

# Directed Reading 19.1 (ODD)

## Section: Characteristics of the Atmosphere

1. Define *atmosphere*.

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2. Describe two important functions served by Earth's atmosphere.

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### COMPOSITION OF THE ATMOSPHERE

\_\_\_\_\_ 3. Which gas is NOT abundant in Earth's atmosphere?

- a. oxygen
- b. hydrogen
- c. nitrogen
- d. argon

\_\_\_\_\_ 4. The composition of air is approximately the same all over Earth up to an altitude of about

- a. 40 km.
- b. 60 km.
- c. 80 km
- d. 100 km.

\_\_\_\_\_ 5. The two most abundant compounds in air are the gases carbon dioxide and

- a. carbon monoxide.
- b. smog.
- c. water vapor.
- d. hydrocarbons.

\_\_\_\_\_ 6. In addition to containing gaseous elements and compounds, the atmosphere carries various kinds of tiny, solid particles such as dust and

- a. pollution.
- b. pollen.
- c. insects.
- d. rocks.

Directed Reading *continued*

- \_\_\_\_\_ 7. How much of Earth's atmosphere is composed of nitrogen?  
a. 26%  
b. 78%  
c. 52%  
d. 87%
- \_\_\_\_\_ 8. The process by which nitrogen moves from air to the soil, then to plants and animals, eventually returning to the air is called the  
a. life cycle.  
b. atmospheric cycle.  
c. Earth cycle.  
d. nitrogen cycle.
- \_\_\_\_\_ 9. Nitrogen is removed from the air primarily by  
a. salt water.  
b. airborne bacteria.  
c. nitrogen-fixing bacteria.  
d. evaporation.

10. Describe the four steps of the nitrogen cycle.

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11. What percentage of Earth's atmosphere is made up of oxygen?

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12. Identify six ways oxygen is removed from the atmosphere.

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**Directed Reading *continued***

13. How is oxygen returned to the atmosphere?

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14. Is the current oxygen content of the atmosphere lower, higher, or about the same as it was millions of years ago? Explain your answer.

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15. As water evaporates from oceans, lakes, streams, and soil, it enters air as \_\_\_\_\_.

16. What is the life process by which plants and animals give off water vapor?

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17. How is water vapor removed as it enters the atmosphere?

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18. What are three factors that affect the percentage of water vapor in the air?

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19. What percentage of dry air is water?

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20. What percentage of moist air is water?

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21. What is ozone? How does it differ from oxygen?

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Directed Reading *continued*

22. What purpose does the ozone layer serve?

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23. Describe the effect of chlorofluorocarbons (CFCs) on the ozone layer.

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24. What are particulates?

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25. List seven different particulates.

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26. List four common sources of particulates.

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Directed Reading *continued*

27. How do large particles in the atmosphere differ from small particles?

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**ATMOSPHERIC PRESSURE**

\_\_\_\_\_ 28. What holds the gases of the atmosphere near Earth's surface?

- a. molecules
- b. air
- c. gravity
- d. pressure

\_\_\_\_\_ 29. The pressure exerted on a surface by the atmosphere is called

- a. water pressure.
- b. gravitational pressure.
- c. surface pressure.
- d. atmospheric pressure.

\_\_\_\_\_ 30. The pressure of the atmosphere is exerted

- a. unequally in all directions.
- b. equally in all directions.
- c. unequally sideways.
- d. unequally up and down.

\_\_\_\_\_ 31. How much of the total mass of the atmosphere does gravity keep within 32 km of Earth's surface?

- a. 1%
- b. 32%
- c. 99%
- d. 78%

\_\_\_\_\_ 32. Because there is less weight pressing down from above at higher altitudes, the air molecules there are farther apart and exert

- a. less pressure.
- b. more pressure.
- c. the same pressure.
- d. no pressure.

\_\_\_\_\_ 33. Atmospheric pressure decreases as altitude

- a. decreases.
- b. disappears.
- c. increases.
- d. remains the same.

**Directed Reading *continued***

34. In addition to altitude, what are two other factors that cause atmospheric pressure to change?

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35. In general, what happens to atmospheric pressure at sea level when the temperature increases?

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36. Why is air that contains a lot of water vapor less dense than drier air?

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**MEASURING ATMOSPHERIC PRESSURE**

37. List three units that meteorologists use to measure atmospheric pressure.

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**In the space provided, write the letter of the description that best matches the term or phrase.**

\_\_\_\_\_ 38. standard atmospheric pressure

\_\_\_\_\_ 39. barometer

\_\_\_\_\_ 40. mercurial barometer

\_\_\_\_\_ 41. aneroid barometer

\_\_\_\_\_ 42. altimeter

a. instrument that measures atmospheric pressure using a column of liquid mercury

b. instrument that measures atmospheric pressure; changes in atmospheric pressure cause the sides of this sealed metal container to bend inward or bulge out

c. instrument used to measure atmospheric pressure

d. aneroid barometer that registers altitude above sea level rather than air pressure

e. the average atmospheric pressure at sea level, equalling 760 mm of mercury, 1 atm, or 1,000 mb

Directed Reading *continued*

**LAYERS OF THE ATMOSPHERE**

43. In Earth's atmosphere, what causes the distinctive pattern of temperature changes with increasing altitude?

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In the space provided, write the letter of the description that best matches the term or phrase.

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|------------------------|---|
| _____ 44. troposphere  | a. the layer of the atmosphere between the troposphere and the mesosphere, in which temperature increases as altitude increases             |
| _____ 45. tropopause   | b. the uppermost layer of the atmosphere, in which temperature increases as altitude increases  |
| _____ 46. stratosphere | c. the upper boundary of the stratosphere   |
| _____ 47. stratopause  | d. the upper boundary of the troposphere  |
| _____ 48. mesosphere   | e. the upper boundary of the mesosphere   |
| _____ 49. mesopause    | f. the coldest layer of the atmosphere, between the stratosphere and the thermosphere, in which temperature decreases as altitude increases |
| _____ 50. thermosphere | g. the lowest layer of the atmosphere, in which temperature drops at a constant rate as altitude increases                                  |
| _____ 51. ionosphere   | h. the region above the ionosphere, where Earth's atmosphere blends into the almost complete vacuum of space                                |
| _____ 52. auroras      | i. phenomena caused by interactions between solar radiation and the ionosphere  |
| _____ 53. exosphere    | j. the lower region of the thermosphere   |

54. Why does the temperature in the troposphere decrease as altitude increases?

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Directed Reading *continued*

55. Why does temperature begin to increase in the upper stratosphere?

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56. Why does the temperature in the thermosphere steadily rise?

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**TEMPERATURE INVERSIONS**

57. What is an air pollutant?

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58. How do fossil fuels cause air pollution?

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59. What is a temperature inversion?

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60. What is smog?

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