Basic Concepts of chemistry



Session Objectives

- **1. Branches of chemistry**
- **2. Importance of chemistry**
- 3. Units
- 4. Significant figures
- **5. Calculation involving significant figures**
- 6. Dimensions
- 7. Matter

Topic Overview

- > Importance of chemistry
- Matter(nature and its properties)
- Uncertainty in measurement
- Significant figures
- Laws of chemical combinations
- Atomic and molecular masses
- Mole concept and Molar masses
- Stoichiometry and stoichiometric Calculations
- Limiting reagent
- Reactions in solutions



Branches of chemistry

- I. Physical chemistry
- II. Organic chemistry
- **III.** Inorganic chemistry
- **IV.** Analytical chemistry
- V. Industrial chemistry
- VI. Bio chemistry
- **VII.** Nuclear chemistry
- **VIII. Agricultural chemistry**
- IX. Geo chemistry

Chemistry as the "Central Science"



About Chemistry? > It is about making matter that never existed

Chemistry is the
mother science
> It is as old as
the universe



All our basic necessities are met by chemistry

Chemistry has extraordinary impact on society

Chemistry is the central, useful and creative science – ronald breslow

Next century is the age of molecules

>Mathematics is the language of science

>Physics is the philosophy of science

BUT

Chemistry is the real life of science

Chemistry changes the way you look at the world.





Importance Of Chemistry Chemistry is all around you >Air you breathe Food you digest Clothes you wear >Textbook you read Chemistry is often said to be the central science

Importance Of Chemistry

- > Chemistry is everywhere
- Revenue of a country depends on Chemical industries
- > Highest knowledge explosion



- > Especially in organic chemistry
- Large number of job opportunities

Evolution Of Chemistry

- >Modern Chemistry Started With Lavoisier (1743-1794)
- >Dalton's Atomic Theory 1803
- >Another Stage Started With Rutherford
- **>G N Lewis Started Thinking About Bonds**
- Linus Pauling Revolutionised Chemistry
- **Faraday (1791-1867) Was Basically A Chemist**
- He discovered benzene, CCl₄. He was the first one to prepare Nanoparticles

- **Evolution Of Organic Chemistry** >Wohler's Synthesis Of Urea (1828) >M.Chevreul (1816) – Preparation of Soap Kekule – Quadrivalence of Carbon, **Chain and Ring structure of Benzene** \succ Out of the first five nobel prizes, three went to kekule's students vant Hoff (1901) Fischer (1902)
- Baeyer (1905) Indigo, Barbituric Acid

Frontier Areas Of Chemistry

- > Nanomaterials, smart materials
- > Photonics molecular computers –
- Moore's law size of chips decreases by half every 4 years
- Combinatorial chemistry
- Supramolecular chemistry
- > Chemical biology

Uses of chemistry





Rocket Fuel







Foods







Uses of chemistry

 LOX and kerosene
LOX and liquid hydrogen used in the Space shuttle
Nitrogen tetroxide (N₂O₄) and hydrazine_(N₂H₄), MMH or UDMH
Monopropellents such as hydrogen peroxide, hydrazine and nitrous oxide



Rocket Fuel

Abuses of chemistry







Thank You...