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pages 4-9

Chapter 1 Section 1--WEATHER & CLIMATE /17

Section: Characteristics of the Atmosphere

_____ **1.** A mixture of gases surrounding a planet is the
- **a.** oxygen.
- **b.** atmosphere.
- **c.** breathable air.
- **d.** hemisphere.

THE COMPOSITION OF THE ATMOSPHERE

_____ **2.** The most common atmospheric gas is
- **a.** oxygen.
- **b.** argon.
- **c.** nitrogen.
- **d.** carbon dioxide.

_____ **3.** Phytoplankton and plants produce the atmosphere's
- **a.** oxygen.
- **b.** argon.
- **c.** nitrogen.
- **d.** carbon dioxide.

_____ **4.** Most water in the atmosphere is in
- **a.** rain.
- **b.** ice.
- **c.** water vapor.
- **d.** carbon dioxide.

ATMOSPHERIC PRESSURE AND TEMPERATURE

_____ **5.** At sea level, a square inch of surface area is under almost how many pounds of pressure?
- **a.** 150
- **b.** 15
- **c.** 30
- **d.** 1500

_____ **6.** Gas molecules in the atmosphere are pulled toward the Earth by
- **a.** air pressure.
- **b.** the moon.
- **c.** gravity.
- **d.** surface area.

7. The measure of the force with which air molecules push on a surface is called _____.

8. Explain what happens to air pressure as you move away from the Earth's surface.

_____

_____

9. Explain why parts of the atmosphere are warmer than others.

_____

_____

LAYERS OF THE ATMOSPHERE

Match the correct definition with the correct term. Write the letter in the space provided.

_____**10.** coldest layer of the atmosphere

_____**11.** atmosphere layer including the ozone layer

_____**12.** layer of atmosphere closest to Earth

_____**13.** uppermost layer of the atmosphere

a. troposphere
b. mesosphere
c. stratosphere
d. thermosphere

14. How are the layers of the atmosphere defined?

_____

_____

15. In the stratosphere, what happens to the temperature as altitude increases?

_____

_____

_____

16. Electrically charged particles are called _____.

17. In polar regions, ions radiate energy as shimmering lights called _____.

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pages 10-13

Chapter 1 Section 2--WEATHER & CLIMATE /16

Section: Atmospheric Heating

_____ **1.** How long does it take the sun's energy to reach the Earth?

a. about 8 hours
b. about 80 hours
c. about 8 minutes
d. about 8 days

ENERGY IN THE ATMOSPHERE

_____ **2.** What percentage of the energy radiated by the sun reaches the Earth's surface?

a. two-fiftieths
b. two-thousandths
c. two-millionths
d. two-billionths

_____ **3.** What percentage of the sun's energy that reaches the Earth is absorbed by Earth's surface?

a. 25%
b. 50%
c. 20%
d. 5%

_____ **4.** What percentage of the sun's energy that reaches the Earth is absorbed by ozone, clouds, and atmospheric gases?

a. 25%
b. 50%
c. 20%
d. 5%

Match the correct description with the correct term. Write the letter in the space provided.

_____ **5.** transfer of energy as heat through a material

_____ **6.** transfer of energy by circulation or movement of a gas

_____ **7.** circular movement of warm air rising and cool air sinking

_____ **8.** transfer of energy as electromagnetic waves

a. thermal conduction
b. radiation
c. convection current
d. convection

9. Explain what process produces the greenhouse effect.

(3pts)

1 _____

2 _____

3 _____

_____

10. The balance between incoming solar energy and outgoing energy radiated into space is called _____.

11. A gradual increase in average global temperature is called _____.

12. What are greenhouse gases?

_____

13. What human activities may increase the level of greenhouse gases in the atmosphere?

(2pts

_____

_____

Name _____ Class _____ Date _____

pages 14-19

Chapter 1 Section 3--WEATHER & CLIMATE /18

Section: Global Winds and Local Winds

WHY AIR MOVES

_____ **1.** What causes differences in air pressure?
- **a.** even heating of the Earth
- **b.** even cooling of the Earth
- **c.** unequal heating of the Earth
- **d.** increased heating of the Earth

_____ **2.** The movement of air caused by differences in air pressure is called
- **a.** dense air.
- **b.** wind.
- **c.** polar air.
- **d.** vents.

_____ **3.** Air is warmer and less dense than surrounding air at the equator because the equator receives more
- **a.** wind.
- **b.** air pressure.
- **c.** solar energy.
- **d.** radiation.

_____ **4.** Because air at the poles in colder and denser than surrounding air, it
- **a.** rises.
- **b.** sinks.
- **c.** circulates.
- **d.** stagnates.

_____ **5.** High pressure areas are created around the poles as cold air
- **a.** rises.
- **b.** blows.
- **c.** stagnates.
- **d.** sinks.

_____ **6.** After high pressure areas are created around the poles, cold polar air flows toward
- **a.** the equator.
- **b.** the North Pole.
- **c.** the South Pole.
- **d.** the atmosphere.

7. Large, circular patterns of air movement are called _____.

8. Bands of high pressure and low pressure found every 30° of latitude are called _____.

9. When the paths of winds and ocean currents seem to curve because of the Earth's rotation, it's called the _____.

GLOBAL WINDS

Match the correct description with the correct term. Write the letter in the space provided.

_____**10.** winds that blow from 30° latitude in both hemispheres almost to the equator

_____**11.** the area around the equator where trade winds meet

_____**12.** wind formed as cold, sinking air moves from the poles to 60° north and 60° south latitude

_____**13.** wind belts that extend between 30° and 60° latitude in both hemispheres

_____**14.** area in which sinking air creates high pressure and weak winds at about 30° north and 30° south latitude

a. polar easterlies
b. westerlies
c. trade winds
d. doldrums
e. horse latitudes

15. Narrow belts of high speed winds in the upper troposphere and lower stratosphere are called _____.

LOCAL WINDS

_____**16.** Which of the following are local winds?
a. mountain breezes
b. convection cells
c. polar winds
d. westerlies

17. Explain how geographic features can cause local winds.

In the mountains...

(2pts

On the beach...

Name _____ Class _____ Date _____

pages 20-26

Chapter 1 Section 4--WEATHER & CLIMATE /34

Section: Air Pollution

1. The contamination of the atmosphere by the introduction of pollutants from human and natural sources is _____.

PRIMARY POLLUTANTS

2. Examples of primary air pollutants are carbon monoxide, smoke, and _____.

SECONDARY POLLUTANTS

3. Explain how secondary pollutants are formed. Two ingredients are necessary.

_____

_____

_____

4. List two examples of secondary pollutants.

(2pts

_____

_____

5. What is one reason that ozone near the Earth's surface is dangerous?

_____

_____

6. How is smog formed? Three ingredients are necessary.

_____

_____

_____

_____

7. What is one way local geography plays a part in smog formation in Los Angeles?

_____

_____

SOURCES OF HUMAN-CAUSED AIR POLLUTION

_____ **8.** How much of the human-caused air pollution in the United States is caused by cars?

a. 20%
b. 30%
c. 100%
d. 60%

9. List two sources of industrial air pollution.

(2pts

_____

_____

_____

10. What are two ways to reduce indoor air pollution?

(2pts

_____

_____

ACID PRECIPITATION

_____**11.** Acid precipitation contains rain, sleet, or snow with a high concentration of acids that come from

a. water pollution.
b. lakes.
c. air pollution.
d. nitric acid.

_____**12.** When sulfur oxide and nitrogen oxide combine with water in the atmosphere, they form

a. sulfuric acid and carbon dioxide.
b. sulfuric acid and nitric acid.
c. nitric acid and carbon dioxide.
d. nitric acid and citric acid.

_____**13.** When acid precipitation causes the acidity of soil to increase, it is called

a. calcification.
b. acidification.
c. sulfurication.
d. deforestation.

14. Where are three of the forest areas in the world that are affected by acid precipitation located?

(3pts)

_____

_____

_____

15. A rapid change in the acidity of a body of water is

called _____.

THE OZONE HOLE

_____**16.** How long do CFC molecules remain active in the stratosphere?

- **a.** 10 to 50 years
- **b.** 30 to 60 years
- **c.** 60 to 120 years
- **d.** 150 to 500 years

17. What is the main problem caused by the ozone hole?

_____

_____

_____

18. What are two reasons the ozone hole is dangerous to humans?

(2pts

_____

_____

AIR POLLUTION AND HUMAN HEALTH

19. What are three effects of air pollution on human health?

_____

(3pts)

_____

_____

CLEANING UP AIR POLLUTION

_____**20.** In the United States, the law that gives the Environmental Protection Agency (EPA) the authority to control the amount of air pollution is the

a. Clean Environment Act.
b. Cleaner World Act.
c. Clean Air Act.
d. Air Quality Act.

21. What are two methods industries use to reduce air pollution?

(2pts _____

_____

22. What are two ways car manufacturers are using to reduce air pollution?

(2pts _____

_____

23. What are two ways people can reduce pollution from vehicles?

(2pts _____

_____

Name _____ Class _____ Date _____

Skills Worksheet

Reinforcement--WEATHER & CLIMATE /15

Earth's Amazing Atmosphere

Complete this worksheet after you finish reading the section "Characteristics of the Atmosphere."

The Earth's atmosphere is divided into four layers. Choose the layer in Column B that best matches the description in Column A, and write your answer in the space provided. Then, use the directions below to label the diagram of the Earth's atmosphere on the next page.

Column A

_____ **1.** the layer of the Earth's atmosphere you live in

(4pts) _____ **2.** the coldest layer of the Earth's atmosphere; lies directly below the uppermost layer

_____ **3.** the uppermost layer of the atmosphere

_____ **4.** the layer that contains most of the atmosphere's ozone; above the layer that you live in

Column B

a. troposphere
b. stratosphere
c. mesosphere
d. thermosphere

(4pts) **5.** Label the four layers of the atmosphere on the diagram on the next page.

(1pt) **6.** There is no clear boundary between the uppermost layer of the atmosphere and space. The atmosphere becomes thinner and thinner and blends into space. At the very top of the diagram, write the word space with an arrow pointing up.

(1pt) **7.** The ozone layer is the upper part of the atmospheric layer that contains most of the atmosphere's ozone. Use the symbol for ozone to draw in the ozone layer on the diagram.

(1pt) **8.** The ozone layer is important because it absorbs ultraviolet radiation. Draw a wavy line coming from space to represent the UV radiation that is absorbed by the ozone layer.

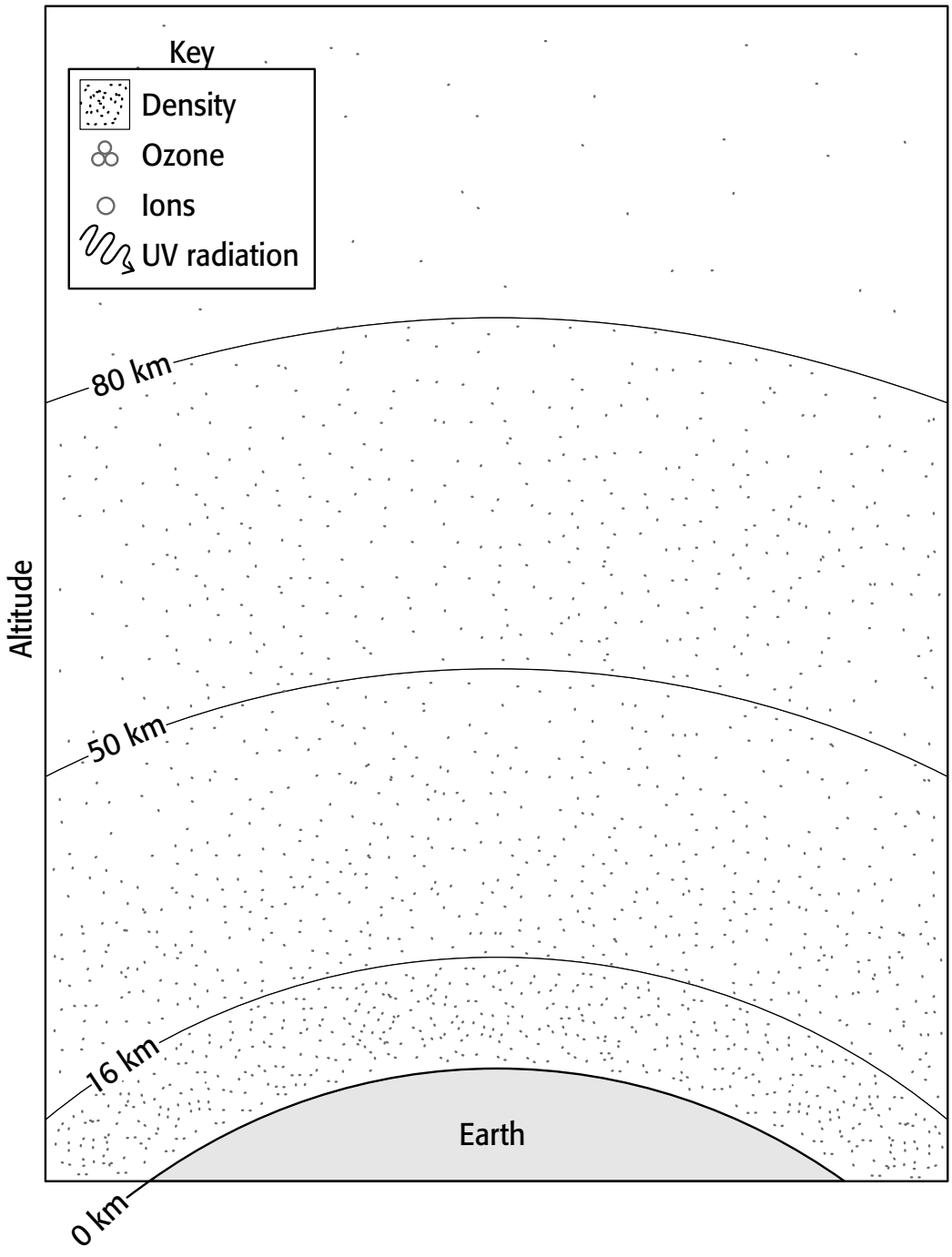
(1pt) **9.** Ions are electrically charged particles. When nitrogen and oxygen atoms absorb solar energy in the lower thermosphere, they become ions. This part of the thermosphere is called the ionosphere. Draw the ions in the ionosphere. Remember that the thermosphere is very thin. There are almost no ions near the top of the thermosphere.

(1pt) **10.** The troposphere is the densest layer of the atmosphere. It is much denser than the other layers. Shade this layer heavily to indicate how dense it is.

(1pt) **11.** The stratosphere is very thin. Shade this lightly.

(1pt) **12.** The mesosphere is even less dense than the stratosphere. Shade this layer very lightly.

Reinforcement *continued*



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Activity

Vocabulary Activity--WEATHER & CLIMATE /21

In the Air

After you finish reading the chapter, try the crossword puzzle on the next page using the clues provided.

ACROSS

2. atmospheric layer above the troposphere

6. the coldest layer of the atmosphere

7. pollutants such as ozone and smog are _____ pollutants.

10. the effect that causes objects to move in a curved direction due to the Earth's rotation

11. a device used to remove some pollutants before they are released by smokestacks

14. wind belts that extend from the poles to 60° latitude

17. a gas in the stratosphere that helps to protect Earth from ultraviolet radiation

19. the movement of air caused by differences in air pressure

20. the effect in which gases in the atmosphere absorb thermal energy and radiate it back to Earth

21. heat transfer from one material to another by direct contact

DOWN

1. narrow belts of high speed winds

3. winds that blow from 30° latitude to the equator

4. the uppermost atmospheric layer

5. mixture of gases that surrounds the Earth

8. the measure of the force with which air molecules are pushing on the Earth's surface

9. a rise in average global temperatures

12. transfer of thermal energy by the circulation or movement of a liquid or gas

13. global winds found between 30° and 60° latitude

15. damaging type of precipitation caused by oxides of sulfur and nitrogen

16. the layer of the atmosphere where we live

18. the transfer of energy by waves

Name _____ Class _____ Date _____

Vocabulary Activity *continued*