

Chapter 13 Assessment The Nature of Storms

Use each of the terms below just once to complete the passage.

condensation	warmer	unstable	convection
cumulonimbus	moisture	stable	

At any moment, more than 2000 thunderstorms are occurring on Earth. Thunderstorms develop from cumulus clouds that grow into huge (1) _____ clouds.

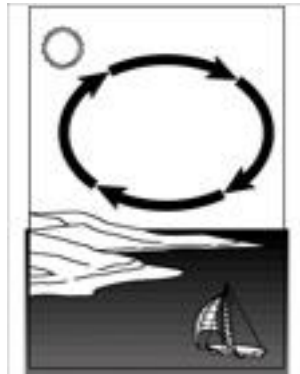
Thunderstorms form when three conditions exist that cause cumulus clouds to grow by the energy transfer method of (2) _____. First, there must be sufficient (3) _____ in the lower atmosphere to condense and release latent heat. Second, some mechanism must make the air rise, causing the cloud to grow. Third, the portion of the atmosphere that the cloud grows through must be (4) _____. The rising cloud must stay (5) _____ than the air around it in order for the growth to continue.

The cloud's growth stops when the rate of (6) _____ in the cloud, which diminishes with height, is insufficient to create enough heat to keep the cloud warmer than the air around it. Growth will also stop if the rising air meets a layer of (7) _____ air that it cannot overcome.

For each item in Column A, write the letter of the matching item in Column B.

- | Column A | Column B |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------|
| <p>_____ 8. Forms when an air mass rises as a result of orographic lifting</p> | <p>a. frontal thunderstorm</p> |
| <p>_____ 9. Forms because of temperature differences between the air over land and the air over water</p> | <p>b. mountain thunderstorm</p> |
| <p>_____ 10. Forms as cold air pushes warm air up at a boundary between cold and warm air masses</p> | <p>c. sea-breeze thunderstorm</p> |

Examine the diagram below. Then answer the questions.



11. What phenomenon is pictured in the diagram?

12. Describe how a sea breeze may lead to the formation of a thunderstorm.

13. Why is a sea-breeze thunderstorm considered a type of air-mass thunderstorm?

Circle the letter of the choice that best completes the statement.

14. Extremely powerful thunderstorms that develop intense, rotating updrafts are

- a. downbursts.
- b. supercells.
- c. cumulus cells.
- d. convection bursts.

15. Electricity caused by the rapid rush of air in a cumulonimbus cloud is

- a. thunder.
- b. hail.
- c. friction.
- d. lightning.

16. Violent downdrafts that are concentrated in one local area are

- a. downdraft cells.
- b. downstrokes.
- c. downbursts.
- d. updrafts.

- 17.** Powerful downdrafts that affect an area of less than 3 km are
- a.** microbursts.
 - b.** macrobursts.
 - c.** supercells.
 - d.** updrafts.
- 18.** Precipitation in the form of balls or lumps of ice is
- a.** sleet.
 - b.** drizzle.
 - c.** snow.
 - d.** hail.
- 19.** The intense updrafts and downdrafts that characterize severe thunderstorms are the result of
- a.** unstable air caused by temperature differences between the upper and lower parts of a storm.
 - b.** the contact between rising air and a layer of stable air.
 - c.** the slowing of the rate of condensation within a cloud.
 - d.** the cooling of the air inside a cumulonimbus cloud to a temperature lower than the surrounding air.
- 20.** Flooding often occurs if rain falls faster than
- a.** snow.
 - b.** rates of condensation.
 - c.** the ground can absorb it.
 - d.** clouds can form.
- 21.** Hail forms in part because of the presence of
- a.** supercooled water droplets.
 - b.** above-freezing temperatures.
 - c.** high-pressure systems.
 - d.** melting snow
- 22.** A mound of water driven toward coastal areas by hurricane winds is called a
- a.** cyclone.
 - b.** supercell.
 - c.** storm surge.
 - d.** cold front.
- 23.** An extended period of well-below-normal rainfall is a
- a.** flood.
 - b.** drought.
 - c.** heat wave.
 - d.** tropical cyclone.
- 24.** The phenomenon in which the effects of cold air are worsened by wind is the
- a.** supercell.
 - b.** sea breeze.
 - c.** wind chill factor.
 - d.** cold wave.

Answer the following questions.

25. What is a tornado?

26. Describe how a tornado forms.

27. During which time of year do most violent tornadoes form? **Explain** why.

28. Where in the United States do many tornadoes occur? **Explain** why.

Examine the table below. Then answer the questions.

Enhanced Fujita Tornado Damage Scale

Rank	Category	Wind Speed (km/h)
EF0 and EF1	Weak	105–177
EF2 and EF3	Strong	178–266
EF4 and EF5	Violent	more than 267

29. The Enhanced Fujita scale classifies tornadoes according to what two criteria?

30. What is the wind speed of the most violent tornadoes on the scale?

31. Which Category is an EF3 tornado?

Number the stages in the development of a hurricane in the order in which they occur.

- _____ 32. tropical disturbance
- _____ 33. hurricane
- _____ 34. tropical storm
- _____ 35. tropical depression

Determine if the statement is true. If it is not, rewrite the italicized part to make it true.

- _____ 36. To people living near the Atlantic Ocean, tropical cyclones are known as *hurricanes*.
- _____ 37. Tropical cyclones are large, rotating, *high-pressure* storms.
- _____ 38. Tropical cyclones originate over the warm waters of most *tropical* oceans.
- _____ 39. Hurricanes are classified according to the *Fujita scale*.
- _____ 40. The minimum wind speed for a *Category 1* hurricane is 74 mph (120 kph).
- _____ 41. The eye of a hurricane is surrounded by a band of strong winds called the *eye current*.
- _____ 42. Hurricane winds can drive a mound of water toward the coast, where it washes over land. This is called a *storm surge*

Complete the table by writing the result of each weather pattern. Choose from the following: cold wave, drought, flood, heat wave.

Weather Pattern	Result
43. Thunderstorm remains over an area for many hours	
44. Extended period of well-below-normal rainfall	
45. Extended period of above-normal temperatures	
46. Extended period of below-normal temperatures	

Complete the table by writing the name of each weather pattern associated with each atmospheric event. Choose from the following: cold wave, flood, heat wave, drought.

Atmospheric Event	Weather Pattern
47. Large pools of extremely cold air develop strong high-pressure systems over polar continental areas. Jet streams move systems.	
48. Large, warm, high-pressure system develops, remains over an area, and blocks cooler air masses from entering the area.	
49. Sinking air from a strong high-pressure system stops air from rising and condensation from occurring over a long period of time.	
50. A thunderstorm unleashes heavy precipitation.	

Answer the following questions.

51. A community in Texas broadcasts public service announcements on tornado safety. Would the broadcasts be more effective right before winter, spring, summer, or fall? **Explain** your answer.

52. Could a hurricane form over the northern Atlantic, off the eastern coast of Canada? **Explain** your answer.

53. Why are people who live along the coast or other low-lying areas often in more danger from hurricanes than people who live inland?

54. A Category 4 hurricane has just become a Category 5. **Explain** what has happened to air pressure in the storm and the strength of its winds. What are the changes?

55. Could the atmospheric conditions that cause a drought also cause the formation of a supercell? **Explain** your answer.

56. Why do weather forecasters often report the wind chill factor in winter?
