

Chapter 15 The Atmosphere

Study Guide

1. The Air Around You

a. Importance of the **Atmosphere**i. **Weather**ii. *What would conditions on Earth be like without the atmosphere?*

b. Composition of the Atmosphere

i. Nitrogen

ii. Oxygen

1. **Ozone**

iii. Carbon Dioxide

iv. Other Gases

v. **Water Vapor**

vi. Particles

2. Air Quality

a. Air Pollution

i. **Pollutants**ii. *What are two sources of air pollution that you see every day?*

b. Particles

i. Natural Sources

ii. Human Activities

c. Smog

i. **Photochemical Smog**d. **Temperature Inversion**e. **Acid Rain**

f. Improving Air Quality

3. Air Pressure

a. Properties of Air

i. **Density**ii. **Pressure**1. **Air Pressure**

b. Measuring Air Pressure

- i. **Barometer**
- ii. **Mercury Barometer**
- iii. **Aneroid Barometer**
- iv. **Units of Air Pressure**

1. *Name two common units used to measure air pressure.*

c. **Increasing Altitude**

- i. **Altitude Affects Air Pressure**
- ii. **Altitude Also Affects Density**

4. **Layers of the Atmosphere**

a. **The Troposphere**

- i. *Why are clouds at the top of the troposphere made of ice crystals instead of drops of water?*

b. **The Stratosphere**

c. **The Mesosphere**

- i. *What is the depth of the mesosphere?*

d. **The Thermosphere**

i. **The Ionosphere**

- 1. **Aurora Borealis**

ii. **The Exosphere**

SECTION 15 - 1

REVIEW AND REINFORCE

The Air Around You

◆ Understanding Main Ideas

Fill in the blanks in the table below.

Gases in Dry Air	Percent by Volume
Argon	1.
2.	0.036
Nitrogen	3.
4.	21

Answer the following questions on a separate sheet of paper.

5. Besides the gases shown in the table, what else is found in Earth's atmosphere?
6. What are two sources of carbon dioxide in air?
7. Why is nitrogen important for living things?
8. How does the atmosphere make conditions on Earth suitable for living things?
9. What are two processes that use oxygen?
10. Where is the amount of water vapor in the air likely to be highest, above a desert or a tropical rain forest?

◆ Building Vocabulary

Match each term with its definition by writing the letter of the correct definition on the line beside the term.

- | | |
|-----------------------|-----------------------------------------------------------------------|
| _____ 11. weather | a. the layer of gases that surrounds Earth |
| _____ 12. atmosphere | b. a form of oxygen with three atoms instead of two |
| _____ 13. ozone | c. water in the form of a gas |
| _____ 14. water vapor | d. the condition of Earth's atmosphere at a particular time and place |
| _____ 15. oxygen | e. gas used by living things to turn food into energy |

SECTION 15-2

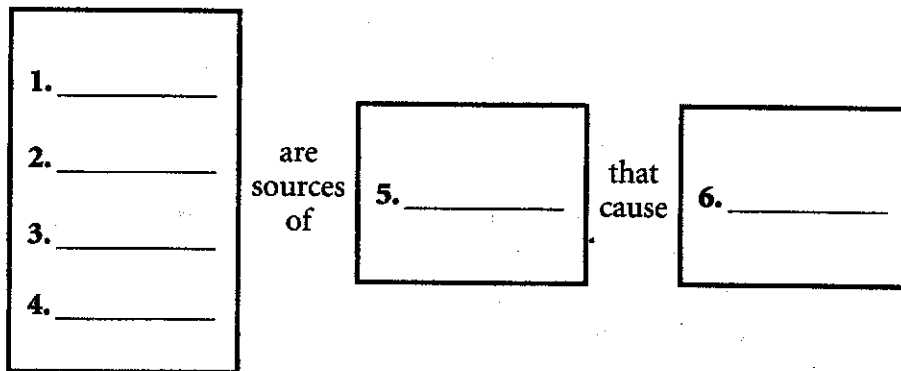
REVIEW AND REINFORCE

Air Quality

◆ Understanding Main Ideas

Fill in the blanks in the flow chart with the words listed below.

burning fossil fuels, air pollution, dust storms, farming, forest fires, pollutants



If the statement is true, write true. If it is false, change the underlined word to make the statement true.

- _____ 7. Almost half the air pollution from human activities comes from factories.
- _____ 8. The average number of pollen grains in a cubic meter of air is called the pollen rate.
- _____ 9. Soot refers to particles that give smoke its dark color.
- _____ 10. Photochemical smog is most likely to occur where it is rainy.

◆ Building Vocabulary

Fill in the blank to complete each statement.

11. Harmful substances in air, water, or soil are called _____.
12. _____ is a brown haze caused by the action of sunlight on chemicals.
13. Rain that contains more acid than normal is known as _____.

SECTION 15-3

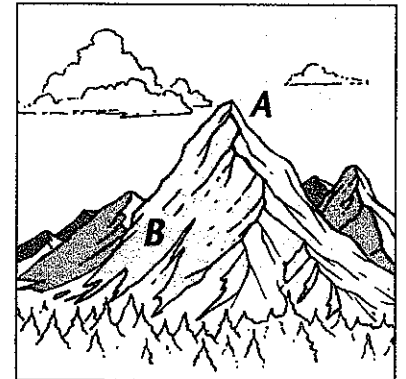
REVIEW AND REINFORCE

Air Pressure

◆ Understanding Main Ideas

Study the figure below, and then complete the following statements.

1. Altitude is greater at point _____.
2. Air pressure is greater at point _____.
3. Density of the air is greater at point _____.
4. A cubic meter of air has less mass at point _____.
5. The percentage of oxygen in the air at point-A is _____ percent.



Answer the following questions on a separate sheet of paper.

6. State three properties of air.
7. Why doesn't air pressure crush objects such as your desk?
8. What two units of air pressure are used in weather reports?

◆ Building Vocabulary

Match each term with its definition by writing the letter of the correct definition on the line beside the term.

- _____ 9. air pressure
- _____ 10. altitude
- _____ 11. aneroid barometer
- _____ 12. barometer
- _____ 13. density
- _____ 14. mercury barometer
- _____ 15. pressure

- a. the amount of mass in a unit volume of a substance
- b. force per unit area
- c. the result of the weight of a column of air pushing down on an area
- d. any instrument that measures changes in air pressure
- e. instrument that measures changes in air pressure using liquid mercury
- f. the distance above sea level
- g. instrument that measures changes in air pressure without using a liquid

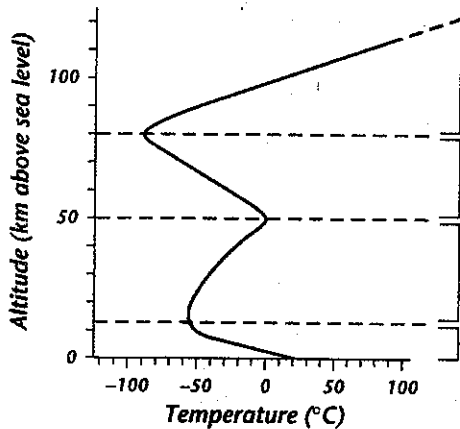
SECTION 15 - 4

REVIEW AND REINFORCE

Layers of the Atmosphere

◆ Understanding Main Ideas

The graph below shows altitudes and temperatures for the four main layers of the atmosphere. Label the four layers and then complete the statements that follow.



1. _____
2. _____
3. _____
4. _____

5. The coldest temperatures in the atmosphere occur at an altitude of about _____.
6. The hottest temperatures in the atmosphere occur in the _____.
7. Temperatures increase in the _____ and _____ layers of the atmosphere.
8. As you move up through the mesosphere, the temperature _____.

◆ Building Vocabulary

If the statement is true, write true. If it is false, change the underlined word to make the statement true.

- _____ 9. The layer of the atmosphere where weather occurs is the thermosphere.
- _____ 10. The mesosphere is the layer of the atmosphere that contains ozone.
- _____ 11. The exosphere is the outer layer of the thermosphere.
- _____ 12. Most meteoroids burn up in the stratosphere.
- _____ 13. The troposphere is divided into two layers.
- _____ 14. The ionosphere lies between the mesosphere and exosphere.

Name: _____

Class: _____

Choose the letter of the correct answer.

1. The gases in our atmosphere aside from oxygen and nitrogen make up about what percentage of dry air?
[A] 2% [B] 10% [C] 1% [D] 5%
2. The main layers of the atmosphere are classified according to changes in
[A] density. [B] temperature. [C] altitude. [D] pressure.
3. The layer in our atmosphere in which weather occurs is the
[A] mesosphere. [B] exosphere. [C] stratosphere. [D] troposphere.
4. Ozone is
[A] a form of oxygen with two oxygen atoms in each molecule.
[B] a form of oxygen with three oxygen atoms in each molecule.
[C] a form of nitrogen with two oxygen atoms in each molecule.
[D] a form of nitrogen with three oxygen atoms in each molecule.
5. Earth's atmosphere contains about four times as much nitrogen as
[A] helium. [B] carbon dioxide. [C] hydrogen. [D] oxygen.
6. The National Weather Service measures air pressure in units called
[A] millibars. [B] barometers. [C] aneroids. [D] pressure bars.
7. Most pollution in the atmosphere comes from
[A] pollen. [B] forest fires. [C] burning fossil fuels. [D] volcanic eruptions.
8. The ozone layer in the stratosphere absorbs
[A] visible light. [B] ultraviolet radiation. [C] infrared rays. [D] carbon dioxide.
9. Water vapor is water in the form of [A] crystals. [B] droplets. [C] steam. [D] a gas.
10. Earth's atmosphere is important to living things because it
[A] is very thin compared to the size of Earth. [B] provides all the gases needed.
[C] contains dust. [D] maintains a constant relative humidity.

Choose the letter of the correct answer.

11. The two most abundant gases in the atmosphere are
[A] nitrogen and hydrogen. [B] carbon dioxide and nitrogen.
[C] carbon dioxide and oxygen. [D] nitrogen and oxygen.
12. In addition to gases, air also contains
[A] water vapor. [B] particles. [C] carbon dioxide. [D] ozone.
13. Pollen is
[A] particles produced when ocean water splashes into the air.
[B] a fine powdery material produced by many plants.
[C] a type of air pollution produced by motor vehicles.
[D] dust produced by erupting volcanoes.

Fill in the word or phrase that best completes the statement(s).

14. In the part of the atmosphere called the _____, solar particles hit atoms and cause them to glow.
15. The name of the molecule that is made up of three oxygen atoms is _____.
16. The atmospheric gas called _____ forms clouds when it condenses.
17. Because air has mass, it exerts a force per unit area called _____.
18. Animals produce the atmospheric gas _____, which plants need to live.
19. Acid rain can form when _____ in the air mixes with sulfur oxides to form sulfuric acid.
20. A(n) _____ barometer measures air pressure by using a metal chamber that is sensitive to pressure changes.

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

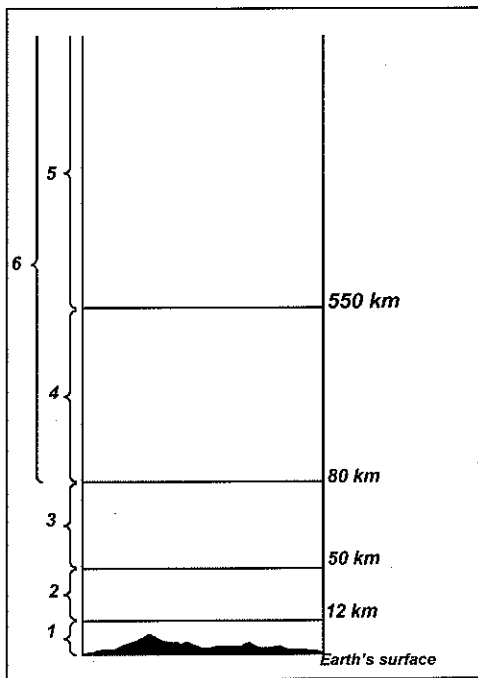
21. Earth's weather is the thin layer of gases that surrounds Earth.
22. As air pressure increases, the column of mercury in a barometer rises.

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

23. People live in the thermosphere, or inner layer of the atmosphere.
24. As altitude decreases, the density of the air decreases.
25. Dry air is 78% nitrogen and 21% carbon dioxide.

Use the diagram to answer the question(s).

Layers of the Atmosphere



26. Give the number and name of the layer that contains the ozone layer.

Use the table to answer the question(s).

Gases In Dry Air

Gas	Percentage by Volume
Nitrogen	78
Oxygen	21
Argon	0.93
Carbon dioxide	0.036
Neon	0.0018
Helium	0.00052
Methane	0.00015
Krypton	0.00011
Hydrogen	0.00005

27. What is the second most abundant gas in air? How many times greater is the percentage of nitrogen than the percentage of oxygen?

Write an answer to the following question(s).

28. Describe four ways in which natural processes add harmful particles to the air.
29. You plan to hike to the top of Mount Shasta where you will measure the air pressure. Which type of barometer will be more practical to take? Explain your answer.
30. Briefly describe how living things use nitrogen and oxygen.

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