Gas Laws Worksheet
1.0 atm = 760.0 mm Hg = 101.3 kPa= 760 .0 torr

Boyle's Law Problems:

1. If 22.5 L of nitrogen at 748 mm Hg are compressed to 725 mm Hg at constant temperature. What is the new volume?

2. A gas with a volume of 4.0L at a pressure of 205kPa is allowed to expand to a volume of 12.0L.
   What is the pressure in the container if the temperature remains constant?

3. What pressure is required to compress 196.0 liters of air at 1.00 atm into a cylinder whose volume is 26.0 liters?

4. A 40.0 L tank of ammonia has a pressure of 12.7 kPa. Calculate the volume of the ammonia if its pressure is changed to 8.4 kPa while its temperature remains constant.

Charles' Law Problems:

1. Calculate the decrease in temperature when 6.00 L at 20.0 °C is compressed to 4.00 L.

2. A container containing 5.00 L of a gas is collected at 100 K and then allowed to expand to 20.0 L. What must the new temperature be in order to maintain the same pressure (as required by Charles' Law)?

3. A gas occupies 900.0 mL at a temperature of 27.0 °C. What is the volume at 132.0 °C?

4. If 15.0 liters of neon at 25.0 °C is allowed to expand to 45.0 liters, what must the new temperature be to maintain constant pressure?

Guy-Lussac's Law

1. The gases in a hair spray can are at a temperature of 27 °C and a pressure of 1550 mm Hg. If the gases in the can reach a pressure of 4650 mm Hg, the can will explode. To what temperature (in Celsius) must the gases be raised in order for the can to explode? Assume constant volume.

2. Maybelline Cousteau's backup oxygen tank reads 900 mmHg while on her boat, where the temperature is 27 °C. When she dives down to the bottom of an unexplored methane lake on a recently-discovered moon of Neptune, the temperature will drop down to −183 °C. What will the pressure in her backup tank be at that temperature?

Combined Gas Law Problems:

1. A gas balloon has a volume of 106.0 liters when the temperature is 45.0 °C and the pressure is 740.0 mm of mercury. What will its volume be at 20.0 °C and 780 .0 mm of mercury pressure?

2. If 10.0 liters of oxygen at STP are heated to 512 °C, what will be the new volume of gas if the pressure is also increased to 1520.0 mm of mercury?

3. A gas is heated from 263.0 K to 298.0 K and the volume is increased from 24.0 liters to 35.0 liters by moving a large piston within a cylinder. If the original pressure was 1.00 atm, what would the final pressure be?

4. The pressure of a gas is reduced from 1200.0 mm Hg to 850.0 mm Hg as the volume of its container is increased by moving a piston from 85.0 mL to 350.0 mL. What would the final temperature be if the original temperature was 90.0 °C?