

## Laboratory instruments and related equipments

### 1. Laboratory attire:

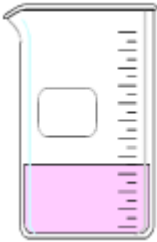
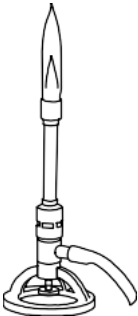


- **Safety Goggles:** Safety goggles are intended to shield the wearer's eyes from impact hazards such as flying fragments, objects, large chips, and particles. Goggles fit the face immediately surrounding the eyes and form a protective seal around the eyes.



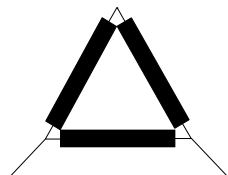
- **Latex Gloves:** used to prevent the exposure to dangerous chemicals that could cause skin injuries.
- **Lab coat:** a light coat worn to protect clothing from substances used while working in a laboratory. Laboratory coat. coat - an outer garment that has sleeves and covers the body from shoulder down; worn outdoors.

### 2. Laboratory equipments and glassware:

	<p>- <b>Beakers</b> are useful as a reaction container or to hold liquid or solid samples. They are also used to catch liquids from titrations and filtrates from filtering operations.</p>
	<p>- <b>Titration</b> is the slow addition of one solution of a known concentration (called a titrant) to a known volume of another solution of unknown concentration until the reaction reaches neutralization, which is often indicated by a color change.</p>
	<p>- <b>Bunsen Burners</b> named after Robert Bunsen, is a kind of gas burner used as laboratory equipment; it produces a single open gas flame, and is used for heating, sterilization, and combustion. The gas can be natural gas (which is mainly methane) or a liquefied petroleum gas, such as propane, butane, or a mixture.</p>



- A **burette** is a graduated glass tube with a tap at one end, for delivering known volumes of a liquid, especially in titrations. It is a long, graduated glass tube, with a stopcock at its lower end and a tapered capillary tube at the stopcock's outlet. Burets are for addition of a precise volume of liquid. The volume of liquid added can be determined to the nearest 0.01 mL with practice.



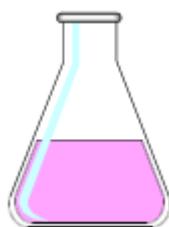
- A **clay triangle** is a piece of laboratory equipment used in the process of heating substances. Clay Triangles are used in conjunction (used together) with other lab equipment to create a stable framework in which to place a substance -- usually a solid chemical -- while it is heated to a high temperature. They are placed on a ring attached to a ring stand as a support for a funnel, crucible, or evaporating dish.



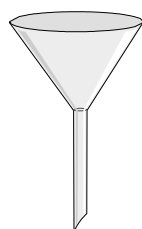
- A **crucible** is a kind of laboratory equipment that is usually a small cup made of porcelain or non-reactive metal. Crucibles are used to heat chemical compounds to very high temperatures using a gas burner.



- **Dropper** is a pipette consisting of a small tube with a vacuum bulb at one end for drawing liquid in and releasing it a drop at a time.



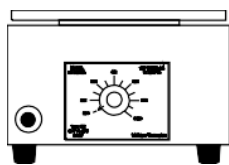
- An **Erlenmeyer flask**, also known as a conical flask or a titration flask, is a type of laboratory flask which features a flat bottom, a conical body, and a cylindrical neck. Erlenmeyer flask are useful to contain reactions or to hold liquid samples. They are also useful to catch filtrates.



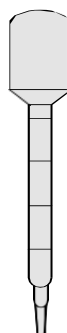
- **Glass Funnels** are for funneling liquids from one container to another or for filtering when equipped with filter paper.



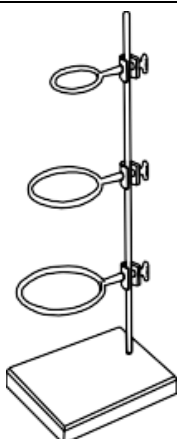
- **Graduated Cylinders** are for measurement of an amount of liquid. The volume of liquid can be estimated to the nearest 0.1 mL with practice.



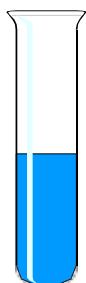
- **Hot plates** are generally used to heat glassware or its contents. Some hot plates also contain a magnetic stirrer, allowing the heated liquid to be stirred automatically. This works well for low boiling point operations or when a heat source's minimum temperature is high.



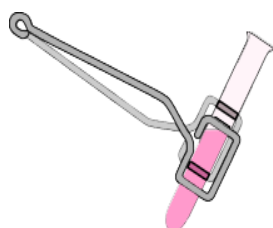
- A **pipette** is a laboratory tool commonly used in chemistry, biology and medicine to transport a measured volume of liquid, often as a media dispenser.



- **Ring stand** a retort stand, also called a clamp stand, a ring stand, or a support stand, is a piece of scientific equipment intended to support other pieces of equipment and glassware — for instance, burettes, test tubes.



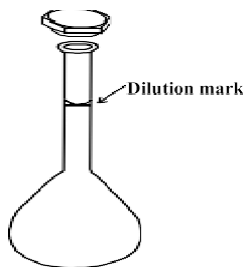
- A **test tube**, also known as a culture tube or sample tube, is a common piece of laboratory glassware consisting of a finger-like length of glass or clear plastic tubing, open at the top and closed at the bottom. Test tubes are usually placed in special-purpose racks.



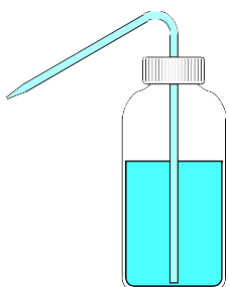
- **Test tube holders** are for holding test tubes when tubes should not be touched.



- **Tongs** are similar in function to forceps but are useful for larger items.



- **Volumetric Flasks** is a piece of laboratory apparatus, a type of laboratory flask, calibrated to contain a precise volume at a certain temperature. Volumetric flasks are used for precise dilutions and preparation of standard solutions.

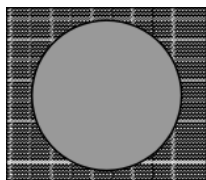


- **Wash bottles** are used for dispensing small quantities of distilled water.

- **Distilled water** is water that has been boiled into vapor and condensed back into liquid in a separate container. Impurities in the original water that do not boil below or near the boiling point of water remain in the original container. Thus, distilled water is a type of purified water.



- **Watch glasses** are for holding small samples or for covering beakers or evaporating dishes.



- **Wire Gauze** is a sheet of thin metal that has net-like patterns or a wire mesh. Wire gauze is placed on the support ring that is attached to the retort stand between the Bunsen burner and the glassware to support the beakers, flasks, or other glassware during heating.

## EXERCISES:

### 1. Fill in the gaps with the following words in their appropriate forms:

*Item, glassware, neck, laboratory, approximate, boiling tube, container, mass, weight, experiment, weigh*

1. Laboratory \_\_\_\_\_ refers to a variety of equipment, traditionally made of glass, used for scientific \_\_\_\_\_ and other work in science, especially in chemistry and biology

\_\_\_\_\_. There are many different kinds of laboratory glassware \_\_\_\_\_.

2. A \_\_\_\_\_ is essentially a scaled-up test tube, being about 50% larger in every aspect.

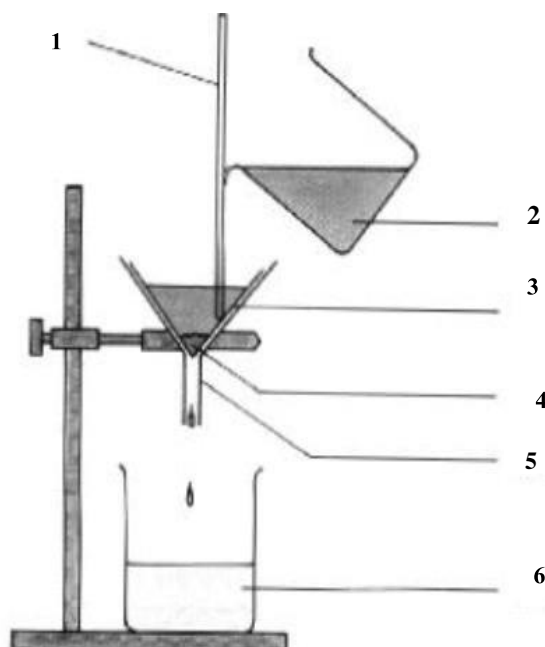
3. A bottle is a small \_\_\_\_\_ with a \_\_\_\_\_ that is narrower than the body and a "mouth".

4. Rounded numbers are only \_\_\_\_\_.

5. \_\_\_\_\_ is a measurement of how much matter is in an object; \_\_\_\_\_ is a measurement of how hard gravity is pulling on that object. Your \_\_\_\_\_ is the same wherever you are - on Earth, on the moon, floating in space. But your \_\_\_\_\_ depends on how much gravity is acting on you at the moment. You would \_\_\_\_\_ less on the moon than on Earth.

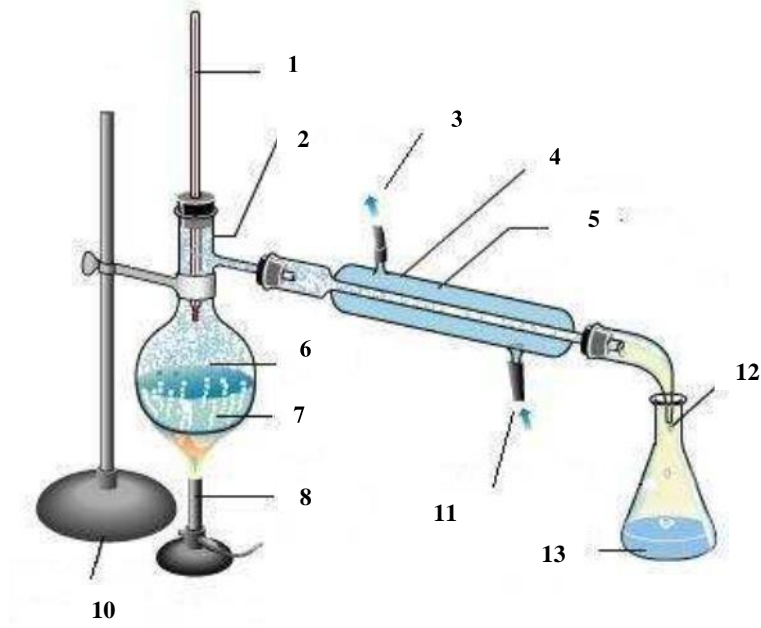
### 2. Fill the following schemes with suitable expressions:

*funnel, filter paper, mixture, residue, glass rod, filtrate*



**-Filtration-**

**Label the tools:** *Bunsen burner, condenser, cooling water, condensed water, thermometer, mixture, stand, distillate, distillation flask, water outlet steam, cold water inlet*



### Distillation