

# Meteorology

## Chapter Preview

Before you read the chapter, use the "What I Know" column to list three things you know about meteorology. Then list three questions you have about meteorology in the "What I Want to Find Out" column

K What I Know	W What I Want to Find Out
1. _____ _____	1. _____ _____
2. _____ _____	2. _____ _____
3. _____ _____	3. _____ _____

### SCIENCE JOURNAL

*Think about the Launch Lab you did to model a cold air mass and record your responses in this science journal. Make a graph showing the temperature changes for each temperature strip.*

What happened to the temperature of the air beneath the tray and the air above the tray?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Explain how this model represents a cold air mass.

\_\_\_\_\_

\_\_\_\_\_

# Meteorology

## SECTION 1 The Causes of Weather

### MAIN IDEA

### DETAILS

Scan Section 1 of your text. Use the checklist below as a guide.

- Read all the section titles.
- Read all bold words.
- Look at all figures and photos and read their captions.
- Think about what you already know about weather and forecasting.

Write three facts you discovered about causes of weather.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your text to define the following term.

heat

\_\_\_\_\_

### New Vocabulary

Use your text to define each term.

weather

\_\_\_\_\_

climate

\_\_\_\_\_

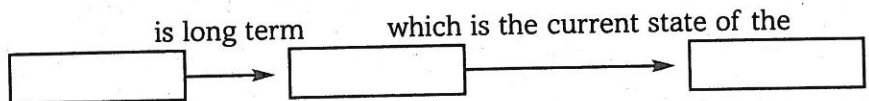
air mass

\_\_\_\_\_

source region

\_\_\_\_\_

Fill in the flow chart below with key terms from the section.



**SECTION 1 The Causes of Weather** (continued)

**MAIN IDEA**

**DETAILS**

**Weather and Climate**

*Use with page 314.*

*Contrast weather and climate by completing the table below.*

	<b>Weather</b>	<b>Climate</b>
<b>Description</b>		
<b>Short or long term; measure of variations</b>		

**A Question of Balance**

*Use with pages 314–315.*

*Model shadows of a person standing in their yard at 6 am, 12 noon, and 6 pm. Assume that north is to the top of the page. Label an approximate degree of latitude your diagram is illustrating.*

**Explain why it is warmest during the middle of the day and cooler in the morning and evening.**

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**SECTION 1 The Causes of Weather** (continued)

**MAIN IDEA**

**DETAILS**

**Air Masses**

Use with pages 316–317.

Compare the major air masses impacting North America.

Type of Air Mass	Source of Air Mass	Weather Associated with Air Mass
		hot, dry summers
Maritime tropical		
	interior of Canada and Alaska	
		heavy rains in winter on West Coast
Arctic		

**What if you are visiting the deserts of the southwestern United States? A sudden thunderstorm moves in. Hypothesize what type of air mass could have brought that storm, and where it likely originated.**

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**REAL-WORLD CONNECTION**

Determine the type of air mass that typically plays a role in the weather in your area. Describe the type of weather that commonly is associated with the air mass and where the air mass originates. Describe the seasons in your area which result from that air mass.

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# Meteorology

## SECTION 2 Weather Systems

### MAIN IDEA

### DETAILS

Scan Section 2 of your text. Read the headings and the figure captions. Write three questions that come to mind.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### New Vocabulary

Use your text to define each term.

*Coriolis effect*

\_\_\_\_\_

*trade winds*

\_\_\_\_\_

*prevailing westerlies*

\_\_\_\_\_

*polar easterlies*

\_\_\_\_\_

*jet stream*

\_\_\_\_\_

*front*

\_\_\_\_\_

### Academic Vocabulary

Define the following term.

*generate*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## SECTION 2 Weather Systems (continued)

### MAIN IDEA

#### Global Wind Systems

Use with pages 318–320.

### DETAILS

Model the movement of air around the surface of Earth. Use Figure 6 to help you. Include the following features:

- doldrums
- equator
- horse latitudes
- northeast trade winds
- northern hemisphere
- polar easterlies
- prevailing westerlies
- southeast trade winds
- southern hemisphere

#### Jet Streams

Use with page 321.

Predict what would happen to the weather in the north-eastern United States if the polar jet stream dipped to the south. How would the weather change if the jet stream moved to the north?

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## SECTION 2 Weather Systems (continued)

<b>MAIN IDEA</b>	<b>DETAILS</b>
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**Fronts**

*Use with page 322.*

Compare the four main types of fronts.

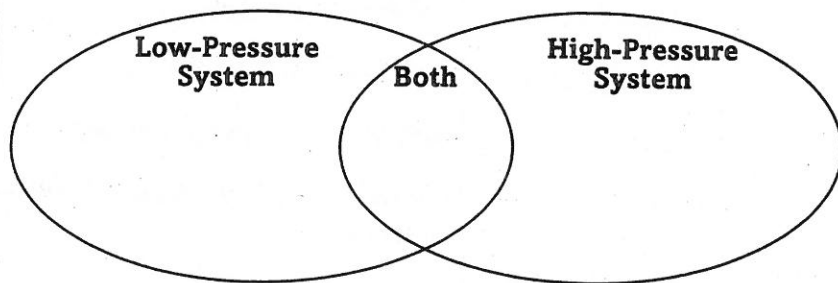
Type of front	Map symbol	Description of air movement	Associated Weather
Cold Front			
Warm Front			
Stationary Front			
Occluded Front			

**Pressure Systems**

*Use with page 323.*

Differentiate between high-pressure systems and low-pressure systems. Use the list of characteristics below to complete the Venn diagram.

- air moves in circular motion
- rising air
- fair weather
- sinking air
- stormy weather
- winds move clockwise in northern hemisphere
- winds move counterclockwise in northern hemisphere



**SYNTHESIZE**

The doldrums along the equator is an area of very little wind. This gave early sailors a difficult time in their transoceanic trips. How could sailors avoid this trouble spot?

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# Meteorology

## SECTION 3 Gathering Weather Data

### MAIN IDEA

### DETAILS

Scan Section 3 of the text. Read the section title, bold words, figures and figure captions. Write four facts you discovered about tropical storms as you scanned the section.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

### Review Vocabulary

*temperature*

Use your text to define the following term.

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Read the definitions below, then write the term for each in the left column.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*measures temperature*

*measures air pressure*

*measures wind speed*

*measures relative humidity*

*balloon borne package to measure upper level atmospheric data*

*change in wave frequency due to the motion of the wave relative to the observer*

### Academic Vocabulary

*compute*

Define the following term.

\_\_\_\_\_



## SECTION 3 Gathering Weather Data (continued)

### MAIN IDEA

### DETAILS

#### Surface Data

Use with pages 324–325

Compare the different types of instruments that measure surface weather data.

Instrument	What does it measure?	How does it work?
Barometer		Changes in pressure measured by changes in height of column of mercury
Anemometer		
		Wet- and dry-bulb thermometers
		Data collected by ASOS

#### Upper Level Data

Use with page 326.

Discuss collecting weather data in the upper atmosphere.

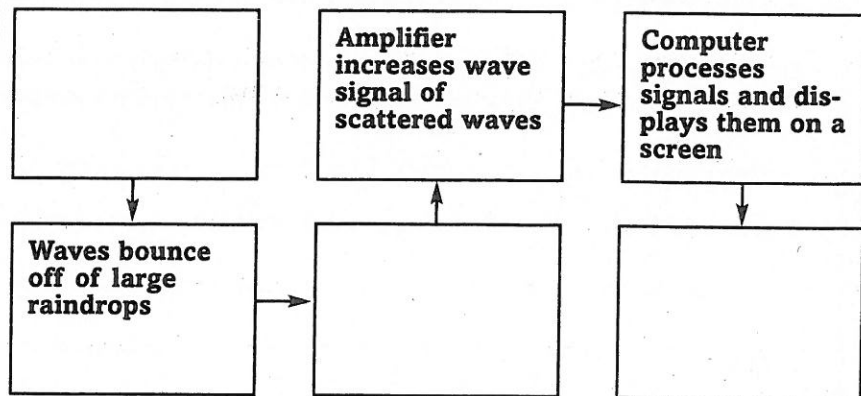
Upper-level weather data is collected by a \_\_\_\_\_, which is a series of sensors carried by a \_\_\_\_\_. Sensors that measure \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ are carried.

Measurements are sent back by \_\_\_\_\_. \_\_\_\_\_ is very important when measuring \_\_\_\_\_ data because it helps meteorologists determine wind speed and \_\_\_\_\_.

#### Weather Radar

Use with page 327.

Sequence the way weather radar works in this flow chart.



### SECTION 3 Gathering Weather Data (continued)

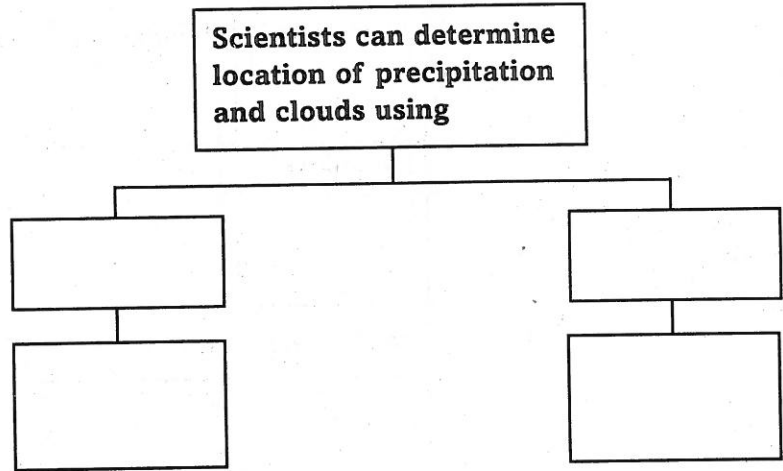
#### MAIN IDEA

#### Weather Satellites

Use with page 327.

#### DETAILS

Organize information about weather data collection for precipitation tracking by completing the graphic organizer.



Analyze how infrared imagery is used by meteorologists by completing the following statements.

Data can be collected in \_\_\_\_\_.

Infrared imagery detects differences in \_\_\_\_\_.

Objects show up differently according to the \_\_\_\_\_.

The temperature of a cloud tells meteorologists about its \_\_\_\_\_ and \_\_\_\_\_.

#### SYNTHESIZE

Suppose you wanted to explain to someone how meteorologists measure the speed of raindrops. How would you explain this procedure in terms that most people would understand?

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# Meteorology

## SECTION 4 Weather Analysis and Prediction

### MAIN IDEA

### DETAILS

Consider the title of Section 4. Think of three things that might be discussed in this section.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

*model*

Use your text to define the following term. What do you think it has to do with weather?

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Read the definitions below, then write the term for each in the left column.

\_\_\_\_\_

*a record of weather data at a particular site at a particular time*

\_\_\_\_\_

*lines of equal pressure*

\_\_\_\_\_

*lines of equal temperature*

\_\_\_\_\_

*forecast that relies on numerical data*

\_\_\_\_\_

*forecast that compares current weather patterns to patterns that took place in the past*

### Academic Vocabulary

*extrapolation*

Define the following term.

\_\_\_\_\_

\_\_\_\_\_

**SECTION 4 Weather Analysis and Prediction** (continued)

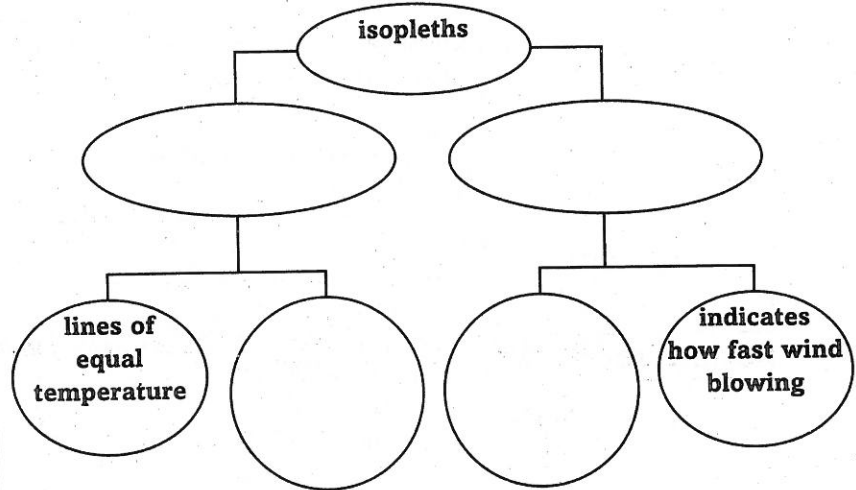
**MAIN IDEA**

**DETAILS**

**Surface Analysis**

*Use with page 329.*

*Classify the different types of isopleths found on a weather map.*



**Short-Term Forecasts**

*Use with page 331.*

*Categorize the following phrases as either digital or analog forecasting.*

- compare current conditions to past
- looks at conditions in all levels of atmosphere
- monthly or seasonal forecasts
- the more data, the more accurate will be the forecast
- numerical data

**Digital**

**Analog**

## SECTION 4 Weather Analysis and Prediction (continued)

### MAIN IDEA

#### Long-Term Forecasts

Use with page 332.

### DETAILS

Summarize three related factors that cause the accuracy of weather forecasts to decline with time.

1.

2.

3.

Compare and Contrast short-term forecasting and long-term forecasting. Discuss reliability, the techniques used, and the type of information that is gathered in each case.

Short-term forecasting	Long-term forecasting
<input type="text"/>	<input type="text"/>

### SYNTHESIZE

Imagine you are reading the newspaper forecast and you want to go downhill skiing the next weekend. Describe the type of information you would like to see on the weather map.

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# Meteorology Chapter Wrap-Up

In the "What I Wanted to Find Out" column, copy the questions you listed in the Chapter Preview. In the "What I Learned" column, write down the answers you discovered as you worked through the chapter.

W What I Wanted to Find Out	L What I Learned
1. _____ _____	1. _____ _____
2. _____ _____	2. _____ _____
3. _____ _____	3. _____ _____

**Review**

Use this checklist to help you study.

- Study your Science Notebook for this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about weather systems and weather prediction.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_