

Basic Chemistry

Mass and number of moles

- Atomic mass, atomic mass unit, molar mass
- Atomic masses of isotopes, average masses
- Number of moles and Avogadro's constant

Concentration of substance in solutions

- Mass percent concentration
- Volume percent composition
- Mole fraction
- Molarity – molar concentration

Structure of atoms

- Periodic table properties
- s-, p- and d-block elements
- Electron configuration of elements
- Dilution of solutions

Molecular formula of compounds

- Inorganic acids and bases
- Inorganic salts
- Nomenclature of salts
- Water properties
- Molecular formula vs. weight percent composition

Chemical reactions and stoichiometry

- Mass and charge balance
- Typical reactions of inorganic synthesis, analysis and exchange
- Oxidation-reduction reactions
- Oxidation numbers and balancing redox equations
- Half-life reactions of radioactive isotopes

Gases

- Gas pressure
- The ideal gas law
- Non-ideal gas behaviour
- Stoichiometry of gaseous substances
- Effusion and diffusion of gases

Organic Chemistry

- Structure and bonding in organic chemistry
- Classification and properties of main organic compound groups
- Nomenclature of organic compounds
- Stereochemistry: conformations, stereoisomers and enantiomers