Chemistry
Study Guide: Ch12 Gas Laws

1. Know the four things about a gas that can change.
2. Know the effect of: a) adding or removing a gas from a container.
   b) Changing the size of a container c) heating or cooling a gas
3. Be able to explain the difference between a real and an ideal gas
4. Know and be able to use Dalton's Law of Partial Pressure.
5. Know and be able to use Boyle's Law.
6. Know what and inverse proportion is and how its graph looks.
7. Know and be able to use Charles' Law.
8. Know what a direct proportion is and how its graph looks like.
9. Know that you must use temperature in Kelvin when working with gases.
10. Know how a gas can be liquidified
11. Know and be able to use the combined gas law.
12. Know and be able to use the ideal gas law if given a calculator.
13. Know the two reason a real gas my deviate from the behavior of an ideal gas.
14. Know effusion and diffusion
15. Know the relationship between the mass of a particle and how fast it moves on average. This is known as Graham's Law.

Boyle's Law- Volume and Pressure are inversely related (T and and n held constant).

1. By hat factor does the volume of a gas in a syringe change when the pressure is doubled? Draw two pictures to illustrate?
2. 150.0 ml of gas at 1.00 atm of pressure is compressed to 50.0 ml. What will the new pressure be? Illustrate by drawings.
3. The pressure of 2.50 liters of gas is changed from 760 mmHg to 76 mmHg. What is the new volume? Illustrate by drawings.
4. What will be the new pressure of 4.50 liters of gas at 3.00 atm if it is changed to 1.50 liters?

Charles's Law- Volume and Temperature are directly related. Temperature must be in Kelvin (P and n held constant)

5. What volume change will take place when a gas is changed from 0.0^oC to 273^oC.
6. 2.00 liters of gas at 27^oC is heated to when thrown into a camp fire?
8. 200 ml of a gas at 27^oC is heated until the volume of the gas is 800 ml. What is the final temperature of the gas in Kelvin and Celsius?
9. 2.50 liters of a gas is cooled until the volume is 0.50 liter. What is the final Celsius temperature if the original temperature was 27^oC?

Pressure and Temperature are directly related. Temperature must be in Kelvin (V and n held constant).

10. by what factor must eh Kelvin temperature change in order to increase the pressure of a gas from 1.00 atm to 3.00 atm?
11. Determine the final temperature needed to increase the pressure of a gas from 1.50 atm to 6.00 atm if the original temperature was 27^oC?
12. A gas at 27^oC and a pressure of 760 mmHg is changed to 600K. What is the new pressure in mm HG and atm?
13. A gas at 127^oC and 4.00 atm is heated until the pressure is 16.0 atm. What is

the new temperature in K and ^{o}C?

Combined Gas Law-(n held constant)

14. 1.00 liter of a gas at 1.00 atm and 300 K is changed to 2.00 atm and 600 K. What will the volume be?
15. 2.00 liter of a gas at 2.00 atm and 300 K is changed to 8.00 liter and 4.00 atm. What is the new temperature in K and ^{o}C?

Ideal Gas Law- (PV = nRT) Temperature must be in Kelvin.

16. Use a calculator to determine the volume of 0.500 mol of hydrogen gas will occupy at 25.^{o}C and 76.0mmHg.

17. What are the two reasons a real gas may not behave like an ideal gas?
18. At the same temperature how does the average kinetic energy of a hydrogen molecule compare to that of an oxygen molecule? Which one, on average, moves faster.
19. Which gas will effuse faster: hydrogen or chlorine? Why?

Daltons Law of Partial Pressures ($P_T = P_1 + P_2 +$ _____)

20. Partial Pressure of O_2 = 10.0 kPa, Partial Pressure of N_2 = 30.0 kPa, Partial Pressure H_2O =? Total Pressure = 45.0 kPa

Problems: 10-12 on p 462
23 & 24 on p. 469
25-29, 35, 39, 50, 54, 58, 61, 64, 67-71, 75, 77, 82 on p. 469-475
10, 11, on p. 483
35 p. 494

ozone, O3, acid rain, greenhouse, smog CFC halogensated hydrocarbons, halogens, Freon, Freon substitutes