**Weather chapter 1 test bank**

**Multiple Choice**

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

\_\_\_\_ 1. What is the most abundant gas in the air that we breathe?

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

\_\_\_\_ 2. The major source of oxygen for the Earth's atmosphere is

|  |  |  |  |
| --- | --- | --- | --- |
| a. | sea water. | c. | plants. |
| b. | the sun. | d. | animals. |

\_\_\_\_ 3. The bottom layer of the atmosphere, where almost all weather occurs is the

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

\_\_\_\_ 4. About \_\_\_\_ percent of the solar energy that reaches the outer atmosphere is absorbed at the Earth's surface.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 20 | c. | 50 |
| b. | 30 | d. | 70 |

\_\_\_\_ 5. The ozone layer is located in the

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

\_\_\_\_ 6. How does most thermal energy in the atmosphere move?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | conduction | c. | advection |
| b. | convection | d. | radiation |

\_\_\_\_ 7. The balance between incoming radiation and outgoing heat energy is called

|  |  |  |  |
| --- | --- | --- | --- |
| a. | convection. | c. | greenhouse effect. |
| b. | conduction. | d. | radiation balance. |

\_\_\_\_ 8. Most of the United States is located in which prevailing wind belt?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | westerlies | c. | southeast trade winds |
| b. | northeast trade winds | d. | doldrums |

\_\_\_\_ 9. Which of the following is NOT a primary pollutant?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | car exhaust | c. | smoke from a factory |
| b. | acid precipitation | d. | fumes from burning plastic |

\_\_\_\_ 10. The Clean Air Act

|  |  |
| --- | --- |
| a. | controls the amount of air pollutants that can be released from most sources. |
| b. | requires cars to run on fuels other than gasoline. |
| c. | requires many industries to use scrubbers. |
| d. | (a) and (c) only |

\_\_\_\_ 11. Wind occurs because air tends to move from regions of higher to lower

|  |  |  |  |
| --- | --- | --- | --- |
| a. | latitude. | c. | nitrogen levels. |
| b. | pressure. | d. | humidity. |

\_\_\_\_ 12. As \_\_\_\_ increases, air pressure decreases.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | altitude | c. | water vapor |
| b. | radiation | d. | pollution |

\_\_\_\_ 13. Most of the heat from equatorial regions is moved toward the poles by

|  |  |  |  |
| --- | --- | --- | --- |
| a. | convection. | c. | conduction. |
| b. | radiation. | d. | precipitation. |

\_\_\_\_ 14. An increase in the greenhouse effect would cause

|  |  |  |  |
| --- | --- | --- | --- |
| a. | acid precipitation. | c. | convection. |
| b. | conduction. | d. | global warming. |

\_\_\_\_ 15. \_\_\_\_ removes ash and other particles from smokestacks.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | A scrubber | c. | Convection |
| b. | Ozone | d. | Radiation |

\_\_\_\_ 16. As you move upward through the atmosphere, the temperature

|  |  |  |  |
| --- | --- | --- | --- |
| a. | increases. | c. | stays the same. |
| b. | decreases. | d. | varies. |

\_\_\_\_ 17. The Earth's atmosphere is divided into four layers based on

|  |  |  |  |
| --- | --- | --- | --- |
| a. | pressure changes. | c. | temperature changes. |
| b. | altitude. | d. | the oxygen levels present. |

\_\_\_\_ 18. Which atmospheric layer is the densest?

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

\_\_\_\_ 19. In the stratosphere, temperature \_\_\_\_ with increasing altitude.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | decreases | c. | fluctuates |
| b. | stays the same | d. | increases |

\_\_\_\_ 20. The oxygen in the air you breathe is made up of \_\_\_\_ atoms.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | one | c. | three |
| b. | two | d. | four |

\_\_\_\_ 21. The *Upper Atmosphere Research Satellite* has detected large \_\_\_\_ in the mesosphere.

|  |  |
| --- | --- |
| a. | meteoroids |
| b. | pockets of ozone |
| c. | wind storms |
| d. | amounts of electrically charged particles |

\_\_\_\_ 22. A high temperature means that

|  |  |  |  |
| --- | --- | --- | --- |
| a. | particles are compacted together. | c. | particles are moving very slowly. |
| b. | particles are moving very fast. | d. | particles cannot move. |

\_\_\_\_ 23. Aurora borealis and aurora australis occur in the

|  |  |  |  |
| --- | --- | --- | --- |
| a. | troposphere. | c. | mesosphere. |
| b. | stratosphere. | d. | ionosphere. |

\_\_\_\_ 24. The ionosphere reflects certain

|  |  |  |  |
| --- | --- | --- | --- |
| a. | X rays. | c. | radio waves. |
| b. | gamma rays. | d. | ultraviolet radiation. |

\_\_\_\_ 25. Near the Earth's surface, air is heated by

|  |  |  |  |
| --- | --- | --- | --- |
| a. | conduction. | c. | ozone. |
| b. | solar winds. | d. | convection. |

\_\_\_\_ 26. Average annual \_\_\_\_ in the Northern Hemisphere have been higher in the 1990s than at any other time in the past 600 years.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | air pressures | c. | air temperatures  |
| b. | surface temperatures | d. | jet stream numbers |

\_\_\_\_ 27. The \_\_\_\_ is the lowest layer of the atmosphere.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | troposphere | c. | mesosphere |
| b. | stratosphere | d. | ionosphere |

\_\_\_\_ 28. The \_\_\_\_ is the atmospheric layer immediately above the troposphere.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | mesosphere | c. | thermosphere |
| b. | stratosphere | d. | ionosphere |

\_\_\_\_ 29. The uppermost atmospheric layer is the

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

\_\_\_\_ 30. The \_\_\_\_ is the coldest layer of the atmosphere.

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

\_\_\_\_ 31. Wind is created by differences in

|  |  |  |  |
| --- | --- | --- | --- |
| a. | air temperature. | c. | air pressure. |
| b. | humidity. | d. | altitude. |

\_\_\_\_ 32. Compared to the poles, the air at the equator is warmer and

|  |  |
| --- | --- |
| a. | less dense, creating an area of high pressure as it rises. |
| b. | less dense, creating an area of low pressure as it rises. |
| c. | more dense, creating an area of low pressure as it rises. |
| d. | more dense, creating an area of high pressure as it rises. |

\_\_\_\_ 33. Winds generally move from the

|  |  |  |  |
| --- | --- | --- | --- |
| a. | poles to the equator. | c. | east to the west. |
| b. | equator to the poles. | d. | west to the east. |

\_\_\_\_ 34. In both hemispheres, winds that blow from 30º latitude to the equator are called

|  |  |  |  |
| --- | --- | --- | --- |
| a. | westerlies. | c. | polar easterlies. |
| b. | trade winds. | d. | jet streams. |

\_\_\_\_ 35. Wind belts between 30º and 60º latitude in both the Northern and Southern Hemispheres are called

|  |  |  |  |
| --- | --- | --- | --- |
| a. | westerlies. | c. | trade winds. |
| b. | polar easterlies. | d. | jet streams. |

\_\_\_\_ 36. Narrow belts of high-speed winds that blow in the upper troposphere and lower stratosphere are known as

|  |  |  |  |
| --- | --- | --- | --- |
| a. | trade winds. | c. | polar easterlies. |
| b. | westerlies. | d. | jet streams. |

\_\_\_\_ 37. Wind belts that extend from the poles to 60º latitude in both hemispheres are called

|  |  |  |  |
| --- | --- | --- | --- |
| a. | westerlies. | c. | polar easterlies. |
| b. | trade winds. | d. | jet streams. |

\_\_\_\_ 38. Each hemisphere has \_\_\_\_ wind belts as a result of pressure differences.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | one | c. | three |
| b. | two | d. | four |

\_\_\_\_ 39. In the \_\_\_\_, there is very little wind because of the warm rising air.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | doldrums | c. | convection cells |
| b. | horse latitudes | d. | mesosphere |

\_\_\_\_ 40. An area of low pressure around the equator is called the

|  |  |  |  |
| --- | --- | --- | --- |
| a. | convection cells. | c. | doldrums. |
| b. | horse latitudes. | d. | jet streams. |

\_\_\_\_ 41. At the poles, cold air

|  |  |  |  |
| --- | --- | --- | --- |
| a. | rises. | c. | freezes. |
| b. | warms. | d. | sinks. |

\_\_\_\_ 42. Which of the following global winds does NOT follow regular paths around the Earth?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | westerlies | c. | polar easterlies |
| b. | trade winds | d. | jet streams |

\_\_\_\_ 43. Which of the following statements describing a sea breeze is true?

|  |  |
| --- | --- |
| a. | Air over the water is cooler, which creates an area of high pressure. |
| b. | Air over the water is cooler, which creates an area of low pressure. |
| c. | Air over the water is warmer, which creates an area of low pressure. |
| d. | Air over the water is warmer, which creates an area of high pressure. |

\_\_\_\_ 44. Which of the following statements describing a land breeze is true?

|  |  |
| --- | --- |
| a. | Air over the water is cooler, which creates an area of high pressure. |
| b. | Air over the water is cooler, which creates an area of low pressure. |
| c. | Air over the water is warmer, which creates an area of low pressure. |
| d. | Air over the water is warmer, which creates an area of high pressure. |

\_\_\_\_ 45. At night, cool air sinks into a valley from the mountain peaks, creating a

|  |  |  |  |
| --- | --- | --- | --- |
| a. | valley breeze. | c. | land breeze. |
| b. | mountain breeze. | d. | jet stream. |

\_\_\_\_ 46. During the day, warm air from a valley moves upslope, creating a

|  |  |  |  |
| --- | --- | --- | --- |
| a. | valley breeze. | c. | land breeze. |
| b. | mountain breeze. | d. | sea breeze. |

\_\_\_\_ 47. Which of the following produces the greatest amount of pollution?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | human-made primary pollutants | c. | naturally made primary pollutants |
| b. | human-made secondary pollutants | d. | None of the above |

\_\_\_\_ 48. Which of the following is NOT considered to be a pollutant?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | dust | c. | sea salt |
| b. | pollen | d. | None of the above |

\_\_\_\_ 49. Automobile exhaust reacts with air and sunlight to form

|  |  |  |  |
| --- | --- | --- | --- |
| a. | smog. | c. | a primary pollutant. |
| b. | ozone. | d. | acid precipitation. |

\_\_\_\_ 50. Ozone reacts with automobile exhaust to form

|  |  |  |  |
| --- | --- | --- | --- |
| a. | smog. | c. | smoke. |
| b. | a primary pollutant. | d. | ash. |

\_\_\_\_ 51. Seventy percent of the carbon monoxide in the United States is produced by

|  |  |  |  |
| --- | --- | --- | --- |
| a. | power plants. | c. | factories. |
| b. | volcanoes. | d. | fuel-burning vehicles. |

\_\_\_\_ 52. Ninety-six percent of the sulfur oxides released into the atmosphere is produced by

|  |  |  |  |
| --- | --- | --- | --- |
| a. | power plants. | c. | factories. |
| b. | volcanoes. | d. | fuel-burning vehicles. |

\_\_\_\_ 53. Scientists have discovered that some chemicals released into the atmosphere react with ozone in the ozone layer, breaking the ozone down into

|  |  |  |  |
| --- | --- | --- | --- |
| a. | nitrogen. | c. | oxygen. |
| b. | carbon dioxide. | d. | carbon monoxide. |

\_\_\_\_ 54. Which of the following is NOT an effect of air pollution?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cancer | c. | increased colds |
| b. | allergies | d. | None of the above |

\_\_\_\_ 55. The Earth receives energy from the sun in the form of

|  |  |  |  |
| --- | --- | --- | --- |
| a. | ozone. | c. | nitrogen. |
| b. | radiation. | d. | carbon dioxide. |

\_\_\_\_ 56. When radiation reaches the Earth's atmosphere, about 25 percent of it is

|  |  |
| --- | --- |
| a. | reflected by the Earth's surface. |
| b. | absorbed by the Earth's surface. |
| c. | scattered and reflected by clouds and air. |
| d. | absorbed by ozone, clouds, and air. |

\_\_\_\_ 57. When radiation reaches the Earth's atmosphere, about 5 percent of it is

|  |  |  |  |
| --- | --- | --- | --- |
| a. | reflected by the Earth's surface. | c. | reflected by clouds and air. |
| b. | absorbed by the Earth's surface. | d. | absorbed by ozone, clouds, and air. |

\_\_\_\_ 58. When radiation reaches the Earth's atmosphere, about 20 percent of it is

|  |  |  |  |
| --- | --- | --- | --- |
| a. | reflected by the Earth's surface. | c. | reflected by clouds and air. |
| b. | absorbed by the Earth's surface. | d. | absorbed by ozone, clouds, and air. |

\_\_\_\_ 59. Which of the following does NOT involve a transfer of energy?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | radiation | c. | convection |
| b. | conduction | d. | none of the above |

\_\_\_\_ 60. Water vapor in the atmosphere is a

|  |  |  |  |
| --- | --- | --- | --- |
| a. | gas. | c. | liquid. |
| b. | solid. | d. | All of the above |

\_\_\_\_ 61. Which of the following substances allows solar energy to pass through it but traps heat?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | wood | c. | glass |
| b. | metal | d. | cement |

Examine the diagram of Earth's global winds and answer the questions that follow.



\_\_\_\_ 62. In which section do the westerlies occur?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | section **1** | c. | section **3** |
| b. | section **2** | d. | section **4** |

\_\_\_\_ 63. In which section do the southeast trade winds occur?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | section **1** | c. | section **3** |
| b. | section **2** | d. | section **4** |

\_\_\_\_ 64. In which section do the northeast trade winds occur?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | section **1** | c. | section **3** |
| b. | section **2** | d. | section **4** |

\_\_\_\_ 65. In which section do the polar easterlies occur?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | section **1** | c. | section **3** |
| b. | section **2** | d. | section **4** |

\_\_\_\_ 66. Where are the horse latitudes?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | at 0º latitude | c. | at 60º latitude |
| b. | at 30º latitude | d. | at the poles |

\_\_\_\_ 67. Where are the doldrums?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | at 0º latitude | c. | at 60º latitude |
| b. | at 30º latitude | d. | at the poles |

\_\_\_\_ 68. The uneven heating of the Earth produces pressure belts about every \_\_\_\_ on the Earth.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 30º of longitude | c. | 30º of latitude |
| b. | 60º of longitude | d. | 60º of latitude |

**Completion**

*Complete each sentence or statement.*

 69. When you pick up a hot cup, heat is transferred from the cup to your hand primarily by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (conduction or convection)

 70. Acids formed in the air from sulfur compounds are an example of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pollutants. (primary or secondary)

 71. Winds that flow toward the poles in the opposite direction of the trade winds are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (polar easterlies or westerlies)

 72. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is caused by gases in the atmosphere that absorb radiation and transfer heat. (greenhouse effect or Coriolis effect)

 73. Winds in the Northern Hemisphere curve to the right, and winds in the Southern Hemisphere curve to the left. This is known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (jet stream or Coriolis effect)

 74. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ meet in an area of low pressure called the doldrums. (Trade winds or Jet streams)

 75. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a mixture of gases that surrounds the Earth.

 76. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the height of an object above the Earth's surface.

 77. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the measure of the force with which air molecules push on a surface.

 78. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a molecule that is made up of three oxygen atoms.

 79. The layer of the stratosphere that absorbs solar energy in the form of ultraviolet radiation is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ layer.

 80. The upper part of the mesosphere and the lower thermosphere is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 81. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a measure of the average energy of particles in motion.

 82. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the transfer of energy between objects at different temperatures.

 83. Electrically charged particles are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 84. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the transfer of energy as electromagnetic waves.

 85. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the transfer of thermal energy by the circulation or movement of a liquid or gas.

 86. A circular movement of air is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 87. Carbon dioxide, a gas that traps thermal energy, is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ gas.

 88. The circular patterns caused by the rising and sinking of air are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 89. The curving of moving objects by the Earth's rotation is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 90. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ winds are part of a pattern of air circulation that moves across the Earth.

 91. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ winds generally move short distances and can blow from any direction.

 92. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are the areas at about 30º north and 30º south latitude where sinking air creates an area of high pressure.

 93. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pollutants are pollutants that are put directly into the air by human or natural activity.

 94. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pollutants are pollutants that form from chemical reactions that occur when primary pollutants come in contact with other primary pollutants or with naturally occurring substances.

 95. Precipitation that contains acids from air pollution is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ precipitation.

 96. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are chemical compounds that contain oxygen and other elements.

**Short Answer**

For each pair of terms, explain the difference in their meanings.

 97. air pressure/altitude

 98. primary pollutant/secondary pollutant

 99. global wind/local wind

 100. troposphere/thermosphere

 101. greenhouse effect/global warming

 102. convection/conduction

 103. Explain why pressure decreases but temperature varies as altitude increases.

 104. What causes air pressure?

 105. How can the thermosphere have high temperatures but not feel hot?

 106. Identify one characteristic of each layer of the atmosphere, and explain how that characteristic affects life on Earth.

 107. Describe three things that can happen to radiation when it reaches the Earth's atmosphere.

 108. How is energy transferred through the atmosphere?

 109. What is the greenhouse effect?

 110. How does the process of convection rely on conduction?

 111. How does the Coriolis effect affect wind movement?

 112. What causes winds?

 113. Compare and contrast global winds and local winds.

 114. Suppose you are vacationing at the beach. It is daytime and you want to go swimming in the ocean. You know the beach is near your hotel, but you don't know what direction it is in. How might the local wind help you find the ocean?

 115. How can the air inside a building be more polluted than the air outside?

 116. Why might it be difficult to establish a direct link between air pollution and health problems?

 117. How has the Clean Air Act helped to reduce air pollution?

 118. How is the water cycle affected by air pollution?

 119. What are the two main gases in Earth's atmosphere?

 120. What is atmospheric pressure?

 121. Name the layers of the atmosphere, starting with the one closest to Earth.

 122. What is the ozone layer, and why is it important to Earth?

 123. Explain how density affects energy transfer in the air.

 124. What is radiation?

 125. A metal spoon left in a bowl of hot soup feels hot. Which process—radiation, conduction, or convection—is mainly responsible for heating the spoon?

 126. What is a convection current?

 127. How does a greenhouse stay warm?

 128. What is wind?

 129. How does air temperature over landmasses and adjacent bodies of water change between day and night?

 130. What is the Coriolis effect?

 131. Compare and contrast the trade winds and the westerlies in the Northern Hemisphere.

 132. What are two kinds of breezes that result from local topography?

 133. Classify each of the following as either a primary or secondary air pollutant: smog, tobacco smoke, chalk dust, and acid rain.

 134. What are the three sources of outdoor air pollution?

 135. What are two health problems that can result form breathing polluted air?

 136. Why does the atmosphere become less dense as altitude increases?

 137. Explain why air rises when it is heated.

 138. What causes temperature changes in the atmosphere?

 139. What are secondary pollutants, and how are they formed? Give an example.

 140. Use the following terms to create a concept map: *altitude, air pressure, temperature, atmosphere.*

 141. What is the relationship between the greenhouse effect and global warming?

 142. How do you think the Coriolis effect would change if the Earth were to rotate twice as fast? Explain.

 143. Without the atmosphere, the Earth's surface would be very different. What are several ways that the atmosphere affects the Earth?

 144. Wind speed is measured in miles per hour and in knots. One mile (statute mile or land mile) is 5,280 ft. One nautical mile (or sea mile) is 6,076 ft. Speed in nautical miles is measured in knots. Calculate the wind speed in knots if the wind is blowing at 25 miles/h.

Use the wind-chill chart to answer the questions that follow.

|  |
| --- |
| **Wind-Chill Chart** |
|  |  | **Actual thermometer reading (°F)** |
| **Wind Speed** | 40 | 30 | 20 | 10 | 0 |
| **Knots** | **mph** | **Equivalent temperature (°F)** |
| Calm |   | 40 | 30 | 20 | 10 | 0 |
| 4 | 5 | 37 | 27 | 16 | 6 | –5 |
| 9 | 10 | 28 | 16 | 4 | –9 | –21 |
| 13 | 15 | 22 | 9 | –5 | –18 | –36 |
| 17 | 20 | 18 | 4 | –10 | –25 | –39 |
| 22 | 25 | 16 | 0 | –15 | –29 | –44 |
| 26 | 30 | 13 | –2 | –18 | –33 | –48 |
| 30 | 35 | 11 | –4 | –20 | –35 | –49 |

 145. If the wind speed is 20 miles/h and the temperature is 40ºF, how cold will the air seem?

 146. If the wind speed is 30 miles/h and the temperature is 20ºF, how cold will the air seem?

 147. Explain why nighttime land breezes occur in areas close to the ocean.

 148. Explain why mountain breezes occur.

 149. Explain how gases in the Earth's atmosphere can be compared to the glass covering a greenhouse.

 150. Suppose the stratosphere became covered in a thick blanket of volcanic dust. How would this affect the temperature of the air in the troposhpere?

The graph below shows atmospheric carbon dioxide levels at a site in Hawaii from 1958 to 1988. Examine the graph and answer the questions that follow.



 151. According to the graph, how have carbon dioxide levels changed from 1958 to 1988?

 152. Why might scientists be concerned about the trend shown in the graph?

 153. Use the following terms to complete the concept map below: *heat, density, thermosphere, ionosphere, particle movement, solar energy, temperature.*

