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CHAPTER 11 STUDY GUIDE

Atmosphere

SECTION 11.1 *Atmospheric Basics*

In your textbook, read about the composition of the atmosphere.
Circle the letter of the choice that best completes the statement.

1. Most of Earth's atmosphere is composed of
   a. oxygen and hydrogen.
   b. hydrogen and nitrogen.
   c. nitrogen and oxygen.
   d. carbon and ozone.

2. Water vapor in the atmosphere is the source of
   a. clouds and rain.
   b. pollution.
   c. carbon dioxide.
   d. wind.

3. The amount of energy the atmosphere absorbs depends in part on its level of
   a. nitrogen.
   b. argon.
   c. nitrogen dioxide.
   d. carbon dioxide.

4. Solid particles in the atmosphere include salt and
   a. leaves.
   b. ozone.
   c. dust.
   d. lightning.

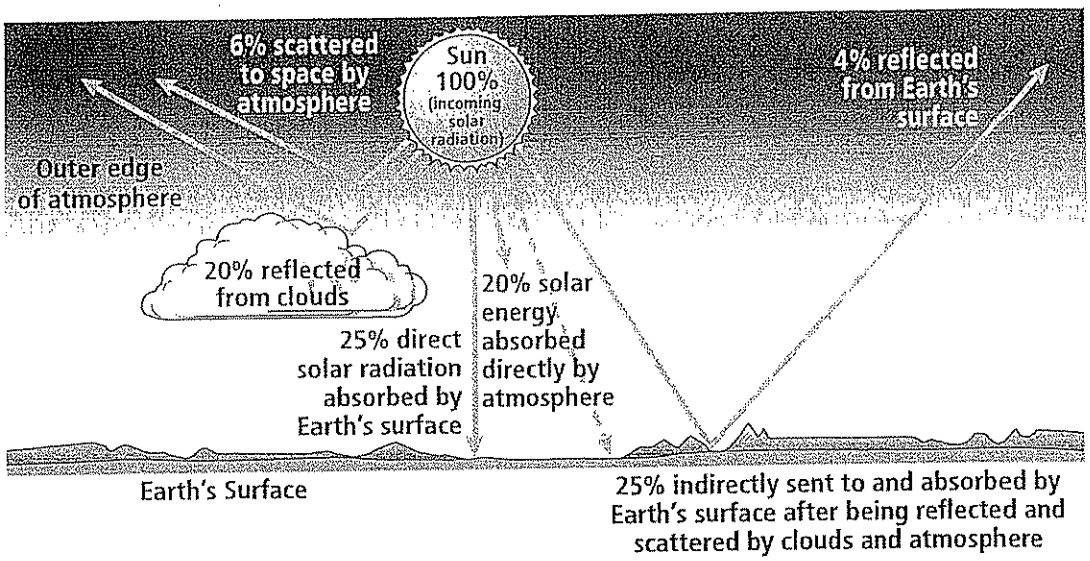
5. Ozone in Earth's atmosphere is important because it
   a. causes rain to fall.
   b. absorbs harmful radiation.
   c. absorbs harmful pollution.
   d. helps clouds form.

In your textbook, read about the structure of the atmosphere.
Complete the table by ~~writing~~ selecting the layer of the atmosphere that matches each description.

Characteristic	Layer
6. Contains concentrated ozone	(A) Exosphere
7. Layer just above the stratosphere	(B) Mesosphere
8. Most weather occurs here.	(C) Thermosphere
9. Outermost layer of the atmosphere	(D) Troposphere
10. Between mesosphere and exosphere	(E) Stratosphere

SECTION 11.1 *Atmospheric Basics, continued*

In your textbook, read about how the atmosphere is heated.
Examine the diagram below. Then answer the questions.



11. What is the source of all energy that reaches Earth? A) clouds B) Sun C) ozone

12. What percentage of the Sun's energy does Earth's surface absorb directly or indirectly? A) 4% B) 20% C) 50%

13. ~~What~~ A percentage of the Sun's energy is scattered or reflected back into space? What causes this loss of solar energy? Lost energy is.....?

A) Scattered by the atmosphere C) Reflected from Earth's surface

B) Reflected from clouds D) All the above

14. Earth's surface is heated by energy from the Sun. For the most part, the rereleased energy from the surface heats the atmosphere. Describe the method by which energy is transferred from Earth's surface to the air above it.

15. Describe convection.

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SECTION 11.2 *Properties of the Atmosphere*

In your textbook, read about heat, temperature, and moisture in the atmosphere.
Use each of the terms below just once to complete the passage.

A **water vapor** B **altitude** C **Fahrenheit** D **heat** E **condensation**
dew point **temperature** **lifted condensation level**

Heat and temperature are not the same. ☐ Temperature is a measure of how rapidly or slowly molecules move. In contrast, 14) _____ is the transfer of energy that takes place because of temperature differences. Temperature can be measured in degrees Fahrenheit, degrees Celsius, or kelvins. The most commonly used temperature scale in the United States is 15 _____.

The atmosphere's temperature plays a role in the formation of rain. Rain drops form when 16) _____ in the atmosphere cools and turns from a gas to a liquid. This change in state is called 17) _____.

Air must be saturated before condensation can occur. Saturation is the point at which the air holds as much water vapor as it possibly can. The ☐ Dew point is the temperature to which air must be cooled at constant pressure to reach saturation. Until this temperature is reached, condensation cannot occur and rain cannot fall.

Temperature in the lower atmosphere generally decreases with increased 18) _____. As air rises, it cools and eventually reaches the temperature at which condensation occurs. The height above the surface at which condensation occurs is the ☐ ~~Lifted condensation level~~.

SECTION 11.2 *Properties of the Atmosphere, continued*

In your textbook, read about air pressure and wind.
For each statement below, write *true* or *false*.

A B

_____ 9. Air is denser near Earth's surface than high in the atmosphere.

_____ 10. Particles of air in the atmosphere exert pressure on Earth's surface.

_____ 11. Air pressure is greater at the top of a mountain than at lower elevations.

_____ 12. In the troposphere, as air temperature increases, generally air pressure increases, too.

_____ 13. Wind is the movement of air from an area of low pressure to an area of high pressure.

_____ 14. As you move upward from Earth's surface, wind speeds increase because the air meets with less friction from Earth's surface.

In your textbook, read about temperature inversion and relative humidity.
Answer the following questions.

15. What is a temperature inversion? Explain how one can form.

A) a decrease in temperature with height in the atmosphere

B) an increase in temperature with height in the atmosphere

C) temperature remains the same with height in the atmosphere

16. What is relative humidity?

A) The amount of oxygen in the air
B) The amount of water vapor in the air
C) The amount of humans in the air

17. What is the relative humidity of fully saturated air?

A) 0% B) 25% C) 50% D) 100% E) 75%

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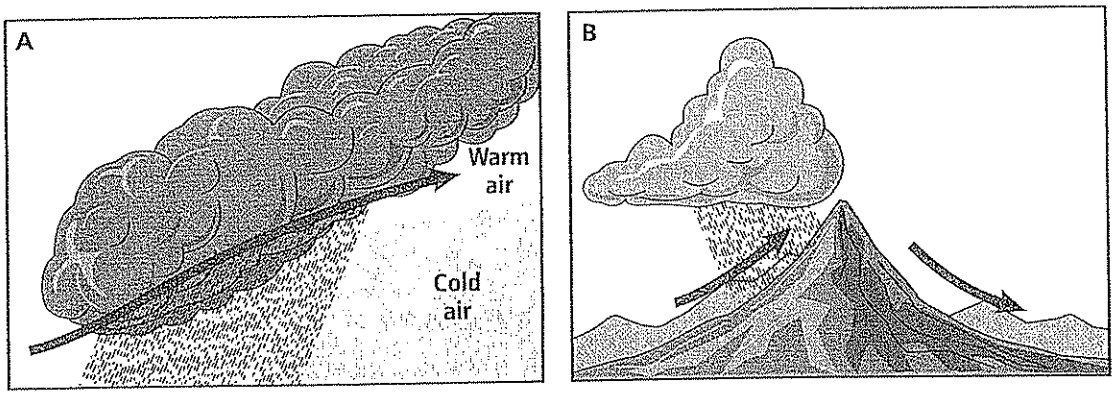
SECTION 11.3 *Clouds and Precipitation*

In your textbook, read about the formation of clouds.
Examine the diagram below. Then answer the questions.



1. What is happening to the air in both A and B that leads to the formation of clouds?

2. What is causing the air to rise in A?

3. What is causing the air to rise in B?

4. What type of cloud formation is shown in B?

5. Explain how condensation nuclei help clouds form.

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SECTION 11.3 *Clouds and Precipitation, continued*

In your textbook, read about moisture in the atmosphere and clouds.
For each item in Column A, write the letter of the matching item in Column B.

Column A	Column B
36. All forms of water that fall from clouds	a. stratus
37. Low, layered clouds	b. cirrus
38. Small cloud droplets join to form larger ones	c. precipitation
39. Wispy, high clouds made of ice crystals	d. coalescence

In your textbook, read about the movement of water between the atmosphere and Earth's surface.
Circle the letter of the choice that best completes the statement.

35 **10.** The constant movement of water between the atmosphere and Earth's surface is
- **a.** cloud formation.
- **b.** the water cycle.
- **c.** precipitation.
- **d.** temperature inversion.

36 **11.** The process of water changing from a liquid to a gas is
- **a.** condensation.
- **b.** precipitation.
- **c.** coalescence.
- **d.** evaporation.

37 **12.** As water vapor rises in the atmosphere, it cools and changes into liquid cloud droplets in a process called
- **a.** evaporation.
- **b.** precipitation.
- **c.** condensation.
- **d.** vaporization.

38 **13.** When cloud droplets combine to form larger drops, they fall to Earth as
- **a.** ozone.
- **b.** condensation.
- **c.** precipitation.
- **d.** water vapor.

39 **14.** The energy that drives the water cycle comes from the
- **a.** Sun.
- **b.** wind.
- **c.** ocean.
- **d.** stratosphere.

40 A