

# 334 MBIO

# Biochemical Instrumentation

# Techniques

- Lab 1 -

By: Aljawharah Alabbad

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# Scientific Lab Equipment

- Refers to the tools, instruments, and apparatus used in laboratories to conduct experiments, analyse samples, measure data, and perform various scientific procedures.



# Scientific Lab Equipment

- These tools support various scientific disciplines, such as chemistry, biology, physics, and medical research, and include items like microscopes, test tubes, beakers, pipettes, and spectrophotometers.



# The Basic Tools:

## 1. Beakers

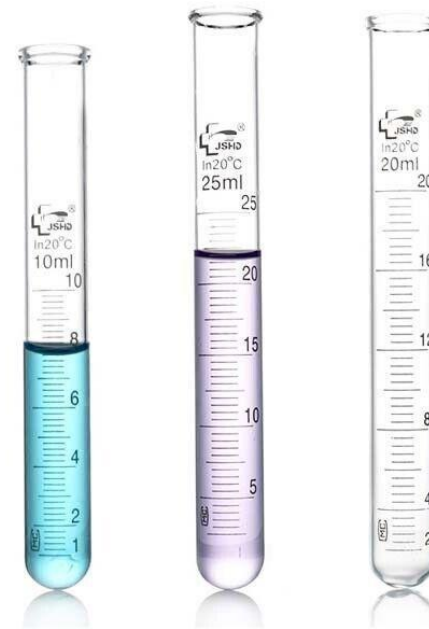
- Used for pouring, storing, mixing, heating, dispensing.
- NOT used to measure.
- Has a “beak” to aid pouring.



# The Basic Tools:

## 2. Test Tubes

- Used for storing, mixing, heating.
- NOT used for measuring.
- Should be held with tongs, clamps or a ring-stand clamp, **NEVER** with hands.



# The Basic Tools:

## 3. Flasks

- Used for storing, mixing, heating.
- NOT used for measuring.
- Different shapes and without beak
- Should not be held with hands.



# The Basic Tools:

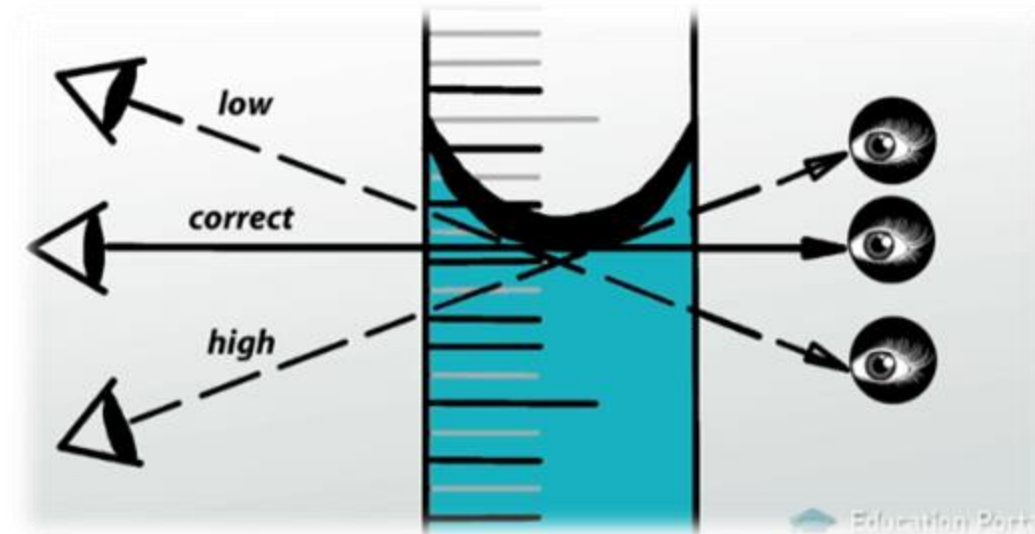
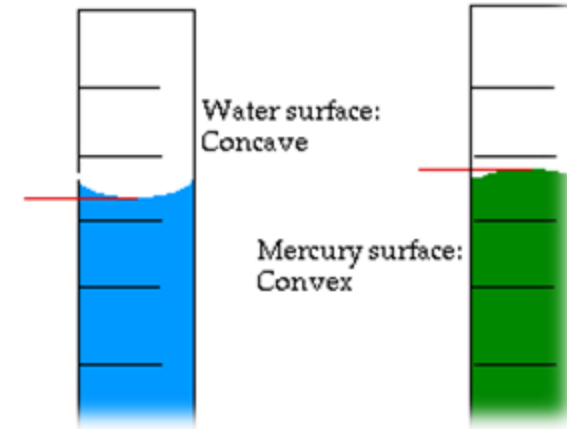
## 4. Graduated cylinders

- Used measure volume of liquids accurately.
- NOT used for reactions.
- Read from the curve of the meniscus.



# What is the meniscus?

- The curved shape of a liquid stored in a cylinder.
- Caused by the adhesive forces between the liquid and its container, as well as the cohesive forces between the particles of the liquid itself.

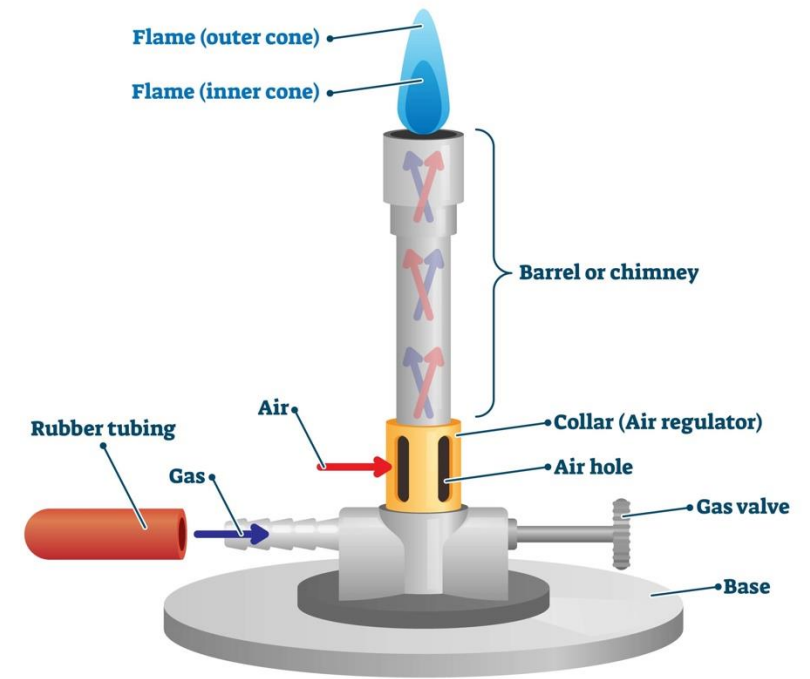




# The Basic Tools:

## 5. Bunsen Burner

- Turn on gas FIRST
- Control gas and air to create a nice blue cone of flame.
- NEVER put glassware into the flame, as the glass will weaken and then melt.



# The Basic Tools:

## 6. Erlenmeyer flasks

- Allows the contents to be swirled or stirred during an experiment.



# The Basic Tools:

## 7. Stirring rods

- To mix chemicals and hot liquids together (like a spoon).



# The Basic Tools:

## 8. Funnels

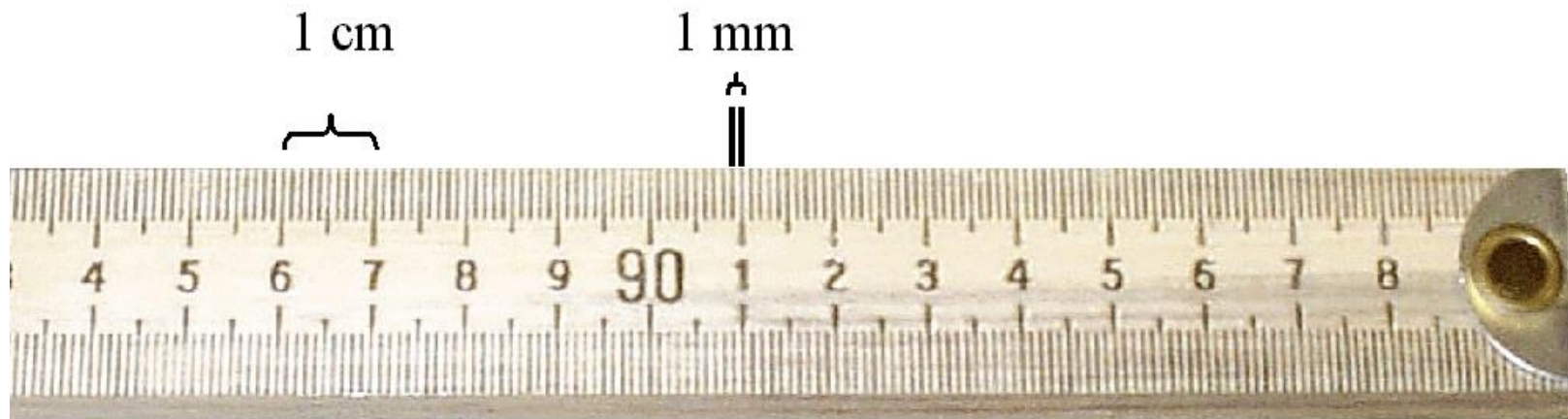
- To transfer liquid from one container to another



# The Basic Tools:

## 9. Meter stick

- To Measures length.



# The Basic Tools:

## 10. Dissecting Kit

- A collection of specialised tools designed for the precise cutting, separation, and examination of biological specimens.



# The Basic Tools:

## 11. Safety goggles

- To protect eyes against burns or cuts.



# The Basic Tools:

## 12. Reagent Bottles

- To use to store reagents.
- Reagent is a substance used in a chemical reaction to detect, measure, examine, or produce other substances.





# The Basic Tools:

## 13. Eppendorf tubes

- A single-use tubes for preparing, mixing, centrifuging, transporting and storing solid and liquid samples and reagents.



# The Basic Tools:

## 14. Cuvette

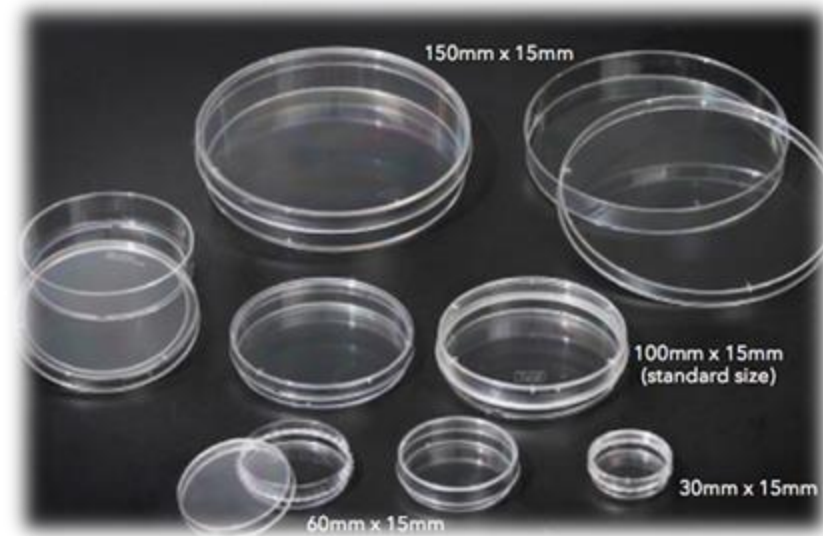
- A small tube of circular or square cross section, sealed at one end, made of plastic, glass, or fused quartz (for UV light).
- Designed to hold samples for spectroscopic experiments.



# The Basic Tools:

## 15. Petri plates

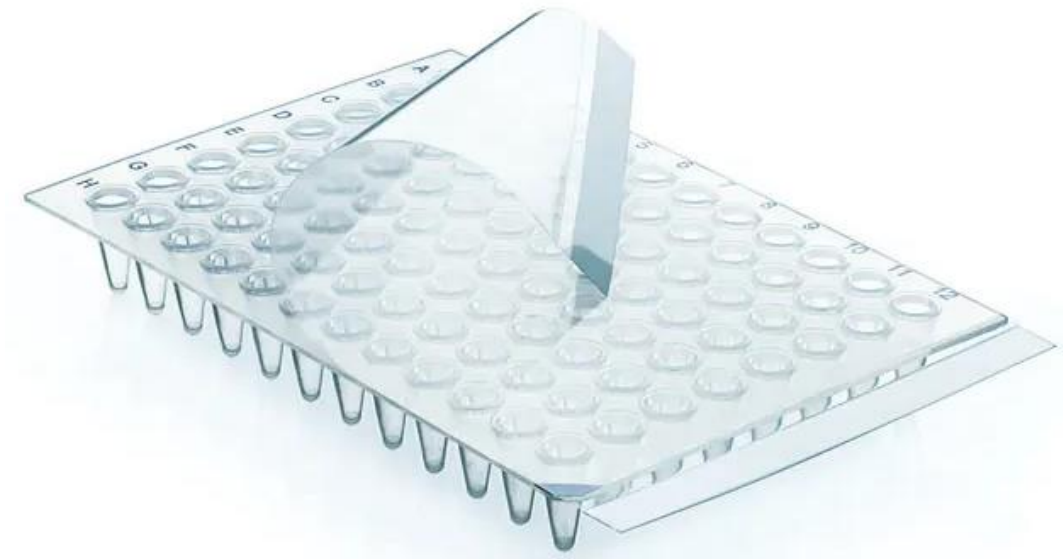
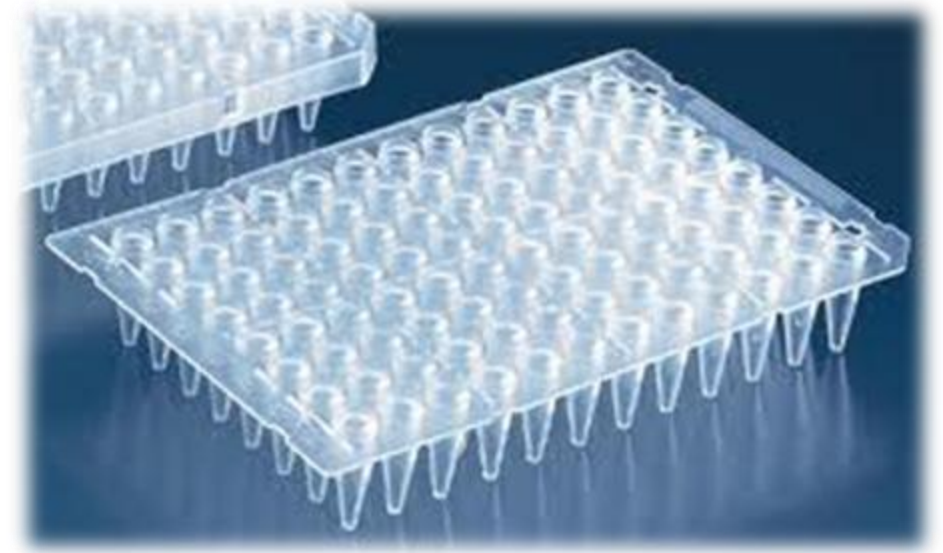
- Used for culturing microorganisms, observing their growth, and conducting various laboratory experiments in microbiology and cell biology.



# The Basic Tools:

## 16. 96 well PCR plate

- Used for PCR experiments, allowing simultaneous amplification of DNA or RNA samples in 96 individual wells.



# Basic Laboratory Equipment:

## 1. Balance/scale

- Used for measuring the mass or weight of objects with precision, commonly utilized in laboratories, industries, and educational setting.
- Bubble adjusting/ Calibration/ Unit.



Bubble level



Anti-slip feet



# Basic Laboratory Equipment:

## 2. Micropipette

- Used to accurately measure and dispense small volumes of liquid.
- The capacity of a micropipette can range from less than 1  $\mu\text{l}$  to 1000  $\mu\text{l}$ .



# Basic Laboratory Equipment:

## 3. Colony counter

- Instrument used for counting of bacterial colonies growing on agar in petri dishes.



# Basic Laboratory Equipment:

## 4. Water Purification System

- This system is designed to produce pure and ultrapure water (Milli-Q water), which are cell and tissue culture processes using water are contamination and chemical free.





# Basic Laboratory Equipment:

## 5. Laboratory shaker

- A piece of laboratory equipment used to mix, or to agitate substances in flasks by shaking to incorporate oxygen and nutrients throughout the culture media.



# Basic Laboratory Equipment:

## 6. Hot air oven

- A dry air type steriliser for sterilizing laboratory glass ware.
- It operates at temperature of 160 - 180 °C for one and a half hour.



# Basic Laboratory Equipment:

## 7. Light Microscope

- An instrument containing two lenses, which magnifies the picture. Because it uses more than one lens, it is sometimes called the compound microscope



# Basic Laboratory Equipment:

## 8. Autoclave

- It is a wet air type steriliser.
- Used to sterilise culture media.



# Basic Laboratory Equipment:

## 9. Incubator

- Provide suitable temperature for the growth of organism.



# Basic Laboratory Equipment:

## 10. Hot plate

- Used for:
  - Heating glassware or its contents.
  - Dissolving chemical compounds.
  - Denaturing proteins prior to SDS-PAGE analysis.



[alalabbad@ksu.edu.sa](mailto:alalabbad@ksu.edu.sa)