

Directed Reading

Section: Clouds and Fog

1. A collection of small water droplets or ice crystals in the air is a(n) _____.
2. Clouds are not limited to _____.
3. A cloud that forms near or on Earth's surface is _____.

CLOUD FORMATION

- _____ 4. What must be available for water vapor to condense and form a cloud?
 - a. a solid surface
 - b. empty space
 - c. high winds
 - d. a body of water
- _____ 5. The lowest layer of the atmosphere is the
 - a. stratosphere.
 - b. ionosphere.
 - c. troposphere.
 - d. thermosphere.
- _____ 6. What is present in the troposphere that is essential for cloud formation?
 - a. a large solid surface
 - b. large particles
 - c. stationary dust surfaces
 - d. millions of particles
- _____ 7. Suspended particles that provide a surface for water vapor to condense are called
 - a. water molecules.
 - b. salt molecules.
 - c. condensation nuclei.
 - d. saturated air.
- _____ 8. What happens when water molecules collect on condensation nuclei?
 - a. The rate of condensation decreases.
 - b. Water droplets form.
 - c. The air temperature reaches the dew point.
 - d. The rate of evaporation decreases.

Directed Reading *continued*

- _____ 9. What condition must the air be in for clouds to form?
- The air must not be saturated with water vapor.
 - The air must have a low relative humidity.
 - The air must be dry.
 - The air initially must be saturated with water vapor.
- _____ 10. The net condensation that forms clouds may be caused by
- the warming of air.
 - the cooling of air.
 - rapid evaporation of air.
 - constant air temperature.

ADIABATIC COOLING

- _____ 11. What happens to molecules in rising air?
- They move closer together.
 - They move farther apart.
 - They do not move.
 - They have more collisions.
- _____ 12. What occurs in adiabatic cooling?
- Two bodies of moist air mix and change the air temperature.
 - The temperature of an air mass decreases as the air rises.
 - Air rises on a mountain and cools.
 - Air moves over a warm surface and cools.
- _____ 13. What does the adiabatic lapse rate describe?
- the temperature of a rising or sinking parcel of air
 - the amount the temperature of rising or sinking air changes
 - the amount of clouds in rising or sinking air
 - the rate at which the temperature of rising or sinking air changes
- _____ 14. What is the adiabatic lapse rate for clear air?
- 1 °C for every 100 m that air rises
 - 1 °C for every 1000 m that air rises
 - 1 °C for every 100 m that air rises
 - 0.5 °C for every 100 m that air rises
- _____ 15. What is the average adiabatic lapse rate for cloudy air?
- more than 1 °C per 100 m that air rises
 - 1 °C per 100 m that air rises
 - between 0.5 °C and 0.9 °C per 100 m that air rises
 - between -0.5 °C and -0.9 °C per 100 m that air rises

Directed Reading *continued*

16. Why does cloudy air have a slower rate of cooling than clear air?

17. What happens to the energy from the sun when it reaches Earth's surface?

18. Describe what happens to air near Earth's surface.

19. What is the name of the altitude at which condensation begins to form clouds?

MIXING

20. How does the mixing of two bodies of moist air with different temperatures cause clouds to form?

LIFTING

21. What are the results of air being forced upward?

22. What kind of terrain may force air upward?

23. How do large cloud formations that are associated with storm systems form?

Directed Reading *continued*

ADVECTIVE COOLING

24. What is the name of the process in which the temperature of an air mass decreases as it moves over a cold surface, such as land or a cold ocean?

25. What happens when an air mass moves over a surface colder than the air is?

26. What must happen in order for air cooled by adiabatic cooling, mixing, lifting, and advective cooling to form clouds?

CLASSIFICATION OF CLOUDS

27. What two features are used to classify clouds?

28. List the three basic types of clouds.

29. List the three altitude groups of clouds and their heights.

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

_____ 30. stratus clouds

_____ 31. altostratus clouds

_____ 32. cumulus clouds

_____ 33. cumulonimbus clouds

_____ 34. cirrus clouds

_____ 35. cirrostratus clouds

a. feathery clouds made of ice crystals

b. middle-altitude clouds that usually produce little precipitation

c. high, dark storm clouds

d. clouds that form a high, transparent veil

e. billowy, low-altitude clouds

f. clouds with a flat base that form at very low altitudes

Directed Reading *continued*

36. Clouds that form where a layer of warm, moist air lies above a layer of cool air are called _____.

37. What do the prefix *nimbo-* and the suffix *-nimbus* both mean?

38. How do nimbostratus clouds differ from other stratus clouds?

39. What does *cumulus* mean?

40. What does the characteristic flat base of cumulus clouds represent?

41. On what two factors does the height of a cumulus cloud depend?

42. In what kind of weather do cumulus clouds grow highest?

43. What are cumulus clouds at middle altitudes called?

44. Name the low clouds that are a combination of two kinds of clouds.

45. What do *cirrus* and *cirro-* both mean?

46. At what altitude do cirrus clouds form?

47. Why does light easily pass through cirrus clouds?

48. Which clouds often appear before a snowfall or rainfall?

Directed Reading *continued*

49. Compare and contrast fog and clouds.

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

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|-------------------------|---|
| _____ 50. radiation fog | a. forms when cool air moves over an inland warm body of water |
| _____ 51. advection fog | b. forms due to the loss of heat by radiation when Earth cools at night |
| _____ 52. upslope fog | c. forms when warm, moist air from above water moves over a cooler land surface |
| _____ 53. steam fog | d. forms when air rises along land slopes |

54. Why is radiation fog thickest in valleys and other low places?

55. Why is radiation fog often thick around cities?

56. Where is advection fog common?
