

CH 8 - Atmosphere and Severe Weather (pp. 236 - 277)

The Tri-State Tornado of 1925

1. Although most weather-related deaths are caused by \_\_\_\_\_, the most feared weather hazard is the \_\_\_\_\_, which is a violently rotating column of air associated with \_\_\_\_\_.
  2. In \_\_\_\_\_ hours, the Tri-State Tornado \_\_\_\_\_ and \_\_\_\_\_ than any other tornado in \_\_\_\_\_.
  3. This tornado was on the ground for \_\_\_\_\_ mi, reached \_\_\_\_\_ mi. in width, produced damage over \_\_\_\_\_ sq. mi., travelled at an average of \_\_\_\_\_ mph., killed at least \_\_\_\_\_ people, injured \_\_\_\_\_, and cost \_\_\_\_\_.
- 8.1
4. The total amount of solar energy that reaches the Earth is about \_\_\_\_\_ times the amount of energy humans use. This gigantic amount of energy drives the \_\_\_\_\_ processes.
  5. The heat that can be sensed or monitored by a thermometer is \_\_\_\_\_.
  6. The heat that is absorbed or released when water changes phase is \_\_\_\_\_.
- 8.2
7. Of the insolation reaching Earth, \_\_\_\_\_ % is reflected back into space, \_\_\_\_\_ % is absorbed in the atmosphere, and \_\_\_\_\_ % is absorbed by Earth's surface. Of the energy absorbed at the surface, \_\_\_\_\_ % is reradiated back into space. Earth's energy balance is such that over time, energy absorbed \_\_\_\_\_ energy re-radiated. Currently however, Earth is absorbing \_\_\_\_\_ than it is re-radiating back into space because of the \_\_\_\_\_ from air pollutants.
- 8.5
8. In North America, thunderstorms are most common along the Front Range of the Rocky Mountains in \_\_\_\_\_ and in the Southeast.

9. Thunderstorms are most common during the \_\_\_\_\_ and \_\_\_\_\_ hours.

10. Things required for a thunderstorm to form:

A) \_\_\_\_\_ in lower atmosphere,

B) A steep vertical temperature gradient, so warm air can rise through colder air above,

Therefore \_\_\_\_\_, \_\_\_\_\_ air exists below \_\_\_\_\_ air,

C) An updraft must force \_\_\_\_\_ air up to \_\_\_\_\_ heights.

11. The three stages of development of a thunderstorm are 1) \_\_\_\_\_,

2) \_\_\_\_\_, 3) \_\_\_\_\_.

12. During the Cumulus Stage, upward growth forms a \_\_\_\_\_

cloud with domes and towers that look like the head of a \_\_\_\_\_.

As water vapor condenses to form clouds, large quantities of \_\_\_\_\_ heat are

released, warming the air and causing it to \_\_\_\_\_ further.

13. At high altitudes, water droplets \_\_\_\_\_ into \_\_\_\_\_,

which fall into warmer air and \_\_\_\_\_ to form \_\_\_\_\_.

Water droplets collide to form \_\_\_\_\_, which fall and create a \_\_\_\_\_.

14. During the Mature Stage, the \_\_\_\_\_ and rain leave the base of the cloud.

The storm grows to reach the \_\_\_\_\_, and updrafts build the cloud

\_\_\_\_\_ to form an \_\_\_\_\_ shape. Heavy rain and \_\_\_\_\_ fall,

along with \_\_\_\_\_ and \_\_\_\_\_.

15. During the Final or \_\_\_\_\_ Stage, the upward supply of

\_\_\_\_\_ air is blocked by \_\_\_\_\_ at the lower levels.

Downdrafts \_\_\_\_\_ from surrounding air, causing evaporation, which \_\_\_\_\_ the

downdraft further. Deprived of \_\_\_\_\_, the thunderstorm \_\_\_\_\_,

\_\_\_\_\_ decreases, and the cloud \_\_\_\_\_.

16. Severe thunderstorms have winds at least \_\_\_\_\_ mph, hailstones at least \_\_\_\_\_ in.,

or tornadoes. They are characterized by large differences in wind speed and direction at

slightly different altitudes, which is called \_\_\_\_\_.

17. There are three types of severe thunderstorms:

A) Mesoscale convective systems: \_\_\_\_\_

B) Squall lines: \_\_\_\_\_

C) Supercells: \_\_\_\_\_

18. Curved lines of thunderstorms that travel long distances are called \_\_\_\_\_.

19. Downdrafts that surge forward ahead of the precipitation are called \_\_\_\_\_.

20. Spring and summer bring air mass boundaries similar to fronts, but where air masses differ in moisture content rather than temperature are called \_\_\_\_\_. The daily \_\_\_\_\_ they produce can lead to tornadoes.

21. Supercell storms are extremely \_\_\_\_\_ and can breed large \_\_\_\_\_.

22. Downbursts can generate strong, straight-line windstorms, the largest of which are called \_\_\_\_\_. These can produce severe, tornado-strength gusts for more than 250 miles. Smaller downburst, called \_\_\_\_\_, are more common.

23. Flashes of \_\_\_\_\_, produced by the discharge of \_\_\_\_\_ of joules of electricity, are called \_\_\_\_\_. It heats the air to \_\_\_\_\_ °F, five times as hot as the surface of \_\_\_\_\_. This cause the surrounding air to explode, which we call \_\_\_\_\_.

24. Most lightning bolts are \_\_\_\_\_ to \_\_\_\_\_, but about \_\_\_\_\_ cloud to ground bolts strike the U.S. each year.

25. When a thunderstorm grows high enough for rising ice crystals and falling pellets to form, interaction between them can create an \_\_\_\_\_. The upper part of the cloud builds up a \_\_\_\_\_ charge, while the lower part becomes \_\_\_\_\_, driving away the negative charges on the ground below, leaving it with a net \_\_\_\_\_ charge.

26. Lightning strikes begin when a narrow column of \_\_\_\_\_ move downward

from the base of a cloud. As this column, called a \_\_\_\_\_, approaches the ground, a spark jumps from a tall object such as a \_\_\_\_\_ or \_\_\_\_\_, and attaches to the leader. Then an \_\_\_\_\_ surge of \_\_\_\_\_ electrical charge heats the air to create a \_\_\_\_\_ of lightning to the cloud. All within milliseconds, additional leaders and return strokes move along the \_\_\_\_\_ and cause the lightning to appear to \_\_\_\_\_ to the human eye.

27. During one 80-year lifetime, your chances of being struck by lightning are about 1 in \_\_\_\_\_, but you are at greater risk if you live or work outside the city in a rural location.

28. Golfer Michael Utley's slogan is " \_\_\_\_\_."

29. The largest authenticated hailstone in North America was \_\_\_\_\_ in. in diameter, weighed \_\_\_\_\_ lbs., and struck the ground at over \_\_\_\_\_ mph. Hail causes property damage of about \_\_\_\_\_ annually in the U.S. Hailstone deaths are common in \_\_\_\_\_ and \_\_\_\_\_, due to poorly constructed dwellings.

30. Usually spawned by \_\_\_\_\_, tornadoes kill about \_\_\_\_\_ people annually in the U.S.

31. A tornado's spinning column of wind, called a \_\_\_\_\_, must touch \_\_\_\_\_ in order to be called a tornado. Until then it is called a \_\_\_\_\_. These can be \_\_\_\_\_ until they pick up \_\_\_\_\_.

32. Tornadoes form where there are large differences in \_\_\_\_\_ over short distances, such as in a \_\_\_\_\_, \_\_\_\_\_ or \_\_\_\_\_.

33. Tornadoes develop in \_\_\_\_\_ stages. The first is the \_\_\_\_\_ stage, where \_\_\_\_\_ causes \_\_\_\_\_ rotation in a \_\_\_\_\_. In the trailing or SW part of the storm, a \_\_\_\_\_ often descends, and may start to \_\_\_\_\_ and form a \_\_\_\_\_. It becomes a tornado if \_\_\_\_\_ begin to swirl on the ground.

34. In the second \_\_\_\_\_ stage, a \_\_\_\_\_ extends to the ground as \_\_\_\_\_ is drawn upward. In stronger tornadoes, \_\_\_\_\_, smaller, intense whirls that orbit the larger central vortex, may form within the tornado, causing the \_\_\_\_\_.
35. In the third, or \_\_\_\_\_ stage, a reduction of warm, moist air causes the tornado to \_\_\_\_\_ and begin to \_\_\_\_\_. As the width \_\_\_\_\_, the winds can \_\_\_\_\_, making the tornado more dangerous.
36. In the final \_\_\_\_\_ stage, the upward-spiraling air comes in contact with \_\_\_\_\_ which cause \_\_\_\_\_ movement. Though the tornado is decaying, it is still \_\_\_\_\_.
37. Meteorologists don't fully understand how tornadoes form. They may \_\_\_\_\_ stages. \_\_\_\_\_ tornadoes may form nearby as older ones \_\_\_\_\_.
38. \_\_\_\_\_ and \_\_\_\_\_ give tornadoes their \_\_\_\_\_ color. Typical diameters are measured in \_\_\_\_\_ of meters with wind speeds from \_\_\_\_\_ to more than \_\_\_\_\_ mph. They usually travel \_\_\_\_\_ miles and last \_\_\_\_\_. But the big ones can move at speeds of \_\_\_\_\_ mph and travel \_\_\_\_\_ of miles.
39. Tornadoes are classified based on the EF, or \_\_\_\_\_ Scale, which assigns values from \_\_\_\_\_ to \_\_\_\_\_ based the most intense damage produced done to \_\_\_\_\_ types of buildings. Towers and poles, and \_\_\_\_\_ and \_\_\_\_\_ trees.
40. The EF Scale replaces the F-Scale developed by T. Theodore \_\_\_\_\_ in 1971.
41. Tornadoes that form over water are called \_\_\_\_\_. One of the largest tornadoes in N.Y.S. history, called the "Great Windfall," tore from Canada, across the northern Adirondack Mountains, and ended as a waterspout over Lake Champlain. It created a swath up to a mile wide through the trackless forest, which settlers used to enter the area, and later, a train was built along its path. Portions of the path can still be seen today in St. Lawrence Co., where changes in the forest can be followed for some distance.

TABLE 8.1 Enhanced Fujita Scale of Tornado Intensity		
Scale	Wind Estimate <sup>1</sup>	Typical Damage <sup>2</sup>
EF0	105–137 km/hr (65–85 mph)	<i>Light damage.</i> Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged
EF1	138–177 km/hr (86–110 mph)	<i>Moderate damage.</i> Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
EF2	178–218 km/hr (111–135 mph)	<i>Considerable damage.</i> Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	219–266 km/hr (136–165 mph)	<i>Severe damage.</i> Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
EF4	267–322 km/hr (166–200 mph)	<i>Devastating damage.</i> Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
EF5	Over 322 km/hr (Over 200 mph)	<i>Incredible damage.</i> Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (110 yds.); trees debarked; incredible phenomena will occur.

<sup>1</sup> Wind speeds are the maximum estimated for a 3-second gust.

<sup>2</sup> Accurate placement on this scale involves expert assessment of the degree of damage to 28 indicators including homes, buildings, towers, poles, and trees.

Source: Wind Science Engineering Center. 2006. A recommendation for an Enhanced Fujita Scale (EF-Scale). Lubbock, TX: Texas Tech University. [www.wind.ttu.edu/EFScale.pdf](http://www.wind.ttu.edu/EFScale.pdf). Accessed 1/16/06.

Copyright © 2008 Pearson Prentice Hall, Inc.

42. Although tornadoes occur throughout the world, they are larger and more numerous by far in \_\_\_\_\_ than anywhere else. As with thunderstorms, \_\_\_\_\_ and \_\_\_\_\_ are the most common seasons, and most develop in the \_\_\_\_\_. The largest and most frequent tornadoes ten to occur in a belt hat stretch south to north through the central U.S. called \_\_\_\_\_. \_\_\_\_\_ are both less hazardous and more common than tornadoes.
43. Severe winter storms, where large amounts of \_\_\_\_\_ are driven by \_\_\_\_\_ to create low \_\_\_\_\_ for an extended period of time are called \_\_\_\_\_. Extremely low visibility, called a \_\_\_\_\_, is especially dangerous. For U.S. blizzards, winds must exceed \_\_\_\_\_ mph with visibilities less than \_\_\_\_\_ mi. for at least \_\_\_\_\_ hours. Even when snow is not falling, \_\_\_\_\_ blizzards can form as high winds pick up snow from the ground.
44. Fast-moving storms forming east of the Canadian Rockies, which bring extremely cold, dry air to the Northeast U.S., are called \_\_\_\_\_.

45. Blizzards can produce large \_\_\_\_\_. The Saskatchewan blizzard of 1947 lasted \_\_\_\_ days and buried an entire \_\_\_\_\_ over \_\_\_\_\_ miles long, \_\_\_\_\_ feet deep. In the Northeast U.S., the Blizzard of 1888 killed more than \_\_\_\_\_ people and created snowdrifts as high as the \_\_\_\_\_ of buildings.
46. That that move along the East Coast of the U.S., called \_\_\_\_\_, are common between \_\_\_\_\_ and \_\_\_\_\_.
47. Moving air that rapidly cools exposed skin, called \_\_\_\_\_, can also lead to \_\_\_\_\_, where the skin, and later underlying tissue, freeze and die. This is why it's important to pay attention to the reported \_\_\_\_\_ temperature.
48. Loss of body heat, leading to shivering, loss of coordination, mental sluggishness and confusion, is called \_\_\_\_\_. It can occur in 77<sup>0</sup>F water or 70<sup>0</sup> air.
49. Prolonged periods of freezing rain, called \_\_\_\_\_, are very damaging. Ice accumulates on \_\_\_\_\_ surfaces, harming utility lines, \_\_\_\_\_ and making travel difficult or impossible. These storms form when \_\_\_\_\_ air lies above \_\_\_\_\_ air. Rain or melted snow become \_\_\_\_\_ when they hit the cold surface air.
50. A cloud on the ground, called \_\_\_\_\_, can be hazardous because of reduced \_\_\_\_\_. Fog caused the worst \_\_\_\_\_ and \_\_\_\_\_ accidents ever.
51. An extended period of unusually low \_\_\_\_\_, that produces a shortage of \_\_\_\_\_ for people, animals and plants, is called \_\_\_\_\_.
52. Over \_\_\_\_\_ people live where droughts are common. In the U.S. drought affects more people than any other natural hazard, and causes losses of \_\_\_\_\_ to \_\_\_\_\_ per year. Besides water shortages, drought cause \_\_\_\_\_ outages and \_\_\_\_\_ failures. Worldwide, over \_\_\_\_\_ people are threatened with \_\_\_\_\_ due to drought.
53. Mountain windstorms can develop on the downwind or \_\_\_\_\_ of large moun-

tain ranges, with winds in excess of \_\_\_\_\_ mph. Called \_\_\_\_\_ east of the Rockies or \_\_\_\_\_ winds in western California, they can cause damage and feed \_\_\_\_\_.

54. Strong windstorms in which suspended \_\_\_\_\_ reduces visibility for a long time are called \_\_\_\_\_. Natural dust contains biological particles, including \_\_\_\_\_ and \_\_\_\_\_, and can affect human \_\_\_\_\_.

55. Unlike dust storms, \_\_\_\_\_ occur in the \_\_\_\_\_. Blowing sand is very \_\_\_\_\_, and can sand-blast \_\_\_\_\_.

56. During the \_\_\_\_\_ in the 1930's, huge dust storms in the Southern High Plains, centering on the \_\_\_\_\_ panhandle, destroyed \_\_\_\_\_. This happened when \_\_\_\_\_ and \_\_\_\_\_ agricultural practices during the Great Depression caused massive \_\_\_\_\_.

57. All of North America, and much of the world, is vulnerable to \_\_\_\_\_, or prolonged periods of extreme heat that are both \_\_\_\_\_ and \_\_\_\_\_ than normal. In 1995 there were over 500 deaths in the \_\_\_\_\_ area, and in 2003, \_\_\_\_\_ Deaths occurred in France.

58. Heatwaves are associated with long ridges of \_\_\_\_\_, that stay in one place for \_\_\_\_\_. They can accompany either severe \_\_\_\_\_ or extreme \_\_\_\_\_.

59. The measure of the body's perception of air temperature is called the \_\_\_\_\_, which is higher with increasing \_\_\_\_\_. An air temperature of 94° F with a relative humidity of 75% result in a dangerous heat index of \_\_\_\_\_.

60. Urban and suburban areas are much \_\_\_\_\_ than surrounding rural areas on hot summer days. Called the \_\_\_\_\_ effect, it is greatest on \_\_\_\_\_, \_\_\_\_\_ evenings, when a city can be 10° F warmer.

61. Climate models indicate that anthropogenic (human-created) greenhouse gases have

		Relative Humidity (%)													With prolonged exposure and/or physical activity	
		40	45	50	55	60	65	70	75	80	85	90	95	100		
Air Temperature (°F)	110	136														<b>Extreme danger</b> Heat stroke or sunstroke highly likely
	108	130	137													
	106	124	130	137												
	104	119	124	131	137											<b>Danger</b> Sunstroke, muscle cramps, and/or heat exhaustion likely
	102	114	119	124	130	137										
	100	109	114	118	124	129	136									
	98	105	109	113	117	123	128	134								<b>Extreme caution</b> Sunstroke, muscle cramps, and/or heat exhaustion possible
	96	101	104	108	112	116	121	126	132							
	94	97	100	102	106	110	114	119	124	129	135					
	92	94	96	99	101	105	108	112	116	121	126	131				<b>Caution</b> Fatigue possible
	90	91	93	95	97	100	103	106	109	113	117	122	127	132		
	88	88	89	91	93	95	98	100	103	106	110	113	117	121		
	86	85	87	88	89	91	93	95	97	100	102	105	108	112		
	84	83	84	85	86	88	89	90	92	94	96	98	100	103		
	82	81	82	83	84	84	85	86	88	89	90	91	93	95		
80	80	80	81	81	82	82	83	84	84	85	86	86	87			

Copyright © 2008 Pearson Prentice Hall, Inc.

\_\_\_\_\_ the probability of a Paris-magnitude heatwave event.

62. Populations most vulnerable to heat waves include the \_\_\_\_\_, infants, young \_\_\_\_\_, people with \_\_\_\_\_, or \_\_\_\_\_ impairments, the \_\_\_\_\_ and \_\_\_\_\_, people engaged in \_\_\_\_\_ or \_\_\_\_\_, and people socially \_\_\_\_\_ or physically \_\_\_\_\_.

63. Heatwaves often cause \_\_\_\_\_ failures, which cause air conditioners, \_\_\_\_\_ and fans to fail, a huge problem for people living in \_\_\_\_\_ buildings. Illnesses can include heat cramps, heat \_\_\_\_\_ and heat \_\_\_\_\_.

64. List the first three "Don'ts" from Table 8.2 (see next page)

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_

**TABLE 8.2 Personal Adjustments for Heatwaves**

**Do**

- Minimize direct exposure to the sun
- Use air conditioners or spend time in air-conditioned places
- Use portable fans to exhaust hot air from or draw cooler air into rooms
- Take a cool bath or shower
- Stay hydrated by regularly drinking water or other nonalcoholic beverages
- Eat light, cool, and easy-to-digest foods such as fruit or salads
- Wear loose fitting, light-colored clothes
- Check on older, sick, or frail people who may need help adjusting to the heat
- Know the symptoms of heat exhaustion and heatstroke, and the appropriate responses

**Don't**

- Direct air from fans towards yourself when room temperature is hotter than 32°C (90°F)
- Leave children and pets alone in cars for any amount of time
- Drink alcoholic beverages to try to stay cool
- Eat heavy, hot, or hard-to-digest foods
- Wear heavy or dark clothing

*Source: After U.S. Environmental Protection Agency. 2006. Excessive heat events guidebook. Publication EPA 430-B-06-005.*

Copyright © 2008 Pearson Prentice Hall, Inc.

3) \_\_\_\_\_

8.6 65. Humans can increase the risk of dust storms by leaving \_\_\_\_\_ exposed to wind erosion. Locating \_\_\_\_\_ in areas subject to high winds increases the probability of damage and loss of life. And \_\_\_\_\_ practices in cities can increase the \_\_\_\_\_ effect. Also, human interaction with severe weather is occurring through anthropogenic \_\_\_\_\_, which is expected to increase the \_\_\_\_\_ and number of \_\_\_\_\_, and the intensity of \_\_\_\_\_ events. Climate change is likely to increase the incidence of \_\_\_\_\_, \_\_\_\_\_ and precipitation intensities in hurricanes, and generally increase the incidence of \_\_\_\_\_.

8.7 66. Severe weather is linked to \_\_\_\_\_, mass movements, and \_\_\_\_\_.

8.9 67. A network of \_\_\_\_\_ radar stations across North America have im-

- proved our ability to predict the \_\_\_\_\_ of severe storms. Doppler radar can detect \_\_\_\_\_, enabling tornado warnings with 30 minute lead times.
68. A \_\_\_\_\_ is issued to warn the public of the possibility of a severe weather event. When a watch is issued, it is wise to listen to the \_\_\_\_\_.
69. A \_\_\_\_\_ is issued when a severe weather event has been sighted and the area is in danger. People should take \_\_\_\_\_ action to protect themselves and others.
70. Meteorologists are not yet able to predict the \_\_\_\_\_ of tornadoes. In the same vein, forecasting snow depth and ice accumulation is difficult.
71. New computer-based techniques for making \_\_\_\_\_ predictions of the intensity, path and development of some events, called, \_\_\_\_\_, uses radar, satellites and automated weather stations.
72. Long-term actions to prevent or minimize death, injuries and damage are called \_\_\_\_\_. These activities include \_\_\_\_\_ engineering and building, installation of \_\_\_\_\_ systems, and hazard \_\_\_\_\_. Such plans to deal with hazards are termed \_\_\_\_\_.
73. Mitigations include \_\_\_\_\_ buildings, offering or applying for grants and architectural plans for community \_\_\_\_\_ and \_\_\_\_\_.
74. Keeping public infrastructure functioning is challenging but important. Electrical \_\_\_\_\_ lines are designed to survive \_\_\_\_\_-year ice storms, but when such storms include winds in forested areas, \_\_\_\_\_ can occur, plunging people into cold and darkness for extended periods. Underground burial of some lines could help mitigate the problem.
75. Public water and sewer systems that rely on \_\_\_\_\_ are vulnerable to power outages if they don't have \_\_\_\_\_ power sources.
76. Communication systems can survive hazards if there is \_\_\_\_\_. This

means having multiple methods and technologies, such as land-line telephone, \_\_\_\_\_ phone, \_\_\_\_\_ (VOIP), \_\_\_\_\_ radio, and \_\_\_\_\_ communications. A hand-cranked weather radio is very useful.

77. Other forms of mitigation include \_\_\_\_\_ systems, and universal hazard \_\_\_\_\_. Announcements can be made by \_\_\_\_\_, TV, the \_\_\_\_\_, \_\_\_\_\_ radio, warning \_\_\_\_\_, and subscriber \_\_\_\_\_ notification (including cell and VOIP phones).

78. Basic homeowners insurance that most have includes only water (from rain) and \_\_\_\_\_. Usually excluded from such policies are flooding, severe storms, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, etc. People living in risk areas need to take advantage of government offered insurance policies.

79. Even before a watch is issued, people can take steps such as being aware of the \_\_\_\_\_ that are most hazardous, and making \_\_\_\_\_ for themselves and their homes. Information on preparedness is available from the National Oceanic and Atmospheric Administration (NOAA), the \_\_\_\_\_, and FEMA.

80. Prudent adjustments to severe weather include proper \_\_\_\_\_ and modifying \_\_\_\_\_ plans. Protection for \_\_\_\_\_ during heat waves, \_\_\_\_\_ clothing during snowstorms and cool, wet, windy weather. Insulation of the extremities, especially hats, mittens, and beneath the foot, and wearing multiple layers of wool, polyester or acrylic is best. Because it absorbs large amounts of water and dries very slowly, cotton is worst... "cotton kills." A nylon or water-resistant shell can also protect from the wind. It is wise to carry such items and blankets in your vehicle.

81. Low visibility can develop rapidly in \_\_\_\_\_ storms, \_\_\_\_\_ and \_\_\_\_\_. This is especially dangerous for travel on high-speed \_\_\_\_\_. Annual U.S. fog-related accidents total about \_\_\_\_\_.