Gas Pressure and Volume

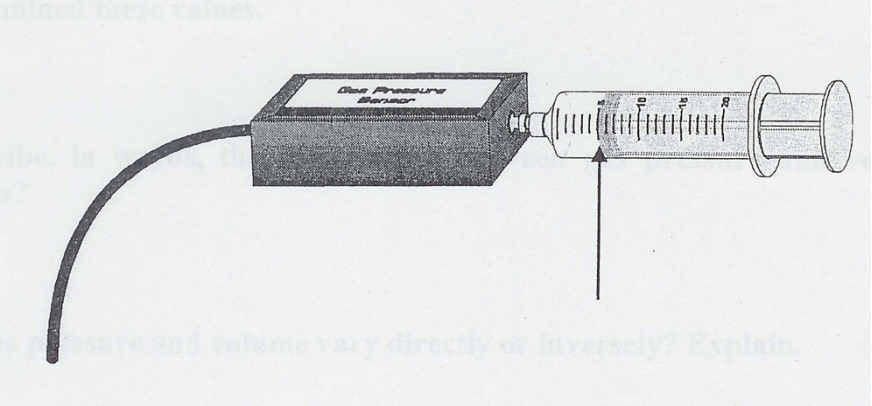
Experiment: You must use a calculator that has the **EasyData** application during the data collection phase of this experiment!

1. Prepare the **Gas Pressure Sensor** and an air sample for data collection.
    a. Plug the **Gas Pressure Sensor** into **CH 1** of the **CBL2**, and use the **link cable** to connect one of your calculators to the **CBL2**.
    b. Pull the syringe to the 10-mL mark and connect it to the **Gas Pressure Sensor**. Turn the syringe clockwise until it is secure.

2. Turn on the calculator and start **EasyData**. Respond to any prompts generated to get to the main screen. The **Gas Pressure Sensor** should automatically be detected and a current reading displayed.
    a. Select the **Setup** tab.
    b. From the menu options displayed select **1: CH1:PRESS**, then select the **Units** tab and select from the type of units you wish to measure pressure in. Now hit the **OK** tab to return to the main menu.
    c. Again select the **Setup** tab and this time from the menu of options displayed select **3: Events with Entry**.

Check with your facilitator

3. Collect pressure and volume data.
    a. Select the **Start** tab to begin data collection.
    b. Move the syringe so the front edge of the inside black ring (see figure) is positioned at the 5.0-mL line on the syringe. Hold the syringe firmly in position until the pressure value stabilizes.



    c. Press the **Keep** tab and type in the **Enter Value** box displayed a **5**, the gas volume (mL). Then press the **OK** tab. The calculator will store the pressure value from the sensor and the entered volume value. The resulting data point is then displayed on a graph.

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1. Collect data for the following Volumes:

Volume (mL)	Pressure (_____)
5	
7.5	
10	
12.5	
15	
17.5	
20	

- Select the **Stop** tab when you have finished collecting data.
- Select the **Main** tab return to the main screen and select the **Quit** tab to exit the **EasyData** application and analyze the data outside of the application. The calculator will tell you where your data has been stored record this and select the **OK** tab. Now link and share this data with your group members!
- Use your calculator to create a scatter plot of your data.

Processing the Data: Only use your calculator to view the lists & graph at this time!

1. Look at your lists of the data and note the gas pressure when the volume is 10.0-mL, and when the volume is 5.0-mL. What happened to the pressure when the volume was halved?

2. Look at your lists of the data and note the gas pressure when the volume is 10.0-mL, and when the volume is 20.0-mL. What happened to the pressure when the volume was doubled?

3. Estimate from your data and graph, what is the pressure when the volume is 16-mL? 8-mL? How do these values compare?

4. What would the pressure be at 40.0-mL? At 2.5-mL? Explain how you determined these values.

5. Describe, in words, the relationship between gas pressure and volume.

6. Do gas pressure and volume vary directly or inversely? Explain.

7. Write an equation to express the relationship between gas pressure and volume. Use the symbols P, V, and k (constant).