

Directed Reading 20.1 (ODD)

Section: Atmospheric Moisture

1. The states in which water exists in the atmosphere are called _____.
2. The gas phase of water is known as _____.
3. The solid phase of water is known as _____.
4. The liquid phase of water is known as _____.

CHANGING FORMS OF WATER

- _____ 5. When does water change from one phase to another?
 - a. when water molecules are held stationary
 - b. when evaporation occurs
 - c. when heat energy is absorbed or released
 - d. when molecules are in a crystalline arrangement
- _____ 6. When ice absorbs energy, the molecules of ice
 - a. move more quickly.
 - b. become stationary.
 - c. become crystals.
 - d. slow down.
- _____ 7. What phase does ice change into when it absorbs energy?
 - a. gas
 - b. liquid
 - c. crystals
 - d. solid
- _____ 8. When liquid water absorbs energy, it changes to
 - a. a gas.
 - b. a liquid.
 - c. crystals.
 - d. a solid.
- _____ 9. What happens to the water molecules when the water absorbs energy?
 - a. They move closer together.
 - b. They collide more frequently.
 - c. They become stationary.
 - d. They move more slowly.

Directed Reading *continued*

- _____ 10. The process in which the fastest-moving molecules escape from liquid and form invisible water vapor is called
- condensation.
 - latent heat.
 - evaporation.
 - collision.
- _____ 11. The name for heat energy that is absorbed or released during a phase change is
- latent heat.
 - evaporation.
 - water vapor.
 - potential energy.
- _____ 12. When liquid water evaporates, the water
- releases energy into the atmosphere.
 - condenses into water vapor.
 - starts to flow more rapidly.
 - absorbs energy from the environment.
- _____ 13. What happens to energy absorbed by water during evaporation?
- It condenses to form a liquid.
 - It melts ice.
 - It is reflected into the atmosphere.
 - It becomes potential energy between water molecules.
- _____ 14. The name for the process in which water vapor changes back into a liquid is
- condensation.
 - latent heat.
 - collision.
 - evaporation.
- _____ 15. During the condensation of water, latent heat
- is released to the water.
 - disappears.
 - is released into the surrounding air.
 - is absorbed by the water.
- _____ 16. What happens to latent heat when ice thaws?
- It is released.
 - It is absorbed.
 - It is recycled.
 - It is lost.

Directed Reading *continued*

_____ 17. When water freezes, latent heat

- a. condenses.
- b. is released into the air.
- c. evaporates.
- d. is absorbed.

_____ 18. Through what process does most water enter the atmosphere?

- a. evaporation
- b. absorption
- c. condensation
- d. release

19. Where on Earth does most evaporation take place?

20. List four other important sources of water vapor in the atmosphere.

21. List three lesser important sources of water vapor in the atmosphere.

22. What usually happens to ice before it changes into a gas?

23. What is the name of the process in which a solid changes directly into a gas?

24. Under what conditions might sublimation of snow and ice occur?

25. Water vapor can turn directly into ice without becoming a(n)

Directed Reading *continued*

HUMIDITY

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

- | | |
|-----------------------------|---|
| _____ 26. humidity | a. the temperature at which condensation equals evaporation |
| _____ 27. dew point | b. water vapor in the atmosphere |
| _____ 28. absolute humidity | c. the mass of water vapor contained in a given volume of air |
| _____ 29. mixing ratio | d. the mass of water vapor in a unit of air relative to the mass of the dry air |

30. What controls humidity?

31. What determines the rate of evaporation?

32. What happens to the rate of evaporation as the temperature gets higher?

33. What determines the rate of condensation?

34. The part of the total atmospheric pressure that is caused by water vapor is

35. When there is equilibrium between the rate of evaporation and the rate of condensation, the air is _____.

36. The measure of the amount of water vapor in the air is called

37. What equation is used to calculate the absolute humidity?

38. Why do meteorologists prefer to describe humidity by using the mixing ratio of air?

Directed Reading *continued*

39. What is the mixing ratio of air that has 18 g of water vapor in 1 kg of air?

40. What is a common mixing ratio for air in polar regions?

41. Why is the mixing ratio not affected by changes in temperature or pressure?

42. The ratio of the actual water vapor content of the air to the amount of water vapor needed to reach saturation is called _____.

43. If a person wanted to know how close the air is to reaching the dew point, he or she would calculate the _____.

44. At what point does air become saturated at 25 °C?

45. How would you express the relative humidity of air that is at 25 °C and contains 5 g of water?

46. What can make the relative humidity change even if the temperature does not change?

47. What can make the relative humidity increase if the moisture in the air remains the same?

48. What happens to the relative humidity if the temperature increases as the moisture in the air remains constant?

49. What can cause air to cool to its dew point?

50. What is the name of the condensation that forms during the night?

Directed Reading *continued*

51. What causes dew to form?

52. Under what conditions is dew most likely to form?

53. What is the form of condensation that forms if the dew point falls below the freezing temperature of water?

54. What is the difference between frost and frozen dew?

MEASURING HUMIDITY

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

_____ 55. dew cell

_____ 56. thin polymer film

_____ 57. psychrometer

a. an instrument used to measure relative humidity consisting of two identical thermometers

b. used in an electrical hygrometer

c. an instrument used to measure relative humidity consisting of a ceramic cylinder and two electrodes

58. Why do meteorologists measure humidity?

59. Describe how a thin polymer film is used to measure relative humidity.

60. What is the difference between the two thermometers of a psychrometer?

Directed Reading *continued*

61. What happens to the water in the wick of a wet-bulb thermometer and the energy when the psychrometer is whirled through the air?

62. How does the temperature of the wet-bulb thermometer differ from that of the dry-bulb thermometer after the psychrometer is whirled through the air?

63. What would you use to calculate the relative humidity from a psychrometer?

64. What happens when the lithium chloride in a dew cell absorbs water from the air?

65. By detecting the electrical resistance of LiCl as it is heated and cooled, the dew cell can determine the _____.

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

_____ 66. hair hygrometer

_____ 67. radiosonde

_____ 68. electric hygrometer

a. an instrument that measures humidity at high altitudes

b. an instrument that measures relative humidity by using hair

c. a package that carries instruments into the atmosphere

69. As relative humidity increases, what happens to hair?

70. How does an electric hygrometer work?
