



# iTeachly

## **Lab Procedures**

Unit 1 Lesson 4

## **Learning Objectives:**

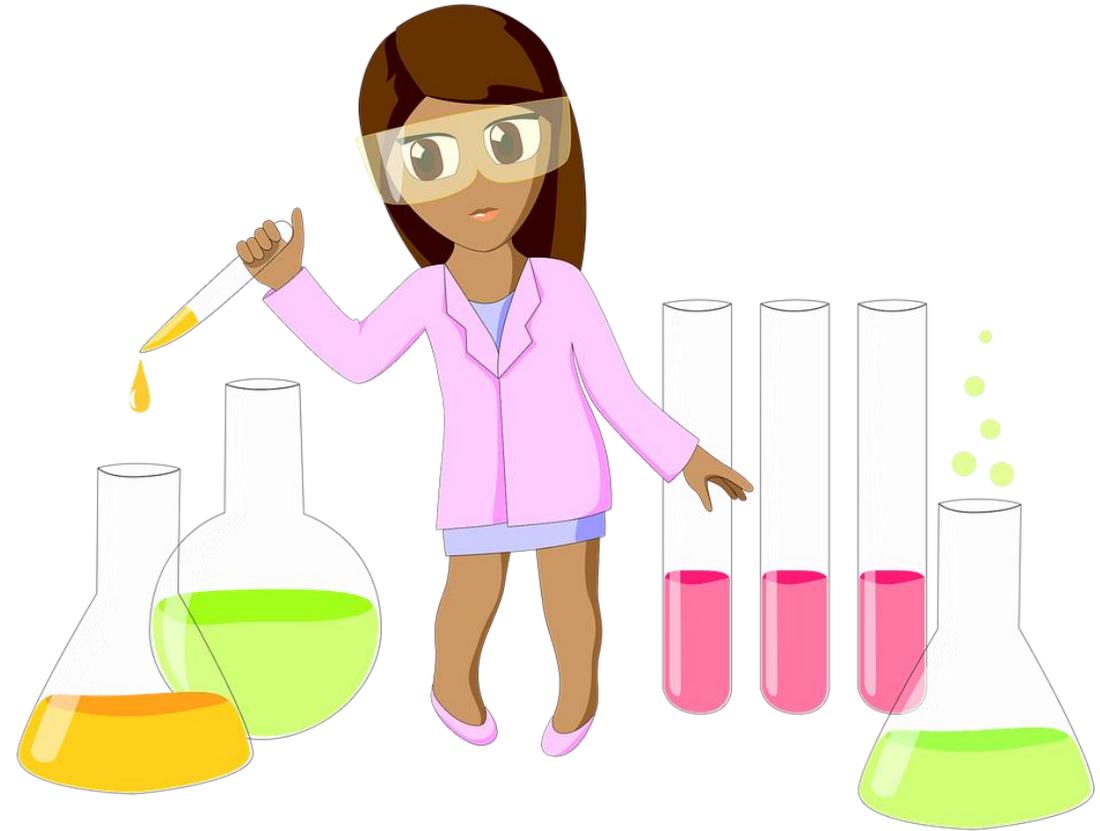
- Name the parts of the Bunsen Burner
- Outline how to safely light the Bunsen burner.
- Describe how to safely heat solids and liquids in a test tube using a Bunsen burner.
- Describe how to heat a beaker of water using a Bunsen Burner.

## **Core Vocabulary:**

Air hole, Barrel, Base, Blue flame, Bunsen burner, Collar, Flammable, Gas hose, Safety flame

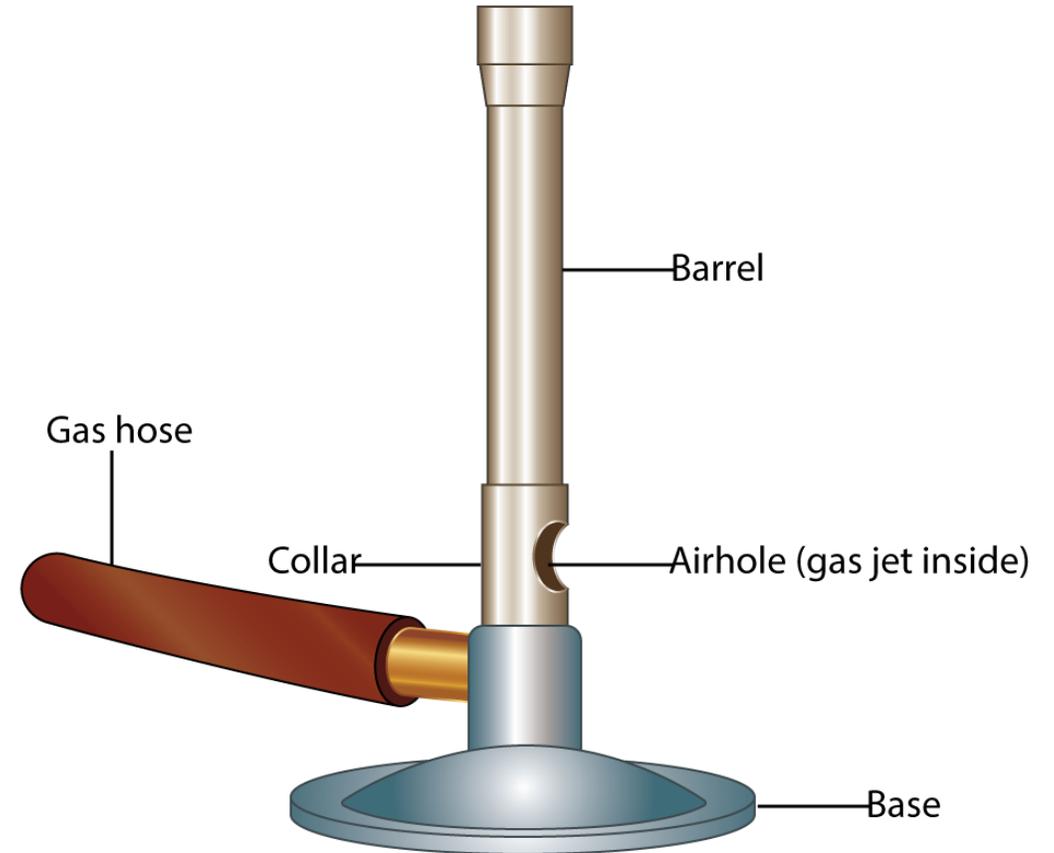
## Why do we have Common Lab Procedures?

- Part of working in a lab is learning how to use certain pieces of equipment correctly so that accidents can be avoided.
- These are called common lab procedures and are essential skills that can be used regardless of the topic being studied.



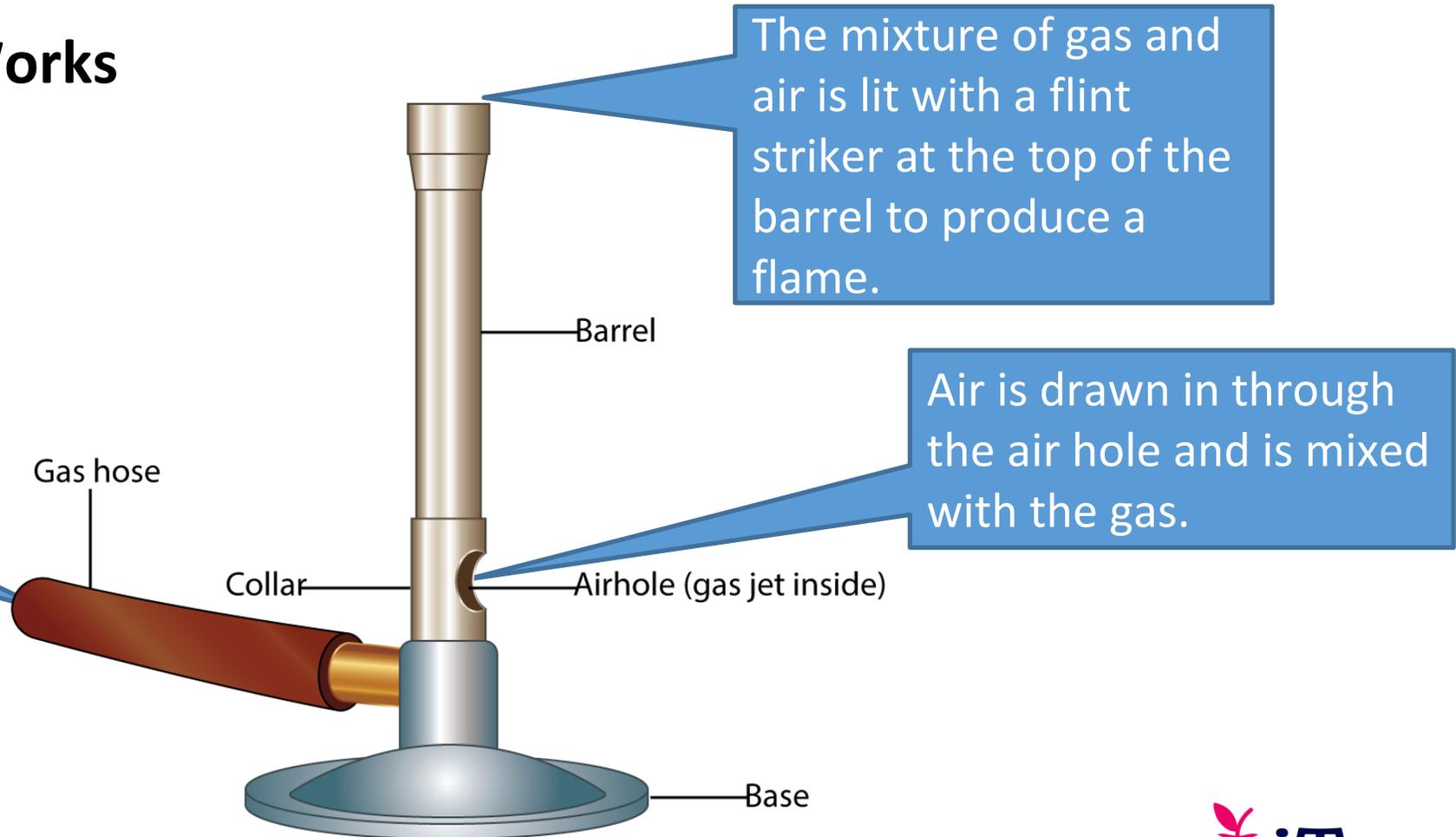
## Using a Bunsen

- A Bunsen burner is the main method used for heating substances when in the laboratory.
- This burner was named after the German chemist Robert Bunsen who invented the burner in 1855.
- The parts of the Bunsen burner are shown in the diagram:



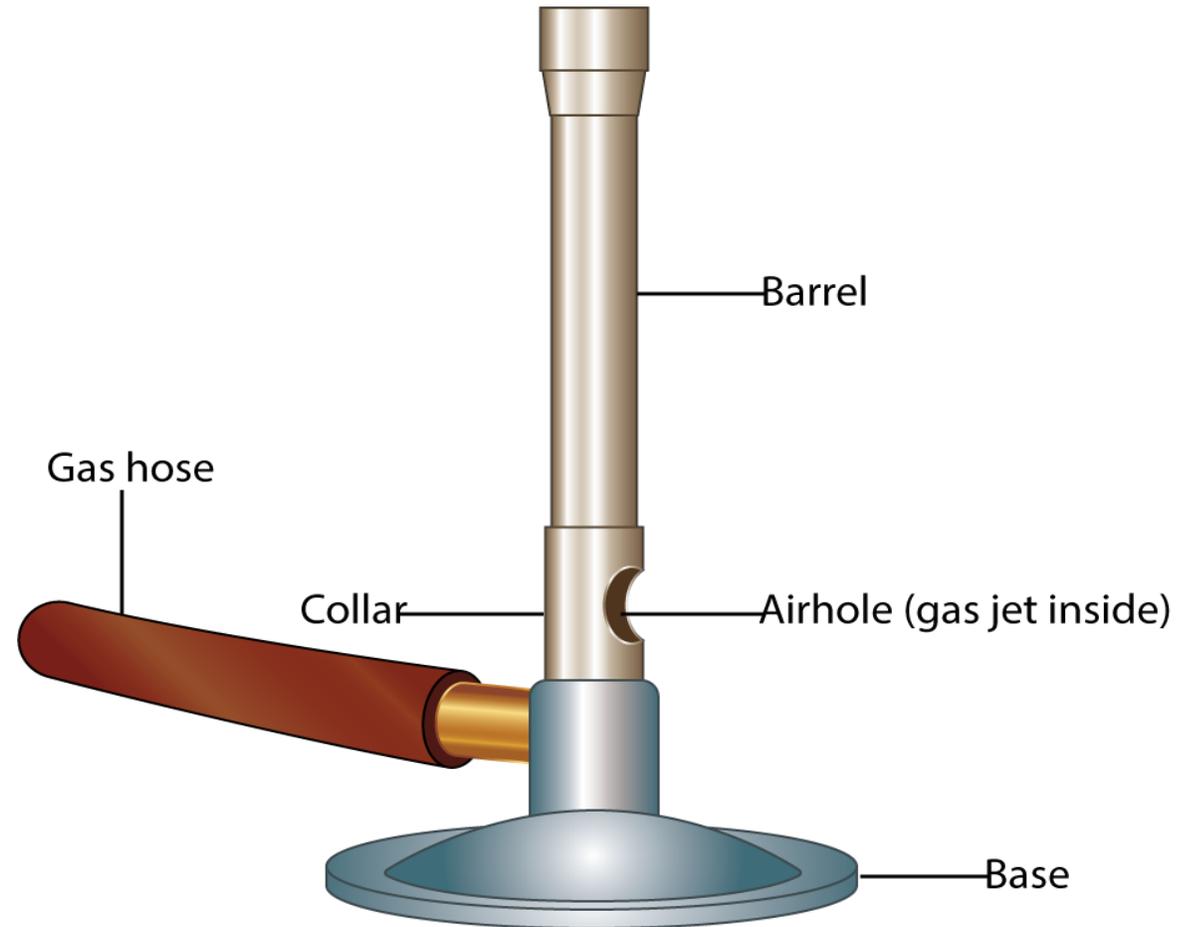
## How the Bunsen Works

The gas hose connects to an outlet on the lab bench. Gas flows through the hose and the gas jet.



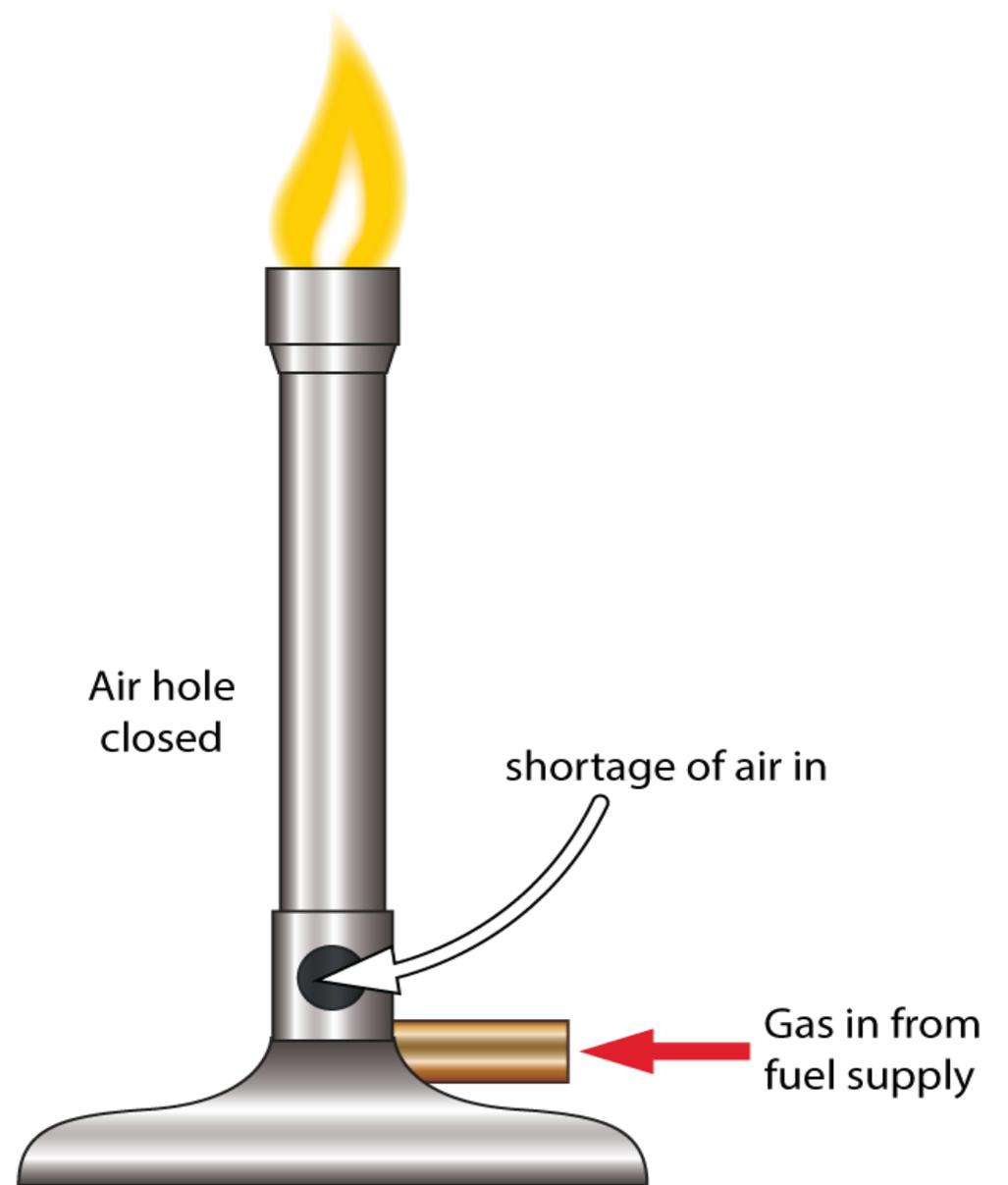
## How the Bunsen Works

- The collar can be turned to alter the amount of air allowed to mix with the gas.
- This adjusts the color and therefore temperature of the flame.
- The more open the air hole is, the more air is mixed with the gas and the hotter the flame.



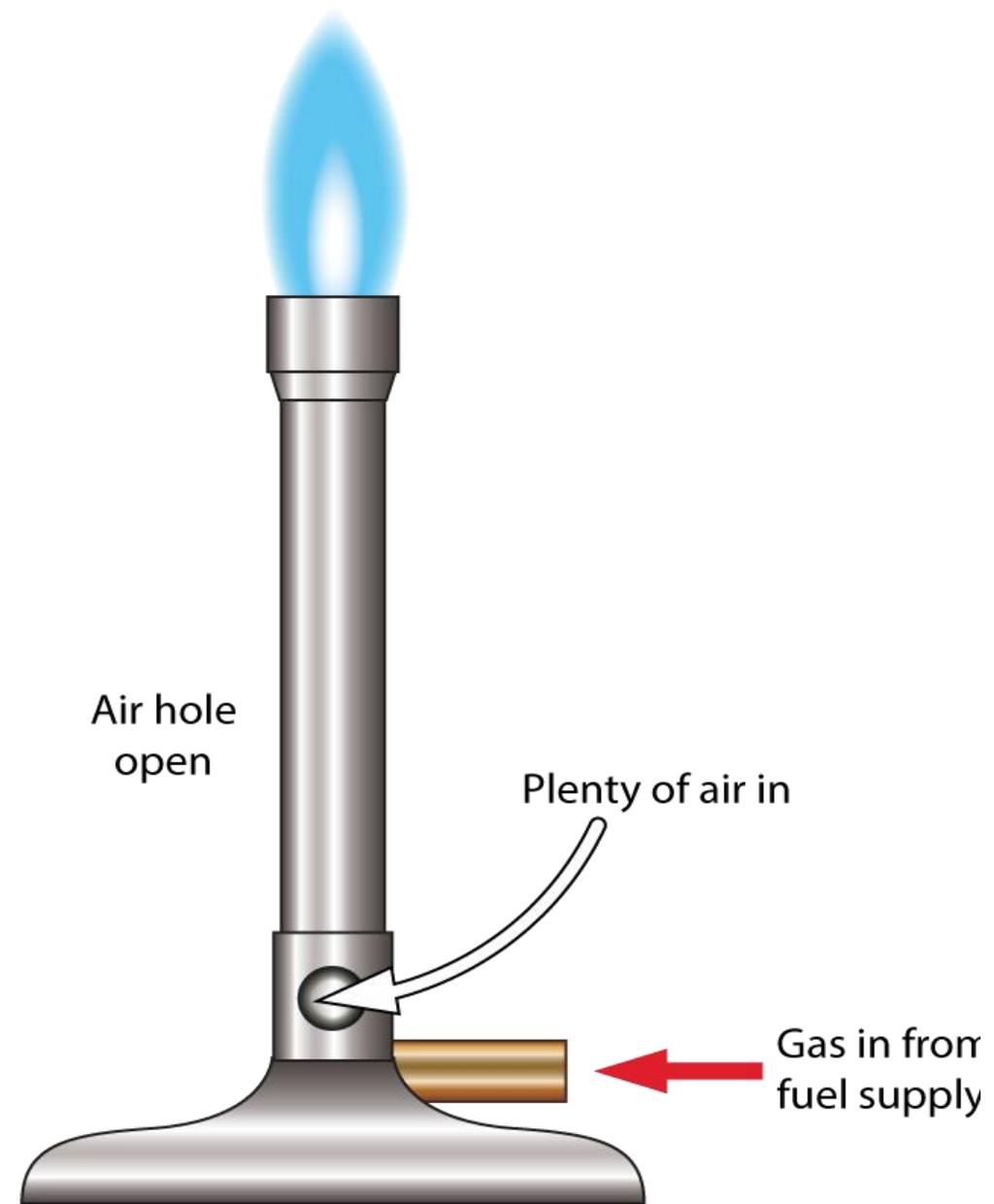
### *When the Air hole is closed:*

- A completely closed air hole produces a yellow flame.
- Also called the safety flame.
- The yellow is the safest way to leave a Bunsen unattended.
- This flame is not suitable for heating as it leaves large amounts of black soot on the glassware.



### *When the Air hole is open:*

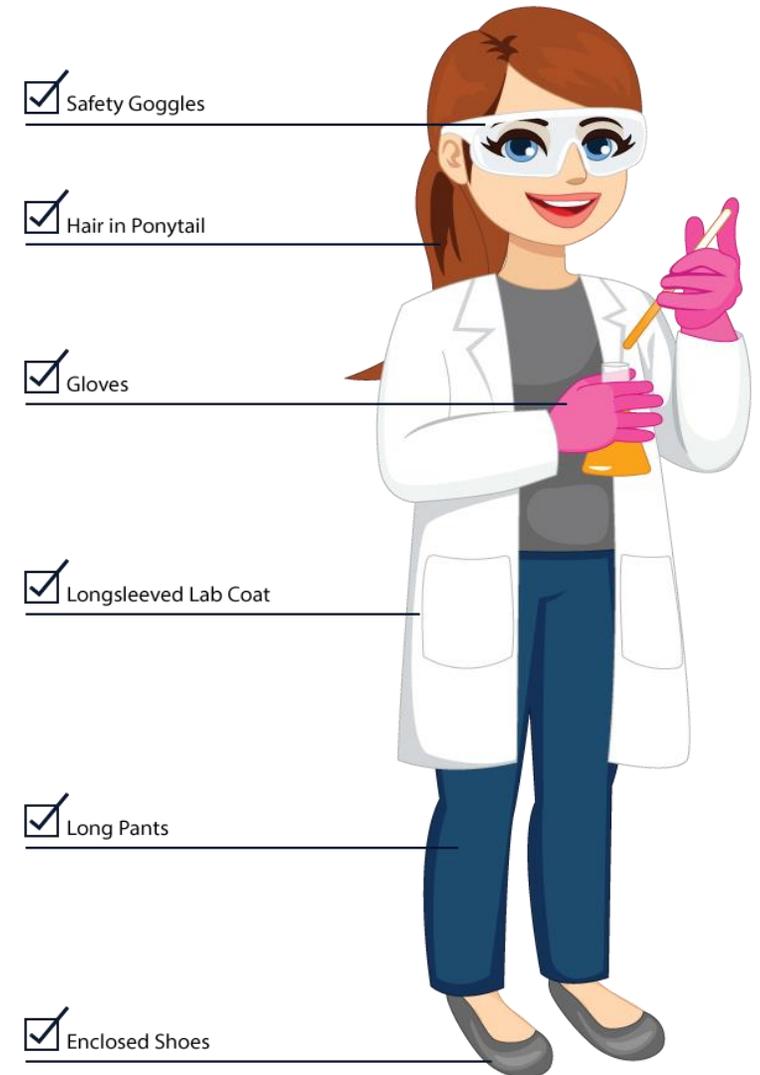
- A completely open air hole produces a blue flame.
- This flame is difficult to see and can cause serious burns.
- Do not leave a blue flame unattended.
- The blue flame is much hotter than the yellow flame (it's hottest part is around 1500°C!)
- This is the best flame heating substances.



## How to light the Bunsen Burner

The steps below should be followed each time a Bunsen is used.

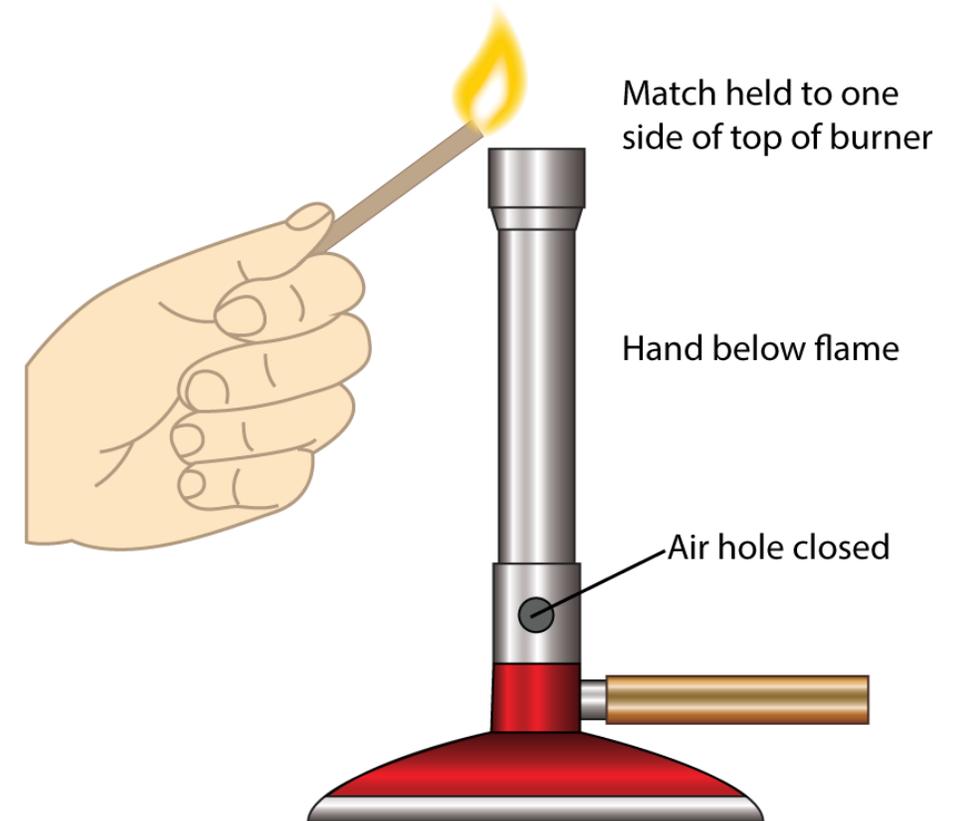
1. Put on your safety equipment including goggles, lab apron and closed-in shoes. If you have long hair, tie it back.
2. Check the Bunsen burner to make sure the hose has no holes, and the tip of the barrel is clean.
3. Connect the rubber hose to a gas tap.
4. Place a heat mat under the Bunsen burner.



## How to light the Bunsen Burner

The steps below should be followed each time a Bunsen is used.

5. Turn the collar so that the air hole is completely closed. You want it to have an orange safety flame when lit.
6. Light a match and hold it about 3 cm above the top of the barrel. If using a flint striker then create the spark directly above the barrel.
7. Turn the gas tap to the 'on' position.
8. Once the Bunsen burner is lit, extinguish the match.



## How to light the Bunsen Burner

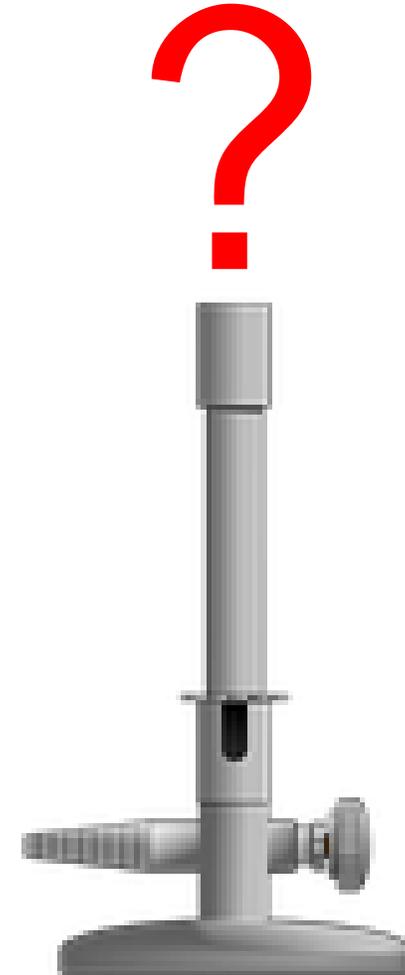
The steps below should be followed each time a Bunsen is used.

9. Leave the Bunsen burner on 'safety flame' until you need to use it for heating.
10. Once finished, turn the Bunsen off using the gas tap and disconnect the hose.



**Time to think...**

What color Bunsen flame should be used for heating a substance????



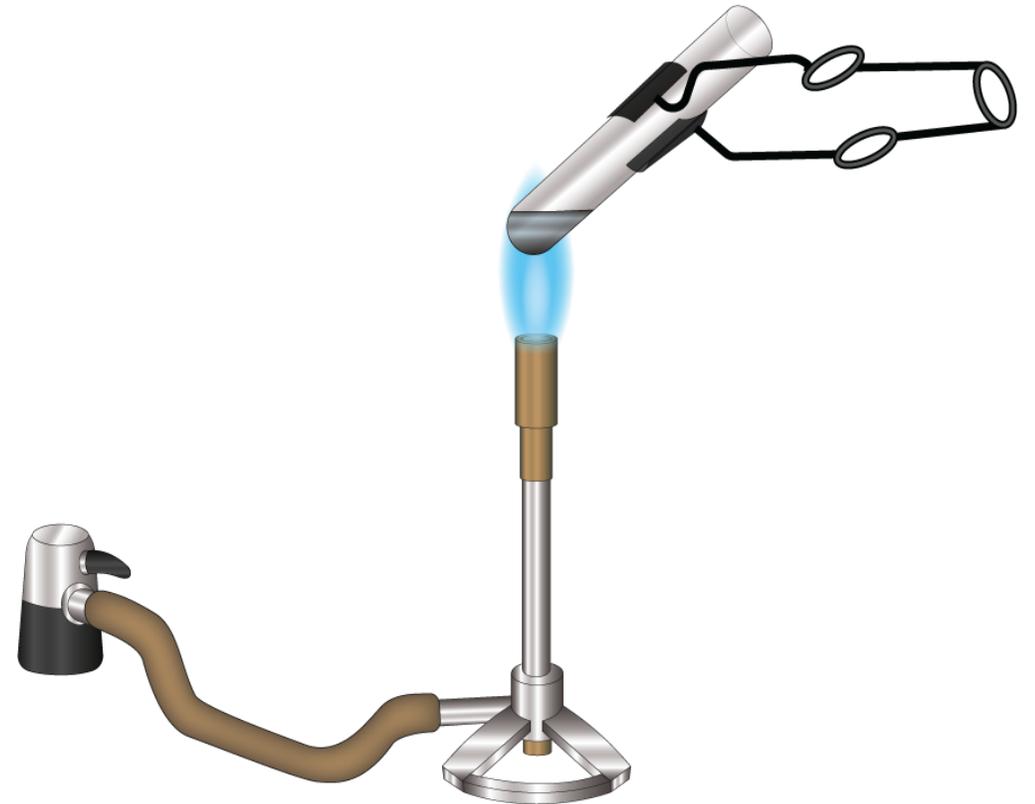
**ANSWER:**

A blue flame should always be used when heating substances.



## Heating substances in a test tube

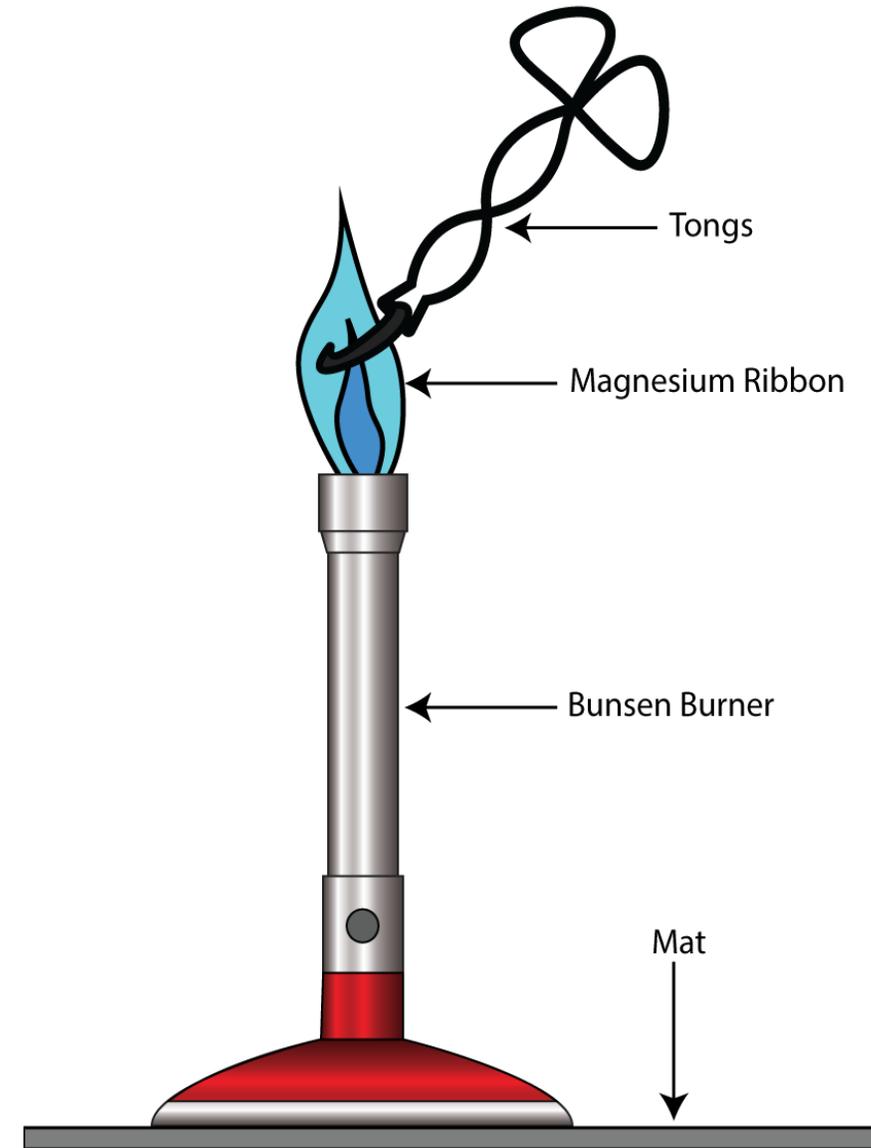
- The mouth of the test tube should be pointing away from yourself or your lab partner/other students.
  - This prevents any of the liquid hurting anyone if it splatters out the top of the tube.
- Continuously move the test tube through the flame evenly heat the contents.
  - This avoids any hotspots in the substance which can rapidly expand and/or evaporate and squirt out of the tube.



## Heating a solid using tongs:

- When heating a solid, such as magnesium strips, metal tongs should be used.
- Keep the substance in the hottest part of the flame until it ignites, then quickly remove it holding over the heat proof mat.

*Note: When some metals burn, they produce a very bright flame. Be careful not to look directly at it as it can damage your eyesight.*



## Heating a substance in a beaker

- Heating a larger volume of liquid is best done in a beaker.
- The setup for this is shown in the diagram to the right.
- Use a thermometer in a clamp stand if the temperature is to be measured.
  - This ensures that the thermometer is giving an accurate reading of the liquid, rather than the glass where the Bunsen flame is touching.

