

Curriculum Map: Chemistry

Course: Chemistry Sub-topic: Chemistry

Grade(s): 11

Course

Description: Chemistry is the study of matter and how it interacts with its environment. We will be learning about the different properties/compositions of matter and the interactions it undergoes. A variety of laboratory experiments will be performed to further the understanding of the concepts discussed during classroom instruction. The topics to be covered include: physical/chemical changes, atomic structure, atomic theory, the periodic table, chemical reaction types/equations, stoichiometry, chemical bonds, and more!

Unit: Unit 0 - Lab Safety

Timeline: Week 36

Topic: Handling Accidents

Topic: Safety Equipment Operation

Topic: Clean-Up Protocol

Topic: Lab Rules

Unit: Unit 1 - Matter and Measurement

Timeline: Week 37

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S3.A.1 (Advanced)	Reasoning and Analysis	
S3.A.2 (Advanced)	Processes, Procedures, and Tools of Scientific Investigations	
S3.A.2.1 (Advanced)	Apply skills necessary to conduct an experiment or design a solution to solve a problem.	
S3.C.1.1 (Advanced)	Describe the observable physical properties of matter.	
S3.C.1.1.1 (Advanced)	Describe matter in terms of its observable properties (e.g., weight, mass, shape, size, color, texture, state).	
S3.C.1.1.2 (Advanced)	Classify matter using observable physical properties (e.g., weight, mass, shape, size, color, texture, state).	
S3.C.1.1.3 (Advanced)	Classify a substance as a solid, liquid, or gas.	
S3.C.1.1.4 (Advanced)	Recognize and identify how water goes through phase changes (i.e., evaporation, condensation, freezing, and melting).	
S4.C.1.1 (Advanced)	Describe observable physical properties of matter.	
S4.C.1.1.1 (Advanced)	Use physical properties [e.g., mass, shape, size, volume, color, texture, magnetism, state (i.e., solid, liquid, and gas), conductivity (i.e., electrical and heat)] to describe matter.	
S5.C.1.1 (Advanced)	Describe the observable physical properties of matter.	
S5.C.1.1.1 (Advanced)	Identify characteristic properties of matter that are independent of mass and volume.	
S5.C.1.1.2 (Advanced)	Differentiate between volume and mass.	
S5.C.1.2 (Advanced)	Describe that matter can undergo chemical and physical changes.	
S5.C.1.2.1 (Advanced)	Describe how water changes from one state to another.	
S5.C.1.2.2 (Advanced)	Identify differences between chemical and physical changes of matter.	
S5.C.3.1.1 (Advanced)	Differentiate between the mass and weight of an object.	
S6.C.1.1 (Advanced)	Explain that matter has observable physical properties.	
S6.C.1.1.1 (Advanced)	Describe how characteristic physical properties of matter can be used to distinguish one substance from another (e.g., boiling point, freezing/melting points).	
S6.C.1.1.2 (Advanced)	Explain that materials are characterized by having a specific amount of mass in each unit of volume (density).	
S6.C.1.2.1 (Advanced)	Describe how water changes from one state to another.	
S7.C.1.1.3 (Advanced)	Explain the differences between elements, compounds, and mixtures.	

S7.C.1.1.4 (Advanced)	Describe the relationship between mass and volume as density.	
S7.C.1.2 (Advanced)	Compare chemical and physical changes of matter.	
S7.C.1.2.2 (Advanced)	Compare the behavior of particle motion in solids, liquids, and gasses.	
S8.C.1.1 (Advanced)	Explain concepts about the structure and properties (physical and chemical) of matter.	

Topic: What is Chemistry?

Topic: The Scientific Method

Topic: Matter Classification

Topic: States of Matter and State Changes

Topic: Chemical and Physical Changes

Topic: Intensive and Extensive Properties

Topic: Separation Techniques

Topic: Density

Topic: SI Units

Topic: Accuracy and Precision

Topic: Percent Error

Topic: Significant Figures

Topic: Dimensional Analysis

Unit: Unit 2 - Understanding Atoms

Timeline: Week 39

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S7.C.1.1.2 (Advanced)	Recognize that the atom is the basic building block for all matter.	
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S11.C.1.1.1 (Advanced)	Explain that matter is made of particles called atoms and that atoms are composed of even smaller particles (e.g., protons, neutrons, electrons).	
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S11.C.2.1.1 (Advanced)	Compare or analyze waves in the electromagnetic spectrum (e.g., ultraviolet, infrared, visible light, Xrays, microwaves) as well as their properties, energy levels, and motion.	
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Topic: Atomic Theory

Topic: Isotopes and Relative Abundance

Topic: Atomic Emission Spectra

Topic: The Bohr/Schrodinger Model

Topic: Electron Configurations

Unit: Unit 3 - The Periodic Table

Timeline: Week 42

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S11.C.1.1.4 (Advanced)	Explain how the relationships of chemical properties of elements are represented in the repeating patterns within the periodic table.	
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Topic: Intro to the Periodic Table

Topic: Effective Nuclear Charge

Topic: Periodic Trends

Topic: Reactivity

Unit: Unit 4 - Nomenclature

Timeline: Week 43

Topic: Chemical Formulas

Topic: Naming/Writing Formulas for Ionic, Acid, and Molecular Compounds

Unit: Unit 5 - Chemical Reactions

Timeline: Week 45

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S7.C.1.2.1](#) Identify the reactants and products of simple chemical reactions (e.g., photosynthesis, cellular respiration).

[S8.C.1.1.3](#) Identify and describe reactants and products of simple chemical reactions.

[S11.C.1.1.6](#) Describe factors that influence the frequency of collisions during chemical reactions that might affect the reaction rates (e.g., surface area, concentration, catalyst, temperature).

[S11.C.2.1.2](#) Describe energy changes in chemical reactions.

Topic: Chemical Equations

Topic: Types of Reactions

Topic: Formula Weight and Molar Mass

Topic: Percent Composition

Topic: The Mole Concept

Topic: Stoichiometry

Topic: Limiting Reactants and Percent Yield

Unit: Unit 6 - Chemical Bonding

Timeline: Week 49

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S11.C.1.1.3](#) Explain the formation of compounds (ionic and covalent) and their resulting properties using bonding theories.

Topic: Types of Bonds

Topic: Resonance Structures

Topic: Lewis Structures

Topic: Bonding Theories

Topic: Polarity

Unit: Unit 7 - Gases

Timeline: Week 51

STANDARDS: STANDARDS

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S11.C.1.1.5

(Advanced)

Predict the behavior of gases through the application of laws (e.g., Boyle's law, Charles' law, or ideal gas law).

Topic: Kinetic Molecular Theory

Topic: Pressure Conversions

Topic: Standard Temperature and Pressure

Topic: Dalton's Law of Partial Pressures

Topic: The Ideal Gas Law

Topic: Avogadro's Law

Topic: Boyle's Law

Topic: Gay-Lussac's Law

Topic: Charles' Law