

Directed Reading

Section: Characteristics of the Atmosphere

1. Define *atmosphere*.

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

COMPOSITION OF THE ATMOSPHERE

3. The most abundant elements in air include all of the following gases EXCEPT
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 and then to plants and animals and eventually returns 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.

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

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

Directed Reading *continued*

13. Explain how oxygen is returned to the atmosphere.

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.

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?

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

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

19. What percentage of water is in dry air?

20. What percentage of water is in moist air?

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

Directed Reading *continued*

22. What purpose does the ozone layer serve?

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

24. What are particulates?

25. List seven different particulates.

26. Describe four common sources of particulates.

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Directed Reading *continued*

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

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 the pull of gravity is not as strong 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. It can be said that atmospheric pressure decreases as altitude

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

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Directed Reading *continued*

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

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

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

37. What three units do meteorologists use to measure atmospheric pressure?

MEASURING ATMOSPHERIC PRESSURE

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 a sealed metal container to bend inward or bulge out

c. an instrument used to measure atmospheric pressure

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

e. 1 atmosphere; the average atmospheric pressure at sea level, equalling 760 mm of mercury or 1,000 millibars

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Directed Reading *continued*

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

LAYERS OF THE ATMOSPHERE

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

- | | |
|------------------------|---|
| _____ 44. troposphere | a. the layer of atmosphere between the troposphere and the mesosphere, in which temperature increases as altitude increases |
| _____ 45. tropopause | b. the uppermost layer of atmosphere, in which temperature increases as altitude increases |
| _____ 46. stratosphere | c. upper boundary of the stratosphere |
| _____ 47. stratopause | d. the upper boundary of the troposphere |
| _____ 48. mesosphere | e. 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. Explain why the temperature in the troposphere decreases as altitude increases.

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

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56. Explain why the temperature in the thermosphere steadily rises.

TEMPERATURE INVERSIONS

57. What is an air pollutant?

58. How do fossil fuels cause air pollution?

59. What is a temperature inversion?

60. What is smog?

