

# Chemistry I Course Syllabus

**Description:** The high school chemistry course is a two-segment study of the foundations of chemistry, building on the concepts and scientific thinking laid in middle school science. Students use scientific inquiry and higher-order problem solving as they explore the composition, properties, and changes of matter and their applications through interactive simulations, engineering solutions, and virtual and hands-on experiences. Scientific inquiry, research, experimental procedures, data collection and analysis, and making inferences are an integral part of the learning experience. In addition, technology, engineering, and mathematics (STEM) concepts are integrated throughout the course. Through phenomenon-based learning, students will be able to demonstrate a vast understanding of the importance of chemistry in the world, enabling them to apply these principles to their everyday lives and our global society.

**Estimated Completion Time:** 2 segments / 32—36 weeks.

## Major Topics and Concepts:

### Segment One:

#### Module One: Matter

- 01.00 Matter Pretest
- 01.01 The Science of Chemistry
- 01.02 Measuring Matter
- 01.03 Energy and Temperature
- 01.04 Properties of Matter
- 01.05 Changes of Matter
- 01.06 Pure Substances and Mixtures
- 01.07 Laboratory Techniques
- 01.08 Honors Scientific Knowledge
- 01.09 Matter Discussion-Based Assessment
- 01.10 Matter Exam

#### Module Two: Atoms and Elements

- 02.00 Atoms and Elements Pretest
- 02.01 Atomic Theory
- 02.02 Electromagnetic Radiation
- 02.03 Quantization of Energy
- 02.04 Quantum Models
- 02.05 Honors Electrons
- 02.06 Periodic Table
- 02.07 Periodic Trends
- 02.08 Contributions to Chemistry
- 02.09 Atoms and Elements Discussion-Based Assessment
- 02.10 Atoms and Elements Exam

#### Module Three: Molecules and Compounds

- 03.00 Molecules and Compounds Pretest
- 03.01 Valence Electrons
- 03.02 Ionic Bonding
- 03.03 Covalent Bonding
- 03.04 Nomenclature
- 03.05 Molecular Structure
- 03.06 Forces and Bonds
- 03.07 Honors Organic Chemistry
- 03.08 Molecules and Compounds Discussion-Based Assessment
- 03.09 Molecules and Compounds Exam

#### **Module Four: Reactions**

- 04.00 Reactions Pretest
- 04.01 Conservation of Mass
- 04.02 Synthesis and Decomposition Reactions
- 04.03 Single and Double Replacement Reactions
- 04.04 Combustion and Redox Reactions
- 04.05 Honors Oxidation Reduction
- 04.06 Reactions in Our World
- 04.07 Honors Radioactive Decay
- 04.08 Reactions Discussion-Based Assessment
- 04.09 Reactions Exam
- 04.10 Segment One Exam

#### **Module Five: Stoichiometry**

- 05.00 Stoichiometry Pretest
- 05.01 The Mole Concept
- 05.02 Molar Mass of Compounds
- 05.03 The Empirical Formula
- 05.04 Stoichiometry
- 05.05 Limiting Reactant
- 05.06 Percent Yield
- 05.07 Honors Stoichiometry
- 05.08 Stoichiometry Discussion-Based Assessment
- 05.09 Stoichiometry Exam

#### **Segment Two**

##### **Module Six: Phases of Matter**

- 06.00 Phases of Matter Pretest
- 06.01 Kinetic Molecular Theory
- 06.02 Phase Changes
- 06.03 Gas Laws
- 06.04 Ideal Gas Law

- 06.05 Ideal Gas Lab
- 06.06 Honors Gas Behavior
- 06.07 Phases of Matter Discussion-Based Assessment
- 06.08 Phases of Matter Exam

### **Module Seven: Energy in Reactions**

- 07.00 Energy in Reactions Pretest
- 07.01 Endothermic and Exothermic
- 07.02 Enthalpy Values
- 07.03 Honors Entropy
- 07.04 Honors Calorimetry
- 07.05 Reaction Rates
- 07.06 Equilibrium
- 07.07 Le Châtelier's Principle
- 07.08 Energy in Reactions Discussion-Based Assessment
- 07.09 Energy in Reactions Exam

### **Module Eight: Solutions**

- 08.00 Solutions Pretest
- 08.01 Properties of Water
- 08.02 Molarity and Dilutions
- 08.03 Solutions Lab
- 08.04 Acids and Bases
- 08.05 Acid and Base Calculations
- 08.06 Honors Environmental Impact
- 08.07 Solutions Discussion-Based Assessment
- 08.08 Solutions Exam
- 08.09 Segment Two Exam

### **Course Assessment and Participation Requirements:**

To achieve success, students are expected to submit work in each course weekly. Students can learn at their own pace; however, “any pace” still means that students must make progress in the course every week. To measure learning, students complete self-checks, practice lessons, multiple choice questions, projects, discussion-based assessments, and discussions. Students are expected to maintain regular contact with instructors; the minimum requirement is monthly. When instructors, students, and parents work together, students are successful.