The Bunsen Burner

The Bunsen burner is used frequently in the laboratory as a source of heat. This burner is designed so that gaseous fuel may be mixed with the correct amount of air to yield the maximum amount of heat. In order to use this burner properly and safely, it is essential that you understand its construction and the adjustments that can be made.

The three principal parts of the burner are: **barrel**, **needle valve**, and **base**. The quantity of gas admitted to the burner is controlled by the needle valve, while the air needed for combustion is admitted at the small opening around the bottom of the barrel. The air is controlled by turning the barrel so as to make the air holes larger or smaller.

Always open the desk outlet valve fully and regulate the gas supply to the burner by the needle valve. Always extinguish your burner by turning off the desk outlet valve (and then closing the needle valve and barrel.) If there is an accident always shut off the desk outlet valve immediately.

STEPS TO LIGHT BUNSEN BURNER:

1. Check connections to burner and desk outlet valve.
2. Close needle valve and barrel.
3. Open desk outlet valve fully.
4. Check for leaks with flame.
5. While holding flame above barrel, open needle valve 1/2 turn.
6. Adjust barrel and needle valve for blue in blue flame.

Always light burner in open space on lab counter. After you have adjusted it for the flame needed move it into position. One person in lab group is always responsible for maintaining the burner and flame.

Burner Procedure:

1. Light the burner according to our rules. Observe the yellow flame which is produced because not enough air is admitted to give complete combustion. The yellow color is caused by small particles of unburned carbon which become incandescent.
2. Now rotate the barrel until the flame is entirely blue. Two different zones should appear when the burner is correctly adjusted. Too much air should not be admitted as it may cool the flame or blow it out entirely. After having the teacher confirm a good hot, blue flame draw a diagram of the flame (use labels and descriptions). Indicate on your diagram of the flame where the hottest part of the flame is located.

The Popcorn Connection

Objectives: This part of the lab is designed to review qualitative and quantitative measurements. Significant figures are to be used throughout the lab. Students should become aware of the Law of Conservation of Mass as well.

Procedure:

1. Identify your 4 best kernels of fresh popcorn The others can be used for practice. Handle the kernels with clean tweezers to avoid moisture on the hands from being transferred to them.

2. List one or two qualitative and one or two quantitative observations about the kernels. Record answers on the back of the notecard.

3. Measure the length of the 4 kernels (in centimeters, with the vernier calipers) and record on the notecard.

4. Find the mass of the 4 kernels (all together) using the lab scales. Be sure to use the massing paper (also be certain to use the tare function correctly). Record this total mass.

5. With the teacher present, ignite the Bunsen burner and adjust for a hot, blue in blue flame.

6. Place **ONE** kernel at a time in the spoon and with continual shaking of the spoon, pop the kernel. Place all the resultant parts on the massing paper. Record all observations made while the kernel was getting ready to pop. Pop the rest of the kernels, placing all parts on the massing paper. Mass all the flowers (and parts). Record this mass. Throw all the popcorn parts in the trash can.

Questions:

1. Give the length of each kernel. Find average length of kernels.
2. Give mass of all 4 kernels. Find average mass of kernels.
3. Give the mass of the flower parts after popping. Divide by 4 to get average mass of popped kernel.
4. What is the percent difference between the average mass before and after popping?
5. Develop a hypothesis as to the reason why the popcorn kernels pop. Can you devise a way to test your hypothesis? Explain.

Materials to be turned in for grading:

1. notecard (procedure on front, observations and data on back)
2. notebook paper with answers to the questions