

### Chapter 12-3: The Gas Laws

- Pressure and Volume (Boyle's Law)

$$P_1 \times V_1 = P_2 \times V_2$$

- Temperature and Volume (Charles' Law)

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} = C$$

- Temperature and Pressure (Gay-Lussac's Law)

$$\frac{P_1}{T_1} = \frac{P_2}{T_2} = C$$

- Pressure, Temperature, and Volume (Combined Gas Law)

$$\frac{P_1 \times V_1}{T_1} = \frac{P_2 \times V_2}{T_2} = C$$

- Practice Problems:

- A girl holds a balloon which contains 30.0L of helium gas at 103kPa. When it starts to pick her off the ground, she lets go and it floats into the air. What is the volume when it gets to an altitude where the pressure is only 25kPa?
- The gas left in a used aerosol can is at 103kPa at 25°C. Someone throws it into a fire and it heats to 928°C – what is the new pressure?
- A balloon contains 4.00L at 24°C. After being heated to 58°C, what is the new volume if the pressure remains constant?
- The volume of a gas-filled balloon is 30.0L at 40°C and 153kPa. What volume will it have at STP?

**Homework: Section 12-3 (p335) #10-11, (p337) #12-13, (p338) #14-15, (p340) #16-21**