



# UNIT 5: CHEMISTRY OF CLIMATE CHANGE

Workbook 5.1: Gas Laws

Lesson 6: Gay-Lussac's Law

# GUIDING QUESTION – PAGE 17: DESCRIBE HOW FLEXIBLE AND RIGID CONTAINERS AFFECT THE PRESSURE, VOLUME, AND TEMPERATURE OF A GAS.

- Do Now:

The first thing in the morning, you fill a bike tube with air to a volume of 180 mL at 50°F. After several hours in the Sun, the air inside the bike tube has warmed to 85°F. Calculate the new volume of the bike tube.

- Gay-Lussac's Law: The pressure of a given amount of gas is directly proportional to temperature, if the gas volume and the amount of gas do not change. Temperature **must be in Kelvin**.

$$k = P/T = \mathbf{P_1T_1/P_2T_2}$$

## NOTES – PAGE 17

- The three gas laws help predict gas temperature, pressure, and volume when two of these variables change and the third remains fixed. In all cases, the amount of gas cannot change.

## NOTES – PAGE 17

- In a *flexible container* changing the temperature or pressure causes the volume to change.
  - **Charles's Law** applies when the volume and temperature vary but pressure does not change.
  - **Boyle's Law** applies when the volume and pressure vary but temperature does not change.

## NOTES – PAGE 17

- In a *rigid container* changing the temperature will change the pressure by the same amount.
  - This is **Gay-Lussac's Law**.



## CHECK-IN – PAGE 17

In the factory, a potato chip bag is filled with 50.0 mL of air. The pressure of the air is 1.0 atm, and the temperature is 25 °C. Imagine that you take the potato chips with you on an airplane. At higher altitudes, the air pressure in the cabin is 0.85 atm, and the temperature is 25 °C. The potato chip bag puffs up.

1. Which gas law applies?
2. Explain why the potato chip bag puffs up in the airplane.
3. What is the volume of the gas in the potato chip bag when it is at a higher altitude? Show your work.

# CLOSURE

- Answer Guiding Question on page 17:
  - Describe how flexible and rigid containers affect the pressure, volume, and temperature of a gas.
- Homework #9 due Friday, 4/20.
- Achieve 3000: “No Idle Law” due Friday, 4/20.