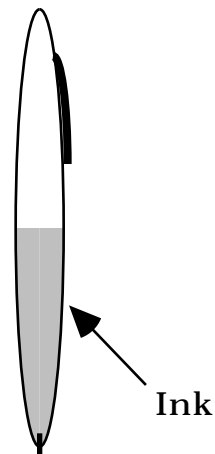# Boyle's Law   Name_____

1) You decide to climb to the tops of some of the tallest mountains. Before you are about to leave on your epic journey, a friend gives you a balloon with a volume of 800.0 cm^3 that was inflated under standard atmospheric pressure. You climbed two different mountains with this balloon: Mt. Everest 29,028 ft above sea level which has an average atmospheric pressure of 221 mmHg, and Mt. McKinley 20,320 ft above sea level which has an average atmospheric pressure of 345 mmHg. Before calculating any values predict on which mountain the balloon will have the largest volume. What was the size of the balloon on each mountain top?

2) Explain why climbers of such tall mountains need to carry oxygen with them near the top. How does this relate to the low pressures described above?

3) A 50.0 ml. soap bubble is blown at standard pressure. When a thunder storm passes later in the day, the pressure becomes 700.0 mmHg. Will the bubble get bigger or smaller? What is its new volume?

4) A balloon was inflated to a volume of 5.0 liters at a pressure of 0.90 atm. It rises to an altitude where its volume becomes 25.0 liters. Will the pressure around the balloon increase or decrease? What was the new pressure?

5) A SCUBA diver inflates a balloon to 10.0 liters at the surface and takes it on a dive. At a depth of 100.0 feet the pressure is 4.0 atm. Will the volume of the balloon increase or decrease? What was the new volume of the balloon?

6) The living quarters of the space shuttle has a volume of 20,000 liters (2.00×10^4 L) and is kept at 12.0 lbs/in^2. If all the air were lost, it would have to be replaced from a compressed air cylinder which has a volume of 50.0 liters. What is the pressure in that tank? (In other words: How much pressure would it take to compress all the air in the shuttle into a 50.0 liter space?)

7) Back to the space shuttle. the living quarters have a volume of 20,000 liters (2.00×10^4 L) at 500.0 mmHg. The shuttle docks with a space-lab which has a volume of 230,000 liters (2.30×10^5 L) and no air in it. What does the air pressure in both become when the hatch is opened between the two?

8) A fountain pen which has a <u>total</u> volume of 2.4 cm^3 is <u>half</u> full with ink at the surface where the pressure is 780.0 mmHg. It is put in a pilot's pocket who flies to an altitude where the pressure is 520.0 mmHg. How much ink leaks out of the pen?

Ink