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# Weather Guided Reading Packet

# Chapter 4

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Room Number

# CHAPTER 4

## CLIMATE AND CLIMATE CHANGE

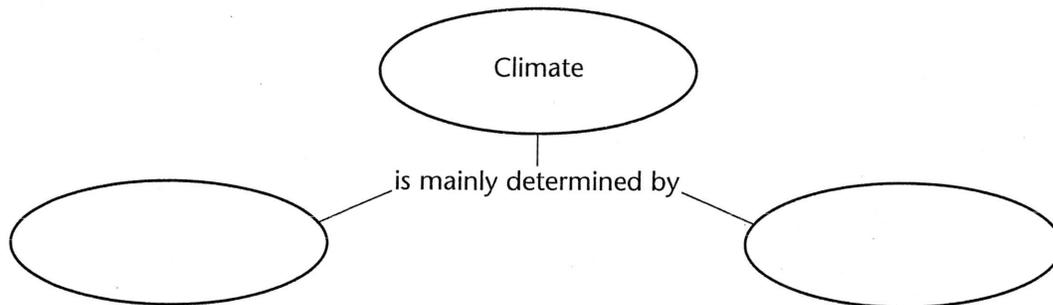
**SECTION** **What Causes Climate?**

**4-1** (pages 112-119)

*This section describes factors that determine climate, or the average weather conditions in an area. The section also explains what causes the seasons.*

► **Introduction** (page 112)

1. The average, year-after-year conditions of temperature, precipitation, winds, and clouds in an area is the \_\_\_\_\_.
2. Complete the concept map.



► **Factors Affecting Temperature** (pages 113-115)

3. What are the main factors that influence temperature? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. It is colder at high latitudes because the sun's rays strike Earth's surface at a(n) \_\_\_\_\_ angle there.
5. List the three temperature zones on Earth's surface that are based on latitude.  
a. \_\_\_\_\_ b. \_\_\_\_\_ c. \_\_\_\_\_

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**CHAPTER 4, Climate and Climate Change** *(continued)*

6. Is the following sentence true or false? Areas at high altitudes have cool climates no matter what their latitude. \_\_\_\_\_

Match the type of climate with its description.

Type of Climate	Description
_____ 7. marine climate	a. Relatively warm winters and cool summers
_____ 8. continental climate	b. Cold winters and warm or hot summers

9. Circle the letter of each sentence that is true about how ocean currents influence climates.
- a. Ocean currents influence many marine climates.
  - b. Only warm ocean currents influence climates.
  - c. The North Atlantic Drift gives Ireland a warm climate for its latitude.
  - d. The California Current gives the West Coast a warm climate for its latitude.

► **Factors Affecting Precipitation** (pages 116–117)

10. List the main factors that affect precipitation.

- a. \_\_\_\_\_ b. \_\_\_\_\_

11. Why does precipitation occur when warm air rises? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

12. Circle the letter of each sentence that is true about the effect of mountain ranges on precipitation.

- a. Precipitation falls mainly on the leeward side of mountains.
- b. The windward side of mountains is in a rain shadow.
- c. As air rises to pass over a mountain range, its water vapor condenses, forming clouds.
- d. Precipitation usually falls on the side of the mountains that the oncoming wind hits.

13. Is the following sentence true or false? Winds blowing inland from oceans carry less water than winds blowing from land. \_\_\_\_\_

► **Microclimates** (page 117)

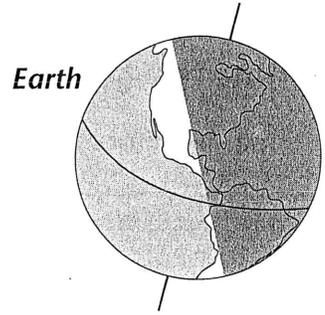
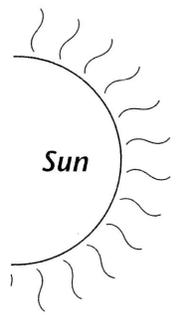
14. The climate characteristic of a small specific area is a(n) \_\_\_\_\_.

15. What are some natural features than can result in a microclimate?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

► **The Seasons** (pages 118-119)

16. Is the following sentence true or false? It is colder in the winter in the Northern Hemisphere because Earth is farther from the sun then.  
\_\_\_\_\_

17. When Earth is in the position shown in the drawing, what season is it in the Northern Hemisphere? \_\_\_\_\_  
\_\_\_\_\_



18. Circle the letter of each sentence that is true about Earth's axis.
- a. The axis always points in the same direction.
  - b. The north end of the axis is tilted away from the sun all year.
  - c. When it is summer in the Southern Hemisphere, the south end of the axis is tilted toward the sun.
  - d. In March and November, neither end of the axis is tilted toward the sun.

## CHAPTER 4, Climate and Climate Change (continued)

19. Why is Earth's surface warmer in the Northern Hemisphere when it is summer there? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



### Reading Skill Practice

When you read a section with difficult material, turning the headings into questions and then trying to find the answers can help you focus on the most important points. For each heading in Section 4-1, first turn the heading into a question, and then try to find the answer. Do your work on a separate sheet of paper.

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**SECTION** **Climate Regions**  
**4-2** (pages 122-131)

*This section explains how scientists classify climates and describes five major climate regions.*

► **Classifying Climates** (pages 122-123)

1. What are the two major factors that scientists use to classify climates?

\_\_\_\_\_  
\_\_\_\_\_

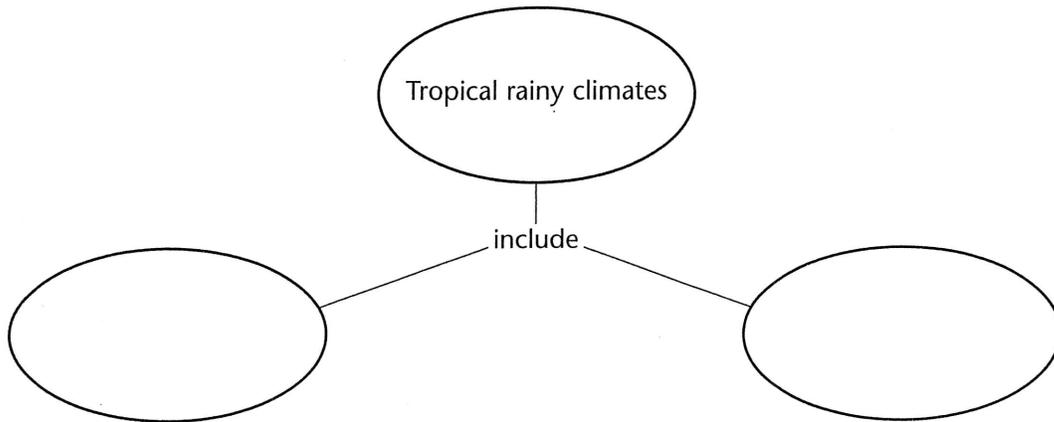
2. List the five major climate regions.

a. \_\_\_\_\_ b. \_\_\_\_\_ c. \_\_\_\_\_  
d. \_\_\_\_\_ e. \_\_\_\_\_

3. Is the following sentence true or false? A highland climate can occur within any of the other climate regions. \_\_\_\_\_

► **Tropical Rainy Climates** (pages 123-126)

4. Complete the concept map.



5. Circle the letter of each sentence that is true about a tropical wet climate.

- a. It has heavy rainfall year-round.
- b. It is hot year-round.
- c. Rain forests grow in this type of climate.
- d. Florida has this type of climate.

6. Circle the letter of each sentence that is true about a tropical wet-and-dry climate.

- a. It has a rainy season and a dry season.
- b. It is hot year-round.
- c. Grasslands grow in this type of climate.
- d. Hawaii has this type of climate.

► **Dry Climates** (pages 126-127)

7. Arid regions, which get less than 25 centimeters of rain every year, are also called \_\_\_\_\_.

8. Where are there arid climates in the United States? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**CHAPTER 4, Climate and Climate Change** (continued)

9. An area that is dry but gets enough rainfall for short grasses and low bushes to grow is called a(n) \_\_\_\_\_.
10. The steppe region of the United States is the \_\_\_\_\_.

► **Temperate Marine Climates** (pages 127–128)

11. Complete the compare/contrast table.

Temperate Marine Climates		
Type of Climate	Characteristics	Region Where It Is Found
	Cool and wet	Pacific Northwest
	Warm and dry	Southern coast of California
	Warm and wet	Southeastern United States

► **Temperate Continental Climates** (page 129)

12. Circle the letter of each sentence that is true about temperate continental climates.
- a. They are found in both Northern and Southern hemispheres.
  - b. They are greatly influenced by oceans.
  - c. They have extremes of temperature.
  - d. They are found in the northeastern United States.
13. Is the following sentence true or false? Humid continental climates receive less precipitation in summer than in winter. \_\_\_\_\_
14. What are summers and winters like in subarctic climates? \_\_\_\_\_
- \_\_\_\_\_

► **Polar Climates** (page 130)

15. Is the following sentence true or false? The polar climate is the coldest climate region. \_\_\_\_\_

16. Complete the compare/contrast table.

Polar Climates		
Type of Climate	Warmest Temperature	Organisms Found There
	0° C (freezing)	Only lichens and a few low plants
Tundra		Many kinds of plants and animals

► **Highlands** (page 131)

17. How do highland climates differ from climates of the regions that surround them? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

18. The climate above the tree line is like that of the \_\_\_\_\_.

.....

**SECTION** **Long-Term Changes in Climate**  
**4-3** (pages 134-138)

*This section explains how scientists learn about past climates and describes a time in the past when ice covered large parts of Earth. The section also gives some possible reasons why climates have changed*

► **Studying Climate Change** (page 135)

1. Circle the letter of each choice that provides evidence of ancient climates.  
 a. fossils      b. tree rings      c. pollen records      d. weather maps

2. Why do scientists think that Greenland's climate was warm and moist 80 million years ago? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### CHAPTER 4, Climate and Climate Change (continued)

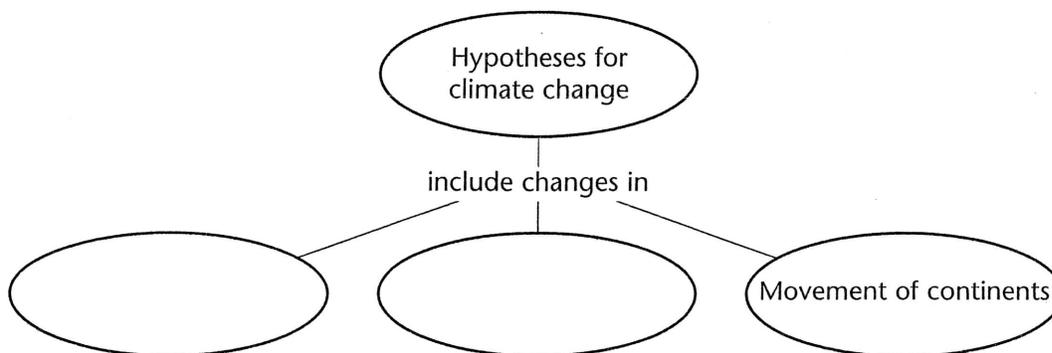
3. Is the following sentence true or false? A thin tree ring indicates that the year was warm or wet. \_\_\_\_\_

#### ► Ice Ages (page 136)

4. Circle the letter of each sentence that is true about the ice ages.
- a. When they occurred, glaciers covered all of Earth's surface.
  - b. There have been at least six major ice ages in the past two million years.
  - c. Each of the major ice ages lasted 100,000 years or longer.
  - d. The most recent major ice age ended about 105,000 years ago.
5. Is the following sentence true or false? Some scientists think that we are now in a warm period between ice ages. \_\_\_\_\_
6. Why was the sea level lower during the ice ages? \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

#### ► Causes of Climate Change (pages 137-138)

7. Complete the concept map.



8. What changes in Earth's position may have affected climates? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9. Circle the letter of each sentence that is true about sunspots.
- a. They are dark, cooler regions on the surface of the sun.
  - b. They increase and decrease in 100-year cycles.
  - c. They could be caused by changes in the sun's energy output.
  - d. They are known to be the chief cause of the ice ages.
10. Circle the letter of each sentence that is true about the movement of Earth's continents.
- a. Earth's continents have always been located where they are now.
  - b. Most of the land on Earth was once part of a single continent.
  - c. Continents now near the poles were once near the equator.
  - d. The movement of continents has had no effect on climates.

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**SECTION** **Global Changes in the Atmosphere**  
**4-4** (pages 139-142)

*This section explains how human activities may be increasing Earth's temperature by changing the atmosphere.*

► **Global Warming** (pages 139-141)

1. Is the following sentence true or false? Over the last 120 years, the average temperature of the troposphere has risen by about 5° C.

\_\_\_\_\_

Match the term with its definition.

Term	Definition
_____ 2. greenhouse effect	a. Process by which Earth's atmosphere traps solar energy
_____ 3. global warming	b. Gradual increase in the temperature of Earth's atmosphere

4. Gases in the atmosphere that trap solar energy are called

\_\_\_\_\_.

**CHAPTER 4, Climate and Climate Change** *(continued)*

5. What are some greenhouse gases? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. How may human activities be warming Earth's atmosphere? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. Circle the letter of each choice that is the outcome of burning wood, coal, oil, and natural gas.
- a. Carbon dioxide is added to the air.
  - b. Global warming is prevented.
  - c. Less heat is trapped by Earth's atmosphere.
  - d. The amount of carbon dioxide in the air decreases.
8. Is the following sentence true or false? The amount of carbon dioxide in the air has been steadily increasing. \_\_\_\_\_
9. Is the following sentence true or false? Everyone agrees about the causes of global warming. \_\_\_\_\_
10. How might changes in solar energy affect Earth's climate? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
11. Circle the letter of each choice that is a possible effect of global warming.
- a. Places too cold for farming today could become farmland.
  - b. Fertile fields might become "dust bowls."
  - c. The number of hurricanes might decrease.
  - d. Low-lying coastal areas might be flooded.

► **Ozone Depletion** (pages 141-142)

12. Is the following sentence true or false? Ozone in the stratosphere filters out much of the harmful ultraviolet radiation from the sun.

\_\_\_\_\_

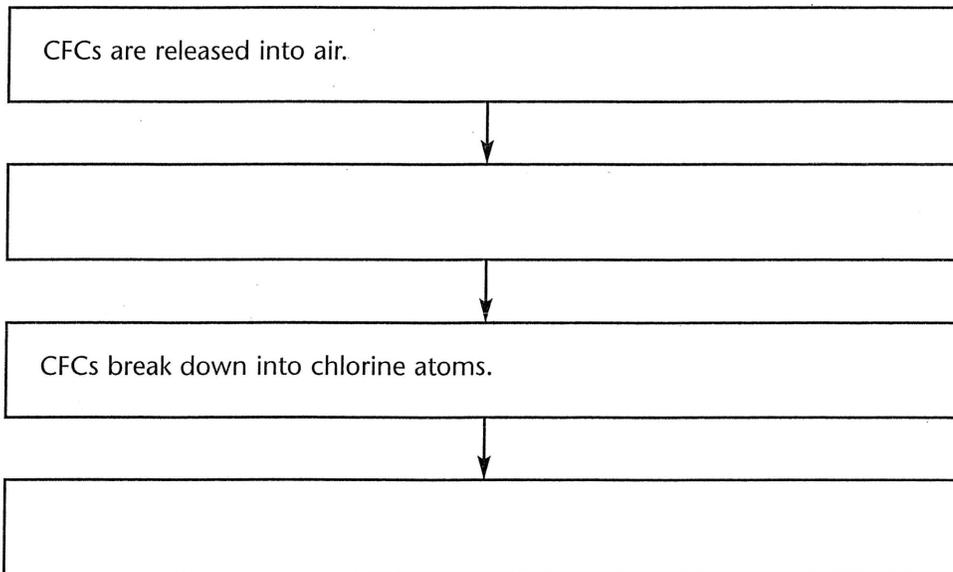
13. Is the following sentence true or false? The ozone layer over Antarctica is growing thinner. \_\_\_\_\_

14. What are chlorofluorocarbons, or CFCs? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

15. Complete the flowchart.

**CFCs and Ozone Depletion**



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16. With a decrease in ozone, the amount of ultraviolet radiation reaching Earth's surface would \_\_\_\_\_.

17. What have the United States and other countries done to try to prevent ozone depletion? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**CHAPTER 4, Climate and Climate Change** *(continued)*

**WordWise**

Use the clues to help you identify the key terms from Chapter 4. Then put the numbered letters in order to find the answer to the riddle.

Clues	Key Terms
Climate characteristic of a small, specific area	— — <u>1</u> — — — — — — — — — —
Downwind side of mountains	<u>2</u> — — — — — — — — — —
Average conditions of temperature, precipitation, winds, and clouds in an area	— — — — — — — — — — <u>3</u> — — — — —
Permanently frozen soil found in the tundra climate region	— — — — — — — — — — <u>4</u> — — — — —
Tropical grassland found in the tropical wet-and-dry climate	— — — — — — — — — — <u>5</u>
Polar climate region with short, cool summers and bitterly cold winters	<u>6</u> — — — — — — — — — —
Region that receives less than 25 centimeters of rain a year	— — — — — — — — — — <u>7</u> — — — — —

**Riddle:** What is determined by temperature and precipitation?

**Answer:** 1 2 3 4 5 6 7