

Name: _____
Mr. Willis
Conceptual Physics: _____
Date: _____

Unit XI
Meteorology
Need extra help?
Check out <http://www.bayhicoach.com>

XI

Unit XI Study Guide

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

_____ 1. What gas makes up about 78 percent of dry air?

- a. oxygen
- b. nitrogen
- c. hydrogen
- d. carbon dioxide

_____ 2. As altitude increases,

- a. air pressure decreases, and density increases.
- b. air pressure increases, and density decreases.
- c. air pressure and density increase.
- d. air pressure and density decrease.

_____ 3. Most weather takes place in the

- a. stratosphere.
- b. thermosphere.
- c. troposphere.
- d. mesosphere.

_____ 4. The ozone layer is located in the

- a. lower troposphere.
- b. lower thermosphere.
- c. upper ionosphere.
- d. upper stratosphere.

_____ 5. Day and night are caused by Earth's

- a. rotation.
- b. revolution.
- c. orbit.
- d. tilt.

_____ 6. As Earth completes one orbit around the sun, it has completed one

- a. rotation.
- b. year.
- c. revolution.
- d. both (b) and (c)

_____ 7. Which region usually has temperatures cooler than temperatures near the equator?

- a. tropic zone
- b. polar zone
- c. temperate zone
- d. both (b) and (c)

_____ 8. Which of the following lists all the zones in the correct order, starting at the North Pole and ending at the South Pole?

- a. polar, temperate, tropic, polar
- b. polar, temperate, tropic, temperate, polar
- c. polar, tropic, temperate, polar
- d. polar, tropic, temperate, tropic, polar

_____ 9. About how much of the solar energy that reaches Earth passes through the atmosphere and is absorbed by the surface of Earth?

- a. 20 percent
- b. 30 percent
- c. 50 percent
- d. 80 percent

____ 10. Earth's atmosphere is heated mainly by

- a. heat that travels directly from the sun.
- b. visible light as it passes through the air.
- c. reflected sunlight.
- d. energy reradiated by Earth's surface.

____ 11. Which of the following is an example of a global wind?

- a. westerlies
- b. trade winds
- c. polar easterlies
- d. all of the above

____ 12. Daily breezes that occur in a city that is located near a large body of water are examples of

- a. local winds.
- b. monsoons.
- c. global winds.
- d. westerlies.

____ 13. A cloud is a dense, visible mass of

- a. tiny water droplets.
- b. ice crystals.
- c. water vapor.
- d. both (a) and (b)

____ 14. Low, flat layers of clouds that often cover much of the sky and produce steady and widespread rain are

- a. cumulonimbus clouds.
- b. cirrus clouds.
- c. nimbostratus clouds.
- d. altostratus clouds.

____ 15. Which of the following forms of precipitation falls as a liquid?

- a. Rain
- b. freezing rain
- c. hail
- d. both (a) and (b)

____ 16. Round, solid pieces of ice more than 5 millimeters in diameter fall as

- a. hail.
- b. sleet.
- c. snow.
- d. freezing rain.

____ 17. A maritime tropical air mass that affects weather in the United States might form over

- a. the Gulf of Mexico.
- b. Mexico.
- c. Canada.
- d. the North Atlantic ocean.

____ 18. Which of the following air masses forms over land north of 50° north latitude?

- a. maritime polar
- b. temperate continental
- c. continental polar
- d. continental tropical

____ 19. What type of front forms when two unlike air masses form a boundary, but neither is moving?

- a. Warm
- b. Cold
- c. stationary
- d. occluded

____ 20. A cold front forms when a cold air mass

- a. Collides with a warm air mass and pushes the warm air up.
- b. Collides with a warm air mass and slides over the warm air.
- c. Collides with another cold air mass.
- d. stops moving over a particular area.

____ 21. Which of the following is a weather system with a center of low pressure?

- a. Cyclone
- b. anticyclone
- c. warm front
- d. cold front

____ 22. Which of the following is a characteristic of an anticyclone?

- a. has a center of high pressure
- b. has clockwise winds in the Northern Hemisphere
- c. is generally associated with clear weather
- d. all of the above

____ 23. A tropical storm with sustained winds of at least 119 kilometers per hour is called a

- a. Tornado.
- b. thunderstorm.
- c. monsoon.
- d. hurricane.

____ 24. A small, intense storm formed when a vertical cylinder of rotating air develops is a

- a. thunderstorm.
- b. Tornado.
- c. monsoon.
- d. hurricane.

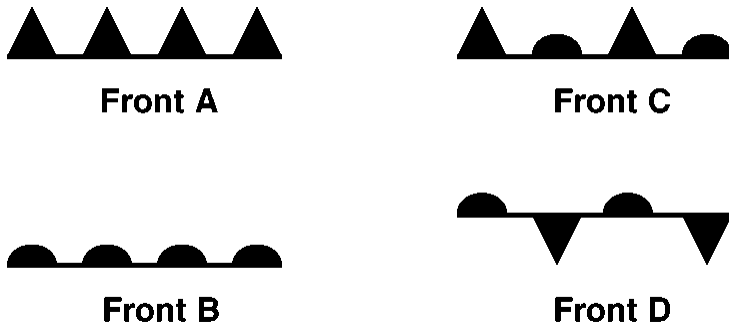


Figure 24-1

____ 25. The symbol for Front C in Figure 24-1 represents a(n)

- a. cold front.
- b. occluded front.
- c. warm front.
- d. stationary front.

____ 26. Lines on a weather map that connect points that have the same air temperature are called

- a. millibars.
- b. isobars.
- c. isotherms.
- d. front lines.

____ 27. A description of the pattern of weather over many years is a region's

- a. weather forecast.
- b. air mass.
- c. climate.
- d. weather system.

____ 28. Which of the following factors affect a region's temperature?

- a. Latitude and altitude
- b. distance from large bodies of water
- c. ocean currents
- d. all of the above

____ 29. An example of a long-term climate change that occurs naturally is

- a. an ice age.
- b. an El Niño.
- c. global warming.
- d. the greenhouse effect.

- ____ 30. Which of the following climate changes may be affected by human activities?
- a. ice age
 - b. El Niño
 - c. global warming
 - d. monsoon

Completion

Complete each sentence or statement.

31. The _____ forms a protective boundary between Earth and space and provides conditions that are suitable for life.
32. Plants need _____ from the air for photosynthesis, and many animals need _____ from the air to breathe.
33. Of the four layers of the atmosphere, the _____ has the hottest temperatures.
34. The seasons are caused by the _____ of Earth's _____ as Earth moves around the sun.
35. On the two days each year when the sun is directly overhead at noon at latitude 23.5° north or 23.5° south, a(an) _____ occurs.
36. The latitude of the equator is _____, and the latitude of the North Pole is _____.
37. The _____ zones are located from 23.5° north to 66.5° north and from 23.5° south to 66.5° south.
38. Energy is transferred within the troposphere in three ways—radiation, _____, and _____.
39. Wind is air blowing from an area of _____ pressure to an area of _____ pressure.
40. A belt of high-speed wind in the upper troposphere is called a(an) _____.
41. The three basic cloud forms are _____, _____, and _____.
42. Rain, sleet, and snow are types of _____.
43. The size and shape of snowflakes depends on the _____ at which they form.
44. Air masses that form over water tend to have more _____ in them than air masses that form over land.
45. The sharply defined boundary that forms where two unlike air masses meet is called a(an) _____.
46. Air spirals in toward the center of a cyclone but flows away from the center of a(an) _____.
47. A major type of storm associated with lightning, strong winds, and heavy rain or hail is called a(an) _____.

48. _____ works by bouncing radio waves off particles of precipitation in moving storms and then measuring the frequency of the waves that return.
49. The two main factors that determine a region's climate are _____ and _____.
50. _____ is a short-term variation in climate that is caused by a change in the normal direction of winds, which causes ocean currents to shift direction.

Short Answer

51. Describe what the temperatures on Earth would be like during the day and at night if the atmosphere did not exist.
52. List the four layers of the atmosphere, starting with the layer closest to Earth.
53. Why is Earth generally warmer near the equator and colder toward the poles?
54. What is the greenhouse effect?
55. What causes the differences in pressure that result in winds?
56. Explain why sea breezes occur during the day.
57. Why do solid particles such as dust need to be present for clouds to form?
58. How does hail form?
59. What is the difference between sleet and freezing rain?
60. What physical properties of an air mass are affected by where the air mass forms?
61. What weather is associated with an anticyclone?
62. How does a thunderstorm form?

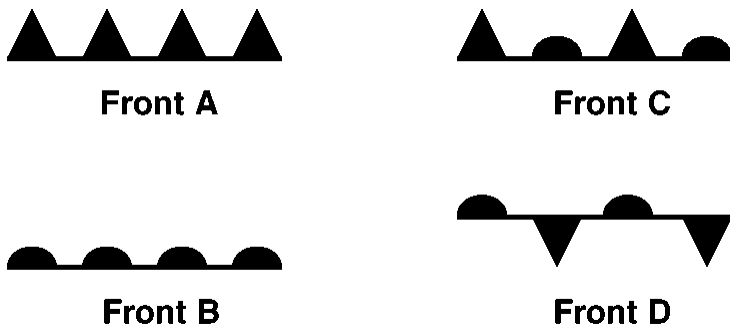


Figure 24-1

63. What is the name of each type of front represented by the symbols in Figure 24-1?

64. What are three factors that affect a region’s pattern of precipitation?

65. What are some ways that people could limit the effects of global warming? Explain how these ways would help.

Other

USING SCIENCE SKILLS

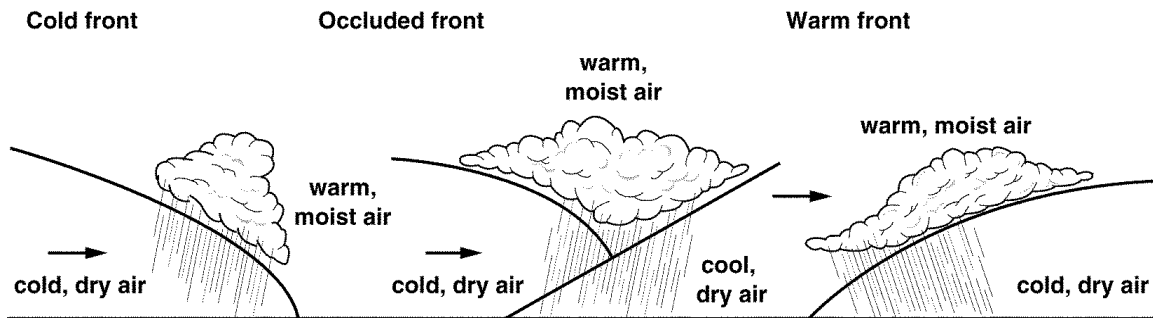


Figure 24-2

66. What causes clouds to form in the three fronts in Figure 24-2?

67. Explain what is happening to the two air masses in the cold front in Figure 24-2.

68. Based on your observations of Figure 24-2, how are a cold front and a warm front alike?

69. Based on your observations of Figure 24-2, how are a cold front and a warm front different?

70. What has happened to the warm air mass in the occluded front in Figure 24-3?

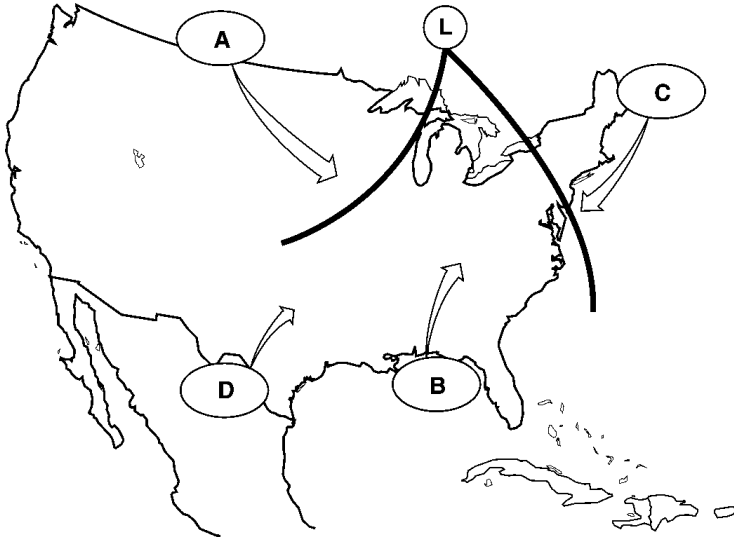


Figure 24-3

71. What factors are used to classify the air masses in Figure 24-3?

72. Based on their locations in Figure 24-3, name the types of air masses represented by A and D and describe the characteristics of each.

73. Based on their locations in Figure 24-3, name the types of air masses represented by B and C. How are they similar, and how are they different?

74. Based on Figure 24-3, what would you expect weather conditions to be like in the southeastern section of the United States at the time this map was drawn? Explain your answer.

75. What does the symbol L represent in Figure 24-3, and what type of weather system is it the center of? What are the characteristics of this weather system?

Essay

76. Explain why temperate zones in the Northern Hemisphere and the Southern Hemisphere have the same seasons but are six months apart.

77. What are trade winds and what causes them? How are trade winds in the Northern Hemisphere different from those in the Southern Hemisphere?

78. What are humidity, relative humidity, and dew point? Explain what happens to each if the temperature of the air decreases.

79. Compare the weather that might occur in an area as a warm front passes through, after the warm front has passed through, as a cold front passes through, and after the cold front has passed through.

80. What information can meteorologists obtain from Doppler radar, automated weather stations, and weather satellites? How do high-speed computers help meteorologists?