
Chemistry 1B

Course Description

The Chemistry 1B course teaches chemistry through challenging and imaginative units centered on typical life-essential scenarios. Students explore colligative properties, kinetics and equilibrium, acids and bases, oxidation and reduction formulas, and organic chemistry and watch video demonstrations of chemical reactions.

Each unit has an interactive laboratory experiment, and students hone their writing and reasoning skills in describing their results and conclusions. Numerous practice exercises gauge students' comprehension as they progress through the course.

Overview

Unit 1 – Colligative Properties

- Lesson 1: How Hydroponics Works
- Lesson 2: Concentration
- Lesson 3: Electrolytes and Dissociation
- Lesson 4: Raoult's Law
- Lesson 5: Vapor Pressure and Boiling Point
- Lesson 6: Vapor Pressure and Freezing Point
- Lesson 7: Accurate Measurements
- Lesson 8: Boiling Point Elevation and Freezing Point
- Lesson 9: Osmosis
- Lesson 10: Solubility

Unit 2 – Kinetics and Equilibrium

- Lesson 1: Activation Energy
- Lesson 2: Other Factors Affecting Reaction Rates
- Lesson 3: Basic Equilibrium
- Lesson 4: Equilibrium Expressions
- Lesson 5: Le Chatelier's Principle

Unit 3 – Acids and Bases

- Lesson 1: Molds
- Lesson 2: Acids, Bases, and Ions
- Lesson 3: Find the pH
- Lesson 4: Definitions of Acids
- Lesson 5: Buffers
- Lesson 6: Acid Rain

Unit 4 – Redox and Formulas

- Lesson 1: Oxidation and Reduction
- Lesson 2: Oxidation Numbers
- Lesson 3: Identifying Redox Reactions
- Lesson 4: Balancing Redox Reactions
- Lesson 5: Ionic and Molecular Compounds
- Lesson 6: Basic Formulas

Unit 5 – Organic Chemistry

Lesson 1: Crude Oil Recovery and Refining

Lesson 2: Crude Oil and Hydrocarbons

Lesson 3: Polymers in Nature

Objectives

Students completing this course will be able to demonstrate the following skills:

- Become familiar with hydroponics and essential nutrients, including nitrogen, phosphorus, potassium, and sulfur.
- Use the pH of a solution to calculate concentration of ions.
- Explain Raoult's Law with regard to vapor pressure, as well as how to determine boiling and freezing points.
- Appreciate the importance of accurate measurements and significant figures.
- Describe osmosis and solubility.
- Define activation energy and list other factors affecting reaction rates.
- Differentiate between exothermic and endothermic reactions.
- Explain equilibrium and the stresses that affect systems in equilibrium.
- Explain and differentiate among acids, bases, and buffers.
- Differentiate between oxidation and reduction, and identify and balance oxidation-reduction reactions.
- Differentiate among ionic, molecular, binary, and polyatomic compounds, and write their formulas.
- On the periodic chart, locate representative elements, noble gases, transition metals, inner transition metals, metals, nonmetals, metalloids, anions, and cations.
- Identify functional groups of hydrocarbons.
- Differentiate among synthetic, natural, condensation, and addition polymers.
- Describe DNA, its base pairs, and DNA replication.

Activities and Assessments

- **5 Laboratory Activities** – Within each unit, students complete an interactive virtual laboratory activity, recording their results and conclusions in their online notebooks. The instructor grades these activities and provides feedback.
- **10 Quizzes, 5 Unit Evaluations, and 1 Final Exam** – Along with numerous self-checks throughout the course, there are two quizzes per unit. There is also an evaluation at the end of each of the five units. At the conclusion of the course, students are given one opportunity to complete a comprehensive final exam. All of these assessments are computer-graded and provide students with instant feedback on their work.