

Chemistry offers a curriculum that facilitates students' understanding of chemistry concepts and critical scientific skills. Topics include the nature of matter; the structure of atoms and molecules; bond formations; the qualitative and quantitative aspects of chemical reactivity; the physical and chemical properties of solids, liquids, and gases; the states of matter; phase transitions; equilibrium; kinetics; thermodynamics; electrochemistry; nuclear chemistry; and an introduction to organic chemistry. Teacher-graded labs encourage students to apply the scientific method.

The content is based on the National Science Teachers Association (NSTA) standards and is aligned to state standards.

Length: Two semesters

## UNIT 1: MEASUREMENT AND MATTER

### LESSON 1: INTRODUCTION TO CHEMISTRY

#### **Discuss: Getting Acquainted**

Introduce yourself to your classmates and instructor learn who your classmates are and why they're taking this course and become familiar with communicating in an online environment.

*Duration: 0 hr 30 min Scoring: 25 points*

#### **Study: A Chemical Way of Knowing**

Demonstrate the central role of experimentation in chemistry and the ability of the scientific method to lead to the generation of chemical knowledge and theory.

*Duration: 1 hr*

#### **Study: What Is Matter?**

Learn about the properties and classification of matter. Become acquainted with the physical and chemical changes that matter can undergo.

*Duration: 1 hr*

#### **Quiz: What about Matter?**

Answer questions involving matter.

*Duration: 0 hr 30 min Scoring: 50 points*

#### **Study: Learning about Labs**

Prepare for laboratory work in chemistry by learning how to work safely and accurately in the lab.

*Duration: 1 hr*

#### **Lab: Physical and Chemical Change**

Conduct experiments to explore physical and chemical changes in matter. Experiment 2 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

### LESSON 2: SCIENTIFIC MEASUREMENT

#### **Study: Problem Solving in Chemistry**

Master the mathematical skills needed to solve problems in chemistry.

*Duration: 1 hr*

#### **Practice: Grab Your Calculator**

Practice your skills at using exponents metric units and algebra. Construct and interpret graphs of scientific information.

*Duration: 1 hr Scoring: 50 points*

### **Study: Measurement in the Laboratory**

Learn about the measurements chemists make in the laboratory and how to express the accuracy and precision of these measurements.

*Duration: 1 hr*

### **Lab: Mass Volume and Density**

Apply the principles of laboratory measurement to determine the density of unknown metals. Experiment 4 in Prentice Hall Chemistry laboratory manual

*Duration: 1 hr Scoring: 50 points*

### **Quiz: Is It Significant?**

Answer questions involving accuracy precision significant figures and units conversions.

*Duration: 0 hr 30 min Scoring: 50 points*

## **LESSON 3: MEASUREMENT AND MATTER WRAP-UP**

### **Review: Measurement and Matter**

Review concepts and skills learned in Measurement and Matter.

*Duration: 3 hr*

### **Test (CS): Measurement and Matter**

Take a computer scored test covering Measurement and Matter.

*Duration: 0 hr 30 min Scoring: 30 points*

### **Test (TS): Measurement and Matter**

Take a 60-minute test covering Measurement and Matter.

*Duration: 1 hr Scoring: 70 points*

## **LESSON 4: DIAGNOSTIC**

### **Diagnostic: Measurement and Matter**

Test your understanding of the key concepts covered in Measurement and Matter.

*Duration: 0 hr 45 min Scoring: 25 points*

## **UNIT 2: ATOMIC STRUCTURE AND PERIODICITY**

### **LESSON 1: THE STRUCTURE OF ATOMS**

#### **Study: Atomic Theory and Structure**

Learn the key postulates of Dalton's Atomic Theory and the historically significant experiments that verified Dalton's theory.

*Duration: 1 hr*

#### **Study: Nuclear Structure**

Learn the fundamental features of the nucleus: protons neutrons isotopes atomic number and atomic mass.

*Duration: 1 hr*

#### **Practice: Applying Dalton's Postulates**

Practice your skills at calculating relative atomic masses isotopic abundance and numbers of protons & neutrons in various atoms

*Duration: 1 hr Scoring: 50 points*

#### **Quiz: Atomic Structure and Theory**

Test your understanding of the atomic structure and notation of various elements as well as principles of atomic theory.

*Duration: 0 hr 30 min Scoring: 50 points*

### **LESSON 2: ELECTRONS IN ATOMS**

#### **Study: Light: Waves and Photons**

Learn about important features of light including frequency wavelength and quantization.

*Duration: 1 hr*

**Study: The Hydrogen Atom**

Learn why atomic line spectra are evidence for the quantization of electron energy levels and energy level transitions.

*Duration: 1 hr*

**Quiz: All about Hydrogen**

Solve numerical problems to demonstrate your understanding of the Bohr model of the hydrogen atom.

*Duration: 0 hr 30 min Scoring: 50 points*

**Study: Electrons Probability and Energy Levels**

Learn the basic principles of quantum mechanics quantum numbers atomic orbitals and electron configuration.

*Duration: 1 hr*

**Quiz: Electrons and Energy Levels**

Answer questions about quantum mechanics and electron configuration.

*Duration: 0 hr 30 min Scoring: 50 points*

**Lab: Electrons in Excited States**

Construct a simple device to measure the wavelength of light emitted by sodium ions. Experiment 7 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

## LESSON 3: THE PERIODIC TABLE

**Journal: Going Around In Circles**

Use your electronic journal to brainstorm some periodic processes in everyday life.

*Duration: 0 hr 30 min Scoring: 15 points*

**Study: Organization of the Elements**

Explore the organization of the elements on the periodic table.

*Duration: 1 hr*

**Study: Periodic Trends and Electronic Structure**

Learn about important periodic trends including atomic radius ionic radius ionization energy and electron affinity.

*Duration: 1 hr*

**Quiz: Periodicity and Structure**

Answer questions about key concepts in atomic structure and periodicity.

*Duration: 0 hr 30 min Scoring: 50 points*

## LESSON 4: ATOMIC STRUCTURE AND PERIODICITY WRAP-UP

**Review: Atomic Structure and Periodicity**

Review concepts and skills learned in Atomic Structure and Periodicity.

*Duration: 3 hr*

**Test (CS): Atomic Structure and Periodicity**

Take a computer scored test covering Atomic Structure and Periodicity.

*Duration: 0 hr 30 min Scoring: 30 points*

**Test (TS): Atomic Structure and Periodicity**

Atomic Structure and Periodicity Written Portion of the Test

*Duration: 1 hr Scoring: 70 points*

## LESSON 5: DIAGNOSTIC

**Diagnostic: Atomic Structure and Periodicity**

Test your understanding of the key concepts covered in Atomic Structure and Periodicity.

*Duration: 0 hr 45 min Scoring: 30 points*

## UNIT 3: CHEMICAL BONDING

### LESSON 1: REPRESENTATIONS OF CHEMICAL BONDS

#### Study: Lewis Structures

Learn to write electron dot structures for atoms. Use the octet rule to write electron dot structures for molecules.

*Duration: 1 hr*

#### Practice: Drawing Lewis Structures

Practice writing Lewis electron dot structures of atoms and molecules.

*Duration: 1 hr Scoring: 50 points*

#### Quiz: Connecting the Atoms

Answer questions about Lewis electron dot structures of atoms and molecules.

*Duration: 0 hr 30 min Scoring: 50 points*

### LESSON 2: TYPES OF CHEMICAL BONDS

#### Study: Covalent Bonding

Learn about bonding in molecules and use electronegativity to predict the relative polarity of covalent bonds.

*Duration: 1 hr*

#### Quiz: Working with Covalent Bonds

Answer questions about covalent bonding.

*Duration: 0 hr 30 min Scoring: 50 points*

#### Study: Properties of Covalent Bonds

Learn about bond length and bond energy.

*Duration: 1 hr*

#### Study: Ionic and Metallic Bonds

Explore the nature of chemical bonds in ionic and metallic compounds.

*Duration: 1 hr*

#### Practice: Covalent and Ionic Bonding

Work problems and answer essay questions covering key concepts about bonding.

*Duration: 1 hr Scoring: 50 points*

### LESSON 3: BONDING AND MOLECULAR SHAPE

#### Study: VSEPR and Molecular Shape

Learn how to use the central atom bonding electron pairs and lone electron pairs to predict the shape and polarity of molecules and polyatomic ions.

*Duration: 1 hr*

#### Study: Valence Bond Theory

Learn how to describe a bond as the overlap of atomic orbitals and learn why chemists use hybrid orbitals to explain some kinds of bonds.

*Duration: 1 hr*

#### Quiz: Molecules and Bonds

Answer questions and solve problems about VSEPR and valence bond theory.

*Duration: 0 hr 30 min Scoring: 50 points*

### LESSON 4: CHEMICAL BONDING WRAP-UP

#### Review: Chemical Bonding

Review concepts and skills learned in Chemical Bonding.

*Duration: 3 hr*

**Test (CS): Chemical Bonding**

Take a computer scored test covering Chemical Bonding.

*Duration: 0 hr 30 min Scoring: 30 points*

**Test (TS): Chemical Bonding**

Chemical Bonding written portion of the test

*Duration: 0 hr 45 min Scoring: 70 points*

## LESSON 5: DIAGNOSTIC

**Diagnostic: Chemical Bonding**

Test your understanding of the key concepts covered in Chemical Bonding.

*Duration: 0 hr 45 min Scoring: 25 points*

## UNIT 4: CHEMICAL FORMULAS AND REACTIONS

### LESSON 1: NAMES AND FORMULAS

**Study: Molecules and Molecular Substances**

Learn what molecules are and see how chemists represent them and name them.

*Duration: 1 hr*

**Study: Ions and Ionic Compounds**

Learn how to name and write formulas of ionic compounds.

*Duration: 1 hr*

**Quiz: Ionic or Molecular?**

Use what you've learned about ionic and molecular substances to answer questions about their names and structures.

*Duration: 0 hr 30 min Scoring: 50 points*

**Study: Acids Bases and Salts**

Become familiar with the names and properties of common acids and bases.

*Duration: 1 hr*

**Quiz: What Do You Call It?**

Answer questions about the names and properties of acids bases and their salts.

*Duration: 0 hr 30 min Scoring: 50 points*

### LESSON 2: REACTIONS IN SOLUTION

**Study: Ions and Molecules in Solution**

Learn about the macroscopic behavior of a solution and the microscopic behavior of the atoms or ions that make up the compound.

*Duration: 1 hr*

**Study: Chemical Reactions**

*Duration: 1 hr*

**Study: Survey of Chemical Reactions**

Study several different types of chemical reactions.

*Duration: 1 hr*

**Quiz: Predicting Reaction Products**

Apply your knowledge of chemical reactions to predict the products of several different reactions.

*Duration: 0 hr 30 min Scoring: 50 points*

**Lab: Precipitation Reactions**

Observe reactions between combinations of ionic solutions and predict the products of these reactions. Experiment 17 in Prentice Hall Chemistry laboratory manual.

Duration: 1 hr Scoring: 50 points

## LESSON 3: CHEMICAL FORMULAS AND REACTIONS WRAP-UP

### Review: Chemical Formulas and Reactions

Review concepts and skills learned in Chemical Formulas and Reactions.

Duration: 3 hr

### Test (CS): Chemical Formulas and Reactions

Take a computer scored test covering Chemical Formulas and Reactions.

Duration: 0 hr 30 min Scoring: 30 points

### Test (TS): Chemical Formulas and Reactions

Chemical Formulas and Reactions written portion of the test.

Duration: 1 hr Scoring: 70 points

## LESSON 4: DIAGNOSTIC

### Diagnostic: Chemical Formulas and Reactions

Test your understanding of the key concepts covered in Chemical Formulas and Reactions.

Duration: 0 hr 45 min Scoring: 30 points

## UNIT 5: QUANTITATIVE RELATIONSHIPS IN CHEMICAL REACTIONS

### LESSON 1: MASSES AND MOLES

#### Study: Weights and Masses

Learn how to use atomic mass units to calculate molecular weight and formula weight.

Duration: 1 hr

#### Quiz: Calculating Weights and Masses

Answer online questions involving calculations of formula weight molecular weight and molar mass

Duration: 0 hr 30 min Scoring: 50 points

#### Study: The Mole Concept

Learn about the basic unit of chemical calculations: the mole. Extend your understanding by exploring related ideas such as Avogadro's number and molar mass.

Duration: 1 hr

#### Discuss: How Big Is a Mole?

Devise a fun "mole" problem (such as "a mole of chocolate cookies would circle the globe X times") solve the problem and explain how you solved it. Respond to the discussion by proposing an alternate solution to someone else's example.

Duration: 0 hr 30 min Scoring: 25 points

### LESSON 2: CALCULATIONS WITH FORMULAS AND EQUATIONS

#### Study: Mole Calculations

Learn more about the mole concept by applying it to more advanced problems such as mass percentage or determination of empirical and molecular formulas.

Duration: 1 hr

#### Study: Stoichiometry

Explore the relationship between the mole concept and chemical reactions and learn strategies for relating the amount of reactant and product in a chemical equation.

Duration: 1 hr

#### Quiz: How Much Will It Take?

Print out a set of multiple choice stoichiometry problems go off line to work the problems then return and select the best answer from among the choices.

*Duration: 0 hr 30 min Scoring: 50 points*

### **Practice: Grams Moles and Formulas**

Practice your skills using moles and stoichiometry as solve problems involving calculations with chemical formulas.

*Duration: 1 hr Scoring: 50 points*

### **Lab: Balanced Chemical Equations**

Examine the relationship between the amounts of reactants and products in a chemical reaction. Experiment 20 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

## **LESSON 3: ENERGY OF CHEMICAL REACTIONS**

### **Study: Energy: Units and Types**

Learn about three kinds of energy: kinetic potential and heat energy.

*Duration: 1 hr*

### **Study: Enthalpy and Enthalpy Change**

Learn about enthalpy and enthalpy change and use these concepts to explore heat capacity specific heat and heat of reaction.

*Duration: 1 hr*

### **Journal: Heat and Temperature: What's the Difference?**

Explain in your own words what "heat" and "temperature" really mean using everyday examples.

*Duration: 0 hr 30 min Scoring: 15 points*

### **Study: Enthalpy Change in Chemical Reactions**

Learn how to apply the concept of enthalpy to a variety of chemical systems.

*Duration: 1 hr*

### **Lab: Heats of Reaction**

Interpret data and calculate the heat of reaction for three chemical reactions. Apply Hess's Law to compare the expected heat of reaction to the experimental value. Experiment 36 in Prentice Hall Chemistry lab manual.

*Duration: 1 hr Scoring: 50 points*

## **LESSON 4: QUANTITATIVE RELATIONSHIPS IN CHEMICAL REACTIONS WRAP-UP**

### **Review: Quantitative Relationships in Chemical Reactions**

Review concepts and skills learned in Quantitative Relationships in Chemical Reactions.

*Duration: 3 hr*

### **Test (CS): Quantitative Relationships in Chemical Reactions**

Take a computer scored test covering Quantitative Relationships in Chemical Reactions.

*Duration: 0 hr 30 min Scoring: 30 points*

### **Test (TS): Quantitative Relationships in Chemical Reactions**

*Duration: 1 hr Scoring: 70 points*

## **LESSON 5: DIAGNOSTIC**

### **Diagnostic: Quantitative Relationships in Chemical Reactions**

Test your understanding of the key concepts covered in Quantitative Relationships in Chemical Reactions.

*Duration: 0 hr 45 min Scoring: 30 points*

## **UNIT 6: CHEMISTRY SEMESTER 1 REVIEW AND EXAM**

### **LESSON 1: CHEMISTRY SEMESTER 1**

#### **Review: Chemistry Semester 1**

Prepare for the Semester Exam by reviewing the content from the entire semester. Includes self-scored practice questions.

*Duration: 6 hr*

### **Exam: Chemistry Semester 1**

Demonstrate your mastery of concepts and skills covered in the first semester of Chemistry.

*Duration: 0 hr 40 min Scoring: 40 points*

### **Final Exam: Chemistry Semester 1**

Semester Exam

*Duration: 1 hr 30 min Scoring: 150 points*

## **UNIT 7: PHYSICAL BEHAVIOR OF MATTER**

### **LESSON 1: SOLIDS LIQUIDS AND GASES**

#### **Study: Properties of Liquids and Solids**

Learn about intermolecular forces and the macroscopic phenomena that result from them such as surface tension and viscosity and crystal shape.

*Duration: 1 hr*

#### **Study: The Nature of Gases**

Learn how kinetic theory explains the properties of gases including pressure diffusion and effusion.

*Duration: 1 hr*

#### **Quiz: Properties of Gases**

Answer questions about the pressure of gases.

*Duration: 0 hr 30 min Scoring: 50 points*

#### **Study: The Gas Laws**

Explore the mathematical laws that describe the relationships among pressure temperature volume and amount of a gas.

*Duration: 1 hr*

#### **Practice: Applications of the Gas Laws**

Complete a set of problems that involve the empirical gas laws and the ideal gas law.

*Duration: 1 hr Scoring: 50 points*

#### **Lab: Temperature-Volume Relationships for Gases**

Investigate the relationship between the temperature and volume of a gas. Experiment 24 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

#### **Quiz: Working with the Gas Laws**

Answer questions about mathematical relationships among the variables that describe a gas sample: P T V and n.

*Duration: 0 hr 30 min Scoring: 50 points*

### **LESSON 2: PROPERTIES OF SOLUTIONS**

#### **Study: Formation of Solutions**

Learn about what happens at the molecular level as ionic and molecular compounds dissolve.

*Duration: 1 hr*

#### **Study: Colligative Properties**

Learn how solutes affect a solution's vapor pressure boiling point and freezing point.

*Duration: 1 hr*

#### **Lab: Freezing Point**

Explore the effect of a solute on the freezing point of a solution. Experiment 33 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

#### **Quiz: The Effect of Solutes**

Answer questions about the effect of a solute on vapor pressure boiling point and freezing point.

*Duration: 0 hr 30 min Scoring: 50 points*

## LESSON 3: PHASE TRANSITIONS

### Study: Changes of State

Explore physical changes between states of matter as examples of reversible processes.

*Duration: 1 hr*

### Quiz: Solid Liquid or Gas?

Answer questions about phase transitions and phase diagrams.

*Duration: 0 hr 30 min Scoring: 50 points*

## LESSON 4: PHYSICAL BEHAVIOR OF MATTER WRAP-UP

### Review: Physical Behavior of Matter

Review concepts and skills learned in Physical Behavior of Matter.

*Duration: 3 hr*

### Test (CS): Physical Behavior of Matter

Take a 45-minute test covering Physical Behavior of Matter.

*Duration: 0 hr 45 min Scoring: 30 points*

### Test (TS): Physical Behavior of Matter

Take a 60-minute test covering Physical Behavior of Matter.

*Duration: 1 hr Scoring: 70 points*

## LESSON 5: DIAGNOSTIC

### Diagnostic: Physical Behavior of Matter

Test your understanding of the key concepts covered in Physical Behavior of Matter.

*Duration: 0 hr 45 min Scoring: 30 points*

## UNIT 8: EQUILIBRIUM

### LESSON 1: PROPERTIES OF EQUILIBRIUM SYSTEMS

#### Study: What is Equilibrium?

Learn about the dynamic nature of physical and chemical equilibria and how reversible chemical reactions can be described as chemical equilibria.

*Duration: 1 hr*

#### Discuss: Behavior of Equilibrium Systems

Discuss examples of equilibria in daily life. Give an example of how these equilibria may be in the process of shifting.

*Duration: 0 hr 30 min Scoring: 25 points*

#### Study: LeChâtelier: Principles of Equilibrium and Stress

Learn how a change in reaction conditions can affect the direction of a reaction at equilibrium.

*Duration: 1 hr*

#### Lab: Disturbing Equilibrium

Investigate how equilibrium systems respond to stresses. Experiment 38 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

#### Quiz: LeChâtelier: Applying the Principle

Use your knowledge of LeChatelier's Principle to answer multiple-choice questions about how an equilibrium system is affected by changes in T P V or concentration of a reactant or product.

*Duration: 0 hr 30 min Scoring: 50 points*

### LESSON 2: EQUILIBRIUM CALCULATIONS

### **Study: The Equilibrium Constant**

Learn to describe the position of an equilibrium in quantitative terms.

*Duration: 1 hr*

### **Study: Solubility Equilibria**

Learn quantitative tools for expressing the solubility of a solute in a solution.

*Duration: 1 hr*

### **Quiz: Solubility Calculations**

Answer questions involving solubility and solubility calculations.

*Duration: 0 hr 30 min Scoring: 50 points*

## **LESSON 3: ACIDS, BASES, AND SALTS**

### **Study: Introduction to Acids and Bases**

Learn about pH pOH the pH scale and acid-base indicators.

*Duration: 1 hr*

### **Quiz: Measuring Acidity and Basicity**

Answer questions about pH pOH and acid-base indicators.

*Duration: 0 hr 30 min Scoring: 50 points*

### **Study: Acid-Base Equilibrium**

Learn about the ionization of water the relationship of pH and pOH and the definitions of  $K_a$  and  $K_b$ . Discover how  $K_a$  and  $K_b$  relate to the strength of an acid or base.

*Duration: 1 hr*

### **Practice: Acid and Base Dissociation Constants**

Complete a set of problems involving the ionization of water and of acid and base dissociation constants.

*Duration: 1 hr Scoring: 50 points*

### **Study: Acid-Base Titrations**

Learn an important laboratory method for determining the concentration of an acid or base.

*Duration: 1 hr*

### **Quiz: Acids Bases and Acid-Base Equilibrium**

Answer questions about the ionization of acids and bases.

*Duration: 0 hr 30 min Scoring: 50 points*

## **LESSON 4: EQUILIBRIUM WRAP-UP**

### **Review: Equilibrium Review**

Review concepts and skills learned in Equilibrium.

*Duration: 3 hr*

### **Test (CS): Equilibrium**

Take a 45-minute test covering Equilibrium.

*Duration: 0 hr 45 min Scoring: 30 points*

### **Test (TS): Equilibrium**

Take a 60-minute test covering Equilibrium

*Duration: 1 hr Scoring: 70 points*

## **LESSON 5: DIAGNOSTIC**

### **Diagnostic: Equilibrium**

Test your understanding of the key concepts covered in Equilibrium.

*Duration: 0 hr 45 min Scoring: 30 points*

## UNIT 9: KINETICS AND THERMODYNAMICS

### LESSON 1: RATE AND RATE LAWS

#### Study: Basic Principles of Kinetics

Learn about reaction rate rate laws and factors that affect the reaction rate.

*Duration: 1 hr*

#### Lab: Factors Affecting Reaction Rates

Conduct experiments to identify several factors that speed up or slow down chemical reactions. Experiment 36 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

#### Practice: Rates of Chemical Reactions

Solve problems and answer essay questions involving rates and rate laws.

*Duration: 1 hr Scoring: 50 points*

#### Study: Kinetics Collisions and Activation Energy

*Duration: 1 hr*

#### Quiz: Things Are Heating Up

Answer questions about the relationship between rate concentration and temperature.

*Duration: 0 hr 30 min Scoring: 50 points*

### LESSON 2: ENERGY ENTROPY AND SPONTANEITY

#### Study: Energy and Spontaneity

Learn about entropy and entropy change in chemical reactions and phase transitions.

*Duration: 1 hr*

#### Journal: Entropy in Real Life

Describe some real-life examples of entropy and spontaneity.

*Duration: 0 hr 30 min Scoring: 15 points*

#### Study: Free Energy

Learn a mathematical approach to spontaneity that incorporates enthalpy and entropy.

*Duration: 1 hr*

#### Quiz: Working with Free Energy

Solve problems and answer questions about free energy.

*Duration: 0 hr 30 min Scoring: 50 points*

### LESSON 3: KINETICS AND THERMODYNAMICS WRAP-UP

#### Review: Kinetics and Thermodynamics

Review concepts and skills learned in Kinetics and Thermodynamics.

*Duration: 3 hr*

#### Test (CS): Kinetics and Thermodynamics

Take a 45-minute test covering Kinetics and Thermodynamics.

*Duration: 0 hr 45 min Scoring: 30 points*

#### Test (TS): Kinetics and Thermodynamics

*Duration: 1 hr Scoring: 70 points*

### LESSON 4: DIAGNOSTIC

#### Diagnostic: Kinetics and Thermodynamics

Test your understanding of the key concepts covered in Kinetics and Thermodynamics.

*Duration: 0 hr 45 min Scoring: 30 points*

## UNIT 10: ELECTROCHEMISTRY

### LESSON 1: OXIDATION-REDUCTION REACTIONS

#### **Study: Oxidation-Reduction Reactions**

Learn the basic concepts of oxidation-reduction ("redox") reactions and use these concepts to develop an activity series.

*Duration: 1 hr*

#### **Discuss: Simplifying Voltaic Cells**

Share your ideas about how to balance redox reactions using the half reaction method (write and interpret electrochemical cells).

*Duration: 0 hr 30 min Scoring: 25 points*

#### **Practice: The Basics of Balancing**

Practice balancing redox reactions using the half-reaction method.

*Duration: 1 hr Scoring: 50 points*

#### **Quiz: Redox Reactions**

Answer questions about oxidation-reduction reactions.

*Duration: 0 hr 30 min Scoring: 50 points*

### LESSON 2: ELECTROCHEMICAL CELLS

#### **Study: Voltaic Cells**

Learn about electrochemical cells a method for describing these cells and how to write redox reactions using standard cell notation.

*Duration: 1 hr*

#### **Lab: Oxidation-Reduction Reactions**

Compare the relative reduction potentials of copper lead and zinc. Experiment 46 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

#### **Quiz: Describing Voltaic Cells**

Demonstrate your skills at interpreting and writing standard cell notations.

*Duration: 0 hr 30 min Scoring: 50 points*

### LESSON 3: ELECTROCHEMISTRY WRAP-UP

#### **Review: Electrochemistry**

Review concepts and skills learned in Electrochemistry.

*Duration: 3 hr*

#### **Test (CS): Electrochemistry**

Take a 45-minute test covering Electrochemistry.

*Duration: 0 hr 45 min Scoring: 30 points*

#### **Test (TS): Electrochemistry**

Take a 60-minute test covering Electrochemistry

*Duration: 1 hr Scoring: 70 points*

### LESSON 4: DIAGNOSTIC

#### **Diagnostic: Electrochemistry**

Test your understanding of the key concepts covered in Electrochemistry.

*Duration: 0 hr 45 min Scoring: 30 points*

## UNIT 11: NUCLEAR, ORGANIC, AND BIOCHEMISTRY

## LESSON 1: NUCLEAR REACTIONS

### Study: Radioactive Decay

Learn about radioactive isotopes the types of radioactive decay and how to write balanced equations for radioactive decay processes.

*Duration: 1 hr*

### Discuss: The Pros and Cons of Nuclear Energy

Engage in a discussion about the benefits and drawbacks of nuclear energy.

*Duration: 0 hr 30 min Scoring: 25 points*

### Study: Rate of Radioactive Decay

*Duration: 1 hr*

### Lab: Radioactivity and Radiation

Analyze the effects of distance shielding and time on radiation exposure. Experiment 52 in Prentice Hall Chemistry laboratory manual.

*Duration: 1 hr Scoring: 50 points*

### Quiz: Nuclear Chemistry

Answer questions about radioactive isotopes and radioactive particles nuclear equations and nuclear power.

*Duration: 0 hr 30 min Scoring: 50 points*

## LESSON 2: SURVEY OF ORGANIC CHEMISTRY

### Study: Hydrocarbon Compounds

Study the structure and physical properties of saturated and unsaturated hydrocarbons.

*Duration: 1 hr*

### Study: Oxygen-Containing Organic Compounds and Polymers

Learn the structures physical properties and rules for naming organic compounds that contain oxygen and the chemistry of polymers.

*Duration: 1 hr*

### Journal: Organically Grown Concepts

Brainstorm uses of polymer and plastics and the qualities that make them good for various applications. Also consider poor uses of plastics that you have seen.

*Duration: 0 hr 30 min Scoring: 15 points*

### Quiz: Oxygen Functional Groups

Answer questions about oxygen-containing organic compounds and polymers.

*Duration: 0 hr 30 min Scoring: 50 points*

## LESSON 3: BIOCHEMISTRY

### Study: Processes of Life

Learn about the main chemicals of life and the chemical processes in the body.

*Duration: 1 hr*

### Practice: Polymers of Life

Practice drawing the components and polymer form of starches polypeptides and nucleotides.

*Duration: 1 hr Scoring: 50 points*

### Quiz: Understanding Life

Understanding Life Quiz

*Duration: 0 hr 30 min Scoring: 50 points*

## LESSON 4: NUCLEAR ORGANIC AND BIOCHEMISTRY WRAP-UP

### Review: Nuclear and Organic Chemistry

Review concepts and skills learned in Nuclear Organic and Biochemistry.

*Duration: 3 hr*

**Test (CS): Nuclear Organic and Biochemistry Test**

Take a computer scored test covering Nuclear Organic and Biochemistry.

*Duration: 0 hr 45 min Scoring: 30 points*

**Test (TS): Nuclear Organic and Biochemistry**

Take a 60-minute test covering Nuclear Organic and Biochemistry.

*Duration: 1 hr Scoring: 70 points*

**LESSON 5: DIAGNOSTIC****Diagnostic: Nuclear and Organic Chemistry**

Test your understanding of the key concepts covered in Nuclear and Organic Chemistry.

*Duration: 0 hr 45 min Scoring: 30 points*

**UNIT 12: CHEMISTRY SEMESTER 2 REVIEW AND EXAM****LESSON 1: CHEMISTRY SEMESTER 2****Review: Chemistry Semester 2**

Review concepts and skills learned throughout the course.

*Duration: 6 hr*

**Exam: Chemistry Semester 2**

Take a two-hour exam covering material in the entire course.

*Duration: 0 hr 40 min Scoring: 40 points*

**Final Exam: Chemistry Semester 2**

*Duration: 1 hr 30 min Scoring: 150 points*