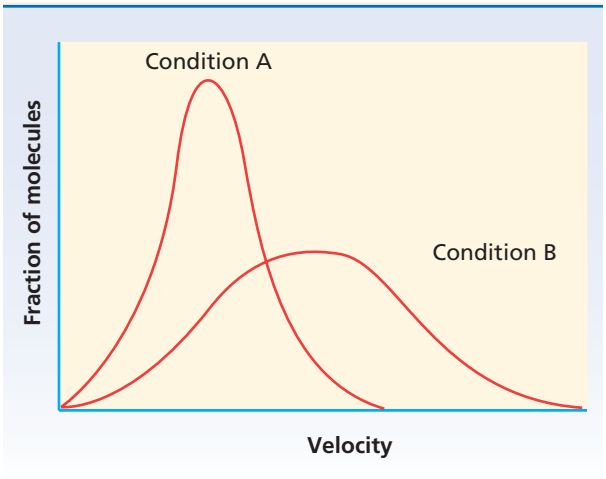
76. Relating Ideas Pressure is defined as force per unit area. Yet Torricelli found that the diameter of the barometer dish and the surface area of contact between the mercury in the tube and in the dish did not affect the height of mercury that was supported. Explain this seemingly inconsistent observation in view of the relationship between pressure and surface area.

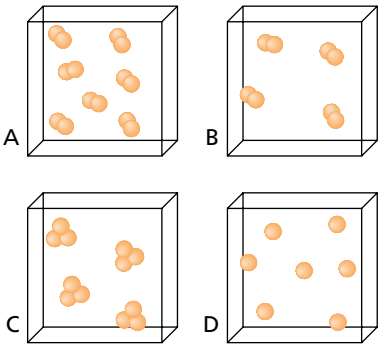
77. Evaluating Methods In solving a problem, what types of conditions involving temperature, pressure, volume, or number of moles would allow you to use
a. the combined gas law?
b. the ideal gas law?

78. Evaluating Ideas Gay-Lussac's law of combining volumes holds true for relative volumes at any proportionate size. Use Avogadro's law to explain why this proportionality exists.

79. Interpreting Graphics The graph below shows velocity distribution curves for the same gas under two different conditions, A and B. Compare the behavior of the gas under conditions A and B in relation to each of the following:
a. temperature
b. average kinetic energy
c. average molecular velocity
d. gas volume
e. gas pressure



80. Interpreting Concepts The diagrams below represent equal volumes of four different gases.



Use the diagrams to answer the following questions:
a. Are these gases at the same temperature and pressure? How do you know?
b. If the molar mass of gas B is 38 g/mol and that of gas C is 46 g/mol, which gas sample is denser?
c. To make the densities of gas samples B and C equal, which gas should expand in volume?
d. If the densities of gas samples A and C are equal, what is the relationship between their molar masses?

RESEARCH & WRITING

81. Design and conduct a meteorological study to examine the interrelationships between barometric pressure, temperature, humidity, and other weather variables. Prepare a report explaining your results.

82. Conduct library research on attempts made to approach absolute zero and on the interesting properties that materials exhibit near that temperature. Write a report on your findings.

83. How do scuba divers use the laws and principles that describe the behavior of gases to their advantage? What precautions do they take to prevent the bends?

84. Explain the processes involved in the liquefaction of gases. Name some substances that are gases under normal room conditions and that are typically used in the liquid form. Explain why this is so.