

Section 10-3 - The Gas Laws Simulation

Open the simulation and spend 5 minutes becoming familiar with the various attributes. Please note the following areas: Constant Parameters, Gas in Chamber, the pressure gauge, the thermometer, the pump and how to add different gases, how to adjust the volume of the box, how to open the lid on the box and the pause button.

Add some gas to the box. It does not matter exactly how much just keep it consistent for each of the following scenarios.

Scenario 1:

Set Temperature as your constant parameter.

Click on the "Measurement Tools" button. Click on the *Ruler* which will cause a ruler to appear. The rulers' units are in nanometers (nm) but we are going to use the ruler to give us an estimated measurement of volume. You will use the ruler to measure the width of the box. We will then change the units of measurement to *liters*. For example: initially the box should have a width of 6.6 nm which will be recorded in your data table as 6.6 L (liters). When you are asked to change/measure the volume of the box, use the ruler to do so.

You can move the ruler. Do so to measure the volume of the box.

Move the box wall at least five times measuring the volume in liters and resulting pressure for each. Wait 30 sec after each movement for the pressure to settle. *Press the pause button at any time if you can't read the pressure gauge easily.* Place your results in the table on your worksheet.

Scenario 2:

Set Pressure as your constant parameter.

This time you will change the temperature of the box by either adding heat or cooling down the gas particles with the heat control below the box. Do this five times and record the Temperature and Volume for each different trail.

Scenario 3:

Set Volume as your constant parameter.

Now you will change the temperature of the box again and this time measure the pressure that is recorded after each Trial.

Concept Questions

Read the following scenarios and use the information gathered from the simulation scenarios to help you understand and explain what is happening. Record how you used the simulation and your observations. Be exact about what you held constant and what you varied, and then write your explanations.

1. During very hot days in the summer, it is sometimes common for people driving on black asphalt roads to have a tire “blowout” while traveling on the road.

2. You jump down on shoes that have air pockets in the heel.

3. Warmer soft drinks in plastic bottles are more difficult to open than cold ones.

4. You buy a bouquet of helium balloons for a friend’s birthday in Seattle, but some pop on the drive up to Snoqualmie.

5. The torch under a hot air balloon is turned on and the balloon goes higher in altitude.