



## Online Courses for High School Students

1-888-972-6237

### Chemistry

#### Course Description:

This course surveys all key areas of chemistry, including atomic structure, chemical bonding and reactions, solutions, stoichiometry, thermochemistry, organic chemistry, and nuclear chemistry.

**Prerequisites:** Middle school Physical Science or Physical Science and satisfactory grasp of algebra basics, evidenced by success in Algebra I, or equivalents.

**Required Text:** Chemistry: Problems and Solutions (online textbook provided)

**Course Length:** Two Semesters

#### Course Outline:

#### Chemistry Part A

#### Unit 1: The Study of Chemistry

- Semester Introduction
- Chemistry and Society
- Matter and Energy
- Review: Matter
- Pure Substances
- Mixtures
- Review: Substances
- Properties of Substances
- Problem Solving in Chemistry
- Review: Properties and Problems
- Metric System: Base Units
- Metric System: Derived Units
- Review: Metric System
- Graphing
- Scientific Method and Chemistry
- Review: Graphing and Scientific Method

## **Unit 2: Atomic Structure**

- Early Theories of the Atom
- The Nuclear Atom
- Atomic Number and Mass Number
- Review: The Atom
- Ions
- Isotopes and Atomic Mass
- Review: Aspects of the Atom
- The Bohr Atom

## **Unit 3: The Periodic Table**

- Atomic Number and the Periodic Law
- The Periodic Table
- Trends within the Periodic Table
- Review: Periodic Table
- Metals
- Nonmetals
- Review: Metals and Nonmetals
- Metalloids
- Inner Transition Metals
- Review: Metalloids and Transition Metals

## **Unit 4: Chemical Bonding**

- Monatomic Ions
- Polyatomic Ions
- Review: Ions
- The Ionic Bond and Salts
- Properties of Ionic Compounds
- Review: Ionic Compounds
- The Covalent Bond and Molecules
- Lewis Structures
- Van der Waals Forces
- Review: Atomic Bonding

## **Unit 5: Chemical Reactions**

- The Conservation of Mass
- Balancing Chemical Equations
- Review: Chemical Equations
- Types of Reactions 1
- Types of Reactions 2
- Review: Chemical Reactions

## Unit 6: Stoichiometry

- Stoichiometry and Its Uses
- Mole-Number Relationships
- Review: Stoichiometry
- Mole-Mass Relationships
- Mole-Volume Relationships
- Review: Moles
- Moles and Chemical Equations
- Calculating Yields of Reactions

## Unit 7: Semester Review and Test

- Semester Review

## Chemistry Part B

### Course Outline:

#### Unit 1: States of Matter

- Semester Introduction
- The Behavior of Gases
- Gas Laws
- Review: Gases
- The Ideal Gas Law
- Absolute Zero
- Review: Ideal Gas Law
- Some Properties of Liquids
- Some Properties of Solids
- Review: Liquids and Solids

#### Unit 2: Solutions

- Solutions
- The Dissolving Process
- Review: Solutions and Dissolving
- Molarity and Mole Fraction
- Molality and Mass Percent
- Review: Molarity and Molality
- Colligative Properties
- Separating Solutions

#### Unit 3: Acids and Bases

- Properties of Acids and Bases
- Types of Acids and Bases

- Review: Acids and Bases
- Measuring Acids and Bases
- Buffers and Titration
- Review: Measuring pH

#### **Unit 4: Chemical Thermodynamics**

- The Conservation of Energy
- Measuring the Flow of Heat
- Review: Thermal Energy
- Specific Heat
- Writing Thermochemical Equations
- Review: More Aspects of Heat

#### **Unit 5: Reaction Rate and Equilibrium**

- Reaction Rates and Energy of Activation
- Factors Affecting Reaction Rates
- Review: Reaction Rates
- Equilibrium
- Le Chatelier's Principle
- Review: Equilibrium

#### **Unit 6: Electrochemistry**

- Electrochemical Processes
- Voltaic Cell
- Review: Electrochemistry
- Dry Cells
- Electrolytic Cells
- Review: Electrochemical Cells

#### **Unit 7: Organic Chemistry**

- Hydrocarbons and Other Organic Chemicals
- Polymers
- Review: Hydrocarbons and Polymers
- Carbohydrates and Fats
- Proteins and Nucleic Acids
- Review: Biochemistry

#### **Unit 8: Nuclear Chemistry**

- Forces within the Nucleus
- Radioactivity and Half-Life
- Review: Nuclear Forces
- Transmutation of Elements
- Nuclear Fission and Fusion

- Review: Nuclear Chemistry

### **Unit 9: Semester Review and Test**

- Semester Review
- Semester Test

**\*\*\*Please Note: Labs must be provided and administered by the Home District.\*\*\***