

Chemistry- High School Priority Standards

Big Ideas in Chemistry:

The following table outlines the big ideas in chemistry that should be addressed in any good curriculum. Within each of these big ideas, important additional topics are suggested. These big ideas need not be covered in the order presented, nor is this an all-inclusive list. See also the NRC, College Board, and others for a list of essential topics in chemistry. Teachers may wish to consult a variety of sources when considering all of the essential elements of their curriculum.

The Big Ideas in Chemistry	Important Topics within These Ideas
Conservation of Matter and energy	<ul style="list-style-type: none"> • Atoms are not destroyed in chemical reactions; they are rearranged • Forms of energy; energy changes in chemical reactions • Stoichiometry and balancing chemical reactions
Behavior and properties of matter	<ul style="list-style-type: none"> • The periodic table of elements as the master organizer of chemistry • Gas laws • Distinguishing among elements, compounds, and mixtures • Chemical bonding • Intermolecular forces
Particulate of nature of matter	<ul style="list-style-type: none"> • Kinetic Molecular Theory • Structure of atoms, ions, and molecules
Equilibrium and driving Forces	<ul style="list-style-type: none"> • Le Chatelier's Principle • Reaction rates • Thermodynamics (entropy and enthalpy) • Acid-base reactions • Redox reactions • Combustion

Chemistry- High School/Pacing Guide

Standards Chemistry/High School Quarter 1 _____	Topics	Notes

Matter and Change HS-PS1-4 HS-PS1-5	1.1 Chemistry is a Physical Science 1.2 Matter and Its Properties 1.3 Elements	
Measurements and Calculations	2.1 Scientific Method 2.2 Units of Measurements 2.3 Using Scientific Measurements	
Atoms: the Building Blocks of Matter HS-PS1-1	3.1 The Atom: From Philosophical Idea to Scientific Theory 3.2 The Structure of the Atom 3.3 Counting Atoms	
Arrangement of Electrons in Atoms HS-PS1-3 HS-PS1-1	4.1 The Development of a New Atomic Model 4.2 The Quantum Model of the Atoms 4.3 Electron Configurations	
The Periodic Law HS-PS1-1 HS-PS1-2	5.1 History of the Periodic Table 5.2 Electron Configuration and the Periodic Table 5.3 Electron Configuration and Periodic Properties	
Chemical Bonding HS-PS1-1 HS-PS1-2 HS-PS1-4	6.1 Introduction to Chemical Bonding 6.2 Covalent Bonding and Molecular Compounds 6.3 Ionic Bonding and Ionic Compounds 6.4 Metallic Bonding 6.5 Molecular Geometry	students will engage in argumentation using evidence to explain how bond formation, shape, polarity, and intermolecular forces influence the properties and behavior of materials
Chemical Formulas and Chemical Compounds HS-PS1-1	7.1 Chemical Names and Formulas 7.2 Oxidation Numbers 7.3 Using Chemical Formulas 7.4 Determining Chemical Formulas	
Chemical Equations and Reactions PS1B:	8.1 Describing Chemical Reactions 8.2 Types of Chemical Reactions 8.3 Activity Series of the Elements	students will: use the science and engineering practices to plan and carry out an investigation to explore how molecules interact with one another through chemical reactions while conserving mass and energy. Students

		will describe how the mathematical representations support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
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Quarter 2 Priority Standards and Skills

Standards Chemistry/High School _____	Topics	Notes
Stoichiometry	9.1 Introduction to Stoichiometry 9.2 Ideal Stoichiometric Calculations 9.3 Limiting Reactants and Percentage Yield	
States of Matter HS-PS1-6 HS-PS-7 HS-PS1	10.1 The Kinetic-Molecular Theory of Matter 10.2 Liquids 10.3 Solids 10.4 Changes of State 10.5 Water	
Gases PS1A	11.1 Gas and Pressure 11.2 The Gas Laws 11.3 Gas Volumes and the Ideal Gas Law 11.4 Diffusion and Effusion	
Solutions	12.1 Types of Mixtures 12.2 The Solution Process 12.3 Concentration of Solutions	
Ions in Aqueous Solutions and Colligative Properties	13.1 Compounds in Aqueous Solutions 13.2 Colligative Properties of Solutions	
Acids and Bases	14.1 Properties of Acids and Bases 14.2 Acid-Base Theories 14.3 Acid-Base Reactions	
Acid-Base Titration and pH	15.1 Aqueous Solutions and the Concept of pH	

	15.2 Determining pH and Titrations	
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Quarter 3 Priority Standards and Skills

Standards Chemistry/High School _____	Topics	Notes
Reaction Energy	16.1 Thermochemistry 16.2 Driving Force of Reactions	
Reaction Kinetics	17.1 The Reaction Process 17.2 Reaction Rate	
Chemical Equilibrium	18.1 The Nature of Chemical Equilibrium 18.2 Shifting Equilibrium 18.3 Equilibria of Acids, Bases, and Salts 18.4 Solubility Equilibrium	
Oxidation-Reduction Reactions	19.1 Oxidation and Reduction 19.2 Balancing Redox Equations 19.3 Oxidizing and Reducing Agents	

Quarter 4 Priority Standards and Skills

Standards Chemistry/High School _____	Topics	Skills
Electrochemistry	20.1 Introduction to Electrochemistry 20.2 Voltaic Cells 20.3 Electrolytic Cells	
Nuclear Chemistry	21.1 The Nucleus 21.2 Radioactive Decay 21.3 Nuclear Radiation 21.4 Nuclear Fission and Nuclear Fusion	

Organic Chemistry	22.1 Organic Compounds 22.2 Hydrocarbons 22.3 Functional Groups 22.4 Organic Reactions	
Biological Chemistry	23.1 Carbohydrates and Lipids 23.2 Amino Acids and Proteins 23.3 Metabolism	

Supporting Standards:

Standards that are not highly assessed but should be presented if not mastered over the course of a year (or the course)