**9** **Chemistry**
Homework: Gas Laws

1. Imagine that you blow up a balloon before you go scuba diving. You put on your gear and descent to 30 ft with the balloon. The total pressure from the ocean at that depth is 2 atm (it is 1 atm at the surface of the water). Assume temperature is constant.
   a. What happened to the volume of the balloon?

   b. What happens to the pressure of the air inside the balloon?

   c. Draw a model before diving (above water) and after diving (30ft below)
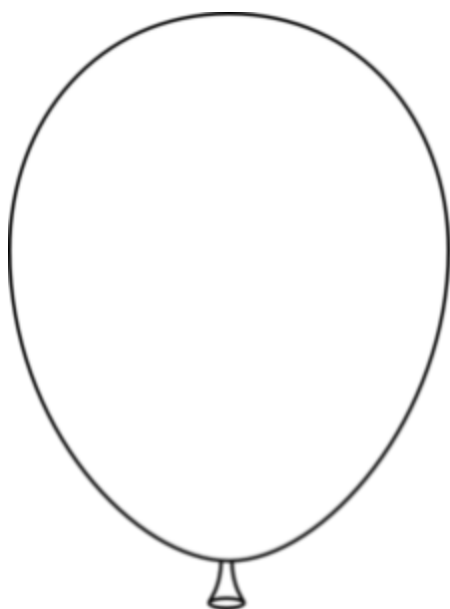
Above Water

30ft Below Water
(you will need to draw the balloon bigger or smaller based off of your reasoning)

2. A scuba diving tank holds 18 L of air at a pressure of 40 atm. If the temperature does not change, what volume would the same amount of air occupy if it were allowed to expand until it reached a pressure of 1.0 atm?

3. The air inside a 180 mL glass bottle is at 1.0 atm and 70°F when you close it. You carry the glass bottle with you up a mountain where the air pressure is 0.75 atm and the temperature is 5°C.

   a. The air pressure outside the bottle has decreased. What happens to the volume of the air inside the bottle? Explain your reasoning.

   b. What would happen to the temperature inside the bottle? Explain your reasoning.

   c. What happens to the pressure inside the bottle? Explain why in terms of molecular motion.

   d. Solve for the new pressure of the gas.

4. A helium balloon floats up into the sky. The pressure around it decreases as the balloons altitude increases. If the temperature does not change, what will happen to the volume of the balloon? Why?

5. A gas collected in a flexible container at a pressure of 0.97 atm has a volume of 0.500 L. The pressure is changed to 1.0 atm. The amount of gas and the temperature do not change.

   a. Will the volume increase or decrease? Explain.

   b. Which equation should you use to calculate the new volume of the gas.

   c. Calculate the new volume.

6. The helium inside a balloon has a volume of 1.5 L, a pressure of 1.0 atm, and a temperature of 25°C. The balloon floats up into the sky where the air pressure is 0.95 atm and the temperature is 20°C.

   a. Will the volume increase or decrease? Explain.

   b. Which equation should you use to calculate the new volume of the gas.

   c. Calculate the new volume.