# Chemistry, Part 2

## How to Take This Course

Complete all the quizzes and the assignment in each unit. Once the quizzes for a unit are complete, you will have access to the unit test. You will have access to the final exam when all of the unit tests are complete, and the assignments are completed and graded.

Please allow for 2-3 days per assignment for grading. Read the full course instructions so you understand how this course works.

- Instructions for the Course
- How This Course Works & Suggested Timeline
- Submitting Your Assignments
- Ask The Teacher

Meet your teacher for this course and ask a question.

## Lab Requirement

In order to satisfy the University of California A-G requirements for a chemistry course, two components are required. The first is our online course and the second is a lab. The lab kit has to be purchased separately, it is not provided by SVHS.

**Lab Kit Requirement**
The kit must be purchased from Quality Science Labs (QSL) and delivered through the mail. This kit has been designed by SVHS and QSL to accompany this course. If you purchased the kit for Chemistry Part 1, you can use that same kit for this Chemistry Part 2--only one kit needs to be purchased for students taking Chemistry Part 1 and Part 2. Order your lab kit from **here**, at checkout use the customer code: svhs2691-17 to receive a 20% discount.

**Lab Details and Descriptions**
Detailed instructions for the labs are provided in the lab kit. Here for a summary description of the labs covered in this course.

The lab assignments that are required to pass this course relate directly to the labs and materials in the "lab kit" mentioned above.

## Unit 1: Quantities in Chemical Reactions

This unit introduces the significance of coefficients in a balanced equation, molar ratios, mole-mole calculations, mass-mass calculations and other stoichiometric calculations. It looks at how to solve Limiting Reactant stoichiometry problems as well as how to determine the excess reactant. The difference between actual, theoretical and percent yields with examples of how to calculate theoretical and percent yields.

- 1.1 Stoichiometry
  - Quiz 1.1 Stoichiometry
- 1.2 The Limiting Reagent
  - Quiz 1.2 Limiting Reagent
- 1.3 Percentage Yield
  - Quiz 1.3 Percent Yield
- Unit 1 Assignment - Energy in Combustion
- Unit 1 Lab: Solubility Product Constant and Analysis of Hydrates

## Unit 2: Solutions and Solubility

Not all matter is in the solid form, and some of the more interesting chemical reactions happen in solutions. This unit discusses the concepts of solutions and solubility. The chemical structure of water, and why water is so important for life. How and why water acts as a wonderful solvent and provides a medium for metabolism. The various factors that affect how well a solid-liquid solute dissolves, including Particle Size, Temperature, Agitation and the Chemical Nature of the solute, particularly polarity (like dissolves like.) How to interpret solubility curves and read solubility curves. To identify and understand saturated, unsaturated and supersaturated solutions. Colligative properties, freezing point depression and boiling point elevation. Plus it will look at the relationship between the amount of solute and degree of freezing point depression-boiling point elevation.

- 2.1 Water and Life
  - Quiz 2.1 Water and Life
- 2.2 Properties of Solutions
  - Quiz 2.2 Properties of Solutions
- 2.3 The Dissolving Process
  - Quiz 2.3 The Dissolving Process
- 2.4 Solubility and Saturation
  - Quiz 2.4 Solubility and Saturation
- 2.5 Dilutions
  - Quiz 2.5 Dilutions
- 2.6 Colligative Properties
  - Quiz 2.6 Colligative Properties
- Unit 2 Assignment - Water Solutions
- Unit 2 Lab: Freezing Point Depression and Enthalpy of Ice

## Unit 3: Acids and Bases

This unit discusses the general properties of acids and bases. The Arrhenius definitions for acids and bases. Bronsted and Lowry's theory of acids and bases. To distinguish between strong and weak acids and bases in terms of the extent of dissociation, reaction with water and electrical conductivity. The pH scale and to consider the effects of acid deposition on limestone buildings and living things. To understand the nature of a strong acid and a strong base. To solve acid-base titration math problems.

- 3.1 Bronsted-Lowry Theory of Acids and Bases
  - Quiz 3.1 Bronsted-Lowry Theory of Acids and Bases
- 3.2 Properties of Acids and Bases and the Arrhenius Theory
  - Quiz 3.2 Properties of Acids and Bases and Arrhenius Theory
- 3.3 Strong and Weak Acids and Bases
  - Quiz 3.3 Strong and Weak Acids and Bases
- 3.4 The pH Scale
  - Quiz 3.4 The pH Scale
- 3.5 Acid-Base Titration
  - Quiz 3.5 Acid-Base Titration
- Unit 3 Assignment - Ocean Acidification
- Unit 3 Lab: pH and pH Indicators and Buffers

## Unit 4: Gases

Gases behave interestingly and predictably, and this unit discusses the behavior of gases in great detail, including the assumptions behind the Kinetic Molecular Theory and some general properties of gases from a molecular perspective. Avogadro's Law, Boyle's Law, Lussac's Law and Charles' law. How the ideal gas equation allows one to find the pressure, volume, temperature and/or moles in a certain situation

- 4.1 Kinetic Molecular Theory of Gases
  - Quiz 4.1 Kinetic Molecular Theory of Gases
- 4.2 Pressure, Volume, Temperature
  - Quiz 4.2 Pressure, Volume, Temperature
- 4.3 Ideal Gas Law
  - Quiz 4.3 Ideal Gas Law
- 4.4 Ideal Gas Law Problems
  - Quiz 4.4 Ideal Gas Law Problems
- 4.5 Gas Law Stoichiometry
  - Quiz 4.5 Gas Law Stoichiometry
- Unit 4 Assignment - Climate Change
- Unit 4 Lab: Boyle's Law & Charles' Law

## Unit 5: Chemical Equilibrium

The majority of matter is constantly busy, reacting and changing, and this unit discusses how to measure and consider the rate of a reaction. The connection between concentration and reaction rate in terms of the Law of Mass Action and Rate Laws. The equilibrium constant (K_c) and how it can be calculated in various reversible reactions. Le Chatelier's Principle and how it predicts changes in concentration when "stressing" reactions at equilibrium.

- 5.1 Rates of Reaction
  - Quiz 5.1 Rates of Reaction
- 5.2 Equilibrium Constant
  - Quiz 5.2 Equilibrium Constant
- 5.3 LeChatelier's Principle
  - Quiz 5.3 LeChatelier's Principle
- Unit 5 Assignment - Ozone
- Unit 5 Lab: Reaction Rates, Concentration and Reaction Rates, Temperature

## Unit 6 - Nuclear Chemistry

In this unit we will learn about nuclear structure and stability, radioactive decay, and nuclear energy. We will focus on the biological effects of radiation as well as technology related to energy, medicine, geology, and other areas.

- 6.1 Introduction to Nuclear Chemistry
  - Quiz 6.1 Introduction to Nuclear Chemistry
- 6.2 Radioactive Decay and Half-Life
  - Quiz 6.2 Radioactive Decay and Half-life
- 6.3 Uses of Radioisotopes
  - Quiz 6.3 Uses of Radioisotopes
- 6.4 Effects of Radiation
  - Quiz 6.4 Effects of Radiation
- Unit 6 Assignment - Researching Nuclear Chemistry

## Unit 7 - Organic Chemistry

This unit focuses on organic chemistry. You will examine why the element carbon results in such a variety of compounds, how those compounds are classified, and the role of organic compounds in biology and industry.

- 7.1 Introduction to Organic Chemistry
  - Quiz 7.1 Introduction to Organic Chemistry
- 7.2 Organic Chemistry and Biology
  - Quiz 7.2 Organic Chemistry and Biology
- 7.3 Organic Chemistry in Everyday Life
  - Quiz 7.3 Organic Chemistry in Everyday Life
- Unit 7 Assignment - Chemistry Careers

## The Final

Once you have completed all of the unit tests **and** all of your assignments have been graded, the final exam will become visible.

**Warning:** You have only ONE attempt at the final. You must score 60% or higher in the final to receive credit for the course!

Are you ready to take the final? We highly recommend you take the practice final first and if you are weak in any area, review the relevant course material again. You have unlimited attempts at the practice final: it will help you to prepare.

Good Luck!!

- Practice Final Exam

## Course Completion

The "Certificate" and "Course Completion Record Request" links below are not active, they cannot be accessed until you have taken the final. Upon satisfying this requirement the links will become active and you can use them.

Before you go, we would appreciate your opinion on the course, please take 1 minute to complete the feedback form.

We hope you enjoyed this course!

- Course Feedback

Thank you for taking this course! Let us know what you think about it.

- Request a Course Completion Record

  Restricted Not available unless: The activity **Final Exam** is marked complete

- Certificate of Completion

  Restricted Not available unless: The activity **Final Exam** is marked complete