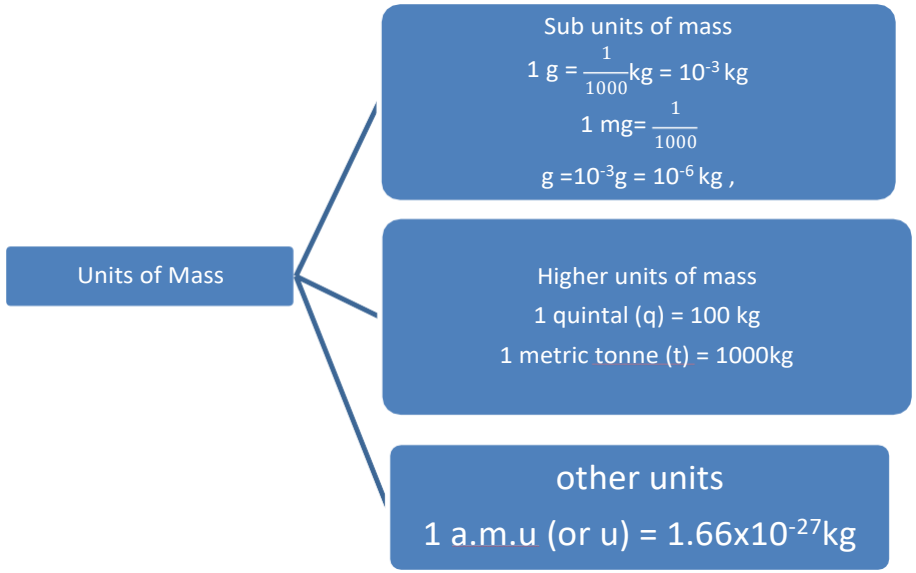
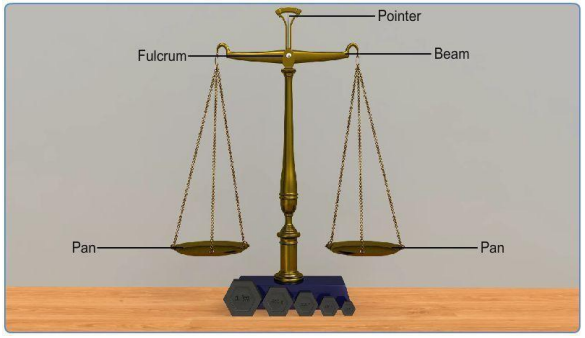
MEASUREMENTS

Mass : - the mass of a body is the quantity of matter contained in it regardless of its volume or any force acting on it.

Units of Mass :



Measurement of Mass: Beam Balance



Characteristics of true beam balance :

1. *Both the arms must be of equal lengths.*
2. *Both the pans must be of equal masses.*
3. *On lifting up the empty beam balance, the pointer should be vertical and the rod should be horizontal.*

Principle of a beam balance :

Two bodies of equal or same mass would secure a balance on the beam balance having arms of equal length and pans of equal masses.

Weight : It is the force with which a body is attracted towards the earth.

Units of Weight:

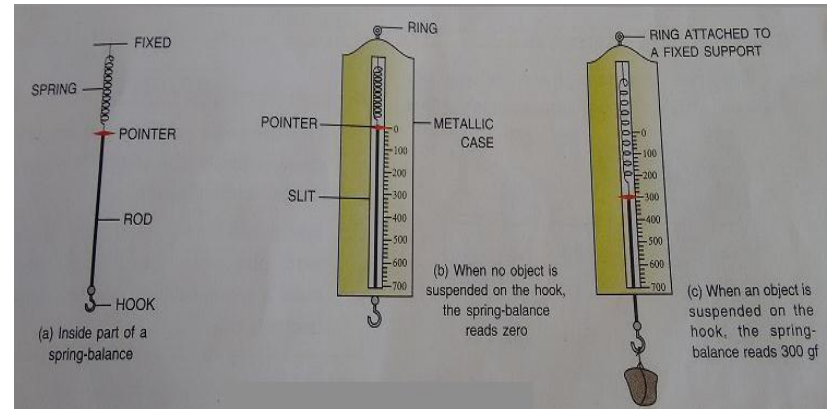
SI unit – newton (N)

1 N = 10^5 dyne

1 Kgf = 9.8 N

1 gf = 980 dyne

Measurement of Weight : Spring Balance



Principle :

The more the weight attached to the spring, the more the spring gets stretched .

Mass	Weight
Quantity of matter contained	Force with which a body is attracted towards earth
can never be zero	can be zero
scalar quantity	vector quantity
measured by beam balance	measured by spring balance
SI unit- kg	SI unit - N
It is universally constant	depends on gravity

Density :

Density of a substance = $\frac{mass\ of\ substance}{volume\ of\ substance}$

SI unit : kg m^{-3} ; CGS unit : g cm^{-3}

1 g cm^{-3} = 1000 kg m^{-3}

Density of water = 1 g cm^{-3} = 1000 kg m^{-3}

Relative Density :

R.D = $\frac{Density\ of\ substance}{Density\ of\ water\ at\ 4°C}$

Unit : NO UNIT

Density in g cm^{-3} = R.D

Density in Kg m^{-3} = R.D x 1000

R.D = $\frac{Mass\ of\ a\ certain\ volume\ of\ substance}{Mass\ of\ the\ same\ volume\ of\ water\ at\ 4°C}$

Sinking and Floating

When Object floats ?

- Density of object < Density of liquid.

When Object Sinks ?

- Density of object > Density of liquid .

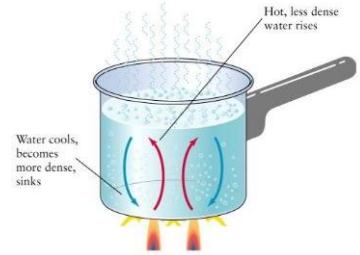
Effect of Temperature on Density :

In solids ,Liquids and gases – density decreases with increase in temperature**.**

Exception : Water – density decreases on freezing ., i.e., ice floats on water.

Convectional current in liquids and gases :

Fluids on heating expands and become lighter moves upwards , whereas the cold fluid being heavier moves downwards. This cycle of upward and downward movements of fluids forms convectional currents.



Practical Applications :

- Ventilators placed near roof and windows near floor
- Chimneys in factories
- Cooling chest in refrigerator (fitted near top of fridge)
- Installation of air conditioner (above window level)
- Installation of room heater (near the floor)