

Group # \_\_\_\_\_

Name \_\_\_\_\_

Period \_\_\_\_ Date \_\_\_\_/\_\_\_\_/\_\_\_\_

## Lab Ch 3 • Effective Bunsen Burner

Lab Partners: \_\_\_\_\_

**Introduction:** Often a chemist needs to heat materials. The Bunsen burner is one of the most efficient ways of doing this. Burners come in a variety of designs but most operate on the principle of mixing gas with air to produce a hot flame.

### Objectives:

- Become familiar with the operation of a Bunsen burner by lighting and adjusting the burner to obtain the hottest possible flame
- Determine the effect of the adjustment of gas and air flow to the burner
- Use the scientific method to determine the most efficient position for heating (optimum height above the burner)

### Materials:

Chemicals	Equipment
Distilled water	100 mL graduated cylinder
	150 or 250 mL beakers (4)
	Stopwatch
	Bunsen burner
	Striker
	Thermometer
	Crucible tongs
	Beaker tongs
	Wire gauze
	Iron Ring
	Ring stand

### Safety Precautions:

- Always wear safety goggles.
- Assume all glassware is hot and handle with gloves or the appropriate tongs.

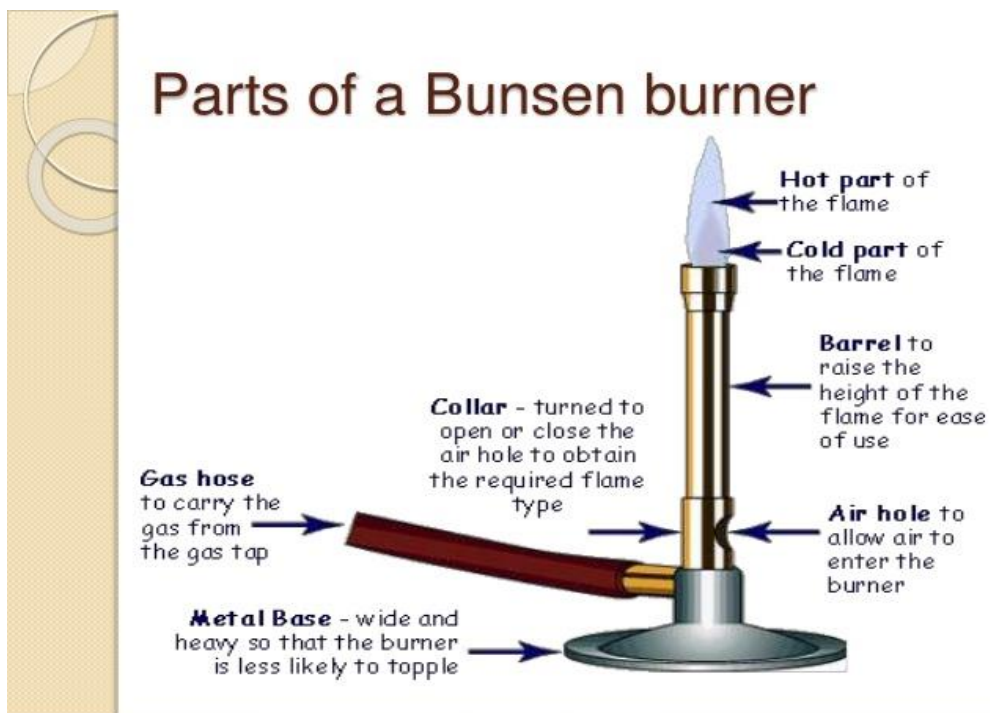
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### Parts of the Bunsen Burner:



When turning knobs a general rule is: “righty tighty, lefty loosey”, which means that turning a knob right will usually turn the flow off and turning a knob to the left will usually turn the flow on.

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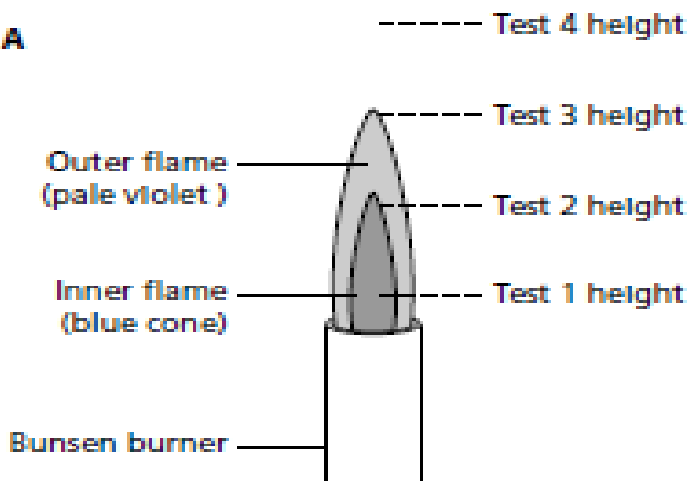
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### PROCEDURE:

USING A GRADUATED CYLINDER, MEASURE 100 ML OF DISTILLED WATER INTO A BEAKER. MEASURE AND RECORD THE TEMPERATURE OF THE WATER IN DATA TABLE.

2. SET UP A RING STAND AND ATTACH THE RING TO THE STAND. PLACE THE WIRE GAUZE ON THE RING TO PROVIDE A PLATFORM ON WHICH TO PLACE THE BEAKER OF WATER.
3. USE BURNER CONNECTOR SAFETY TUBING TO CONNECT THE BUNSEN BURNER TO THE GAS INLET. MAKE SURE THE HOSE DOES NOT HAVE ANY CRACKS OR HOLES.
4. LIGHT THE BURNER FOLLOWING PROPER PROCEDURE. WHEN THE FLAME IS LIT, **ADJUST THE GAS FLOW AND OXYGEN FLOW SO THAT THE FLAME IS BLUE WITH AN INNER LIGHT-BLUE CONE.** A YELLOW FLAME IS TOO COOL AND NEEDS MORE OXYGEN (DO NOT WANT YELLOW FLAME). SHOW YOUR TEACHER YOUR FLAME BEFORE CONTINUING.
6. MOVE THE BURNER TO THE RING STAND AND OBSERVE THE HEIGHT OF THE WIRE GAUZE ABOVE THE FLAME. ADJUST THE HEIGHT SO THE WIRE GAUZE IS APPROXIMATELY HALFWAY UP THE INNER BLUE CONE.
  - REFER TO FIGURE A BELOW, TEST 1 HEIGHT.
  - ESTIMATE THE DISTANCE FROM THE TOP OF THE BURNER TO THE WIRE GAUZE WITH A RULER.
  - **RECORD** THIS DISTANCE AS BEAKER 1 IN DATA TABLE. THIS WILL BE YOUR STARTING DISTANCE.

Figure A



7. PREPARE TO **WORK TOGETHER!!!** (ONE PERSON READ TEMP, ONE PERSON WATCH TIME, ONE PERSON RECORD DATA, ETC.)
  - PLACE BEAKER ON THE WIRE GAUZE.
  - AS SOON AS YOU PLACE BEAKER ON WIRE GAUZE START THE TIME.
  - MEASURE THE TIME (IN SECONDS) EVERY 15 SECONDS FOR A TOTAL OF 2 MINUTES.
  - **RECORD** THESE TIMES IN DATA TABLE.

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8. USING BEAKER TONGS, CAREFULLY REMOVE THE HOT BEAKER OF WATER FROM THE WIRE GAUZE AND PLACE IT ON YOUR LAB BENCH TO COOL DOWN.

9. REPEAT STEPS 6-8 FOR EACH OF THESE HEIGHTS:

- BEAKER 2: TOP OF THE INNER CONE (TEST 2 HEIGHT – SEE FIGURE ABOVE)
- BEAKER 3: TOP OF THE OUTER CONE (TEST 3 HEIGHT – SEE FIGURE ABOVE)
- BEAKER 4: ABOVE OUTER CONE A DISTANCE EQUAL TO DISTANCE BETWEEN BEAKER 2 AND 3. (TEST 4 HEIGHT – SEE FIGURE ABOVE)

10. WHEN THE BEAKERS COOL, EMPTY THE WATER IN THE SINK AND DRY THE GLASSWARE.

### Disposal/Clean Up

- Clean and Dry ALL equipment with LAB Equipment soap & brushes
- Clean Lab BENCH with small soap bottle and sponge.
- Wash hands with hand soap.
- Let me know when you are ready. **Do not get unprotected until dismissed.**

### DATA TABLE:

Record the temperature for each time interval. Remember to be precise and record at least one sig fig after the decimal.

Beaker	Estimated Height in cm	Starting Temp °C	15 s	30 s	45 s	60 s	75 s	90 s	105s	120s
1										
2										
3										
4										

**GRAPH: (TEACHER WILL GIVE YOU GRAPH PAPER AND YOU WILL GRAPH IN CLASS ONCE WE COLLECT DATA)**

1. Using pencil, graph your data points for all 4 beakers.
2. Draw the best fit line for each beaker.
3. Label each line. (can use different color pens/highlighters)

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### POST-LAB QUESTIONS:

1. For which beaker (1, 2, 3, 4) did the water heat the quickest?
2. Why did the water heat quicker at this position?
3. What are some possible sources of error in this experiment? State at least **TWO** AND explain how they might affect the results.