

Part 1: Introduction:

The Bunsen burner reacts methane (CH₄) with oxygen gas (O₂) in the air to produce gaseous carbon dioxide (CO₂) and gaseous water (H₂O). This is referred to as *complete combustion*. $CH_4(g) + 2 O_2(g) \rightarrow CO_2(g) + 2 H_2O(g) + \text{heat}$. If insufficient oxygen is available, there would be an incomplete combustion, producing poisonous carbon monoxide (CO), soot (C), and a cooler yellow flame. It is important to learn how to control the type and the temperature of the flame. A hotter, bluer flame is needed and is accomplished by mixing more air with the methane gas.

Part 2: The Equipment

A. The Flint Striker: used to light Bunsen burner

- Has two arms, a metal flint, and a metal cap.
- One of the arms moves towards the other arm to create a spark.
- The spark can then ignite any escaping gas.



Flint Striker

B. The Bunsen Burner

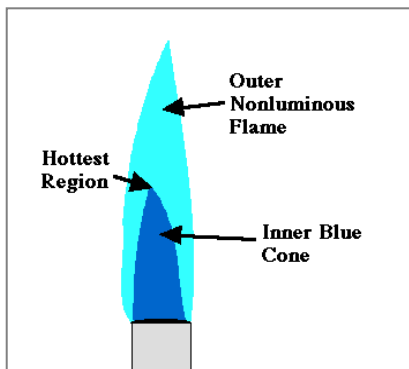
The Bunsen Burner Parts

- The Base:** supports burner
- Gas Inlet:** connects the gas jet at the lab station to the Burner via rubber tubing
- Gas Control Valve:** regulates the amount of gas flow (twistable)
- Collar & Air Vents:** can be turned to adjust the intake of air (larger holes more air will be drawn into the barrel)
- Barrel :** where the gas and air mix

Label the Bunsen Burner:

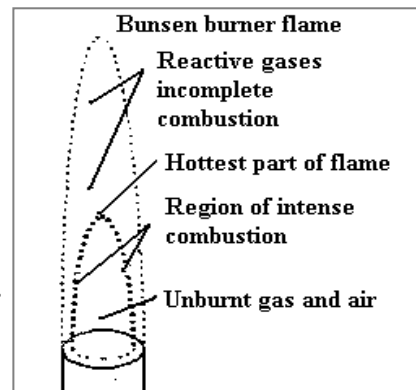


Gold Twistable Knob



C. The Bunsen Burner Flame:

- **Safety Flame:** yellow-orange color. 300°C. This flame should never be used to heat anything, only to show that the burner is on.
- **Blue Flame:** medium flame, it is difficult to see in a well-lit room. 500°C.
- **Roaring Blue Flame:** has an inner blue cone. It is the only of the three that makes a noise. 700°C.



Part 3: Lighting the Burner

- CONNECT the hose to the gas jet at the lab bench.
- CLOSE the GAS CONTROL VALVE (twist clockwise, righty tighty) AND the AIR VENTS on the Bunsen burner.
- Turn ON the GAS JET at the lab bench by moving the handle from the perpendicular position to the parallel position.
- Turn ON the GAS CONTROL VALVE slightly by twisting counter clockwise ¼ - ½ turn (lefty loosey).
 - If you hear the gas, it is on too high.
- IGNITE the gas by holding the flint striker or a match at an angle to the side of the barrel.
 - Do not hold it directly above the Bunsen burner, this is unsafe.
 - If your flame sputters and goes out, then turn off the gas at the control valve and the gas jet at the lab bench. Wait then try again. If the gas does not ignite right away, then turn off the gas, wait and try again.
- ADJUST the flame.
 - Use the gas valve to adjust the height of the flame. More gas = taller flame.
 - Open the air vents so that the flame is more intense and controlled. The inner blue cone will appear.
- Turn OFF the BUNSEN BURNER by twisting the gas control valve to the right, clockwise (righty tighty 😊)
- Turn OFF the GAS JET at the lab bench by moving the handle back to a perpendicular position.

Part 4: Summary Questions:

1. Chemical reaction of the Bunsen burner is:
2. What safety precautions should be taken before lighting the Bunsen burner?
3. What is "on" and "off" position of the gas jet located at your lab bench?
4. The Bunsen burner mixes _____ with _____.
5. The orange-yellow part of a flame is about _____ °C.
6. Blue color of a flame is _____ °C.
7. Top of the inner blue cone is about _____ °C.
8. What would happen if the air vents were made really small?
9. How do you adjust the gas flow through the burner?
10. What happens to the flame when the gas is "turned up"?
11. Your flame on the burner sputters and then goes out. What should you do immediately?
12. State TWO reasons why a blue flame is preferred over a yellow flame in a burner.
13. Arrange the following steps in the proper sequence for lighting a burner.
 - A. Slightly open the gas control valve.
 - B. Adjust the flame by opening the air vents and using the gas valve to change the height of the flame.
 - C. Turn on the gas jet on the lab bench.
 - D. Make sure the gas control valve is off and the air vents are closed.
 - E. Connect the burner's tubing to the desk gas jet.
 - F. Put out the flame by closing the gas valve.
 - G. Turn off the gas jet on the lab bench.
 - H. Light the escaping gas.

_____ / _____ / _____ / _____ / _____ / _____ / _____ / _____
Start End

14. Sketch a flame and label the hottest part of the flame. →

