



# Medical chemistry- year1



## Matter

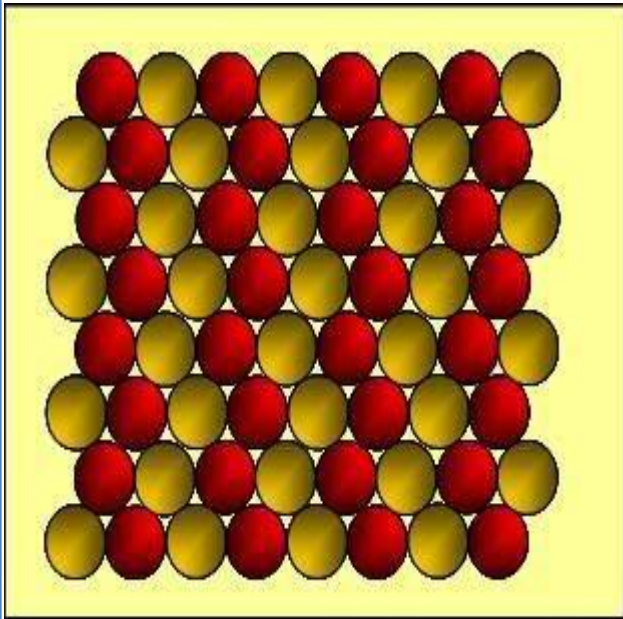
### Lecture 1 (part-1)

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# Objectives

- 1-Definition of matter
- 2-Properties of matter
- 3-State of matter
- 4-Changes in matter
- 5-Classification of matter
- 6-Separation of mixtures

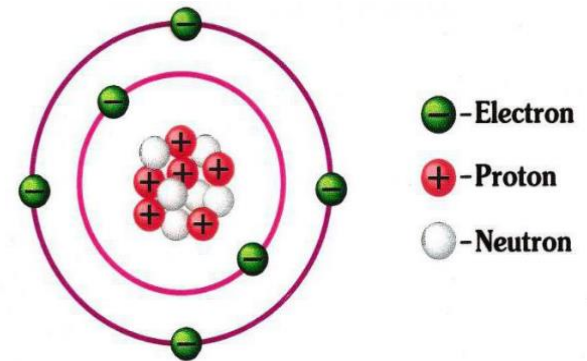
# What is chemistry?

- **chemistry** is The study of matter, its composition, properties, and the changes it undergoes .
- **Matter** is anything that has mass and takes up space.
- The two properties of Matter are:
  - Mass – amount or quantity of matter
  - Volume – amount of space occupied

## Definition Of Matter

**Matter : is anything that has mass and volume**

- All matter is composed of atoms



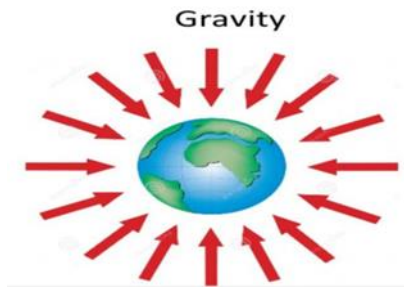
- **Atom :**
  - Extremely small chemically indivisible particle.
  - Atom is Greek for “that which cannot be divided”

## What is Mass?

Mass: is a scientific measure of the amount of matter an object is made up of. No matter where you are at given moment in time, mass is constant.

Mass is commonly measured in kilogram and gram. Mass unlike weight .what is weight?

**Weight:** is a measure of how strongly gravity pull On something. Earth has a stronger gravitational Pull than the moon.therefore,an object's weight on the moon is less than its weight on earth .



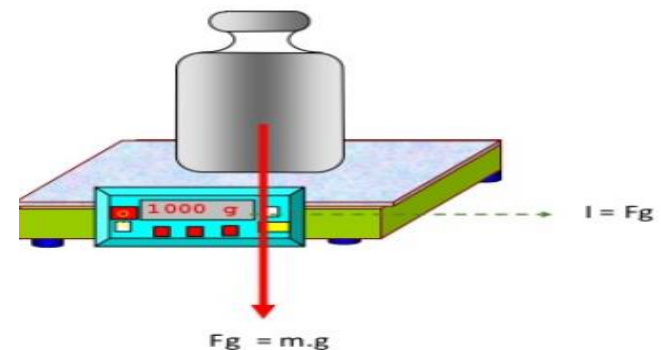
Body weight on the moon's surface =  $1/6$  of its weight on Earth.

# Newton's

- On earth every kilogram of mass is pulled down by gravity with a force of 10N.

$$\text{Weight} = \text{mass} \times 9.8 \text{ m/s}^2$$

$$F_g = m \times g$$



**Ex :** An object on the surface of the earth = 30 kg. What is its mass on the surface of the moon? What is its weight on the surface of the earth? Weight on the surface of the moon?

Mass on moon= 30 kg

Weight on the surface of the earth=  $m \times g = 30 \times 10 = 300\text{N}$

Weight on the surface of the moon=  $\frac{1}{6}$  weight on the earth =  $300/6 = 50\text{N}$



## Mass and weight

Mass	weight
Mass of the body is the quantity of matter contained in it	Weight of the body is the force with which the body is attracted towards the center of earth.
It is a scalar quantity.	It is a vector quantity
Mass on the body is constant quantity	Weight of the body varies place to place (with value of $g$ )
SI unit kilogram(kg)	SI unit newton (N)
It is measured with the help of a common balance	It is measured with the help a spring balance.

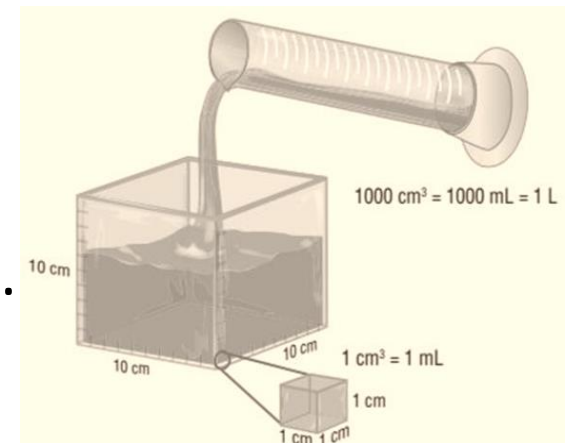
# Volume

Volume: measures how much space an object or substance takes up. You can measure the volume of an object with a regular shape, such as a cube. Multiply the object's length, width, and height together. The answer will be in cubic units ( $\text{m}^3$ ,  $\text{cm}^3$ , and so on).

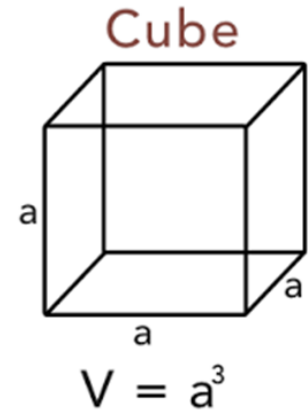
$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

The length, width, and height are each 10 cm.

$$10\text{cm} \times 10\text{cm} \times 10\text{cm} = 1000\text{cm}^3 = 1\text{L}$$



# The Volume of the cube



Ex: find the volume of the shape given the length of one length of on cube is 2 cm?

$$V = a^3$$

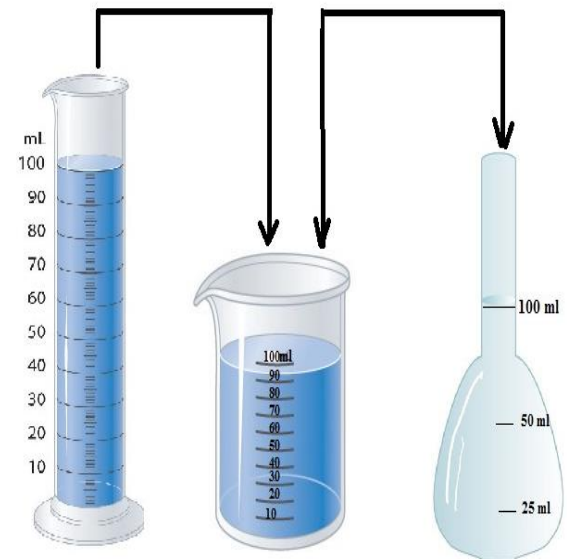
$$V = 2 \times 2 \times 2 = 8 \text{ cm}^3$$

# Volume

Milliliters (mL) are used to measure small volumes of liquids.

$$1\text{L} = 1000\text{ mL} = 1000\text{cm}^3$$

$$1\text{cm}^3 = 1\text{mL}$$



## Properties of matter

- properties of matter allow us to distinguish between : substances and classify them .

Can reveal the identity of an unknown substance.

- Divided into two groups:

- 1-Physical properties:

- 2-Chemical Properties:

# Physical Properties

- defined as – a characteristic that can be observed or measured without changing the identity or composition of substance
  - example include
    - Colour
    - Odor
    - Size
    - Physical state (liquid, gas or solid)
    - Boiling point
    - Melting point
    - density



COLOUR



ODOUR



MELTING AND BOILING POINT

Water boiling is a physical change.

# Physical Properties

- Physical properties used to describe matter can be classified as:

- 1) Extensive : depends on the amount of matter in the sample

E,g. mass,volume,length

- 2- intensive :depends on the type of matter, not the amount present

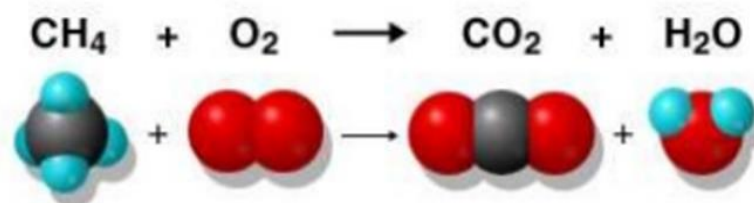
- color,density,boiling point

## 2- Chemical Properties:

- Defined as – ability or inability of a substance to combine with or change into one or more other substances i.e ability of a substance to undergo a chemical reaction

- example include :

- Charcoal burning in air
- iron rust
- Decomposition of wood
- Methane oxidation

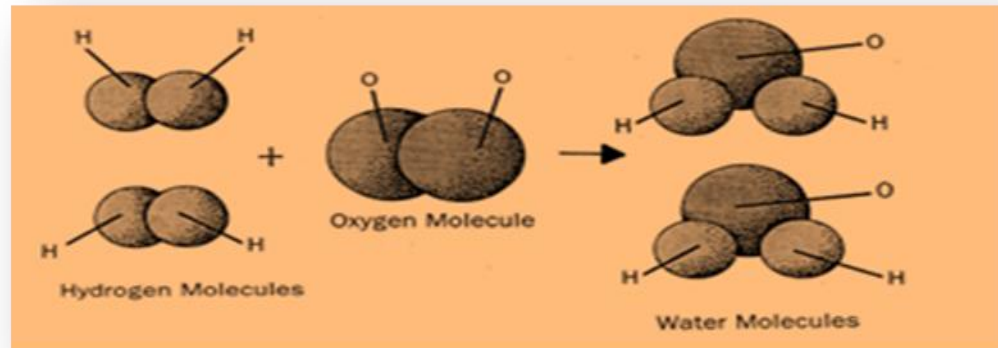




## Chemical Properties:

• consider terms such as:

- Burn
- Rot
- Decompose
- ferment
- Explode
- Oxidize
- Corrode
- precipitate
- Gas formation



Lecture 1

