Bunsen's Birthday

Momentary Diversions

Introduction

A fitting tribute to the man who invented the most useful instrument ever used in a chemistry lab, the Bunsen burner!

Concepts

- Laboratory safety
- Bunsen burners
- Combustion

Materials

Bunsen or Tirrill burners with gas supply (gas outlet), 8–12
T- or Y-tubing connectors, 8–12
Burner tubing, 1-foot lengths, 16–32
Butane safety lighter

Safety Precautions

Always inspect the Bunsen burner, rubber tubing, and gas valve before using a Bunsen burner. Follow proper procedures for lighting and using a Bunsen burner (see Procedure). Tie back long hair and do not wear loose, long sleeves. Use tongs when holding metal objects in a flame. Have an ABC dry chemical fire extinguisher available. Never leave lit burners unattended. When gas burners are not in use, turn off the main gas supply to the laboratory. Always wear chemical splash goggles whenever chemicals, glassware, or heat are used. All food-grade items that have been brought into the lab are considered laboratory chemicals and are for lab use only. Do not taste or ingest any food items in the chemical laboratory and do not remove any remaining food items after they have been used in the lab.

Procedure for Constructing a Bunsen Burner Tribute

1. Clear off the lab bench. Remove all flammable and combustible materials from the work area.
2. Connect three sections of rubber tubing to the first Y-tubing connector. Connect one of these section to the gas outlet. Check for holes or cracks in the all the tubing.
3. Connect two sections of rubber tubing to each of the remaining T-or Y-tubing connectors.
4. Connect each free section of hose attached to the Y-tubing of step 2 to a T- or Y-tubing connector from step 3. Now connect to each second Y-tubing connector a Bunsen burner and another T- or Y-tubing connector from step 3.
5. Keep adding burners and Y-tubing connectors to each side until only two connectors and four burners are left. In the final connection, add two burners to each final Y-connector.

Procedure

1. Close or partially close the air vents on the burners to make it easier to light.
2. Obtain a butane safety lighter and light it now.
3. Turn on the gas.
4. Bring the lighter alongside the barrel of the farthest burner and raise it slowly over the edge of the barrel from the side.
5. Quickly light the rest of the burners.
6. A rousing rendition of "*Happy Birthday Robert Bunsen*" is now in order.

Publication No. 91081
061616

Discussion

Methane or propane is used as the source of gas in most laboratories. Check that the burner being used is appropriate for the gas source in your laboratory. Sufficient oxygen is needed for complete combustion. Complete combustion of methane produces a blue, non-luminous flame yielding carbon dioxide and water. When the oxygen supply is insufficient, small carbon particles are produced that, when heated, form a yellow, luminous flame. Bunsen burners (named after Robert Bunsen, 1811–1899) were designed to generate a combustible gas–air mixture that produces an efficient, hot flame. A properly adjusted burner flame should have three distinct cones: an outer violet oxidizing flame and an inner blue reducing flame with a cone of unburned gas. The tip of the inner blue cone is the hottest part of the flame—reaching 1500°C. The cool region inside the innermost blue cone may only be 300°C (see Figure 2).

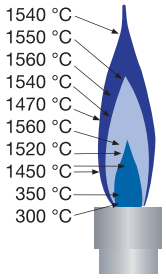

Figure 2.

Connecting to the National Standards

This laboratory activity relates to the following National Science Education Standards (1996):

Unifying Concepts and Processes: Grades K–12
Evidence, models, and explanation
Constancy, change, and measurement
Content Standards: Grades 9–12
Content Standard A: Science as Inquiry
Content Standard B: Physical Science, transfer of energy
Content Standards: Grades 9–12
Content Standard A: Science as Inquiry
Content Standard B: Physical Science, conservation of energy and increase in disorder

Flinn Scientific—Teaching Chemistry™ eLearning Video Series

A video of the *Bunsen's Birthday* activity, presented by Lee Marek, is available in *Momentary Diversions*, part of the Flinn Scientific—Teaching Chemistry eLearning Video Series.

Materials for *Bunsen's Birthday* are available from Flinn Scientific, Inc.

Catalog No.	Description
AP8344	Bunsen Burner
AP1661	Burner Tubing
AP8385	Tubing Connector, Y-Shaped

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.