

The Nature of Storms

SECTION 13.1 Thunderstorms

In your textbook, read about thunderstorm formation.

Use each of the terms below just once to complete the passage. #1 to #5

- A) convection C) warmer E) unstable
 B) cumulonimbus D) moisture

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.

#6 & #7 select from the list below:
 A) condensation
 B) Unstable
 C) Stable

In your textbook, read about different types of thunderstorms.

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

Column A

- _____ **8.** Forms when an air mass rises as a result of orographic lifting
- _____ **9.** Forms because of temperature differences between the air over land and the air over water
- _____ **10.** Forms as cold air pushes warm air up at a boundary between cold and warm air masses

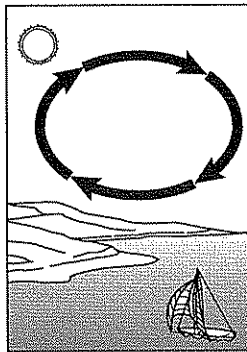
Column B

- a.** frontal thunderstorm
- b.** mountain thunderstorm
- c.** sea-breeze thunderstorm

SECTION 13.1 Thunderstorms, continued

In your textbook, read about air-mass thunderstorms.

Examine the diagram below. Then answer the questions.



11. What phenomenon is pictured in the diagram?

- A) Land Breeze B) Sea Breeze

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

cool dense air over the water moves inland, forcing up the warm, less dense air up over the land.
This process can produce strong updrafts that results in a thunderstorm.

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

- A) Frontal Thunderstorm

- B) Air mass Thunderstorm

In your textbook, read about the stages of thunderstorm development.

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

- | | |
|---|-----------------------|
| _____ 13. Equal amounts of updrafts and downdrafts form convection cells. | Step 1 = A |
| _____ 14. Warm, moist air rises quickly, and the moisture condenses into a visible cloud. Then updrafts form. | Step 2 = B |
| _____ 15. Falling precipitation cools the air around it, forming downdrafts. | Step 3 = C |
| _____ 16. Precipitation begins to fall. | Step 4 = D |
| _____ LAST step | Step 5 = E |
| _____ The updrafts cease and precipitation stops. | Last step = last step |
| _____ 17. The updrafts slow as downdrafts decrease the supply of warm, moist surface air. | |

SECTION 13.2 Severe Weather

In your textbook, read about thunderstorms and the dangerous conditions they cause.

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

18. Extremely powerful thunderstorms that develop intense, rotating updrafts are
- a. downbursts.
 - b. supercells.
 - c. cumulus cells.
 - d. convection bursts.
19. Electricity caused by the rapid rush of air in a cumulonimbus cloud is
- a. thunder.
 - b. hail.
 - c. friction.
 - d. lightning.
20. Violent downdrafts that are concentrated in one local area are
- a. downdraft cells.
 - b. downstrokes.
 - c. downbursts.
 - d. updrafts.
21. Powerful downdrafts that affect an area of less than 3 km are
- a. microbursts.
 - b. macrobursts.
 - c. supercells.
 - d. updrafts.
22. Precipitation in the form of balls or lumps of ice is
- a. sleet.
 - b. drizzle.
 - c. snow.
 - d. hail.
23. 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.
24. Flooding often occurs if rain falls faster than
- a. snow.
 - b. rates of condensation.
 - c. the ground can absorb it.
 - d. clouds can form.
25. Hail forms in part because of the presence of
- a. supercooled water droplets.
 - b. above-freezing temperatures.
 - c. high-pressure systems.
 - d. melting snow.

SECTION 13.2 Severe Weather, continued

In your textbook, read about tornado formation.

Answer the following questions.

26) . What is a tornado?

- A) Rapidly rotation storm system around Low Pressure B) Rapidly rotating column of air around Low Pressure

Describe how a tornado forms.

Froms when wind speed :& direction shift suddenly with height. This horizontal rotation can be shifted to vertical position with UPDRAFTS

27) During which time of year do most violent tornadoes form?

- A) Spring B) Summer C) Winter D) Fall

28) . Where in the United States do many tornadoes occur? .

- A) California C) Central U.S. (great plains)
B) Eastern Coastline D) Florida

In your textbook, read about tornado classification.

Examine the table below. Then answer the questions.

Fujita Tornado Intensity Scale

Rank	Category	Path of Destruction	Wind Speed (mph)	Duration
F0 and F1	Weak	up to 3 miles	60–115	1–10 minutes
F2 and F3	Strong	15+ miles	110–205	20 minutes or longer
F4 and F5	Violent	50+ miles	more than 200	1 hour or longer

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

- A) Path of Destruction B) Wind Speed C) Duration D) A, B, & C

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

- A) 60 - 115 mph B) 110 - 205 mph C) 200+ mph D) 1000 - 1500 mph

31) . How long would an average F3 tornado last?

- A) 1 to 10 minutes B) 20 minutes to hour C) hour to 4 hours

SECTION 13.3 Tropical Storms

In your textbook, read about the life cycle of a hurricane.

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

In your textbook, read about tropical cyclones and the damage they cause.

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

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

SECTION 13.4 Recurrent Weather

In your textbook, read about weather patterns and problems they cause.

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

(a) (b) (c) (d)

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

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*.

(a) (b) (c) (d)

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