Boyle's Law

$P_1V_1 = P_2V_2$

This Law basically states that a change in the volume of a gas will have an effect on its pressure. To test this, we will use the PASCO sensor for pressure and change the volume of the gas held in a syringe.

1. Pull the stopper out of the syringe until it reads 50mL.
2. Plug the syringe into the PASCO Pressure Sensor.
3. Click the collect button, and record the pressure reading in kPA.
4. Slowly depress the plunger on the syringe until you have decreased the volume by 30mL.
5. Record the new pressure.
6. Click stop, and release the plunger.
7. Disconnect the syringe before leaving the station.

Charles's Law

$$\frac{V1}{T1} = \frac{V2}{T2}$$

This law describes how the volume of a gas will change in response to a change of temperature. There is a very simple way to show this change!

1. Prepare 2 water baths in the 600 ml beakers:
   a. Add 200 ml of water to each of the 2 beakers.
   b. Add ice to beaker 1. The temperature should measure 0° C
   c. Place beaker 2 on the hot plate. Heat the water to 50° C
      i. Remove the beaker from the hot plate before it reaches 50° C The thermometer should continue to rise to 50° C. Adjust with cool water or ice if the temperature goes past 50° C
2. Place the flask into the cold 0° C water bath for 1 minute:

3. After the air inside the flask has cooled, stretch a balloon over the mouth of the flask.
4. Record the initial temperature (0° C) and the initial volume of air (250ml) in the flask.
5. Transfer the flask into the hot water bath. Observe the balloon. Measure its diameter (cm) when it reaches its greatest volume. Record the diameter of the balloon.

Gay-Lussac's Law:

$$\frac{P1}{T1} = \frac{P2}{T2}$$

1. Place the flask with the attached pipe into the ice bath. Record the initial temperature.
2. Attach the other end of the tube to the pressure sensor. Tap collect, and record the initial pressure of the gas in the flask once the reading stabilizes.
3. Move the flask to the hot water bath. Allow it to sit in the hot water bath until the pressure reading stabilizes.
4. Record the temperature of the water in °C, as well as the final pressure.