

# USES OF COMMON LABORATORY APPARATUS AND EQUIPMENTS

***BIO 107: General Biology Practical I (1 credit)***

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# **Introduction**

- **Laboratory apparatus and equipment are indispensable tool in the laboratory.**
- **Their uses enable students to conduct accurately and systematically the practical assigned to them each day.**
- **Different laboratory apparatus may carry a similar function. Thus, as students, we should know the proper procedures of using these lab instruments while conducting the experiments apparatus is needed for each experiment**

# Laboratory Apparatus

- ✓ **Beaker:** Is a cylindrical glass or plastic vessel used for holding liquids. It is a multipurpose piece of equipment used for containing a chemical reaction, mixing, measuring liquids, heating them over a Bunsen burner's flame or collecting them in a titration experiment.
- ✓ **Graduated Cylinder:** Are used primarily for measuring of volume of liquid. Graduated cylinders come in a variety of sizes such as 10 ml, 25 ml, 50 ml, 100 ml, 500 ml and 1,000 ml. Scientists take measurements by viewing, at eye-level, the lowest point of the convex dip that the liquid in the cylinder makes.
- ✓ **Test 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. Used to hold small samples, primarily quantitative assessment and comparison.

## Laboratory Apparatus Cont'd

- ✓ **Test tube racks:** Are laboratory equipment used to hold upright multiple test tubes at the same time. They are most commonly used when various different solutions are needed to work with simultaneously, for safety reasons, for safe storage of test tubes, and to ease the transport of multiple tubes.
- ✓ **Droppers** are used for addition of liquids drop by drop.
- ✓ **Conical flask:** Heating, storing, mixing, and performing chemical reactions.
- **Bunsen Burners:** It is a mechanical apparatus that is connected to a flammable gas source. There is a knob to adjust the amount of gas flow

# Laboratory Apparatus Cont'd

- ✓ **Microscope slide:** Is a thin flat piece of glass, typically 75 by 26 mm (3 by 1 inches) and about 1 mm thick, used to hold objects for examination under a microscope.
- ✓ **Glass pipette:** is a pipette with its volume, in increments, marked along the tube.
  - It is used to accurately measure and transfer a volume of liquid from one container to another.
- ✓ **Spatula:** Are for scooping solid chemicals.
  - **Forceps:** Are used to grab small things like solid chemicals that are broken into chunks, so they can be safely handled and added to containers.
- ✓ **Petri dish:** Is a shallow, circular, glass or plastic dish with a loose-fitting cover over the top and sides, used for culturing bacteria and other microorganisms.
- ✓ **Inoculation loop**, also called a smear **loop** or **inoculation wand** is a simple tool used mainly by microbiologists to pick up and transfer a small sample (inoculum) from a culture of microorganisms, e.g. for streaking on a culture plate.

# Laboratory Equipment

- **Balances:** A balance determines the mass of something, such as a dry chemical. While balances once used two flat trays--one to hold the material and the other to hold weights--electronic balances represent the norm in most laboratories.
- **Autoclave:** An autoclave is a machine that uses **steam** under **pressure** to kill harmful bacteria, viruses, fungi, and spores on items that are placed inside a pressure vessel.
- It is a type of moist sterilization.
- Autoclave is use for sterilization of glass ware and biological culture media.
- The items are heated to an appropriate sterilization **temperature** of **121°C** for a given amount of **time** of **15 minutes** with a pressure of **15 pounds per square inch (psi)**.
- Temperature, Pressure and Time are important parameters in an autoclave.

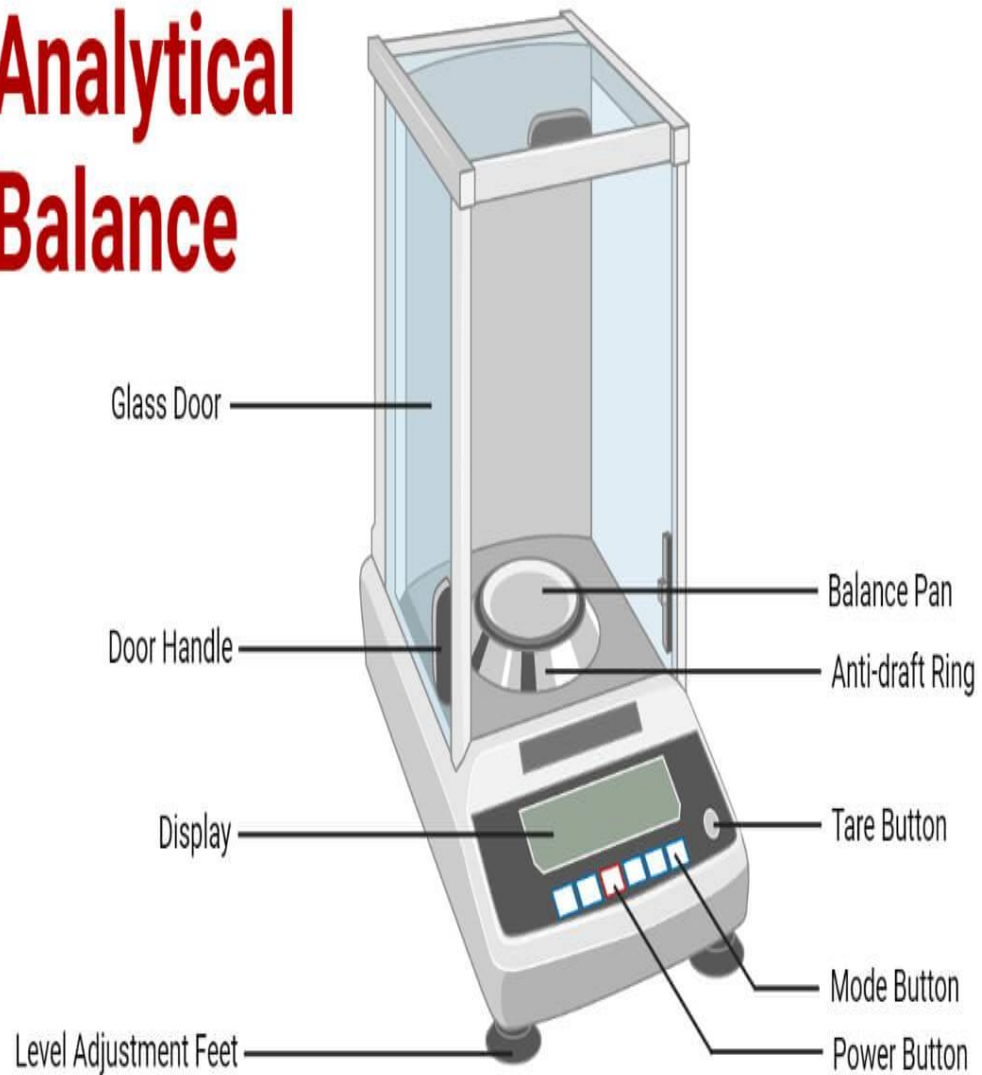
- **Oven:** Is used on equipment that cannot be wet and on material that will not melt, catch fire, or change form when exposed to high temperatures. It is a type of dry heat sterilization. Petri dishes arranged in a cannister are sterilized in oven at 160°C for 2 hours.
- **pH meter:** Is a scientific instrument that measures the hydrogen ion concentration in solution, indicating its alkalinity or acidity which is expressed as pH.
- It measures pH on a scale of 0 to 14. (0- 6 is acidic, 7 is neutral while 8-14 is alkaline).
- pH meter is first calibrated in buffer solution before use.
- When not in use the electrode is submerged in a beaker containing deionized water.

# Laboratory Equipment Cont'd

- **Centrifuge:** Lab device used for separation. Separation occur on the basis of density.
- **Water Bath:** A water bath is laboratory equipment made from a container filled with heated water. It is used to incubate samples in water at a constant temperature over a long period of time.
- **Laminar cabinet:** A laminar flow cabinet is defined as enclosed workbench which is used to create a contamination free work environment through installed HEPA filters that capture all the particles entering the cabinet.
- **Fume Hoods:** It's a ventilation device that is designed to limit exposure of people to hazardous or toxic fumes, vapour or dust. Fume hoods should be used when working with toxic compounds or compounds with a boiling point below  $120^{\circ}$  C.
- **Spectrophotometers** are used to measure the absorbance or transmittance of a liquid sample. Clean cuvettes are used to hold the sample for measurement.



# Analytical Balance



**ANALYTICAL BALANCE**



**TOP LOADING BALANCE**



**AUTOCLAVE**



**OVEN**



**pH METER**



**CENTRIFUGE**



**LAMINAR CABINET**