



Glassware and
equipment used in
the field of pharmacy



Mortar and pestle

- The mortar and pestle is used to grind and crash various ingredients.
- To prepare fine powder capsule.
- prepare emulsion and paste.



Beaker

- Beaker is a common container in most labs.
- It is used for mixing ,stirring and heating chemicals
- Rough liquid measurements.

Glass Stirring Rod

- Glass stirring rods are used for mixing and stirring chemical ingredients



Conical flask

- It is used for heating and mixing liquids.
- Rough liquid measurements.



Graduated cylinder

- A graduated cylinder is used for accurately measuring the volume of liquids.
- It has multiple marks for a range of volumes.



Conical measuring cylinder

- Used for measuring and mixing liquids.
- Pouring and handling thick or viscous liquids.



Volumetric flask

- One of the most precise pieces of glassware.
- Used for high-accuracy preparation of solutions.
- Mixing solutions, preparation of standard solutions and accurate dilutions.
- It has only one calibration mark for a specific volume.



Graduated pipettes

- Used to accurately measure and transfer variable volumes of Liquids.
- A graduated pipette has multiple calibration marks allowing measurements and delivery of a range of volumes.



Volumetric (bulb) pipette

- Used for very precise measurement and transfer of liquid.
- It has only one calibration mark to deliver a single, very precise volume.



Burette

- Used for delivering known volumes of a liquid, especially in titrations



Test tube

- Used for holding, mixing, and heating small liquid/solid samples,



Reagent bottles

- Used for safe, long-term storage and dispensing of laboratory chemicals in liquid or powder form.



Balances

a-Electronic balances

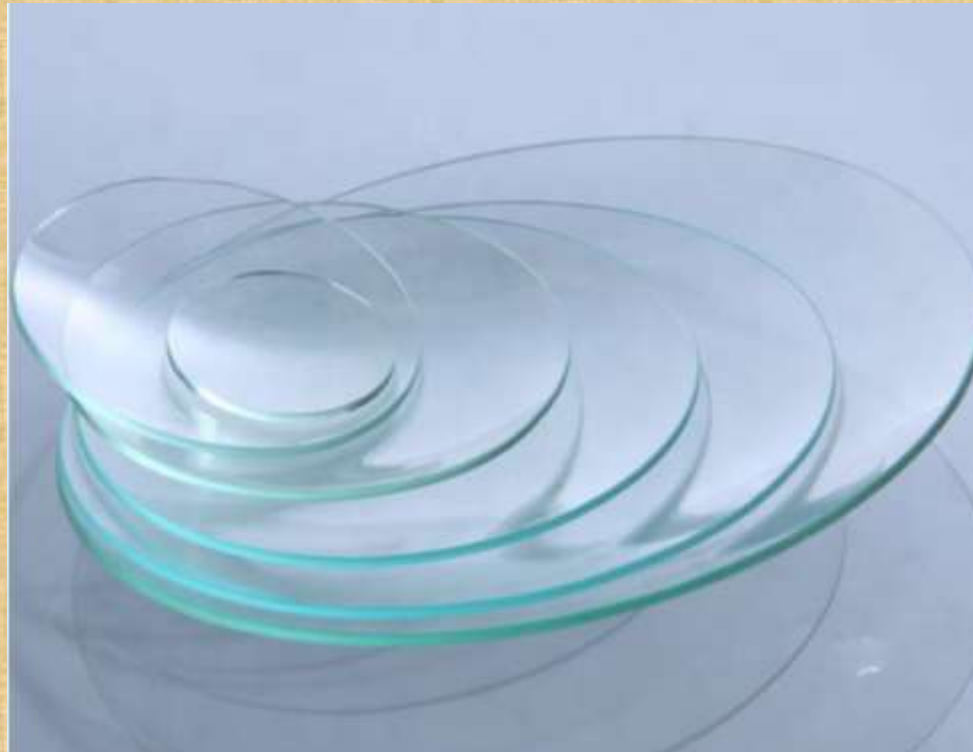


b-Manual balance



Watch glass

- Used as a surface to evaporate liquids.
- hold solids during weighing.
- heat small amounts of substances.
- act as a cover for beakers and flasks.



Laboratory spatulas

- Used for transferring solids for weight measurement.



Funnels

- Used in filtration and pouring liquids into narrow mouth containers such as flask and bottles



Slab and spatula

- Used for mixing ingredients for preparation of cream and ointment.



The background is a light blue gradient with several realistic water droplets of various sizes scattered across the surface. The droplets have highlights and shadows, giving them a three-dimensional appearance.

Pharmaceutical measurements



The pharmaceutical preparation, as the final form used for medication, should be:

1-Effective

2-Safe

.

#The pharmacist should be aware of:

1-Weighing of solids(weight measurement).

2-Volume measurement of liquids.



Weights

Weight is measured by means of balance, there are different types of balance for **rough weights(double beam balance)**, others for **highly accurate and sensitive weights(electronic balance)**.



Electronic balances



Rules for Using a Balance

- 1-The balance should be located in a well –lightened place ,as free as possible from vibration ,dust, moisture and corrosive vapor .
- 2- The balance should be kept clean at all times .Any chemicals spilled on balance should be removed immediately with soft brush or clean dry towel.
- 3-A watch glass should be used for weighing solids, stoppered bottle should be used for corrosive substance or liquids.
- 4-Never place materials to be weighted directly on the pan .
- 5-Check to see if the balance is adjusted including zeroing of it ,also check the adjustment of the balance before each weighing.

Sources of errors in weight measurement

1-Air Currents.

2-Failure in zeroing the balance.

3-Posture of the balance (should be positioned on a flat surface).

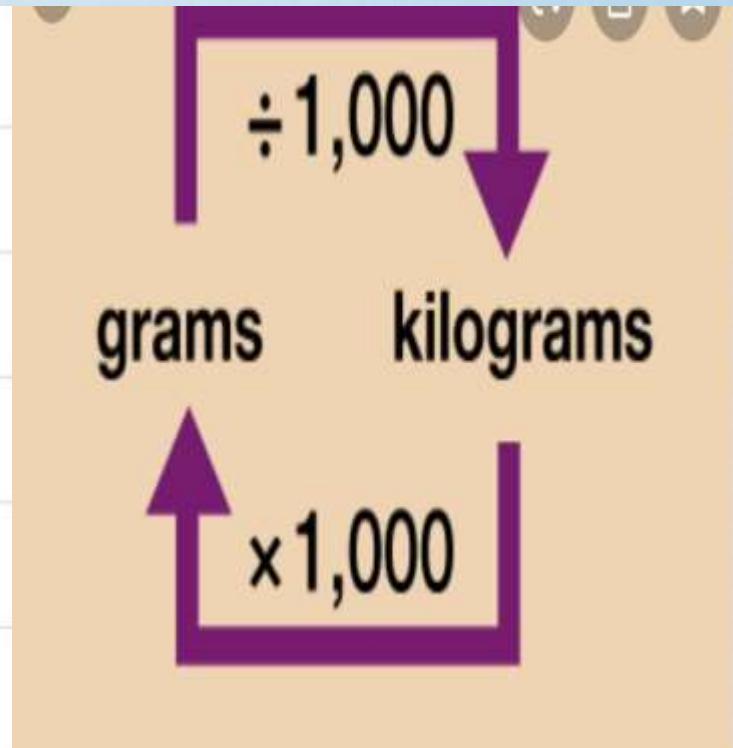
Systems of measuring weight

There are two systems:

1-Imperial system: units of weight in this system are: grain (gr.),drachm (ʒ),ounce ʒ Pound(lb).

2-Metric system : units of weight in this system are: gram(g), kg, mg.

10 milligrams (mg) =	1 centigram (cg)	
10 centigrams =	1 decigram (dg)	= 100 milligrams
10 decigrams =	1 gram (g)	= 1,000 milligrams
10 grams =	1 dekagram (dag)	
10 dekagrams =	1 hectogram (hg)	= 100 grams
10 hectograms =	1 kilogram (kg)	= 1,000 grams



Relationship between metric and imperial system for weight measurement

$$1 \text{ gr} = 65 \text{ mg} = 0.065 \text{ gm}$$

$$1 \text{ gm} = 15.432 \text{ gr}$$

$$1 \text{ oz} = 4 \text{ gm}$$

$$1 \text{ ounce} = 30 \text{ gm}$$

$$1 \text{ ounce} = 480 \text{ gr}$$

$$1 \text{ Kg} = 2.2 \text{ lb}$$

Procedure for weight measurement

- 1- Place the balance on a stable, flat surface.
- 2-Turn it on.
- 3-Put the paper on the pan and zero the balance using tare button .
- 4-Adding the chemical substances gradually until we get the desired weight.



VOLUME MEASUREMENT



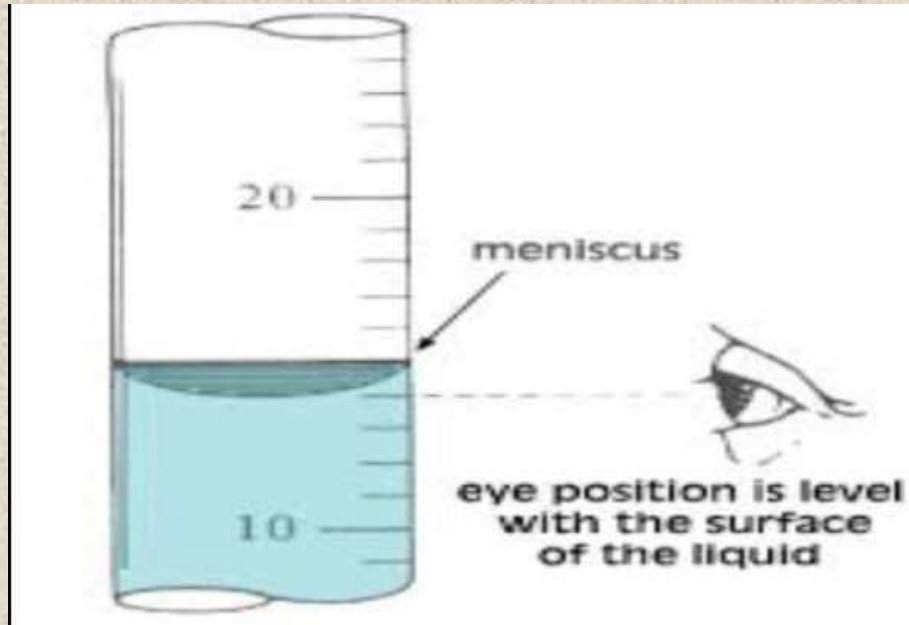
Volume is the space which is occupied by a given amount of material.

Many types of apparatus are used in volume measurement ; this depend on the:

- 1- The kind of liquid.
- 2- The quantity of liquid to be measured.
- 3- The degree of accuracy required .

Techniques of measuring volume

- 1- Place the cylinder on a flat surface.***
- 2- Pour the liquid slowly.***
- 3- The volume should be read at eye level.***
- 4- Read the bottom of the meniscus.***



Techniques of measuring volume

3-We measure the amount of liquid by volume although there are exceptions , some liquids are measured by weight as glycerin , acids and oils .

-Which are more accurate for volume measurement (graduated cylinder or conical graduated cylinder)?

Systems of measuring volume

1-Imperial system: the units of volume in this system are :minim (m), fluid drachm(fz), fluid ounce(fz) and gallon(gal).

$$1fz = 60 m$$

$$1fz = 8 fz$$

$$1gal = 8 pints$$

2-Metric system: the units of volume in this system are :liter (L), centiliter(CL), milliliter (mL) and microliter (μ L).

$$1kl = 1000 L$$

$$1ml = 1000 \mu L \quad (1 \mu L) = 0.001 ml$$

$$1cubic\ cm\ (cc) = 1ml$$

Relationship between Metric and Imperial systems

$$1 \text{ ml} = 15 \text{ ȳ}$$

$$1 \text{ ȳ} = 0.06 \text{ ml}$$

$$1 \text{ f3} = 4 \text{ ml}$$

$$1 \text{ f3} = 30 \text{ ml}$$

$$1 \text{ gal} = 3.785 \text{ L} = 3785.4 \text{ ml}$$

$$1 \text{ pint} = 473.17 \text{ ml}$$

Household measurements

1 teaspoonful (tsp) = 5 ml = 1.25 fl oz

1 dessertspoonful = 10 ml

1 tablespoonful (tbsp) = 15 ml

1 teacupful = 120 ml = 4 fl oz

1 glassful = 240 ml = 8 fl oz

Thank you for listening