ice, sleet, snow, and hail

**temperature**—a measure of the effect of heat energy

---

## To Find Out More . . .

Want to learn more about tracking weather?

### Try these books

*Weather Atlas in the Round* by Keith Lye.  
Running Press Book Publishers, 2001.

*Storm Chasers* by Gail Herman. Grosset & Dunlap, 1997.

### Access these Web sites

U.S. Department of Labor  
Occupational Outlook Handbook:  
Atmospheric Scientists  
<http://www.bls.gov/oco/ocos051.htm>

The American Meteorological Society  
<http://www.ametsoc.org>

### Write for more information

The American Meteorological Society  
Education Programs  
1120 G Street, NW Suite 800  
Washington, DC 20005-3826



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# Index

anemometer, 7

barometer, 7

floods, 16, 17

hurricanes, 16, 19

line graph, 9

rain gauge, 6

table, 8

thermometer, 6

tornado, 16, 18

weather map, 10–13, 15

weather vane, 7

wind patterns, 14–15

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ENGLISH-LANGUAGE ARTS • GRADE 5

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Structural Features of Informational Materials: 2.2

Comprehension and Analysis of Grade-Level-Appropriate Text: 2.3

Expository Critique: 2.5

# English-language Arts Activities

*Tracking Weather Patterns*

Print pages 20–24 of this PDF for the reading activities.

# Main Idea and Supporting Details

## TRY THE SKILL

The main idea is the writer's main point. Look for main ideas and supporting details as you read.

Here is a paragraph from *Tracking Weather Patterns*. The graphic organizer below shows the main idea and the details that support it.

In the United States, most weather moves from west to east. For example, if a rain cloud forms over the Pacific Ocean, wind can blow it inland causing rain on the west coast. Then, it rains in states in the middle of the country, like Iowa. In a few days, rain might fall on the east coast in the mid-Atlantic states such as Virginia.

### Main Idea

U.S. weather moves from west to east.

### Supporting Details

- If a rain cloud forms over the Pacific Ocean, the wind can blow it inland.
- A cloud that forms over the Pacific, might bring rain to the middle of the country.
- In a few days, this same cloud might bring rain to the east coast.

Read this passage from *Tracking Weather Patterns*.

One important thing, a meteorologist does is study severe weather. One reason to study severe weather is to better predict it. Meteorologists can then help people know what to do to stay safe in a storm. By predicting storms, scientists can save lives.

Now complete this graphic.

### Main Idea

### Supporting Details

# Fact and Opinion

## TRY THE SKILL

A fact is something that has been proven to be true. An opinion is someone's point of view and is not usually something that can be proved. Instead, an opinion gives a person's preference or describes their feelings.

Most of the statements in *Tracking Weather Patterns* are facts but not all.

Which statement from *Tracking Weather Patterns* is a fact? Which is an opinion?

1. A meteorologist has an exciting job.
2. There are about 7,400 meteorologists in the United States.

The first statement is an opinion. Some people will think being a meteorologist is exciting, but some won't.

The second statement is a fact. You can count the number of meteorologists in the United States to test whether the statement is true.

Read the statements below. Write an "F" beside the statements that are facts. Write an "O" beside the statements that are opinions.

- \_\_\_ 1. A tornado is the most frightening type of severe weather.
- \_\_\_ 2. A drop in air pressure usually means stormy or rainy weather.
- \_\_\_ 3. Rising air pressure often means fair weather.
- \_\_\_ 4. People like to watch the weather report on T.V.
- \_\_\_ 5. Hurricanes start over the ocean.
- \_\_\_ 6. Weather predictions are not always correct.

Write one fact and one opinion about weather.

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# Interpret Tables

## TRY THE SKILL

Tables can provide you with information quickly. Look at these tables from *Tracking Weather Patterns* about average temperature and average rainfall.

Weather in Miami, Florida												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature in Degrees Fahrenheit	67°	68°	72°	75°	78°	81°	84°	84°	82°	78°	74°	68°
Average Precipitation in Inches	2.0	2.1	2.4	2.9	6.3	9.3	5.7	7.6	7.6	5.6	2.7	1.8

Weather in Augusta, Maine												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature in Degrees Fahrenheit	18°	22°	32°	44°	55°	64°	70°	68°	58°	48°	38°	24°
Average Precipitation in Inches	2.9	2.8	3.3	3.7	3.8	3.3	3.3	3.3	3.1	3.9	4.5	3.8

**What is the hottest month in Augusta, Maine?**

July. You can tell this by looking at the second table and reading across the row for average temperature. In July, the average temperature is highest.

Look at the tables again. Answer the questions.

- Which two months are the hottest in Miami, Florida?  
Ⓐ May and June  
Ⓑ June and July  
Ⓒ July and August
- What is the coldest month in Augusta, Maine?  
Ⓐ December  
Ⓑ January  
Ⓒ February
- In Miami, Florida, which month has the most precipitation?  
Ⓐ March  
Ⓑ June  
Ⓒ December
- In Augusta, Maine, which month has the least precipitation?  
Ⓐ February  
Ⓑ June  
Ⓒ November
- Which statement is true?  
Ⓐ Miami, Florida, is usually hotter than Augusta, Maine.  
Ⓑ Augusta, Maine, is usually hotter than Miami, Florida.  
Ⓒ Miami, Florida, and Augusta, Maine, are about the same temperature.

# Steps in a Process

## TRY THE SKILL

Understanding the steps in a process can help you understand and remember what you read. You can summarize the steps in a process using words such as, *first*, *then*, *next*, and *finally*.

Read this passage and try to identify the steps in the process.

There are about 7,400 meteorologists in the United States. This number will grow in the future. Are you interested in a career studying weather? If so, you should study science in school. You will also need to get a college degree. Later, you might even get a more advanced degree.

What should you do if you are interested in a career in weather? A graphic organizer can help you identify the steps.

Step 1	First, you should study science in school.
Step 2	Then, you will need to get a college degree.
Step 3	Finally, you might get an advanced degree.

Read this passage. What should you do to stay safe in a flood? Try to identify the steps in the process. Use the graphic organizer to help you.

First, find out if you are in an area that floods often. If so, keep important things out of the basement or ground floor.

What if you can't escape in time? Have canned food and plenty of bottled water in your house. You can eat this food and drink the water, even if the other water and food in your house gets dirty or damaged in the flood waters.

Finally, listen to the news when it is raining. Learning about a flood early can help you act quickly.

Step 1	
Step 2	
Step 3	

# Answer Key

## Main Idea and Supporting Details

### Main Idea

One of the most important things, a meteorologist does is study and track severe weather.

### Supporting Details

- These scientists can help predict severe weather.
- They can also help people know what to do to stay safe.
- Their work can save lives.

## Fact and Opinion

1. O
2. F
3. F
4. O
5. F
6. F

## Interpret Tables

1. C
2. B
3. B
4. A
5. A

## Steps in a Process

Step 1	First, find out if you are in an area that floods often.
Step 2	Next, have canned food and plenty of bottled water in your house.
Step 3	Finally, listen to the news when it is raining.