CHAPTER 3	**Properties of Gases**	**BLM 3.1.2**
ASSESSMENT		

1. Read the following experiments and decide what property of gases is being investigated:
   (a) A student inflates a balloon and records its mass on a balance. A pin is used to gently puncture the balloon to release the gas and then the balloon is re-massed.

   (b) An inverted glass is inserted into a sink full of water. Water does not enter the glass easily until the glass is tipped.

   (c) A balloon is inserted into a soft plastic 2 L drink container and the balloon's neck is stretched over the mouth of the bottle. A student attempts to blow up the balloon, but finds that it gets more difficult as the balloon gets larger.

   (d) A balloon is inflated and put into a freezer. After a couple of hours, the balloon's size decreases.
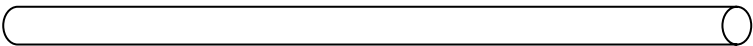
   (e) An aerosol can is thrown into a fire and it explodes.

2. Draw the difference, as seen molecularly, between solids, liquids, and gases. Use open circles (O) to represent the molecules. Comment upon the mobility of the molecules in each state.

   Solid   ☐   Liquid   ☐   Gas   ☐

3. Review the points of the kinetic molecular theory (KMT) for gases. Use the theory to explain why a tire will remain at the same volume for a considerable period of time if the temperature is kept constant.

4. Two gases, argon and krypton, are released at the same time on opposite ends of a glass tube. Where do they meet (i.e. in the middle, or closer to one end of the tube)? Explain your answer.

   Ar(g) ⟮_____⟯ Kr(g)

5. Use the KMT of gases to compare two balloons, one filled with hydrogen and the other filled with nitrogen. The balloons are kept at the same temperature and volume, and the number of molecules in each balloon is equal. Which has the higher:
   (a) kinetic energy?
   (b) speed?
   (c) mass?

6. Use the KMT of gases to explain what happens to the volume of a tire on a cold day.

7. When we breathe, the diaphragm moves down. What happens to the volume in the lung cavity? What happens to the pressure? How does this help us to breathe?

8. The temperature of $NH_3(g)$ was dropped to −20 °C and the volume of the gas deviated from its expected ideal gas value. Explain what happened using the KMT of gases. Ammonia gas has a boiling point of −33 °C.

9. A small child cries as his helium-filled balloon drifts up into the air and floats away. Explain why the balloon quickly rises into the atmosphere.