



# Reavis High School

## AP Chemistry Curriculum Snapshot



### Unit 1: Science Fundamentals

5  
Days

Students will learn the safety rules and laboratory equipment of the science laboratory and demonstrate their competence by observing proper safety protocol and equipment usage throughout the school year. Through scientific research, experimental design, and application, students will identify and apply the steps of scientific reasoning. Students will be able to analyze/manipulate qualitative and quantitative data and express results in a proper scientific manner.



### Unit 2: Atoms, Molecules, and Ions

5  
Days

Atoms are the building blocks of matter. In this unit, the students will understand how the present-day model of atomic structure developed historically. The students will distinguish between atoms, ions, and molecules. The periodic table will be used to make predictions about ionic charge and will also be used to write formulas for binary compounds.



### Unit 3: Chemical Equations and Stoichiometry

7  
Days

Stoichiometry is the study of quantities in chemical reactions. Students will use their math skills and dimensional analysis to determine stoichiometric quantities in chemical reactions. An understanding of the mole concept is imperative in using stoichiometry. Students will also understand the mole concept and be able to solve problems involving the mole. Other concepts in this unit include percent composition, empirical and molecular formulas, limiting reactants, and percent yield.



## Unit 4: Types of Chemical Equations and Solution Stoichiometry

15  
Days

Much of experimental chemistry is conducted in aqueous systems. The polar nature of water and why it is considered the universal solvent is emphasized. The students will perform dilutions, prepare solutions, and determine concentration (molarity). Predicting the products of a reaction is a skill that is necessary for good chemistry. The students will learn rules of solubility to make predictions about precipitation formation. The students will also standardize solutions and perform a titration.



## Unit 5: Gases

10  
Days

The Kinetic Molecular Theory is a major model in chemistry. The students will learn how the KMT is used to predict the properties and behaviors of gases. The students will solve stoichiometry problems of reactions involving gases and understand the difference between a real gas and an ideal gas.



## Unit 6: Thermochemistry

15  
Days

The study of energy is essential to the understanding of how and why chemical reactions take place. In this unit, the students will understand the energy flow between systems and surroundings. The students will use calorimetry to measure the energy changes. The students will also solve thermodynamics problems involving enthalpy.



## Unit 7: Atomic Structure

15  
Days

Tracing the historical development of the model of the atom and understanding the current model is the focus of this unit. The students will characterize the electromagnetic spectrum in terms of wavelength, frequency, and energy. The students will also be able to describe quantum theory and understand what is meant by quantum numbers.



## Unit 8: Bonding

20  
Days

Chemical bonding is a fundamental concept in the study of chemistry. In this unit, the students will understand the different types of bonding and the different bond theories. They will use Lewis structures to draw two-dimensional diagrams of molecules and apply the VSEPR to determine the geometry and hybridization of molecular compounds. At the conclusion of this unit, students will come to understand how bonding and molecular structure determines the properties of substances.



## Unit 9: Liquids and Solids

10  
Days

In this unit, students will study the factors that affect why substances exist as a certain state of matter. The students will distinguish intermolecular forces and intramolecular forces and understand what role forces play in determining the properties of substances. The different types of solids and their structures will be examined. Phase diagrams will also be covered in depth.



## Unit 10: Chemical Kinetics

10  
Days

Chemical kinetics is the study of reaction rates and factors that affect how fast a reaction will proceed. The students will use experimental data to determine rate laws and explore the relationship between reaction mechanisms and rate laws. The students will be able to describe collision theory and how it applies to the rate of reaction. Lastly, the students will understand how catalysts work.



## Unit 11: Chemical Equilibria

10  
Days

The students will understand the characteristics and conditions of equilibrium and how it is established. The students will write equilibrium expressions and determine equilibrium constants. The students will also use LeChatelier to predict how a system will react to a change imposed on it.



## Unit 12: Acid Base Chemistry

20  
Days

As a result of this unit, the students will be able to distinguish between the various models of acids and bases. They will relate equilibrium concepts to acid dissociation and determine the pH, pOH and determine the pK of acid/base systems. The students will also perform an acid base titration to determine the pKa of an acid. Other topics to be studied in this unit include buffers and solubility product constant.



## Unit 13: Spontaneity and Free Energy

15  
Days

The study of entropy and Gibbs free energy will complete the thermodynamics picture. Students will understand the second law of thermodynamics and understand what conditions are required for a reaction to be spontaneous. The students will understand the relationship between free energy and equilibrium.



## Unit 14: Electrochemistry

15  
Days

In this unit, the students will learn about electrochemical cells. They will know the components of an electrochemical cell and be able to determine a cell potential. The students will understand how cell concentration affects cell potential. The students will also understand how electroplating occurs.