

5.2 - Simple Gas Laws I - Boyle's Law

The next few sections will focus on the relationships involving pressure, volume, temperature, and amount of a gas.

Specifically, we will see how one variable at a time depends on another while the other two are fixed.

For example, how the volume depend on temperature when the amount of gas in a container and the pressure are kept constant.

The relationships we will study are collectively called the **simple gas laws**. They will eventually combine to form the **ideal gas equation**.

In 1662, while working with air, Robert Boyle discovered the first of the simple gas laws.

Boyle's Law states that for a fixed amount of gas at a constant temperature the volume of the gas is inversely proportional to the pressure.

- Ex) If a gas is kept at constant temperature and a constant amount;
- a) describe what would happen to the volume if pressure was doubled.

 - b) describe what would happen to the volume if the pressure was cut in half.

Mathematically, we can express the inverse relationship between pressure and volume with the following equation.

Therefore, for a specific amount of any gas at constant temperature the product of the pressure and volume will always be the same.

Once you change the amount of gas, or the temperature you will get a different constant.

Therefore, if we happen to change the initial pressure and volume we can predict the final pressure and volume assuming temperature is constant.

Ex) If a sample of gas has a volume of 100.0 mL when the pressure is 150.0 kPa, what is its volume when the pressure is increased to 200.0 kPa?

Ex)

