General Syllabus for Chemistry 2 (Organic Chemistry) - Conneaut School District

Text Information: Essential Organic Chemistry: ©2010 (ISBN# 0321596951) Pearson/Prentice

Online Text Book: provided via password access

Course Description: Organic Chemistry is designed to provide students opportunities to learn Organic Chemistry and act as scientists to develop a fundamental understanding of compounds of carbon, hydrocarbons, alkyl groups, functional groups, aromatics, and reactions for each of the various groups of compounds. The curriculum is organized around student needs based on university requirements.

Objectives:

- to give students a breadth and depth study in Organic Chemistry
- to provide common knowledge, scientific and problem solving skills, and investigations within the Organic Chemistry discipline
- to promote national, state, and local science standards that promote unifying concepts at each grade level and within the Chemistry discipline
- to enhance understanding through the use of technology

Topics Covered:

Bonding (approximately 10 days)

PA Anchors: (S11.A.2.1.1; S11.A.2.2.1; S11.A.1.3.2; S11.A.1.1.5; S11.A.2.1.3; S11.A.2.1.3; S11.A.1.1.4; S11.A.3.2.1; S11.A.3.2.2; S11.A.3.2.3; S11.C.1.1.1; S11.C.1.1.3)

- Electron Configurations
- Ionic Bonding/Compounds
- Covalent Bonding/Compounds
- Orbital Diagrams
- Aufbau Principal
- Stable Octets
- Electron Dot Formulas
- Formal Charge
- Polar/Nonpolar bonds
- Bonding Diagrams
- Hybridization

Structure and Nomenclature **(approximately 20 days)**

PA Anchors: (S11.C.1.1.2; S11.A.3.2.1; S11.A.3.2.2; S11.A.3.2.3)

- Hydrocarbons
  - Saturated Hydrocarbons
  - Unsaturated Hydrocarbons
- Alkanes
- Alkenes
- Alkynes
- Types of Formulas
  - Molecular Formula
  - Structural Formula
  - Condensed Formula
- Isomers
  - Structural Isomers
  - Constitutional Isomers
  - Stereoisomers
  - Skeletal Isomers
  - Positional Isomers
  - Functional Isomers
  - Geometric Isomers
    - Cis
    - Trans
  - Conformational Isomers
    - Boat
    - Chair
    - Eclipsed
    - Staggered
      - Sawhorse Diagram
      - Newman Projection
- Cyclic Compounds
- IUPAC Nomenclature
  - Alkyl Groups
  - Functional Groups
  - Halides
  - Alkenes
  - Alkynes
  - Cyclic Compounds
- Units of Unsaturation

Organic Reactions (approximately 15 days)

PA Anchors: (S11.C.1.1.2; S11.C.1.1.3; S11.A.1.3.2; S11.A.2.2.1)

- Reaction Equation
- Types of Reactions
  - Substitution
  - Elimination
  - Addition
- Reaction Mechanisms
  - Reaction Intermediates
    - Homolytic Cleavage
      - Free Radical
    - Heterolytic Cleavage
      - Carbocation
      - Carbanion
- Sites of Reactions
  - Electrophiles
  - Nucleophiles
  - Multiple Bonds
  - Polar Bonds
  - Lewis Acids
  - Lewis Bases
- Halogenation Reaction
- Elimination Reactions
  - Dehydration
  - Dehydrohalogenation
- Addition Reactions
  - Halogenation
  - Hydration
  - Hydrogenation

Aromatic Hydrocarbons (approximately 10 days)

PA Anchors: (S11.A.2.1.1; S11.A.3.1.2; S11.A.3.2.1; S11.A.3.3.1; S11.C.1.1.3)

- Aromatic Compounds
- Nomenclature of Aromatic Compounds
  - Monosubstituted Benzenes
  - Disubstituted Benzenes
  - PolySubstituted Benzenes
- Aromatic Reactions
  - Halogenation
  - Alkylation
  - AcylationNitration
  - Sulfonation
- Orientation of Substitution
  - Directive Effects
  - Synthesis
- Oxidation of Alkylbenzenes

Optical Isomerism (approximately 10 days)

- **PA Anchors: (S11.A.1.1.5; S11.A.2.1.1; S11.A.3.2.1)**

- Chiral Carbon
- Mirror Images
- Optical Isomers
- Enantiomers
- Chiral Compounds
- Racemic Mixture
- Optical Isomers
  - Specific Rotation
    - Dextrorotatory
    - Levoratatory
- Fischer Projections
  - Enantiomers
  - Diastereomers
  - Meso Compounds
- Specification of Configuration
  - R
  - S
  - Z
  - E

Organic Halogen Compounds **(approximately 10 days)**

PA Anchors: (S11.A.1.3.2; S11.A.2.1.1; S11.C.1.1.2; S11.C.1.1.3)

- Alkyl Halides
- Preparation of Organic Halogen Compounds
  - Free Radical Halogenation
  - Addition to Alkenes and Alkynes
  - Electrophilic Aromatic Substitution
  - Conversion of Alcohols
- Nucleophilic Substitution
  - Reaction Mechanisms
    - Sn_2
    - Sn_1
    - E_2
    - E_1

Alcohols, Phenols, Ethers, Amides, Aldehydes, Ketones, Carboxylic Acids (approximately 15 days)

PA Anchors: (S11.A.1.3.2; S11.A.2.1.1; S11.C.1.1.2; S11.C.1.1.3)

- Structure and Nomenclature
- Preparation of Alcohols and Ethers
  - Hydration of Alkenes
  - Nucleophilic Substitution
  - Reduction of Aldehydes and Ketones
- Preparation of Amines
  - Alkylation of Amines
- Reactions of Carboxylic Acids

Instruction:

- Lecture
- Power point presentations
- Streaming Media
- Demonstrations
- Student inquiry labs/Guided labs
- Videos
- CD-ROM instruction
- Cooperative learning

Assessment:

- Success Tracker (online testing and remediation)
- Projects/independent research (power point presentation, research paper)
- Teacher observation
- Tests
- Quizzes
- Lab activities with writing component

Parent/Student Resources:

- Online Textbook with audio capabilities
- Success Tracker (online assessment tool)
- Online Leveled Readers
- Edline