

Lab #1

Boyle's Law

1. Place the large wooden base on the lab table, with the larger hole facing down.
2. Remove the red tip from the syringe and draw approximately 30 ml of air into the syringe.
3. Place the red tip back on the syringe.
4. Press the tip of the syringe into the wooden base.
5. Press the top of the syringe plunger into the hole in the thin wooden top.
6. Record the exact measure of air in the syringe.
7. Begin adding books to the top block. You may have to help balance the books.
8. Record the volume of the gas after each book addition. This data is "Trial One".
9. After all 10 books are stacked, unstack the books one at a time and record the volume after each book is removed. This data is "Trial Two".
10. Disassembly your apparatus carefully.
11. Remove the red tip from the syringe, expel the air and replace the red tip on the syringe.

For the report:

1. Graph both trials on one graph. Using a different color for each trial
 - a. The x-axis is the number of weights (which is proportional to pressure)
 - b. The y-axis is the recorded volume.
2. Does your data correctly correspond to Boyle's Law? Why or why not?

Lab #2

Charles' Law

1. Remove the red tip from the syringe and draw approximately 20 ml of air into the syringe.
2. Place the red tip back on the syringe.
3. Record the temperature of the water in one of the beakers.
4. Place the syringe of air in the beaker of water. You will have to hold it to keep the air filled portion of the syringe under water.
5. Wait two minutes for the air in the syringe to equilibrate with the surrounding water temperature.
6. Record the volume of the gas in the syringe. It is best to push the syringe plunger down a bit allow it to spring back and then take a reading, then pull the plunger out a bit, allow it to spring back and take another reading. The actual reading is an average of these two.
7. Repeat this process for all 4 available temperatures. Use a separate syringe for each temperature.
8. When you are finished make sure all syringes are emptied of air and the red tips are on the syringes.

For the report:

1. Graph your data.
 - a. The x-axis is the temperature IN KELVIN.
 - b. The y-axis is the recorded volume.
2. Does your data correctly correspond to Charles' Law? Why or why not?

Lab #3

Observe and Explain

1. Place 10 ml of water in an Erlenmeyer flask using the graduated cylinder.
2. Stretch an un-inflated balloon over the mouth of the flask. Try to center the opening of the balloon over the center of the flask opening.
3. Place the flask on the hotplate and heat the water until it is boiling.
4. Record your observations.
5. Carefully remove the flask from the hotplate using the hot grips and place it in the ice water bath. You will have to hold the flask in the water to prevent it from floating.
6. Record your observations.

For the report:

1. What gas law most accurately explains your observations?
2. Write few sentences, describing what you saw in this experiment.

Lab #4

Magic Candle

PERFORM THE EXPERIMENT AT LEAST TWICE!

1. Place the candle in the center of the pie dish.
 - a. One trial should be with the tea candle the other should use the birthday candle with a ball of modeling compound used as a support.
2. Place the penny in the dish near the candle.
3. Pour enough water into the dish to completely cover the bottom of the dish to at least the depth of the penny (cover the penny), but do not cover the candle.
4. Light the candle and lower the jar over the candle, resting an edge on the penny.
5. Make and record careful observations. Paying close attention to the sides of the jar, the behavior of the flame and the level of water in the jar.
6. You may repeat the experiment several times to view certain observations in more detail.
7. When you are finished empty the tray into the sink and dry all materials.

For the report:

1. What peculiar event happened with the water level?
2. Determine possible explanations for this occurrence. Need at least one for credit.

Lab #5

Freezing with out a Freezer

1. Hold the can of air in your hand, making sure your palm makes good contact with the side of the can.
2. Aim the can away from all people (aiming at the floor is a good idea).
3. Depress the nozzle. A very short burst is sufficient. Do not waste!!
4. Record your observations (what did your hand on the can feel).

For the report:

1. Describe in sentence form what you observed (felt).
2. Using your gas laws, mathematically explain what you observed (felt) when you depressed the nozzle.

Lab #6

Ask Neiman to help if you are having difficulty with the set up!

Boiling without Heat

1. Measure 10 ml of 50°C water into the syringe.
2. Put the 10 ml of warm water into container inside the bell jar.
3. Have one partner hold the bell jar in place while the other partner pumps the syringe.
4. Make careful observations.
5. When you are done observing, check the temperature of the water in the container
6. You may repeat this several times until you are satisfied with your results.

For the report:

1. Describe in sentence form what you observed.
2. How do you know the water did not “boil” due to temperature?

“Breathing Objects”

1. Blow up a balloon to the size of a small orange (Clementine).
2. Place the balloon in the bell jar
3. Have one partner hold the bell jar in place while the other partner pumps the syringe.
4. Make careful observations.
5. Release the pressure from the bell jar and observe what happens to the balloon
6. Repeat if necessary.

For the report:

1. Describe in at least one complete sentence your observations
2. Explain your observations in a few sentences using at least one gas law.