

12A – VOLUME OF A GAS



INQUIRY

What factors affect how much a material can expand as conditions in its surroundings change?



MATERIALS

- Device with SPARKvue software
- Miniature marshmallows
- Pressure sensor with syringe



BACKGROUND

Gases expand to fill their containers. Some materials have empty space that contains gases. Due to molecular structure and attractions, some materials will expand more than others. In this investigation, you will use marshmallows to determine how a material expands and contracts as pressure is changed.



SAFETY

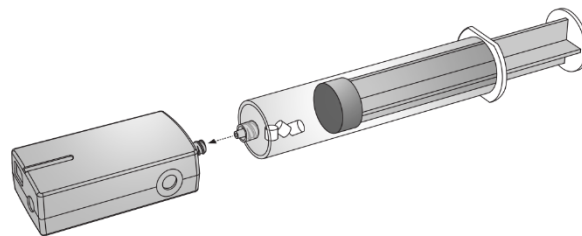
Follow these important safety precautions in addition to your regular classroom procedures.

- Never eat or drink in the lab even when working with food.



PROCEDURE

1. Open SPARKvue .
2. Open the 12A Volume of a Gas lab file in SPARKvue.
3. Use the Bluetooth icon to connect the Pressure sensor.
4. Remove the plunger from the syringe.
5. Place three mini-marshmallows into the barrel of the syringe.
6. Replace the plunger, and push it down until it reaches the 40 mL mark. Connect the syringe directly to the Pressure sensor. Do not overtighten the syringe.
7. Start collecting data.
8. Push the plunger to the 20 mL mark on the syringe and hold. Record the pressure in SPARKvue by selecting the check-mark. Use the markings on the syringe to read the approximate volume of the marshmallows and record this volume in SPARKvue. Record the pressure, volume and any additional observations of the marshmallows in Table 1 on your answer sheet.
9. Pull the syringe back to the 30 mL mark and hold. Record the pressure and approximate size of the marshmallows in SPARKvue. Record the pressure, volume and additional observations in Table 1.
10. Repeat step 9 at 40 mL, 50 mL and 60 mL. The same person should read the volume to reduce error.



 **ANALYSIS** 

Complete the analysis on your answer sheet.

 **QUESTIONS** 

Answer the questions on your answer sheet.