



Lab Equipment

Unit 1 Lesson 1

Lab Equipment

Learning Objectives:

Students will be able to:

- Name common lab equipment and describe its function.
- Describe the correct use of common lab equipment.

Lab Equipment

Core Vocabulary

- Beaker
- Beaker tongs
- Boiling tube
- Boss head & clamp
- Bunsen burner
- Clay triangle
- Crucible and lid
- Digital balance
- Dropper
- Dropper bottle
- Erlenmeyer flask
- Evaporating dish
- Forceps
- Funnel
- Heat proof mat
- Hot Plate
- Measuring cylinder
- Mortar and Pestle
- Petri dish
- Ring Stand
- Rubber stopper
- Ruler
- Spatula
- Spirit lamp
- Stirring rod
- Spot Plate
- Stopwatch/Timer
- Striker
- Test Tubes
- Test Tube Brush
- Test Tube Rack
- Test Tube holder
- Thermometer
- Triple Beam Balance
- Tripod
- Tweezers
- Watch glass
- Wash bottle
- Wire Gauze Mat

Lab Equipment

Containers for Chemicals



Lab Equipment

Beaker

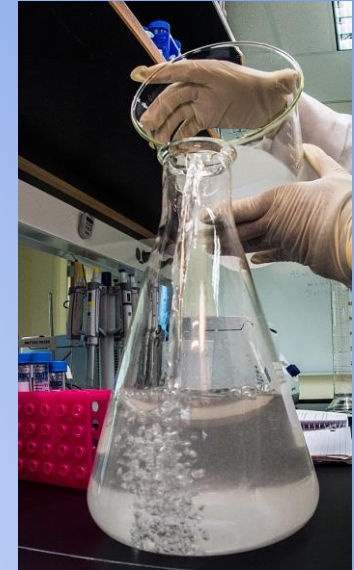
- Used for:
 - storing a measured amount of **liquid**.
 - holding **solids** and to
 - mixing or heating materials.
- Different capacities including: 50 ml, 250 ml, 500 ml, 1000 ml.
- Beakers have **poor** accuracy, so should not be used to measure a volume of liquid.



Lab Equipment

Erlenmeyer Flask

- Also known as **conical flasks** due to their conical shape.
- Used for:
 - holding **solids** or **liquids**
 - **heating** a substance
 - stirring or **swirling** a liquid as their shape prevents spillage.



Lab Equipment



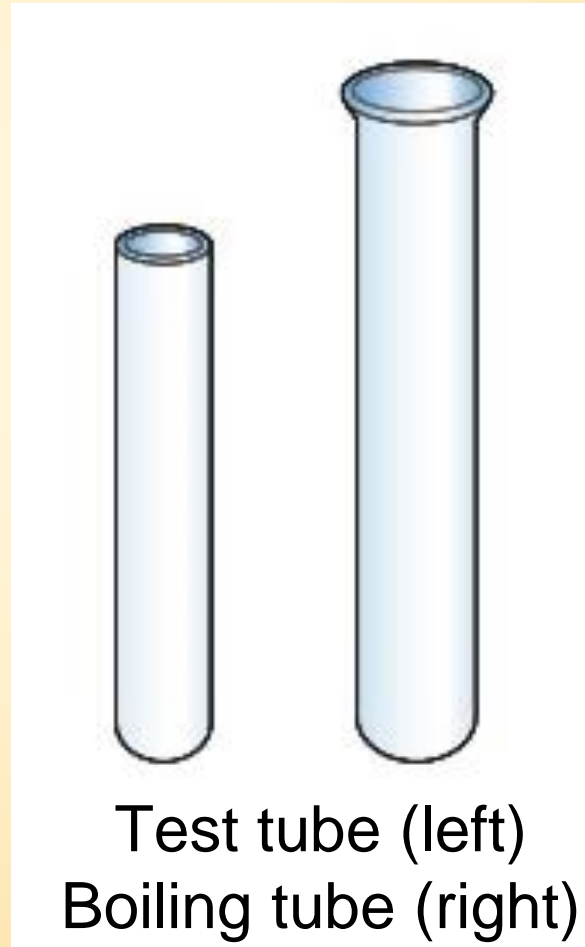
Test tube

- The test tube is the most common piece of glassware used in the Science laboratory.
- It comes in various **sizes** and is used to:
 - mix liquids,
 - mix solids with a liquid,
 - grow cultures, etc.

Lab Equipment

Boiling Tube

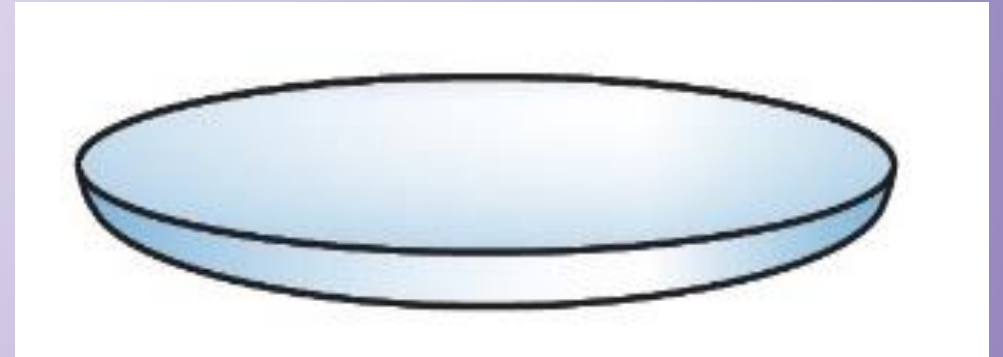
- A boiling tube is a **larger**, more robust test-tube which can withstand higher amounts of **heat**.
- These are used to heat **small** volumes of substance.



Lab Equipment

Watch Glass

- These are used to hold a small amount of solid or liquid when **heating** it.
- It can also be used as a **lid** for a beaker.



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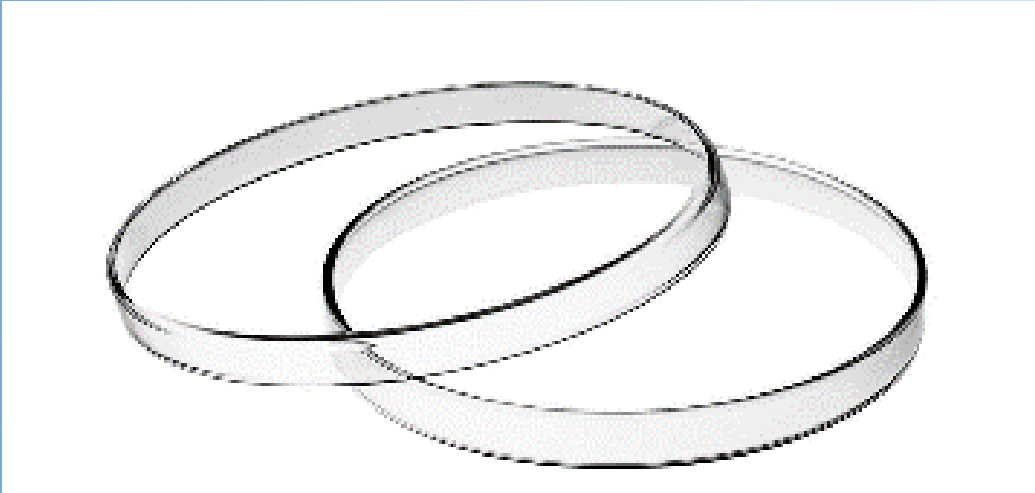
Evaporating Dish

- This ceramic vessel is used to **heat** substances.
- The substance may be a solid which needs to **melt**, or mixture which needs to be evaporated to obtain a crystalline solid.



Lab Equipment

Petri Dish



- A Petri dish is a shallow glass or plastic dish that comes with a cover.
- Named after its inventor **Julius Richard Petri**.
- It is used to grow microbiological cultures.

Mortar and Pestle



- This is a porcelain **bowl** and rounded club-like tool which can be used to **crush** and **grind** solids into a fine powder or mixture.

Lab Equipment

Time to Think!

Which piece of lab equipment would be the **best** choice for mixing **2 milliliters** of Dihydrogen monoxide (water) with **1 milliliter** of Trihydrogen nitride (ammonia)?

Answer:

C! A test tube is the best choice to mix two **small amounts** of liquids

Lab Equipment

Holding things



Lab Equipment

Tweezers

- Used for picking up **small** or sterile objects.
- They are usually metal or sometimes plastic.



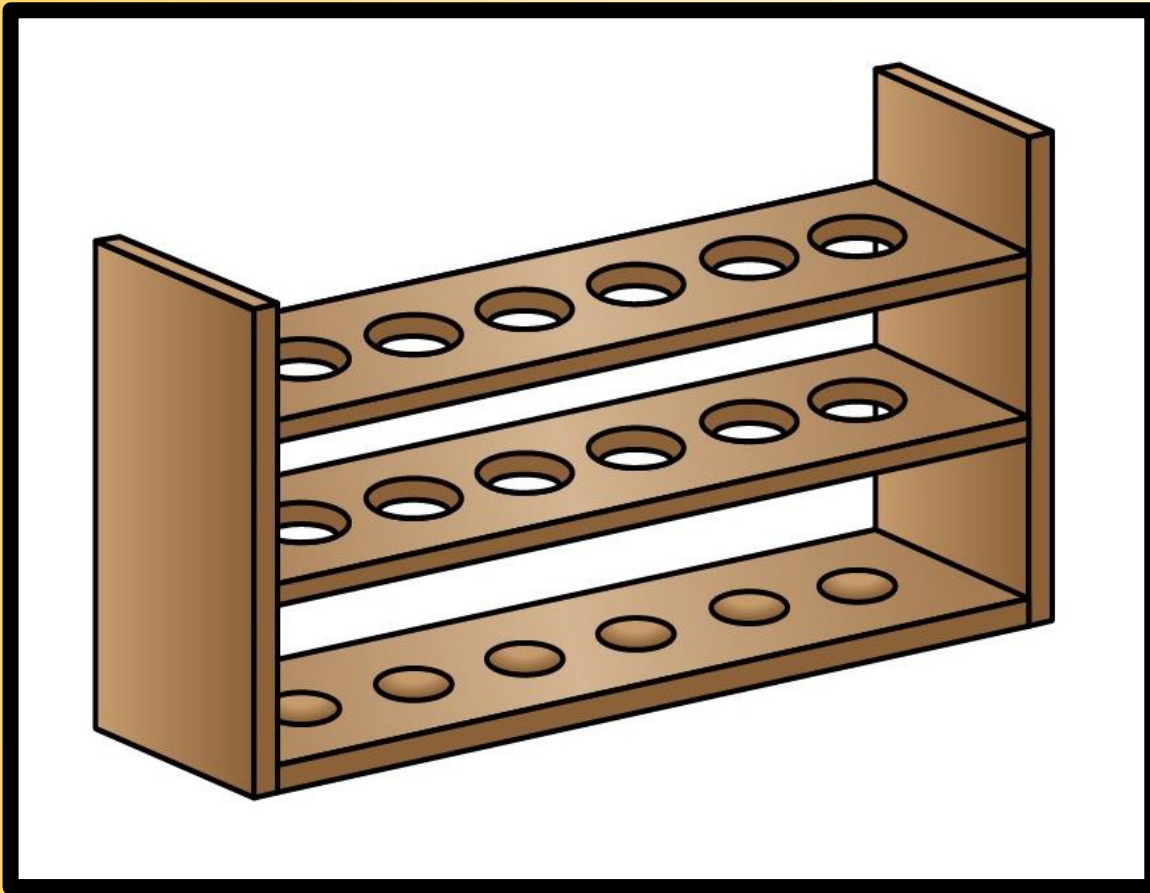
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Spatula

- A spatula allows small quantities of a solid or to be picked up and **transferred** to and from any container.
- It is generally used as a spoon in a laboratory.



Test tube rack

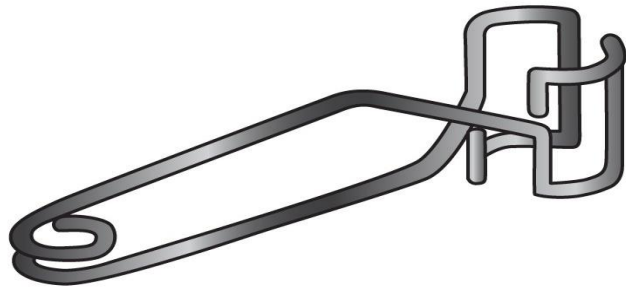


- This is a stand that is used to hold 5-10 test tubes upright.
- Some holders have a row of **spikes** which can be used to invert test tubes for **drying** them after your experiment.

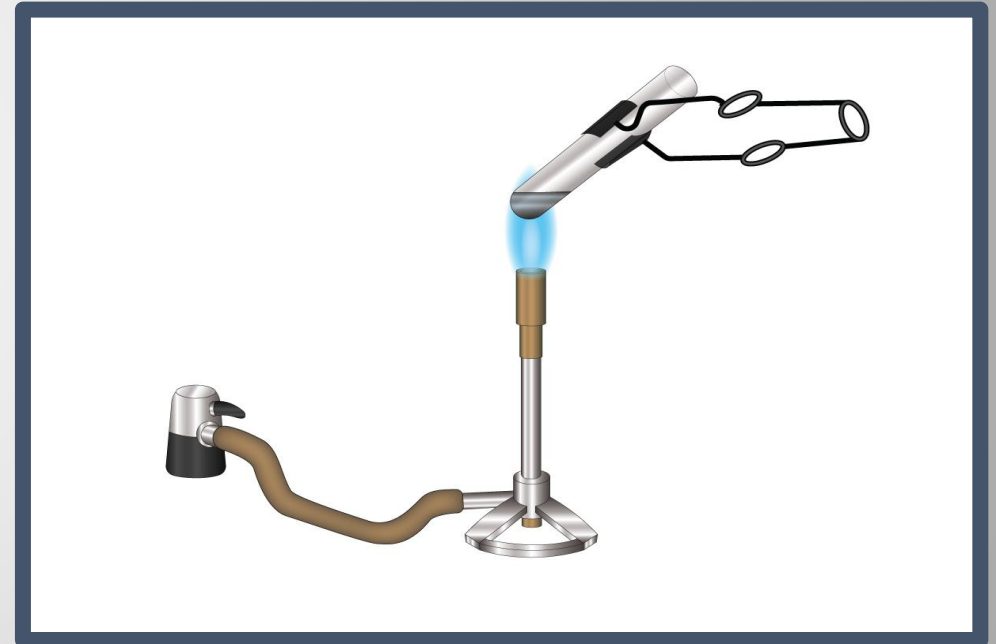
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Test tube holder

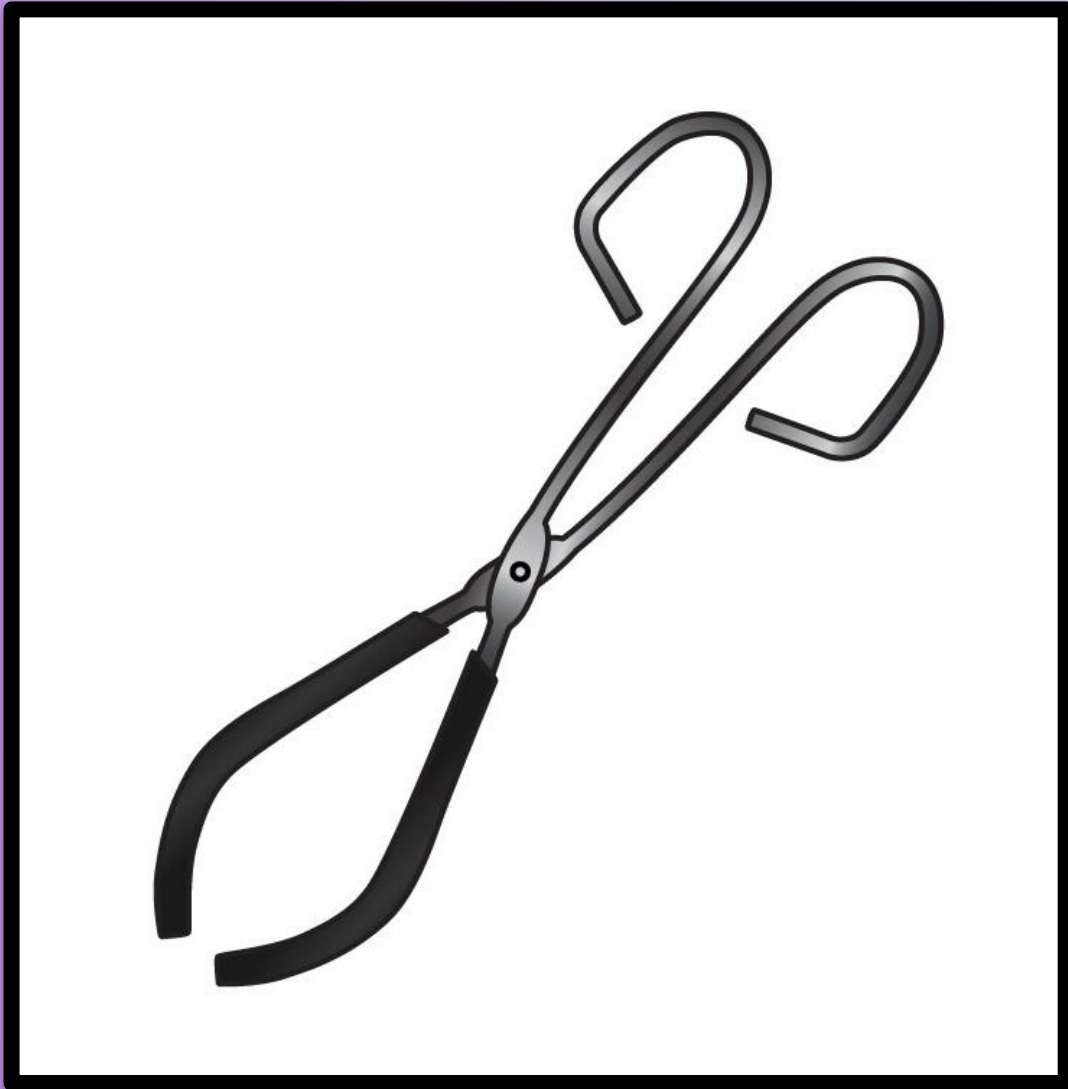
- Used to hold a **hot** test tube during or after it has been heated.



Test tube holder



Beaker Tongs



- Allows you to safely carry a **beaker** after it has been heated.

Lab Equipment



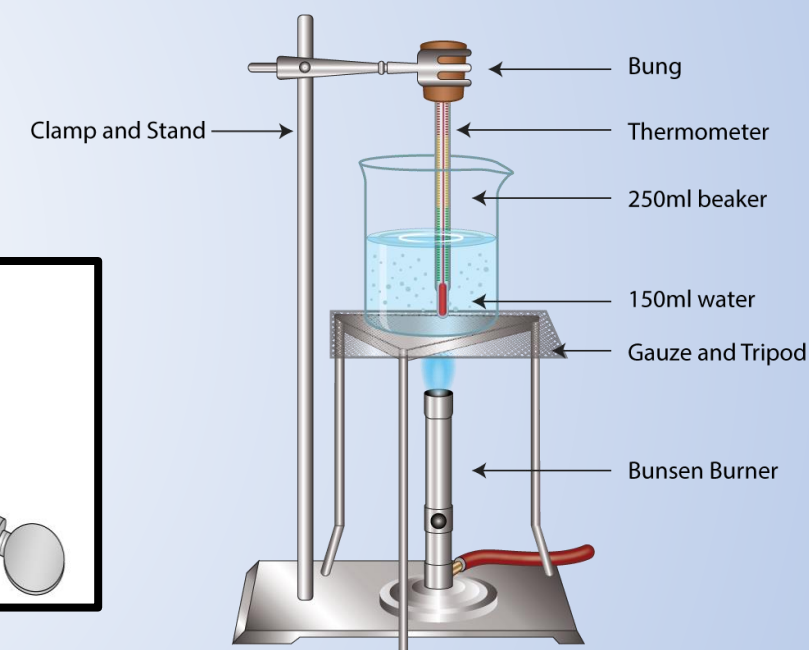
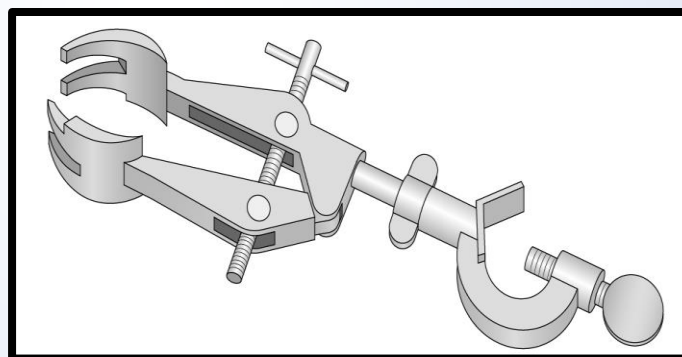
Ring Stand

- A ring stand (also known as a retort or clamp stand) is used with a boss head and clamp.
- It is used to **hold** other pieces of equipment such as burettes, flasks, or Petri dishes in a **fixed position**.

Lab Equipment

Boss head and Clamp

- A boss head is a double-ended screw which secures a **clamp** to a ring stand.
- The clamp connects to the boss head and holds other **lab equipment** such as flasks, usually during heating or separation labs



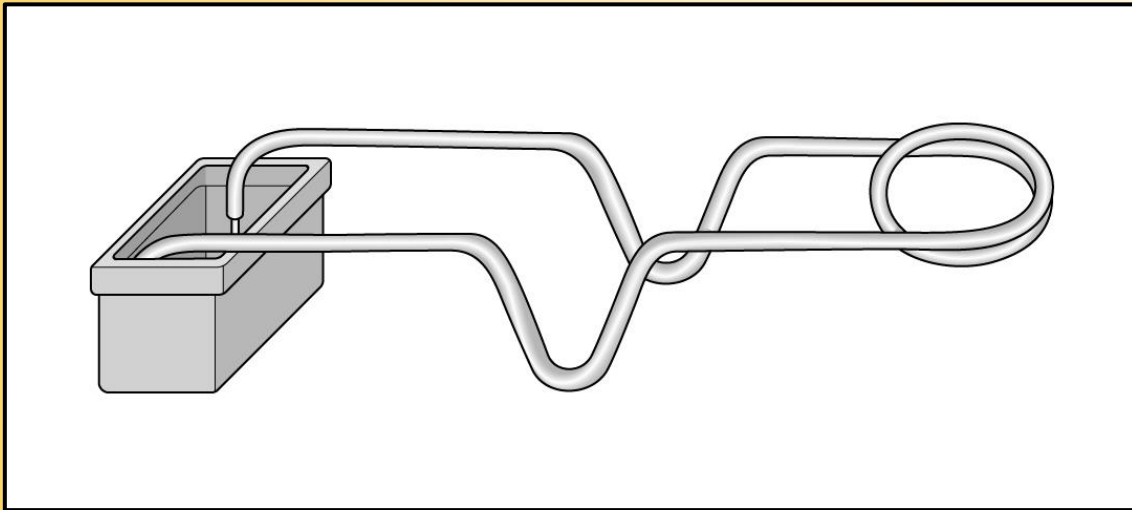
Lab Equipment

Heating Equipment



Lab Equipment

Striker

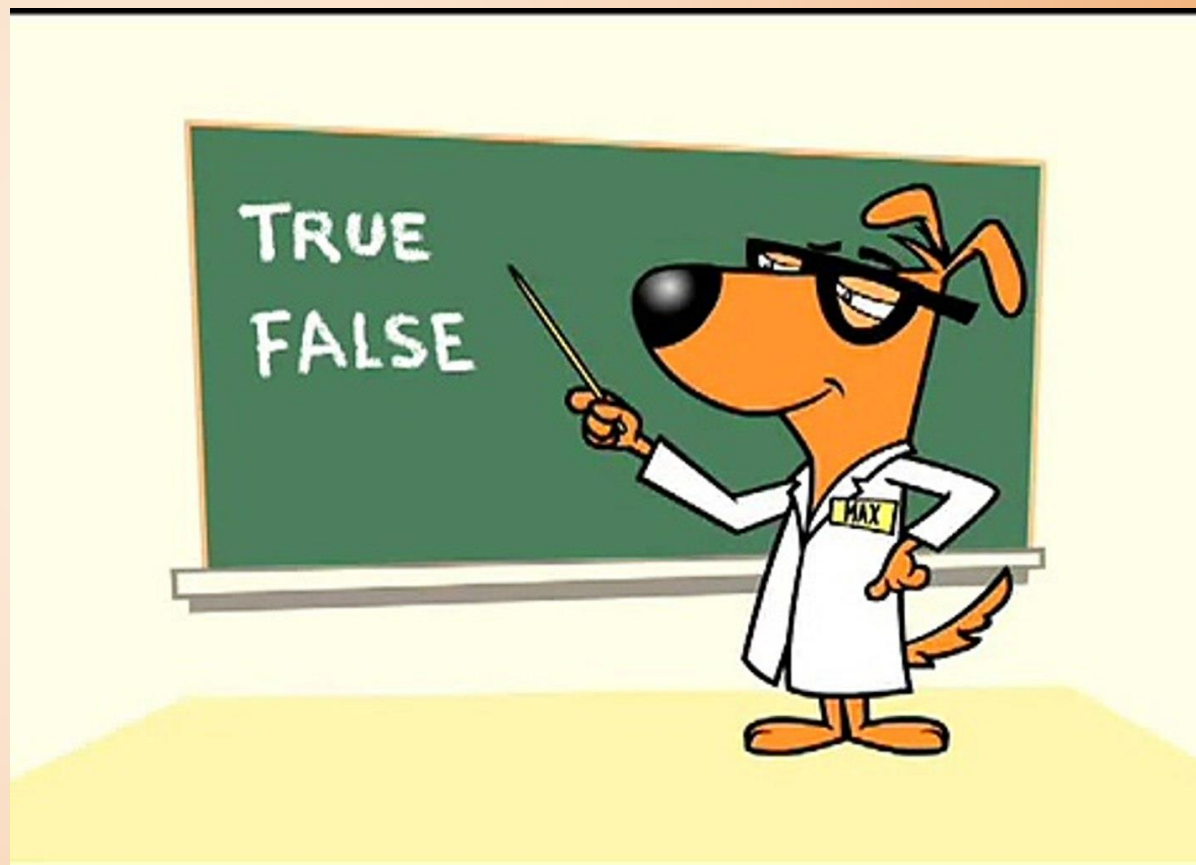


A flint striker is used to provide spark to light a Bunsen burner.

Lab Equipment

TRUE OR FALSE?

A **striker** used to start a bunsen burner uses **phosphorus**, the same material on the tip of a safety match, to spark a flame.



Lab Equipment

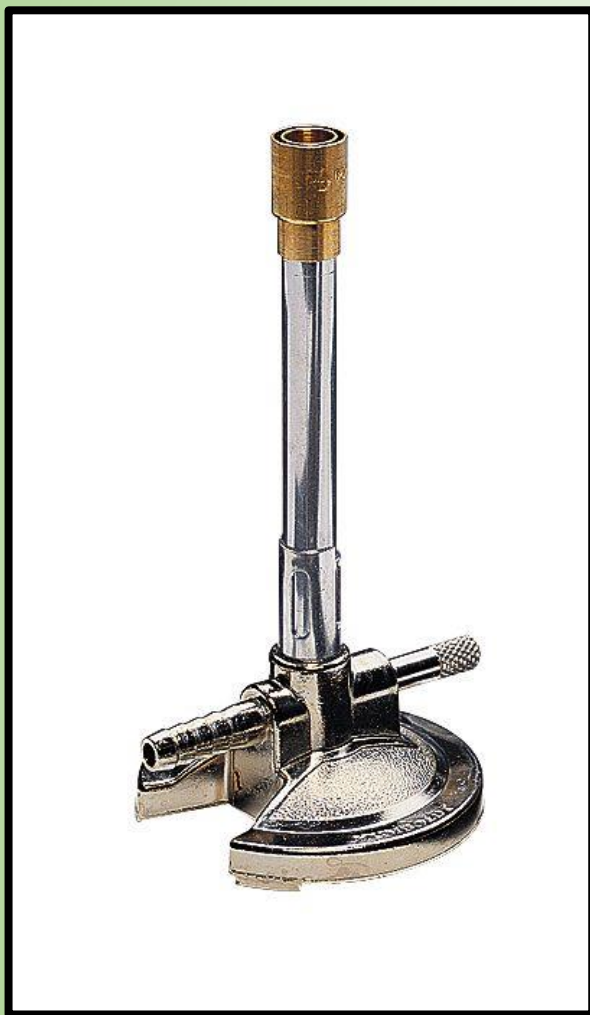
TRUE OR FALSE?

A **striker** used to start a bunsen burner uses **phosphorus**, the same material on the tip of a safety match, to spark a flame.

FALSE!

A **striker** uses **flint**, a form of the mineral quartz. When the flint strikes against the steel it produces sparks as the flint edge shaves off particles of steel which then exposes the iron that reacts to oxygen. This reaction causes the spark that ignites your Bunsen burner!

Lab Equipment

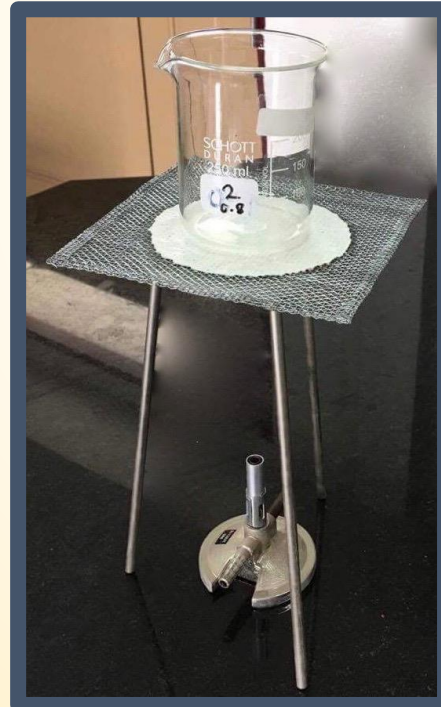
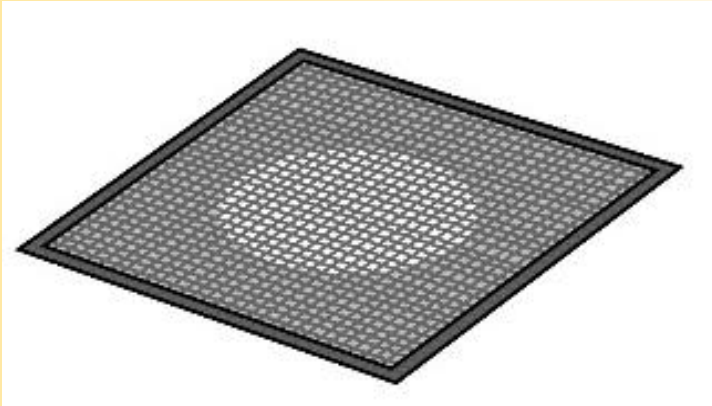


Bunsen Burner

- The Bunsen is used for **burning** or **heating** substances.
- It has an adjustable collar which changes the color of the **flame** from orange (safety) to blue (heating).

Lab Equipment

Gauze Mat



- This is a mesh-like structure made of **iron**.
- It is used to support a beaker or a flask on top of a **tripod** while heating.
- The wire mesh distributes the heat **evenly** so that there are no hot spots in the substance being heated.

Lab Equipment

Clay Triangle, Crucible and Lid

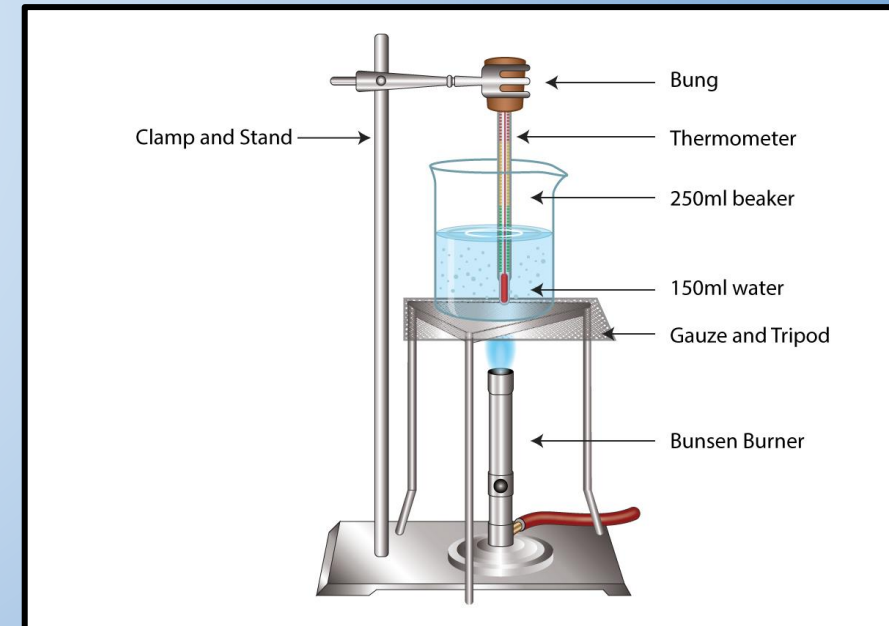
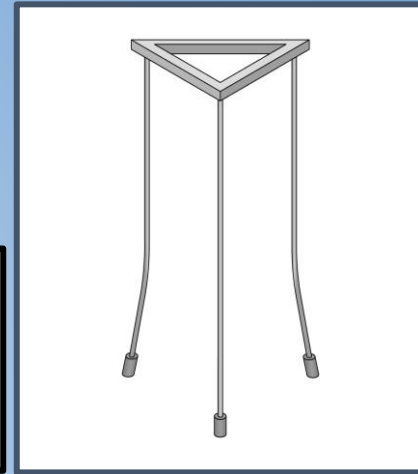
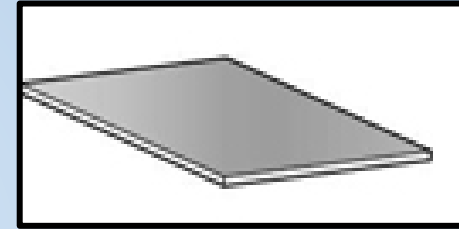
- A clay triangle is used to hold a **crucible** or evaporating dish while its being heated.
- A crucible heats small amounts of substance to extremely **high** temperatures.



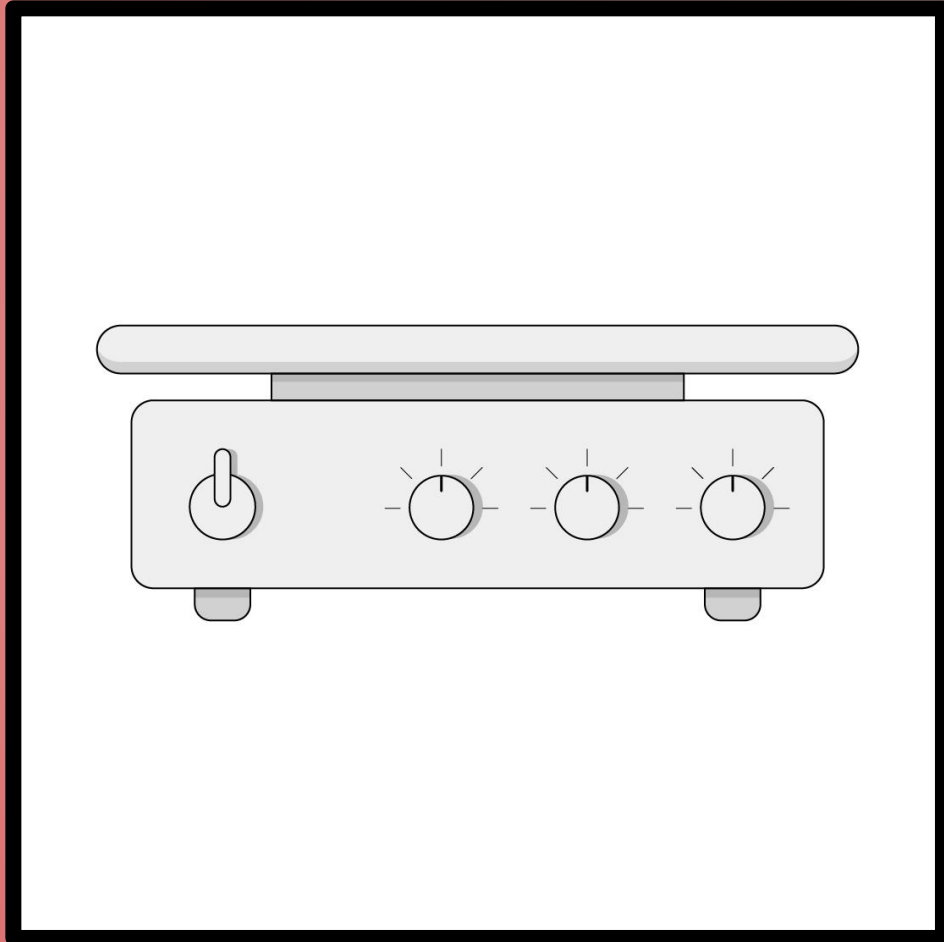
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Tripod and Heat proof mat

- A tripod supports **glassware** e.g., beakers and flasks on a wire mat while a substance is being heated with a **Bunsen**.
- A heat proof mat is placed underneath any **heating** equipment and protects the bench, should anything overflow or **splash** out of your experiment.



Hot Plate



- Hot plates can be used to heat liquid substances in glass beakers.
- Usually used when you don't need extremely high temperatures like temperatures you get with a Bunsen burner.

Lab Equipment

Spirit lamp

- This lamp can be used instead of a **Bunsen burner**.
- It has a container filled with a **fuel** such as spirits or alcohol and a wick inside.



Lab Equipment

Measuring



Lab Equipment

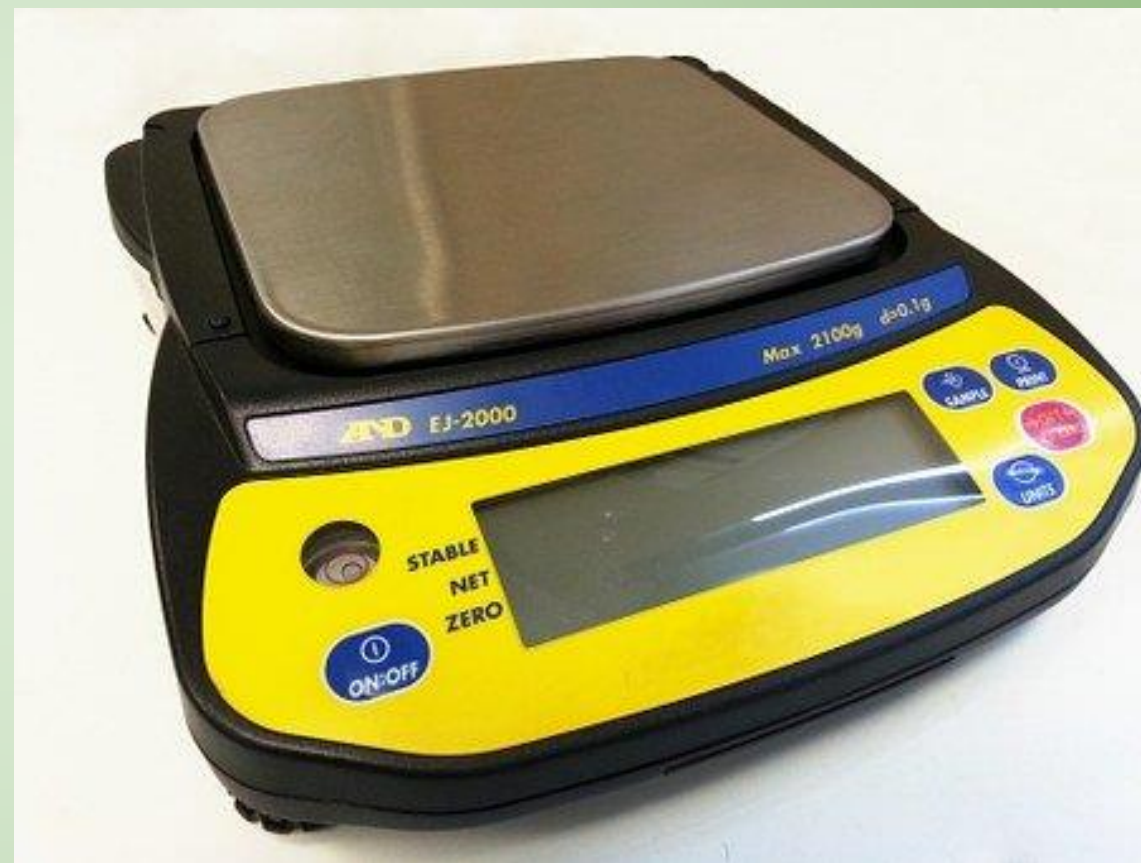
Measuring Cylinder

- Also known as a **graduated cylinder**, the measuring cylinder is used to accurately measure a **volume** of a liquid in milliliters (**ml**).
- The measuring cylinder has markings on it so that an **accurate** amount of liquid can be measured.

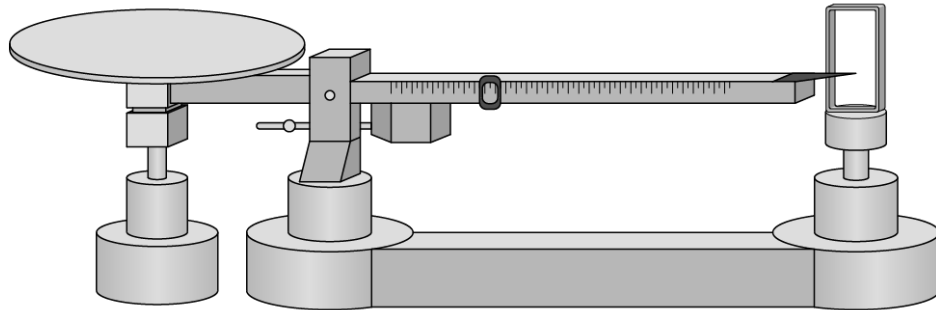


Digital Balance

- Also known as an analytical balance.
- This is used to accurately measure the **mass** of any solid.

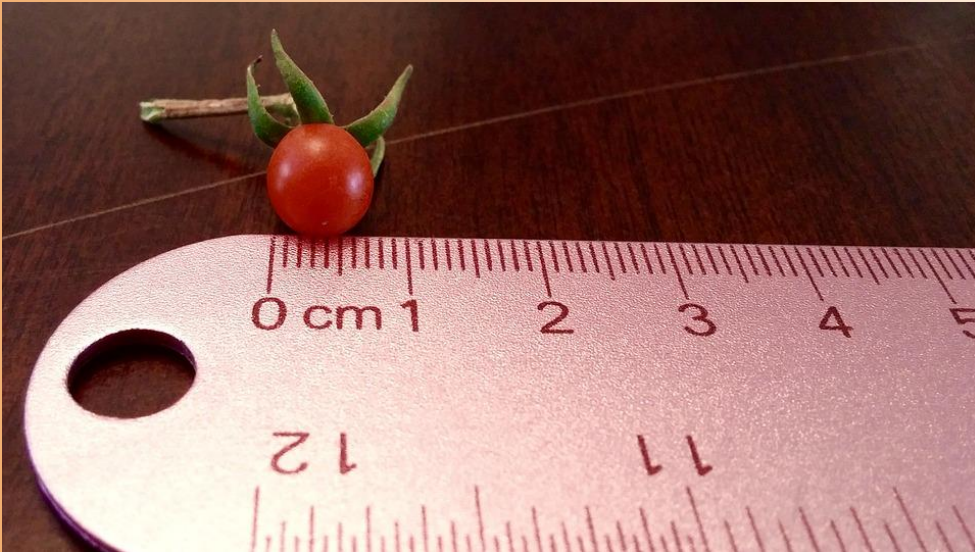


Triple Beam Balance



- Measures the mass of a solid accurately.
- These have largely been replaced by **electronic** balances.

Lab Equipment



Ruler

- Used to measure the **dimensions** of an object, draw graphs and scientific **diagrams**.

Name THREE types of units of measurement on a ruler commonly used in a lab setting.

- Millimeters
- Centimeters
- Meters

Lab Equipment

Thermometer



- Used to accurately measure the **temperature** of a substance.

Lab Equipment

Time to Think!

TRUE OR FALSE:

A triple beam balance is used to measure the **volume** of an object.



Lab Equipment

Time to Think!

TRUE OR FALSE?

A triple beam balance is used to measure the **volume** of an object.

FALSE!

A **triple beam balance** is used to measure to **mass** of an object.

A **graduated cylinder** would be used to measure the **volume** of a substance.

Lab Equipment

Time to Think!

The lab instructions tell you to measure the time it takes for a reaction to occur.

Then it asks, “How long did it take to see a visible change in color of the chemical mixture?”

What piece of lab equipment would be **best** to measure the time it took to see the reaction?



Lab Equipment

Time to Think!

Answer:

A stopwatch

A **stopwatch** would be best to measure the time it took to see the reaction.

A **timer** would be used if the lab instructed you to observe the reaction after a specified amount of time (example: 2 minutes)



Lab Equipment

Stopwatch / Timer

- Stopwatches and timers are used in the lab setting to accurately measure the timing on a reaction or experiment.



Lab Equipment

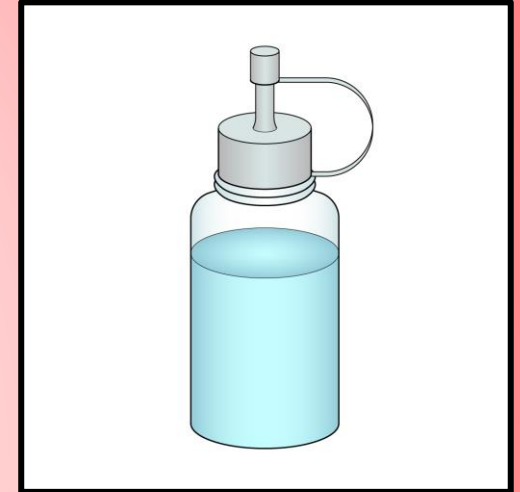
Other Useful Items



Lab Equipment

Droppers and dropper bottles

- Droppers and dropper bottles dispense liquids **one drop** at a time.
- Droppers can be made of plastic or glass.
- Disposable droppers are made of plastic and are useful when **sterile** technique is needed. Glass droppers usually have a **rubber bulb** attached to draw the liquid into the dropper.



Lab Equipment

Do you know...



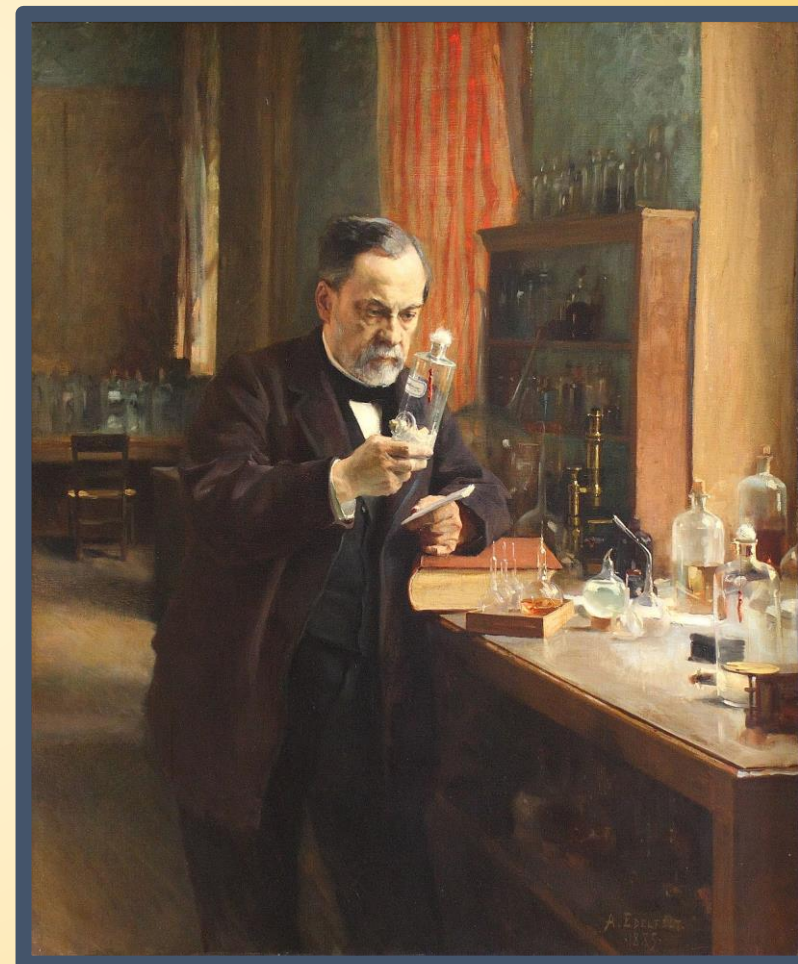
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Answer:

Louis Pasteur!

The French chemist & microbiologist that discovered germs cause disease!

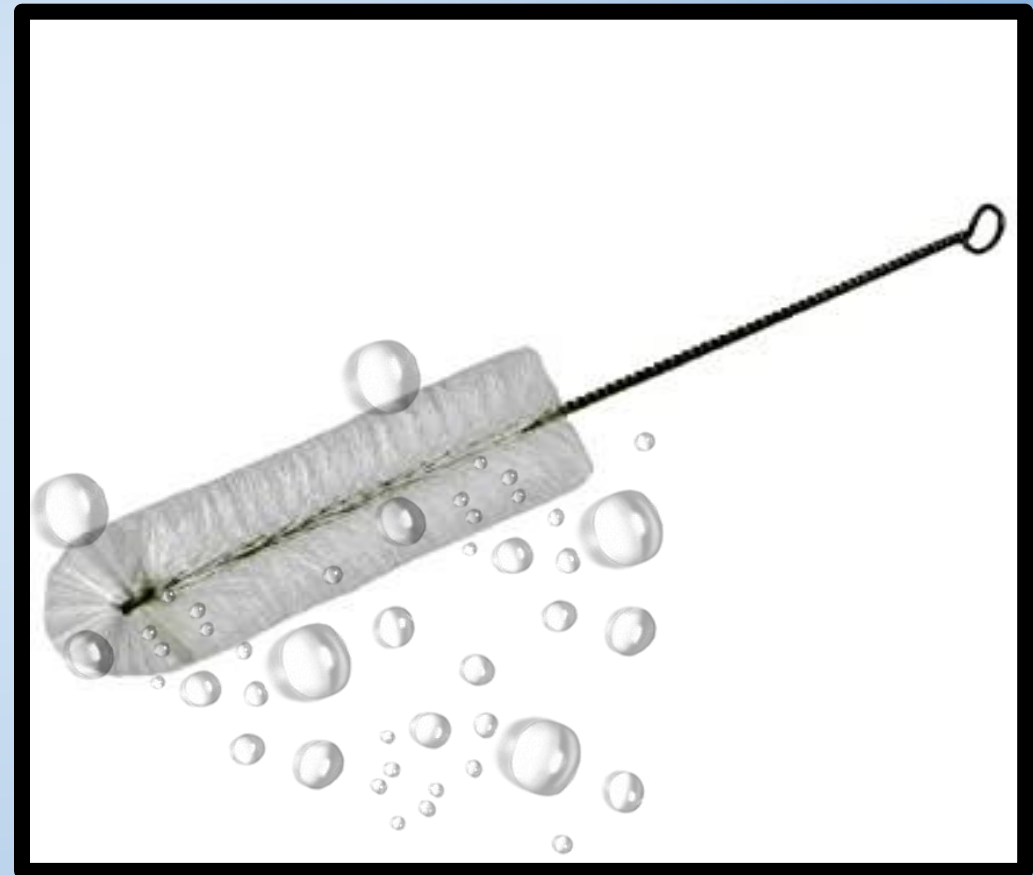
The dropper is also known as a Pasteur pipette because of how often Louis Pasteur used it during his microscopic research on germs.



Lab Equipment

Test tube brush

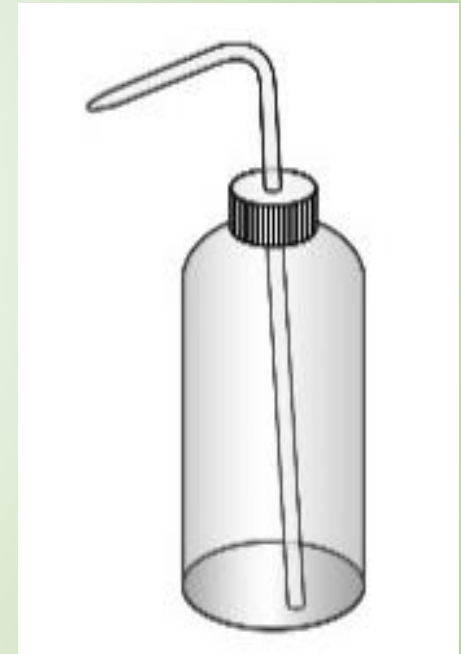
- Test tube brushes are used to wash and clean test tubes.
- Test tubes should always be cleaned after every use.



Lab Equipment

Wash bottle

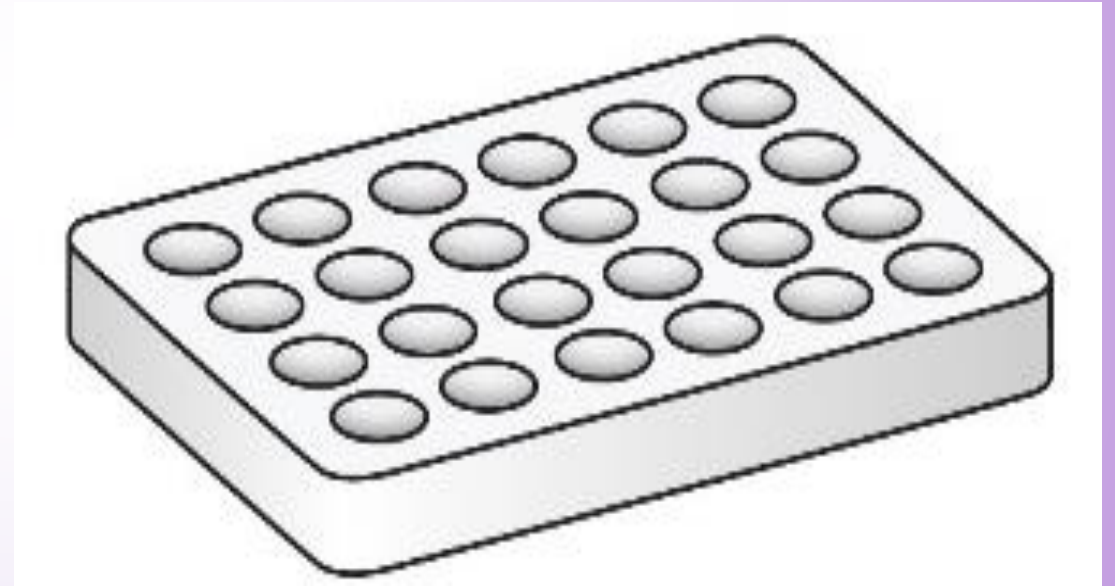
- Used to **wash** specimens, rinsing crystals and adding a small amount of water to an experiment.



Lab Equipment

Spot Plate

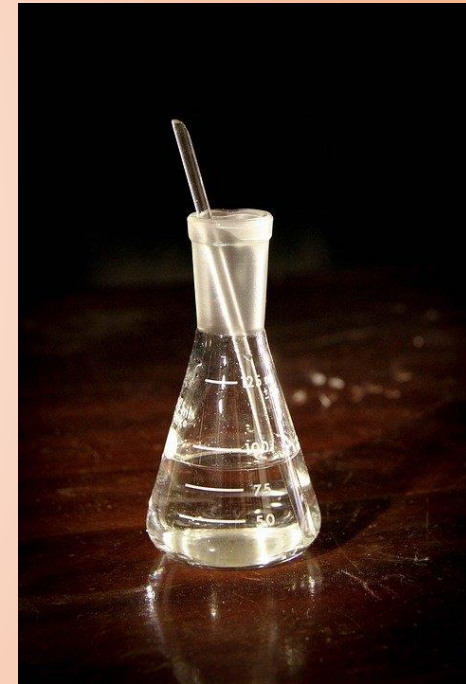
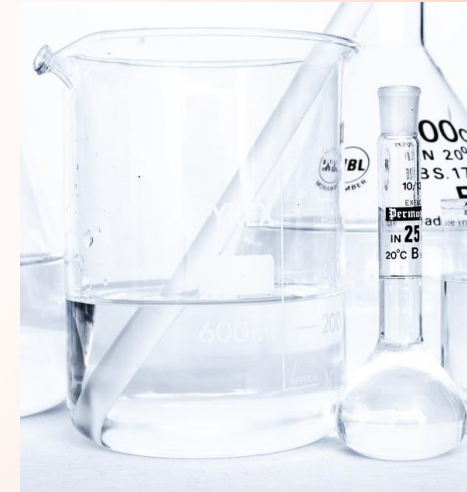
- Used to perform **small chemical reactions** which only require a few drops of chemical.



Lab Equipment

Glass stirring rod

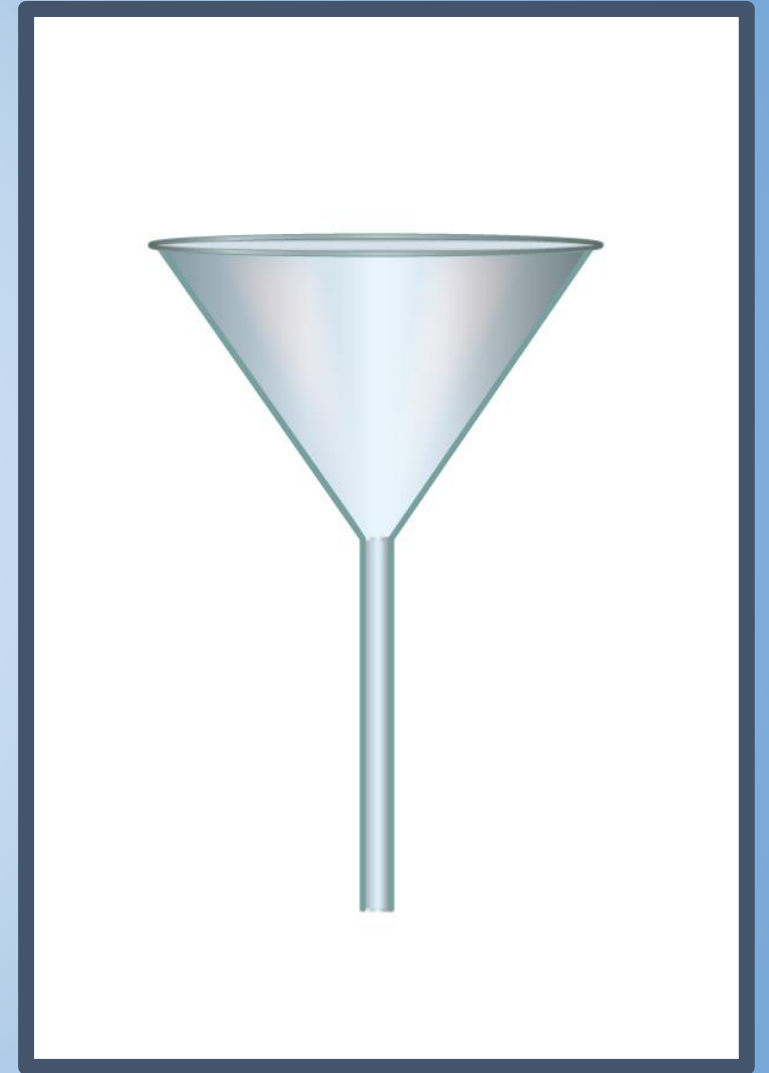
- Used to **stir** chemicals which are hot or need to be **dissolved**.
- Glass does not react with common lab chemicals, does not conduct heat like **metals** or melt like **plastic**.



Lab Equipment

Funnel

- Used for filtering substances or pouring **liquids** from one container into another.
- Prevents **spilling**.



Lab Equipment

Rubber Stopper

- Used to plug a **flask** or **test tube** to ensure the contents is kept inside.

