Air Masses and Fronts (pp. 578–585)

This section describes huge bodies of air, called air masses, and explains how they move. The section also explains how the meeting of different air masses affects weather.

Use Target Reading Skills

As you read about the four types of fronts, complete the compare-and-contrast table below.

<table>
<thead>
<tr>
<th>Front</th>
<th>How It Forms</th>
<th>Type of Weather</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold front</td>
<td>A cold air mass overtakes a warm air mass.</td>
<td>a.</td>
</tr>
<tr>
<td>Warm front</td>
<td>b.</td>
<td>c.</td>
</tr>
<tr>
<td>Occluded front</td>
<td>d.</td>
<td>e.</td>
</tr>
<tr>
<td>Stationary front</td>
<td>f.</td>
<td>g.</td>
</tr>
</tbody>
</table>

Introduction (p. 578)

1. What is an air mass?

Types of Air Masses (pp. 579–580)

2. Scientists classify air masses according to __________________________ and __________________________.

3. Is the following sentence true or false? Polar air masses have low air pressure. __________________________
Weather Patterns  •  Guided Reading and Study

Air Masses and Fronts (continued)

4. Complete the compare/contrast table that shows the types of air masses and their characteristics.

Types of Air Masses and Their Characteristics

<table>
<thead>
<tr>
<th>Type or Air Mass</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Warm and humid</td>
</tr>
<tr>
<td>b.</td>
<td>Cool and humid</td>
</tr>
<tr>
<td>c.</td>
<td>Warm and dry</td>
</tr>
<tr>
<td>d.</td>
<td>Cool and dry</td>
</tr>
</tbody>
</table>

5. e. How are maritime tropical and marine polar air masses alike, and how are they different?

f. How are continental tropical and continental polar air masses alike, and how are they different?

How Air Masses Move (p. 581)

6. In the continental United States, major wind belts generally push air masses from to

7. How do jet streams affect air masses?

Types of Fronts (pp. 582–583)

8. Label the drawings to indicate a cold front and a warm front.

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Weather Patterns  ·  Guided Reading and Study

Match the type of front with how it forms.

<table>
<thead>
<tr>
<th>Type of Front</th>
<th>How It Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. cold front</td>
<td>a. A moving warm air mass overtakes a slowly moving cold air mass.</td>
</tr>
<tr>
<td>10. warm front</td>
<td>b. A warm air mass is caught between two cooler air masses.</td>
</tr>
<tr>
<td>11. stationary front</td>
<td>c. A rapidly moving cold air mass runs into a slowly moving warm air mass.</td>
</tr>
<tr>
<td>12. occluded front</td>
<td>d. A cold air mass and a warm air mass meet and remain stalled over an area.</td>
</tr>
</tbody>
</table>

13. Circle the letter of each sentence that is true about fronts.
    a. Cold fronts can bring violent thunderstorms.
    b. Warm fronts are associated with clouds and rain.
    c. Stationary fronts may bring many days of clouds and precipitation.
    d. Occluded fronts always bring fair weather.

Cyclones and Anticyclones (pp. 584–585)

14. A swirling center of low air pressure is called a(n) ____________________

15. Is the following sentence true or false? Winds spiral inward toward the center of a cyclone. ____________________

16. What type of weather is associated with cyclones? ____________________

17. Is the following sentence true or false? Winds in an anticyclone spin clockwise in the Northern Hemisphere. ____________________

18. What type of weather is generally associated with anticyclones? ____________________
Weather Patterns - Guided Reading and Study

Storms (pp. 586–595)

This section explains how thunderstorms, tornadoes, hurricanes, and snowstorms form. The section also describes how people can stay safe in the different types of storms.

Use Target Reading Skills

As you read about how hurricanes form, fill in the flowchart to show the sequence of events.

Hurricane Formation

Begins as a low-pressure area over warm water, or a tropical disturbance

Warm, humid air rises and begins to spiral.

a.

b.

Introduction (p. 586)

1. What is a storm?

Thunderstorms (pp. 587–588)

2. Circle the letter of the type of clouds in which thunderstorms form.

   a. cumulus  c. nimbostratus
   b. nimbus  d. cumulonimbus

3. A sudden energy discharge between parts of a cloud, between nearby clouds, or between a cloud and the ground is called _________________.

4. Circle the letter of each sentence that is true about thunder.

   a. It causes lightning to occur.
   b. You hear it after you see the lightning that caused it.
   c. It occurs because lightning heats the air.
   d. It occurs because light travels faster than sound.

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5. A sudden, violent flood that occurs within a few hours, or even minutes, of a storm is called a(n) _________________.

6. Circle the letter of each sentence that is a way to stay safe in a thunderstorm.
   a. Avoid touching electrical appliances.
   b. Get out of the water if you are swimming.
   c. Don’t use the telephone.
   d. Get out of your car and go under a tree.

Tornadoes (pp. 588–591)

7. What is a tornado?

8. Is the following sentence true or false? Tornadoes develop in the same type of clouds that bring thunderstorms. ________________

9. Circle the letter of each sentence that is true about where and when tornadoes occur.
   a. Tornadoes are most likely in late summer and early fall.
   b. Tornadoes occur often in the Great Plains.
   c. Tornadoes occur more often in the United States than in any other country.
   d. Tornadoes occur in just a few parts of the United States.

10. Complete the flowchart to show the sequence of events in how a thunderstorm forms.

   1. Warm air is forced upward along a _________________.
   2. As the air rises, it _________________.
   3. c. _______________________ falls.

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11. Where is the safest place to be during a tornado?

Hurricanes (pp. 592–593)

12. Circle the letter of each sentence that is true about a hurricane.
   a. It is a tropical storm.
   b. It has winds of at least 320 kilometers per hour.
   c. It is typically about 60 kilometers across.
   d. It forms over water.

13. The center of a hurricane is called the ____________________.

14. Is the following sentence true or false? Hurricanes do not last as long as other storms. ____________________

15. A “dome” of water that sweeps across the coast where the hurricane lands is called a(n) ____________________.

16. Is the following sentence true or false? If you hear a hurricane warning and are told to evacuate, you should leave the area immediately. ____________________
Weather Patterns * Guided Reading and Study

Winter Storms (pp. 594–595)

17. When does snow fall?

18. Circle the letter of each sentence that is true about lake-effect snow.
   a. It occurs in Detroit and Chicago.
   b. It occurs because land cools more rapidly than water.
   c. It occurs on the south and west sides of the Great Lakes.
   d. It occurs when humid air rises over a body of water and later cools over land.

19. What should you do if you are caught in a snowstorm?
Weather Patterns  •  Guided Reading and Study

Predicting the Weather  (pp. 598–604)

This section explains how scientists predict the weather in the future and why it is difficult to predict the weather accurately. The section also explains how to read weather maps.

Use Target Reading Skills

As you look at the weather map, write questions in the appropriate spaces in the graphic organizer. As you read the information about weather maps, fill in the answers under the questions.

Weather Map

<table>
<thead>
<tr>
<th>Q. What type of front is located west of Oklahoma City?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Q.</td>
</tr>
<tr>
<td>A.</td>
</tr>
<tr>
<td>Q.</td>
</tr>
<tr>
<td>A.</td>
</tr>
</tbody>
</table>

Weather Forecasting  (p. 599)

1. Scientists who study the causes of weather and try to predict it are called

2. Circle the letter of each choice that is a source of weather information for meteorologists.
   a. radar
   b. seismographs
   c. instruments carried by balloons
   d. satellites
Weather Patterns • Guided Reading and Study

Weather Technology (pp. 600–601)

3. In what two areas have improvements in technology improved the accuracy of weather forecasts?

4. Is the following sentence true or false? Weather forecasts for over three days into the future are never reliable. 

5. Fill in the blanks in the flowchart to show the sequence of events in forecasting the weather.

   Step 1. Weather data are collected from instruments in balloons, a. ________, and b. ________.
   
   Step 2. Data are sent to a(n) c. ________. 
   
   Step 3. Numerous calculations are performed. 
   
   Step 4. Scientists called d. ________ use the information. 
   
   Step 5. A e. ________ is prepared. 

f. What happens to the calculations in Step 3 if the data collected in Step 1 changes?

   ____________________________

   g. How would this change what is prepared in Step 5?

   ____________________________

6. Circle the letter of each sentence that is true about weather balloons or weather satellites.
   a. Weather balloons can carry instruments as high as the stratosphere.
   b. Weather balloons carry instruments that measure humidity.
   c. The first weather satellite was launched in 1940.
   d. Weather satellites take pictures of Earth from the exosphere.

7. Circle the letter of each sentence that is true about computer weather forecasts.
   a. Computers are rarely used to help forecast weather.
   b. Computer forecasts are based on weather conditions from many weather stations.
   c. Computers make only long-term forecasts of a week or more.
   d. When new weather data come in, new computer forecasts are produced.
Predicting the Weather (continued)

Reading Weather Maps (pp. 602–604)

8. What data are indicated by symbols on a weather map?

9. What are the temperature, air pressure, and wind direction at the weather station represented by the symbol shown here?

Match the term with its definition.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. isobars</td>
<td>Lines on a weather map joining places that have the same temperature</td>
</tr>
<tr>
<td>11. isotherms</td>
<td>Lines on a weather map joining places that have the same air pressure</td>
</tr>
</tbody>
</table>

12. What do standard symbols show on weather maps in newspapers?

13. Is the following sentence true or false? The “butterfly effect” refers to the fact that a small change in the weather today can mean a larger change in the weather a week later.
Weather Patterns  -  Key Terms

Key Terms

Solve the clues by filling in the blanks with key terms from the chapter. Then write the numbered letters in the correct order to find the hidden message.

Clues

1. Violent disturbance in the atmosphere
2. Type of air mass that forms north of 50° north latitude or south of 50° south latitude
3. Type of air mass that forms over oceans
4. Lines on a map joining places that have the same air pressure
5. Type of front in which a warm air mass is cut off from the ground by cool air beneath it
6. Type of air mass that forms in the tropics
7. A sudden spark when electrical charges jump between nearby clouds or parts of a cloud or between a cloud and the ground
8. Lines on a map joining places that have the same temperature
9. Rapidly whirling funnel-shaped cloud that reaches down from a storm cloud to touch Earth's surface
10. Tropical storm with winds of 119 kilometers per hour or higher
11. Scientist who studies the causes of weather and tries to predict it

Key Terms

1 2
3 4
5
6 7 8
9 10
11
12 13
14 15
16
17
18

Hidden Message

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

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