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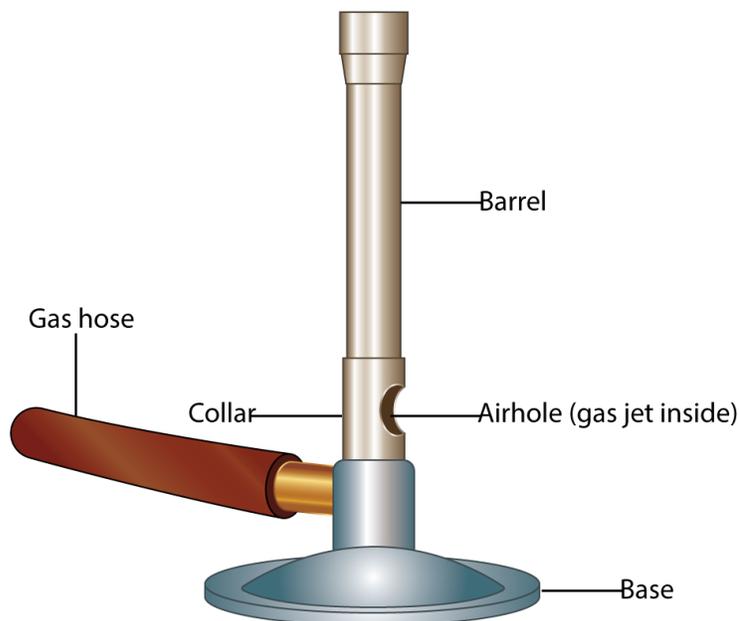
Lab Procedures Guided Notes - Teacher Edition

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 below:

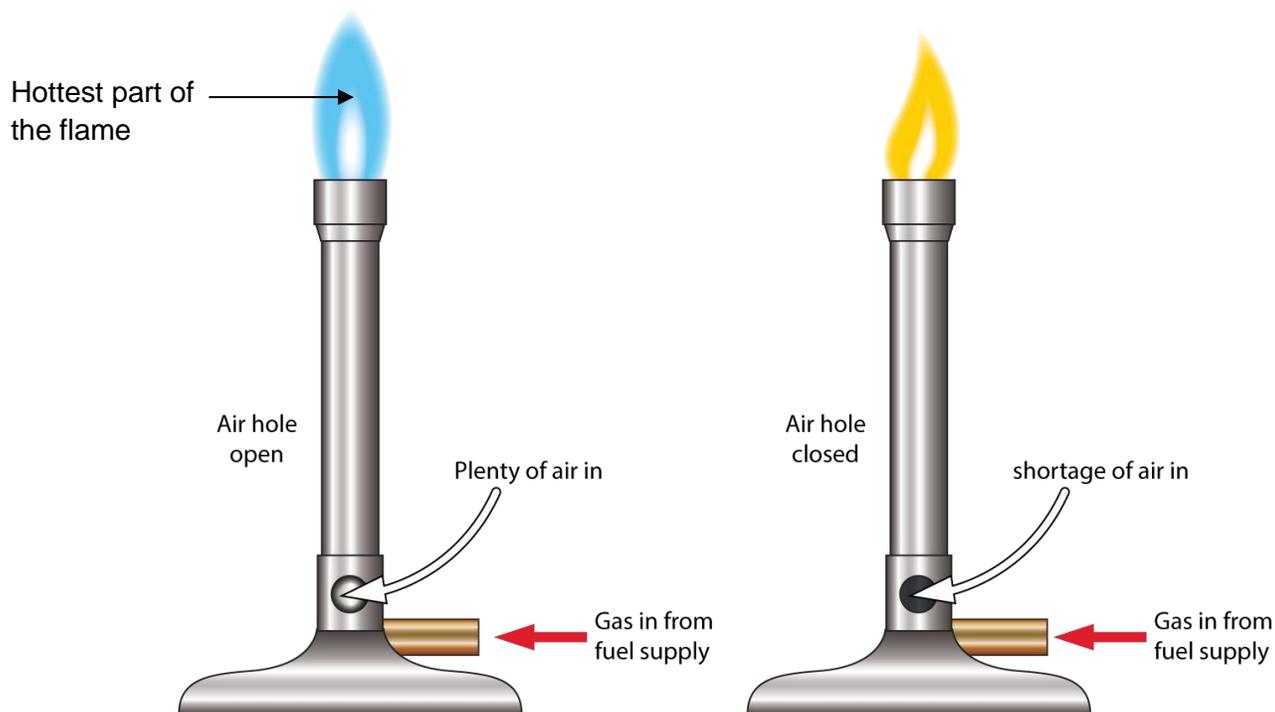


How the Bunsen Works

The gas hose connects to an **outlet** on the lab bench. Gas flows through the hose and the gas jet. Air is drawn in through the air hole and is mixed with the gas. The mixture of gas and air is lit with a **flint striker** at the top of the barrel to produce a **flame**.

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.

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When the Air hole is closed:

A completely closed air hole produces a **yellow** flame. This is often called the safety flame as it can be clearly seen. Should you need to leave your burner unattended for a short period of time (e.g., while you collect a piece of **equipment**), this is the safest way to leave it. 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. A burner should never be left unattended on a blue flame. This flame is much hotter than the yellow flame (it's hottest part is around 1500°C!) The blue flame is the best flame **heating** substances.

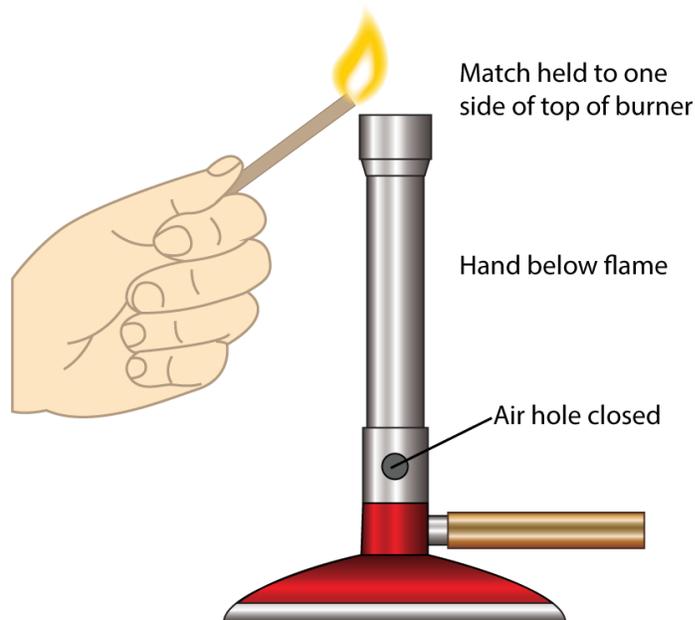
How to light the Bunsen Burner

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**.

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3. Connect the rubber hose to a **gas tap**.
4. Place a **heat mat** under the Bunsen burner.
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**.
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**.



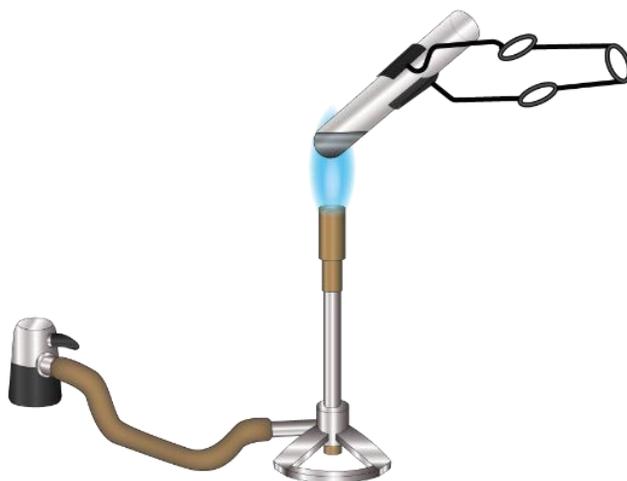
Heating Substances Safely

A **blue** flame should always be used when heating substances.

Heating substances in a test tube:

When heating a test tube, the mouth of the test tube should be pointing **away** from yourself or your lab partner/other students. This ensures that if any of the liquid splatters out the top, there is less chance that it will **hurt** anyone.

The test tube should be **continuously moved** through the flame so that the substance is evenly **heated**. This avoids any hotspots in the substance which can rapidly expand and/or evaporate and squirt out of the tube.



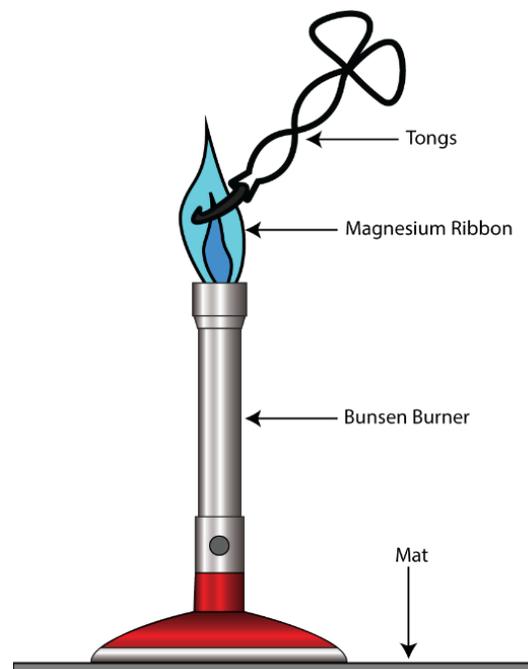
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Heating a solid using tongs:

When heating a solid, such as magnesium strips, **metal tongs** should be used. If the substance is flammable (can easily catch alight), then ensure it is kept in the **hottest** part of the flame until it ignites. Once this happens remove it quickly and hold it over the **heat proof mat** so that any hot ash does not fall onto the bench.

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 below. If the temperature needs to be monitored, then a **clamp stand** can be used to hold a thermometer in position. This ensures that the thermometer is giving an accurate reading of the **liquid**, rather than the glass where the Bunsen flame is touching.

