Section 1

Weather Guided Reading and Study Workbook

_____

Name

_____

Period

_____

Room Number

Name _____ Date _____ Class _____

Guided Reading Chpt. 1

CHAPTER 1

THE ATMOSPHERE

SECTION 1-1 The Air Around You (pages 14–17)

This section describes Earth's atmosphere, or the layer of gases that surrounds the planet.

▶ Importance of the Atmosphere (pages 14–15)

1. The condition of Earth's atmosphere at a particular time and place is called _____.

2. How does Earth's atmosphere make conditions on Earth suitable for living things? _____

_____

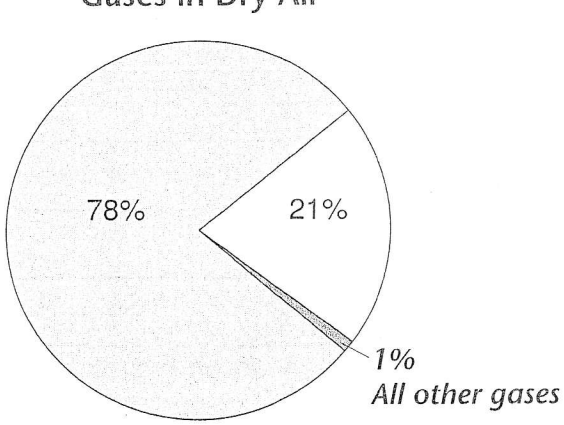
_____

_____

_____

▶ Composition of the Atmosphere (pages 15–17)

3. Label the two larger pieces of the graph with the gases they represent.



CHAPTER 1, The Atmosphere *(continued)*

4. Circle the letter of each sentence that is true about nitrogen.
   - **a.** It is essential to living things.
   - **b.** It is found in proteins.
   - **c.** It is needed for growth and repair of cells.
   - **d.** It is obtained directly from the air by all living things.

5. Circle the letter of each sentence that is true about oxygen.
   - **a.** It is needed by animals but not plants.
   - **b.** It is needed to release energy from food.
   - **c.** It is released by fuels when they burn.
   - **d.** It forms ozone when it interacts with lightning.

6. Circle the letter of each sentence that is true about carbon dioxide.
   - **a.** It is essential to life.
   - **b.** It is given off by animals as a waste product.
   - **c.** It is used by animals to digest food.
   - **d.** It is needed by fuels to burn.

7. Is the following sentence true or false? Carbon dioxide alone makes up almost 1 percent of dry air. _____

8. Water in the form of a gas is called _____.

9. Is the following sentence true or false? Water vapor is the same as steam. _____

10. What role does water vapor play in Earth's weather? _____

_____

_____

_____

11. What particles does air contain? _____

_____

_____

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SECTION 1-2 Air Quality (pages 20-23)

This section describes harmful substances in the air and explains how they can affect people and things. The section also describes what has been done to improve air quality.

▶ Air Pollution (pages 20-21)

1. Harmful substances in the air, water, or soil are known as _____.

2. How can air pollution affect human health? _____

3. Circle the letter of each sentence that is true about the causes of air pollution.
   a. Some air pollution occurs naturally.
   b. Much of air pollution is caused by human activities.
   c. Motor vehicles cause almost half the air pollution from human activities.
   d. Factories and power plants cause a little more than half of all air pollution.

▶ Particles (page 21)

4. What are some natural sources of particles in the atmosphere? _____

5. The average number of pollen grains in a cubic meter of air is known as the _____.

6. The particles in smoke that give it its dark color are _____.

▶ Smog (page 22)

7. The brown haze that forms over sunny cities like Los Angeles is called _____.

8. Circle the letter of each sentence that is true about photochemical smog.
   a. It is caused by the action of sunlight on chemicals.
   b. It forms when particles in smoke combine with water droplets in air.
   c. It forms when nitrogen oxides and hydrocarbons react with each other.
   d. It is a mixture of ozone and other chemicals.

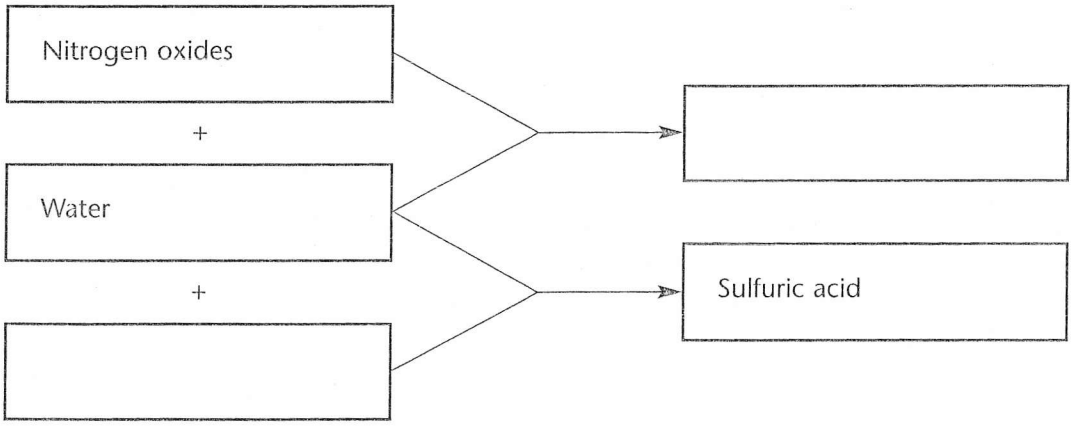
9. What effects does ozone have on people and things? _____

▶ Acid Rain (pages 22–23)

10. Is the following sentence true or false? One result of air pollution is acid rain. _____

11. Complete the flow chart.

Formation of Acid Rain



12. Is the following sentence true or false? Burning coal that is low in sulfur produces sulfur oxides. _____

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13. Rain that contains more acid than normal is known as _____.

14. How can acid rain affect trees such as pines and spruce? _____

15. How can acid rain harm lakes and ponds? _____

▶ Improving Air Quality (page 23)

16. What are some laws and regulations that have been passed to reduce air pollution? _____

17. Is the following sentence true or false? Air quality in this country has worsened over the past 30 years. _____

18. Is the following sentence true or false? The air in many American cities is still polluted. _____

Reading Skill Practice

When you read about a complex process, representing the process with a flowchart can help you understand it. Make a flowchart to show how photochemical smog forms. For more information on flowcharts, see page 161 of the Skills Handbook in your text. Do your work on a separate sheet of paper.

SECTION 1–3 Air Pressure (pages 25–30)

This section describes several properties of air, including density and air pressure. The section also explains how air pressure is measured and how it changes with altitude.

▶ Properties of Air (pages 25–26)

1. Circle the letter of each sentence that is true about air.
   a. Air has mass because it is composed of atoms and molecules.
   b. Because air has mass, it has density and pressure.
   c. The more molecules in a given volume of air, the greater its density.
   d. The greater the density of air, the less pressure it exerts.

2. Complete the table.

Properties of Air	
Property	**Definition**
	Amount of mass in a given volume of air
	Weight of the air pushing down on an area

3. Why doesn't air pressure crush your desk? _____

_____

_____

_____

▶ Measuring Air Pressure (pages 26–27)

4. Is the following sentence true or false? Falling air pressure usually indicates that a storm is approaching. _____

5. An instrument that is used to measure changes in air pressure is a(n) _____.

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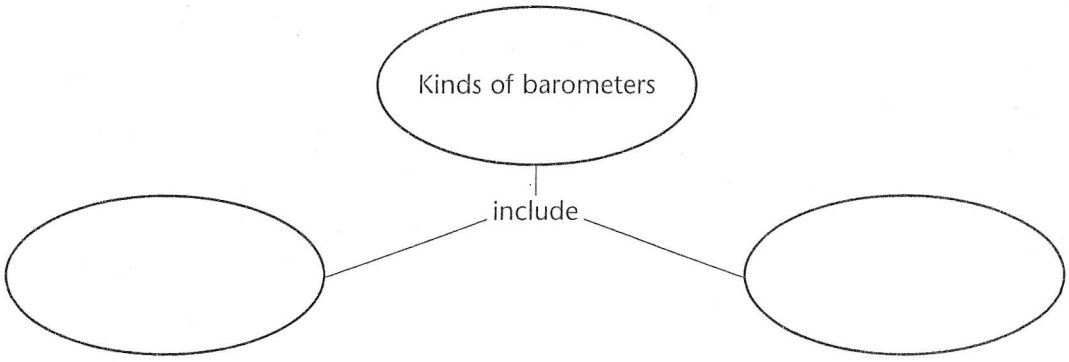
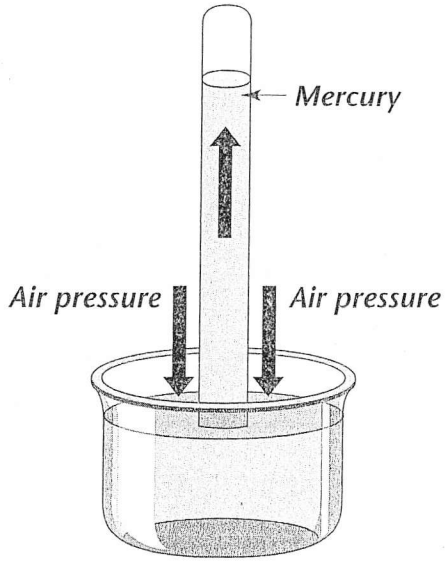
6. Complete the concept map.



7. Is the following sentence true or false? The first barometers invented were aneroid barometers. _____

8. Draw a line on the glass tube to show where the level of the mercury might be if the air pressure fell.



9. Why are aneroid barometers often more practical than mercury barometers? _____

_____

_____

10. Two different units used to measure air pressure are _____ and _____.

11. If the air pressure is 30 inches, how many millibars of air pressure are there? _____

▶ Increasing Altitude (pages 28–30)

12. Another word for elevation, or distance above sea level, is _____.

13. Is the following sentence true or false? Air pressure increases as altitude increases. _____

14. Is the following sentence true or false? As air pressure decreases, so does air density. _____

15. Why is air pressure greater at sea level than at the top of a mountain?

_____

_____

_____

16. Explain why mountain climbers sometimes bring tanks of oxygen along with them on their climbs? _____

_____

_____

17. Is the following sentence true or false? As altitude increases, so does air density. _____

18. Circle the letter of the sentence that helps explain why you would have more difficulty breathing at high altitudes than at sea level.

a. Air pressure is higher at high altitudes.

b. Density of the air is greater at high altitudes.

c. The percentage of oxygen in the air is lower at high altitudes.

d. The amount of oxygen in each breath is less at high altitudes.

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SECTION 1–4

Layers of the Atmosphere

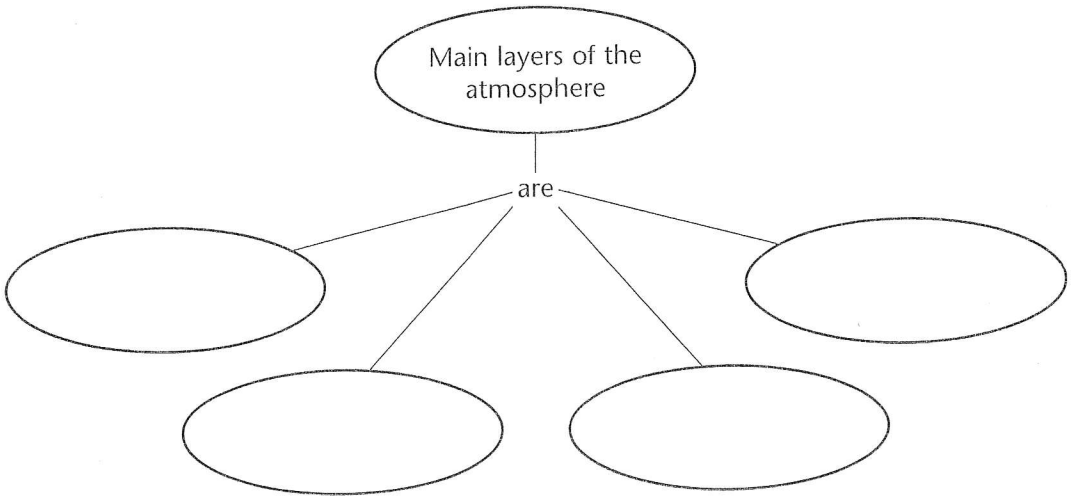
(pages 31–36)

This section describes the four main layers of the atmosphere.

▶ Introduction (page 31)

1. The four main layers of the atmosphere are classified according to changes in _____.

2. Complete the concept map.



▶ The Troposphere (pages 31–32)

3. Circle the letter of each sentence that is true about the troposphere.
   a. It is the lowest layer of Earth's atmosphere.
   b. It has less variable conditions than other layers.
   c. It is where Earth's weather occurs.
   d. It is the shallowest layer of the atmosphere.

4. Is the following sentence true or false? The troposphere contains almost all of the mass of the atmosphere. _____

5. Is the following sentence true or false? As altitude increases in the troposphere, temperature also increases. _____

6. How does the depth of the troposphere vary? _____

_____

_____

7. Is the following sentence true or false? At the top of the troposphere, the temperature stays constant. _____

▶ The Stratosphere (page 32)

8. How far does the stratosphere extend above Earth's surface? _____

_____

9. Circle the letter of each sentence that is true about the stratosphere.
   a. The temperature of the lower stratosphere is about –60°C.
   b. The upper stratosphere is colder than the lower stratosphere.
   c. The upper stratosphere contains a layer of ozone.
   d. The ozone in the stratosphere reflects energy from the sun.

10. Why does a weather balloon keep increasing in volume as it rises through the stratosphere? _____

_____

_____

▶ The Mesosphere (pages 32–34)

11. Where does the mesosphere begin? _____

_____

12. Circle the letter of each sentence that is true about the mesosphere.
   a. It is the middle layer of the atmosphere.
   b. It is very cold, with temperatures near –90°C.
   c. It protects Earth's surface from being hit by most meteoroids.
   d. It ends at 320 kilometers above sea level.

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▶ The Thermosphere (pages 34–36)

13. Circle the letter of each sentence that is true about the thermosphere.

    a. It is the outermost layer of the atmosphere.

    b. Its air is very thin.

    c. It has no definite outer limit.

    d. It starts at 320 kilometers above sea level.

14. Why is the thermosphere so hot? _____

    _____

    _____

    _____

    _____

15. Why would an ordinary thermometer show a low temperature in the thermosphere? _____

    _____

    _____

    _____

16. Complete the table.

Layers of the Thermosphere	
Layer	**Distance Above Sea Level**
	80–550 kilometers
	Above 550 kilometers

17. Brilliant light displays that occur in the ionosphere are called the _____.

18. Is the following sentence true or false? Satellites orbit Earth in the exosphere. _____

WordWise

Match each definition in the left column with the correct term in the right column. Then write the number of each term in the appropriate box below. When you have filled all the boxes, add up the numbers in each column, row, and two diagonals. All the sums should be the same.

Definitions

A. Mixture of gases that surrounds Earth

B. Form of oxygen with three atoms instead of two

C. Harmful substance in the air, water, or soil

D. Amount of mass in a given space

E. Amount of force pushing on an area

F. Elevation above sea level

G. Second-lowest layer of Earth's atmosphere

H. Outermost layer of Earth's atmosphere

I. Outer layer of the thermosphere

Terms

1. thermosphere
2. atmosphere
3. altitude
4. pollutant
5. pressure
6. stratosphere
7. density
8. exosphere
9. ozone

			= _____
A _____	B _____	C _____	= _____
D _____	E _____	F _____	= _____
G _____	H _____	I _____	= _____
= _____	= _____	= _____	= _____