SCIENCE • GRADE 5

Science Content Standards
Earth Sciences: 4.C
Earth Sciences: 4.D

Below Level

Tracking Weather Patterns

FOCUScurriculum

Curriculum materials for **your** content standards

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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

1.0 WORD ANALYSIS, FLUENCY, AND SYSTEMATIC VOCABULARY DEVELOPMENT

***Vocabulary and Concept Development 1.3*—**Understand and explain frequently used synonyms, antonyms, and homographs.

***Vocabulary and Concept Development 1.4*—**Know abstract, derived roots and affixes from Greek and Latin and use this knowledge to analyze the meaning of complex words (e.g., controversial).

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.

***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.

SCIENCE • GRADE 5

Science Content Standards
Earth Sciences: 4.C
Earth Sciences: 4.D

Below Level

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.

BL

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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GRADE 5 ENGLISH LANGUAGE ARTS

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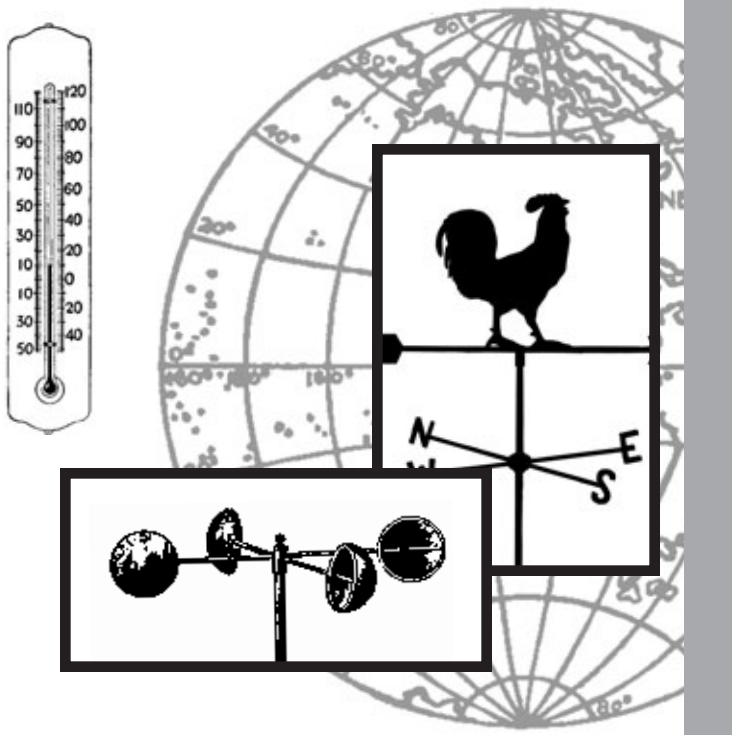
FOCUS ON CALIFORNIA STANDARDS

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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Curriculum materials for **your** content standards

Table of Contents

INTRODUCTION

Who Tracks Weather?

What is the weather like outside? Will farms get enough rain? Who should **evacuate** in a storm? Where should we build a wind farm?

Scientists answer these questions by tracking, or following, weather. These scientists are called meteorologists. They study weather, or meteorology.

evacuate: to leave in a time of emergency

CHAPTER 1

Meteorologists

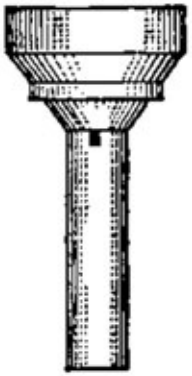
A meteorologist has an exciting job. Weather happens all the time. Many of these scientists work at night. Some work on weekends. Sometimes, they work in offices. They also work outside to observe, or watch, the weather. Sometimes, they even fly in planes to watch the weather.

Some meteorologists predict the weather. Others study changes in weather patterns. Still, others invent new tools to study the weather.

What might you like about being a meteorologist?

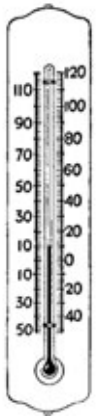
A Meteorologist's Tools

Meteorologists study the weather at weather stations. They have tools to help them.



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

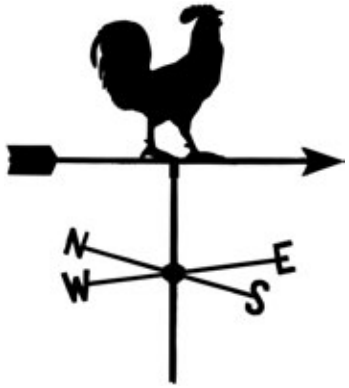
A thermometer shows how hot or cold the air is. It is colder in winter than in summer.

Barometer

A barometer measures air pressure. Rising air pressure means fair weather. Falling air pressure means bad weather.

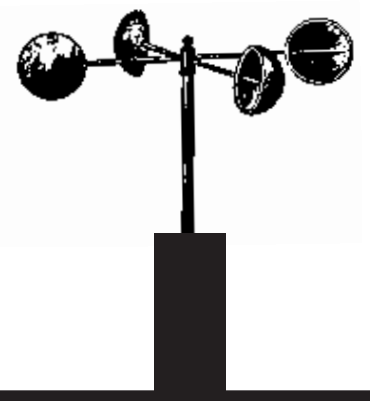
Weather vane

A weather vane shows the direction of the wind. Storms move with the wind.



Anemometer

An anemometer measures how hard the wind is blowing. Storm winds blow very hard. In good weather, the wind is gentle.



Recording and Presenting Data

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

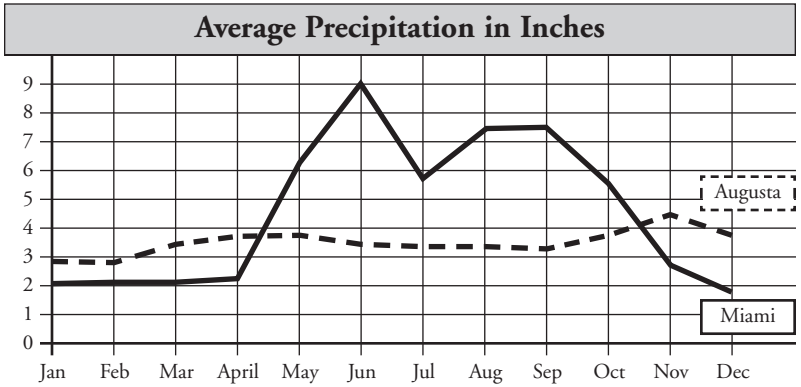
For example, here are two tables. They show average **temperature** and **precipitation** for Miami, Florida and Augusta, Maine.

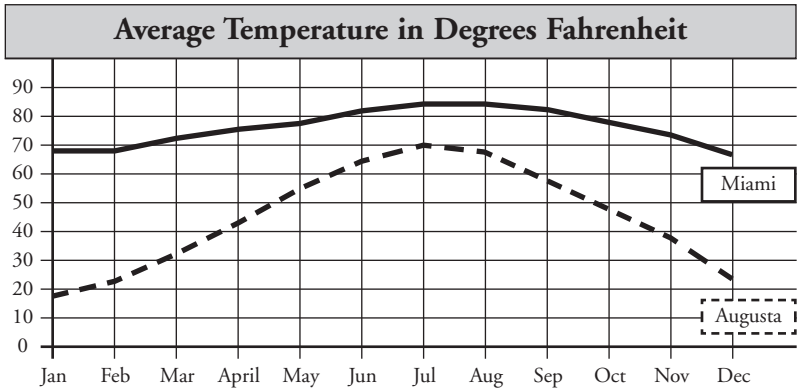
Weather in Miami, Florida												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature in Degrees Fahrenheit	67°	68°	72°	75°	78°	81°	84°	84°	82°	78°	74°	68°
Average Precipitation in Inches	2.0	2.1	2.4	2.9	6.3	9.3	5.7	7.6	7.6	5.6	2.7	1.8

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

Scientists sometimes use line graphs to record data. Here is the same information. Compare the tables and line graphs. Which type do you think is easiest to read?





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

Weather Maps

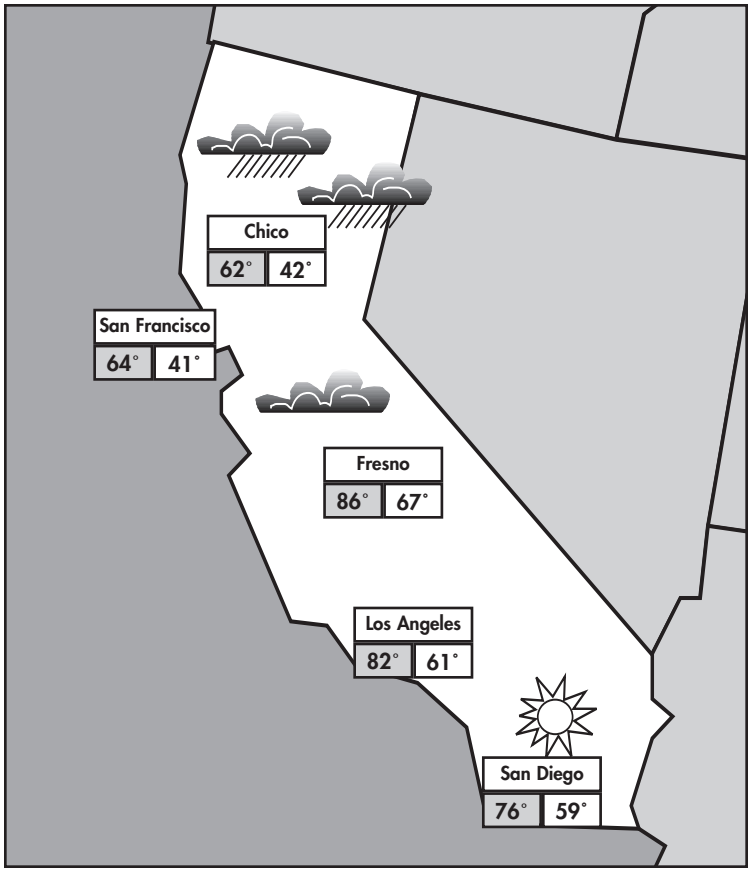
Scientists need to tell people about weather. Sometimes they use tables to do this. Sometimes they use line graphs. But, often they use weather maps.

Weather maps use symbols that stand for different types of weather. A cloud symbol means it will be cloudy in that area. A raindrop symbol on the map means it is raining in that area. A snowflake means snow. A lightning bolt means a thunderstorm.

Meteorologists also display, or show, temperatures on weather maps. They may be the current temperature. They may be a **forecast** for the high and low temperatures for the coming days.

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

Weather Map of California

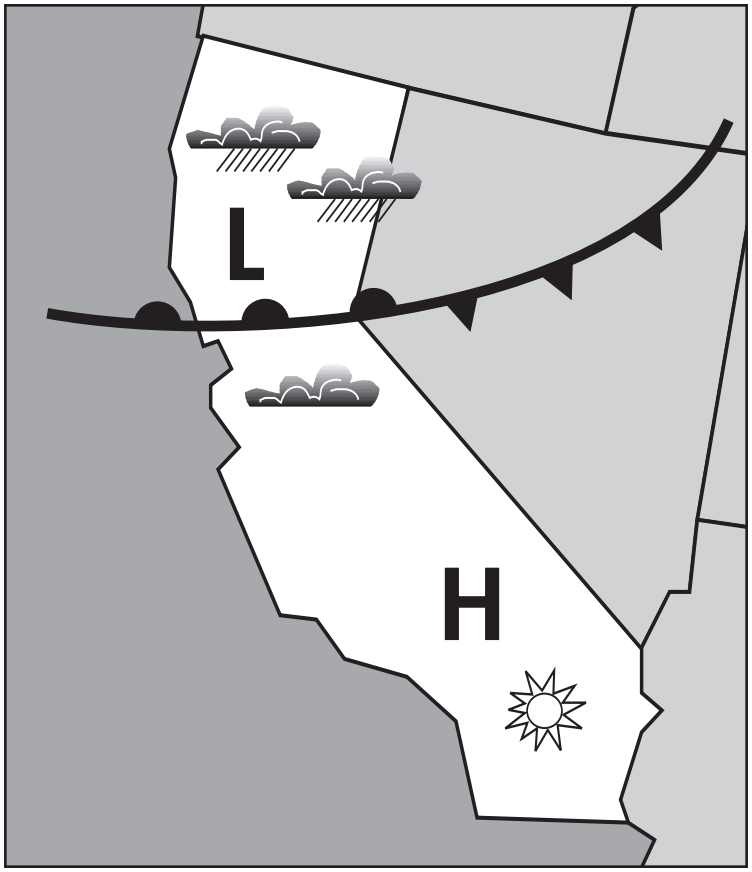


Describe the weather in California based on this map.

Meteorologists 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.

Meteorologists record air pressure. They use symbols to show areas of high and low pressure on weather maps. An "H" stands for high pressure. It usually indicating clear skies and fair weather. An "L" stands for low pressure. It typically indicates stormy skies and rough or rainy weather.

Weather Map of California



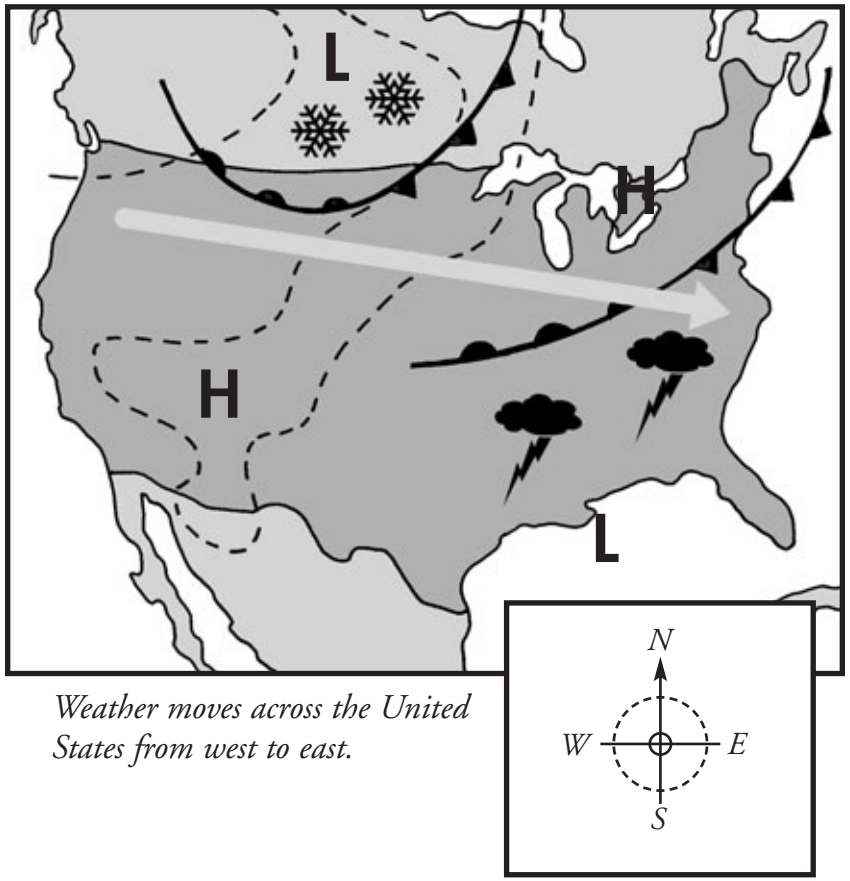
How does air pressure affect the weather?

Weather Is Global

Weather moves over the surface of our entire planet. What happens in one place affects the weather in another.

In the United States, most wind and weather moves from west to east. For example, if a rain cloud forms over the Pacific Ocean, wind may blow it inland. This causes rain on the West Coast. Then the rain may move to states in the middle of the country, such as Iowa. In a few days, rain might fall on the East Coast, such as Virginia.

Weather Map of the United States



Weather moves across the United States from west to east.

What areas of the country will experience high pressure a few days from now?

CHAPTER 2

Studying Severe Weather

One of the most important things a meteorologist does is study and track severe weather. One purpose of studying severe weather is to better predict it. Then people and their property can be better protected.

Floods, tornados, and hurricanes are examples of severe weather. Floods result from large amounts of rain from storms. Meteorologists can warn people of these storms. They can tell people what to do to be safe.

severe: causing great damage

Floods

Floods can damage property and cause drowning. These safety tips may help save you and your home.

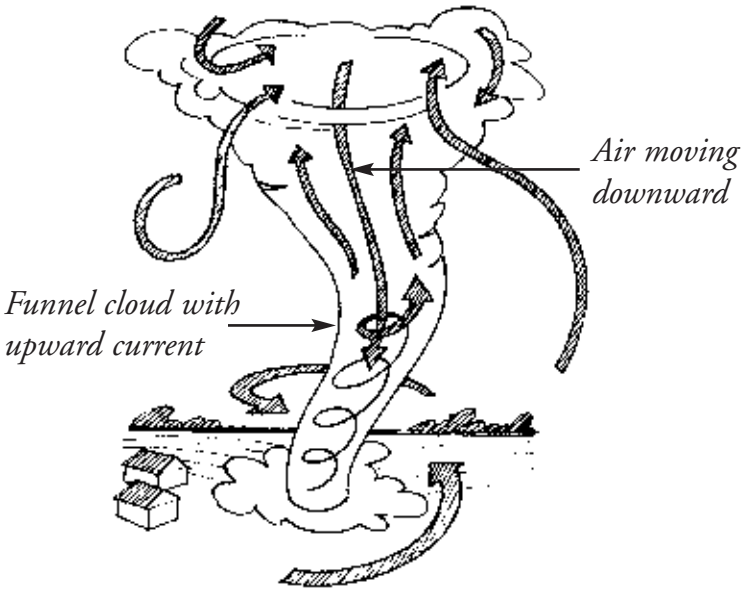
- Find out if your town floods often. If so, keep important things out of the basement or ground floor.
- Have canned food and bottles of water in your home. You can use this food and water if your kitchen is damaged in the flood.
- Have an escape plan. Know how to get to higher ground quickly.
- When it rains, listen to the news and weather reports. Learning about a flood early can help you act quickly.

Tornados

Tornados form when cold air meets warm air and the air spins. The air can spin at more than 100 miles per hour.

Some towns have lots of tornados. These towns have tornado warning sirens. If you hear this siren, move quickly. Go to the basement, the storm cellar, or a room with no windows. This will help protect you from glass and other flying objects.

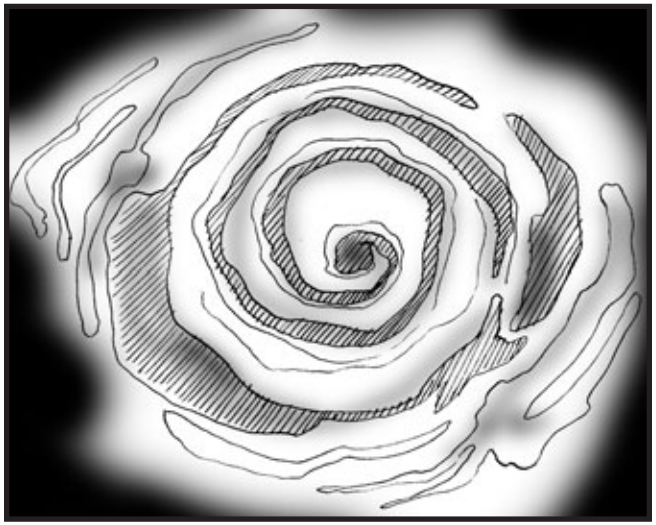
Tornado



Hurricanes

Hurricanes are very bad storms. They begin over the ocean. Hurricanes form when cold and warm air meets and start spinning.

In hurricanes, people usually have time to get away. Still, if you are told to leave, leave that day. If you wait, 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.

CHAPTER 3

Investigate Your Weather

Recording the weather is fun. 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

DATE:

Temperature

Wind Direction

Wind Speed

Precipitation

Barometric Pressure

DATE:

Temperature

Wind Direction

Wind Speed

Precipitation

Barometric Pressure

Glossary

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

severe—causing great damage

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

Index

ENGLISH-LANGUAGE ARTS • GRADE 5

Below Level

California Content Standards
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Structural Features of Informational Materials: 2.1
Comprehension and Analysis of Grade-Level-Appropriate Text: 2.3

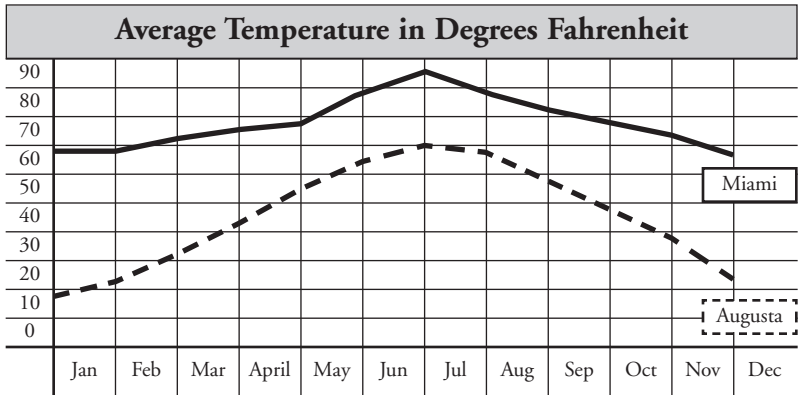
English-language Arts Activities

Tracking Weather Patterns

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

Interpret Graphs

A line graph shows changes over time. You can use a line graph to compare two changes. For example, the graph below shows the changes in temperature during one year in Augusta, Maine, and in Miami, Florida.



Which month was the warmest in Miami?

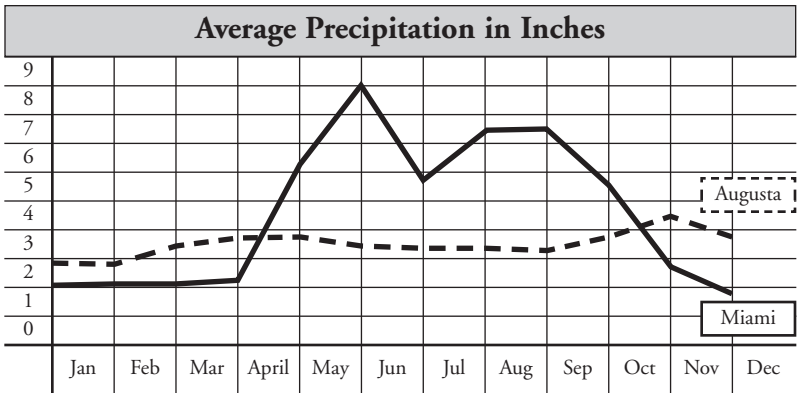
Look for the highest part of the solid line. Then find the month at the bottom of the graph. The warmest month was July. In Augusta, the warmest month was also July, but June was warm, too.

The left side of the graph shows the temperatures. What was the warmest temperature in Miami?

The highest part of the solid line is about above 90, so the warmest day in Miami reached about 95 degrees.

TRY THE SKILL

Study the graph below and answer the questions. Remember that precipitation includes rain, snow, sleet, and hail.



1. What does the solid line on this graph show? What does the dotted line show?

   _____

2. About how many inches of precipitation fall in Augusta each month? _____

3. What conclusion can you draw about the precipitation pattern in Augusta?

   _____

   _____

   _____

Main Idea and Supporting Details

The main idea is the writer's main point. A supporting detail tells more about the main idea.

Read this paragraph. The graphic organizer shows the main idea and supporting details. The main idea is often in the first sentence.

Meteorologists have found several global weather patterns. One is based on temperature. That means how hot or cold the air is. They have also found patterns based on wind.

Main Idea

Meteorologists have found several global weather patterns.

Supporting Details

- One is based on temperature. That means how hot or cold the air is.
- They have also found patterns based on wind.

TRY THE SKILL

Read this paragraph.

In the United States, most wind and weather moves from west to east. For example, if a rain cloud forms over the Pacific Ocean, wind may blow it inland. This causes rain on the West Coast. Then the rain may move to states in the middle of the country, such as Iowa. In a few days, rain might fall on the East Coast, such as Virginia.

Main Idea

Supporting Details

Use Context Clues

To figure out the meaning of an unknown word, look for words in the same sentence or nearby sentences that give you clues.

Read this paragraph and try to figure out what *temperature* means.

Meteorologists have found several global weather patterns. One is based on temperature. That means how hot or cold the air is. They have also found patterns based on wind.

What does the word *temperature* mean?

Temperature means how hot or cold something is.

The third sentence of the paragraph gives you the clue.

TRY THE SKILL

Read this passage from *Tracking Weather Patterns*. Then, answer the questions by shading the circle next to the correct answer.

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

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

1. What does the word *record* mean in the passage?

Ⓐ something like a CD
Ⓑ to write something down
Ⓒ a table or graph

2. What does the word *precipitation* mean in the passage?

Ⓐ two different tables of data
Ⓑ two different cities on the map
Ⓒ rain, snow, sleet, or hail

Synonyms

Synonyms are words that mean almost the same thing. Sometimes you can find out what one word means by knowing what its synonym means.

Read the paragraph from *Tracking Weather Patterns*.

A meteorologist has an exciting job. Weather happens all the time. Many of these scientists work at night. Some work on weekends. Sometimes, they work in offices. They also work outside to observe, or watch, the weather. Sometimes, they even fly in planes to watch the weather.

What does *observe* mean? Can you find its synonym?

Watch and *observe* are synonyms. They mean almost the same thing—to see or notice."

TRY THE SKILL

Now read this paragraph from *Tracking Weather Patterns*. Underline the synonym for *stormy*. Circle the synonym for *fair*.

Meteorologists record air pressure. They use symbols to show areas of high and low pressure on weather maps. An "H" stands for high pressure. It usually indicating clear skies and fair weather. An "L" stands for low pressure. It typically indicates stormy skies and rough or rainy weather.

Think of four more words that have to do with weather. Then think of a synonym for those words. Write them on the lines below.

_____

_____

_____

_____

Answer Key

Interpret Graphs

1. solid: the average precipitation in Miami
dotted: the average precipitation in Augusta

2. about 4 inches

3. The amount of precipitation does not change much from month to month.

Main Idea and Supporting Details

Main Idea: U.S. weather also moves from west to east.

Supporting Details: If a cloud forms over the Pacific Ocean, the wind can blow it inland. Then, it might rain in the middle of the country. Later it might rain on the East Coast.

Use Context Clues

1. B

2. C

Synonyms

Underline *rainy.*

Circle *clear.*