Name:_____ Block:_____ *The Bunsen Burner*

Part I: Introduction:

The Bunsen burner reacts methane (CH_4) with oxygen gas (O_2) in the air to produce gaseous carbon dioxide (CO_2) and gaseous water (H_2O). This is referred to as *complete combustion.* CH_4 *(g)* + 2 O_2 *(g)* CO_2 *(g)* + 2 H_2O *(g)* + heat. If insufficient oxygen is available, we would have 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 II: The equipment

Draw *a Flint Striker:*

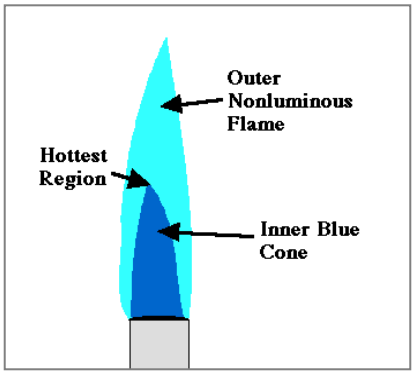
A. **The Flint Striker:** used to light Bunsen burner
- Has two arms, a metal flint, and a metal cap.
- One of the arms moves towards the other arm to create a spark
- The spark can then ignite any escaping gas.

B. **The Bunsen Burner**

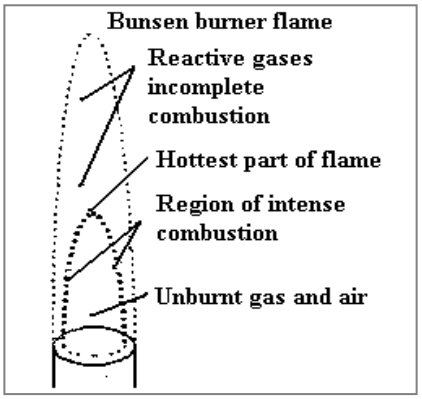
The Bunsen Burner Parts

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

Label *the Bunsen Burner*:



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.

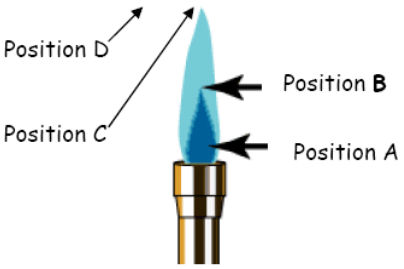


Part III: Lighting the Burner

1. Connect the hose to the desk gas jet.
2. Close the gas control valve on the Bunsen burner
3. Close the vents on the Bunsen burner.
4. Turn **on** the desk gas jet by moving the handle from the perpendicular position to the parallel position.
5. Use a flint striker to create a spark or strike a match
6. Turn the gas control valve slightly, ¼ to the left, counter clock wise
   - If you hear the gas, it is on too high
7. Ignite the gas by holding the flint striker or the match to the side of the barrel.
   - Do not hold it directly above the Bunsen burner, this is unsafe
   - If your flame sputters, turn off the gas at the control valve. The gas was on too high.
8. Adjust the air vent so that it is open
   - The flame will be more controlled, almost colorless, and the inner blue cone will appear.
9. Adjust the gas control valve to allow more gas in the barrel to adjust the height of flame.
10. Turn the Bunsen burner off by moving the gas control valve to the right, clockwise
11. Turn the gas jet off by moving the handle back to a perpendicular position.

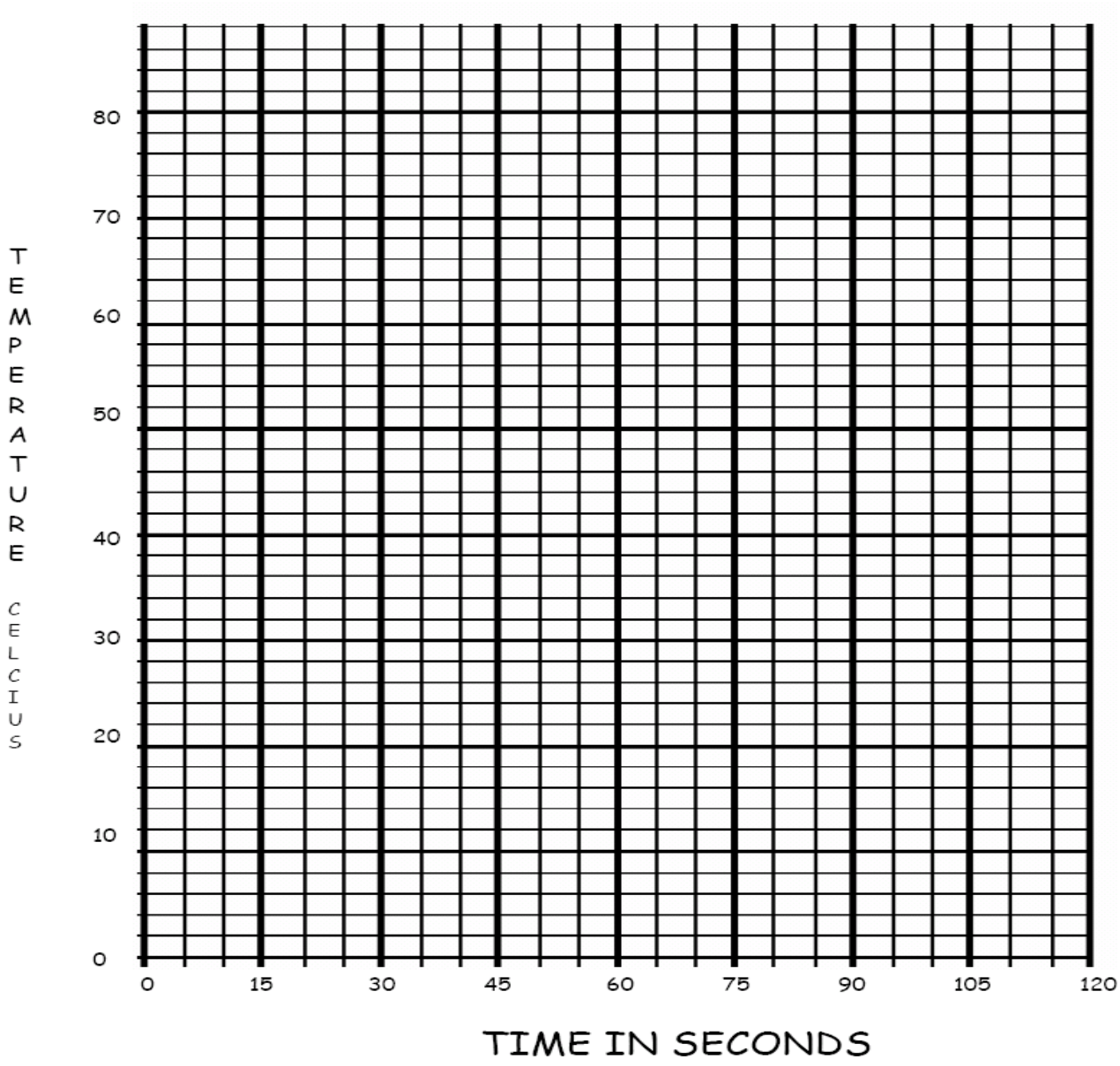
Part 3: Boiling water at four different height

A. Data Table for boiling water at the different heights:



Position	Starting Temp	15 sec	30 sec	45 sec	60 sec	75 sec	90 sec	105 sec	120 sec
A	24	24	25	29	31	36	39	42	44
B	24	26	30	30	33	37	40	43	46
C	24	25	25	28	29	31	33	35	36
D	24	24	25	26	27	29	31	33	34

B. **Graphing Data** *Graph your data for all four positions. Label each line.*



C. Graphing Questions: *Circle the correct answer.*

1. In the experiment above, temperature is the **independent/dependent** variable.
2. In the experiment above, time is the **independent/dependent** variable.
3. As time is increasing, the temperature is: **increasing/decreasing.**
4. The graph represented above is: **inversely/directly** proportional.
5. Position, **A, B, C, D**, was the best for boiling water.

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. There are some steps where the order makes no difference- enclose these steps in parenthesis.

    A. Slightly open the gas control valve
    B. Turn on the desk gas jet located at the lab station
    C. Make sure the gas control valve is off
    D. Make sure the air vent is closed
    E. Connect the burner's tubing to the desk gas jet
    F. Light the escaping gas
    G. Open air vent to adjust the type of flame
    H. Open or close the gas control valve as needed to adjust the height of the flame

_____, _____, _____, _____, _____, _____, _____, _____

14. According to your results, where is the hottest part of the flame?

    Position A, B, C or D _____

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

Sketch of a flame: