

## 12B – BOYLE'S LAW

### INQUIRY

What is the relationship between pressure and volume in gases?

### MATERIALS

- Device with SPARKvue software
- Pressure sensor and syringe



### BACKGROUND

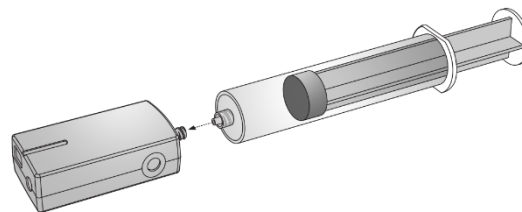
Volume, temperature, the number of moles, and pressure are all physical properties of a gas that can be affected by the properties of a system. To understand the relationship between any pair of properties, the other properties must be held constant within a system.

### SAFETY

Follow regular lab safety procedures.

### PROCEDURE

1. Open SPARKvue.
2. Open the 12B Boyle's Law lab file. You may need to scroll to the top of the numbers in the table to see the first volume set at 60 mL.
3. Use the Bluetooth icon to connect the Pressure sensor.
4. In this lab you will vary the volume of gas in a syringe between 60 mL and 15 mL. Draw your prediction of what will happen to pressure as you vary the volume in Graph 1 on your answer sheet.
5. Move the plunger on the syringe to 30 mL. Connect the syringe directly to the pressure sensor. Do not overtighten the syringe.
6. Start collecting data.
7. Pull the syringe back to 60 mL. When the pressure has stabilized, click the check mark to record the pressure in the SPARKvue display. Record the pressure in Table 1 on your answer sheet as well.
8. Repeat step 7, but set the syringe volume to 55 mL, 50 mL, 45 mL, 40 mL, 35 mL, 30 mL, 25 mL, 20 mL, and 15 mL respectively.
9. Stop collecting data. Disconnect the syringe and repeat steps 5-8 for two more runs.



### ANALYSIS

Complete the analysis on your answer sheet.

### QUESTIONS

Answer the questions on your answer sheet.