2026-27

Chemistry Scope and Sequence Planning Guide

Unit 1: *Structure and Properties of Matter*	**Module:** 2	**Instructional Periods:** 20
Module and Lessons	**STEELS Standards for Unit 1**	
Module 2: *Matter- Properties and Changes* (August 24 – September 30) **Encounter the Unit Phenomena:** *How do fireworks get their colors?* **Encounter the Module Phenomenon:** *Why is the Volcano spewing bright blue flames?* ***STEM Unit Project:*** *Utilizing Properties of Matter in Construction* **Lesson 1:** *Properties of Matter* **Lesson 2:** *Changes in Matter* **Lesson 3:** *Elements and Compounds* **Lesson 4:** *Mixtures of Matters* **Science & Society:** *In Rare Form* **Module Wrap-up:** *Revisit the phenomena; Go Further Data Analysis; Module Vocabulary Practice and Module Test* Related Gizmos •Electron Configuration • Element Builder •Periodic Trends •Balancing Chemical Equations •Chemical Changes •Chemical Equations •Moles •Stoichiometry •Mystery Powder Analysis •pH Analysis •pH Analysis: Quad Color Indicator •Water Crisis - High School STEM CASE •Colligative Properties •Sticky Molecules •Melting Points •Density Laboratory •Density via Comparison •Density Experiment: Slice and Dice •Determining Density via Water Displacement •Density	**Students develop understanding toward the following Performance Expectations (PEs). (Note: Not all elements of the PEs may be fully developed within this unit.)** 3.2.9-12.A Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. 3.2.9-12.C Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. 3.2.9-12.G Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. 3.2.9-12.N Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials 3.5.9-12.Y (ETS) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. 3.5.9-12.I (ETS) Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.	

2026-27

Chemistry Scope and Sequence Planning Guide

Science & Engineering Practices: Gizmos SEP Graphic Organizers **Cross-cutting Concepts:** Gizmos CCC Graphic Organizers	

Unit 1: *Structure and Properties of Matter*	**Module:** 3	**Instructional Periods:** 15
Module and Lessons	**STEELS Standards Unit 1**	
Module 3: *The Structure of the Atom* (October 1 – October 30) **Encounter the Phenomena:** *What is matter made of?* **Lesson 1:** *Early Ideas About Matter* **Lesson 2:** *Defining the Atom* **Lesson 3:** How Atoms Differ **Lesson 4:** *Unstable Nuclei and Radioactive Decay* **Scientific Breakthroughs:** *Mapping the Mysteries of Materials* **Module Wrap-up:** *Revisit the phenomena; Go Further Data Analysis; Module Vocabulary Practice and Module Test* **Related Gizmos** •Electron Configuration • Element Builder •Periodic Trends •Covalent Bonds •Ionic Bonds •Periodic Trends •Electrons and Chemical Reactions - High School STEM CASE •Melting Points •Polarity and Intermolecular Forces •Sticky Molecules •Average Atomic Mass •Half-life •Isotopes •Nuclear Decay •Nuclear Reactions •Coulomb Force (Static) •Gravitational Force •Pith Ball Lab •Charge Launcher •Electromagnetic Induction •Magnetic Induction •Magnetism •Pith Ball Lab	**Students develop understanding toward the following Performance Expectations (PEs). (Note: Not all elements of the PEs may be fully developed within this unit.)** 3.2.9-12.A Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. 3.2.9-12.C Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. 3.2.9-12.G Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. 3.2.9-12.N Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials 3.5.9-12.Y (ETS) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. 3.5.9-12.I (ETS) Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.	

•Polarity and Intermolecular Forces •Sticky Molecules	

Unit 1: *Structure and Properties of Matter*	**Module:** 4	**Instructional Periods:** 15

Module and Lessons	**STEELS Standards Unit 1**
Module 4: *Electrons in Atoms* (November 2 – November 25) **Encounter the Phenomena:** *How do we know what stars are made of?* **Lesson 1:** *Light and Quantized Energy* **Lesson 2:** *Quantum Theory and the Atom* **Lesson 3:** *Electron Configuration* **Scientific Breakthroughs:** *Batteries of the Future* **Module Wrap-up:** *Revisit the phenomena; Go Further Data Analysis; Module Vocabulary Practice and Module Test* **Related Gizmos** •Electron Configuration • Element Builder •Periodic Trends •Covalent Bonds •Ionic Bonds •Periodic Trends •Electrons and Chemical Reactions - High School STEM CASE •Heat Absorption •Herschel Experiment •Herschel Experiment - Metric •Photoelectric Effect •Radiation •Earthquakes 1 - Recording Station •Refraction •Ripple Tank •Waves •Basic Prism •Photoelectric Effect	**Students develop understanding toward the following Performance Expectations (PEs). (Note: Not all elements of the PEs may be fully developed within this unit.)** 3.2.9-12.A Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. 3.2.9-12.C Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. 3.2.9-12.G Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. 3.2.9-12.N Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials 3.5.9-12.Y (ETS) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. 3.5.9-12.I (ETS) Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

2026-27

Chemistry Scope and Sequence Planning Guide

Unit 1: *Structure and Properties of Matter*	**Module:** 5	Instructional Periods: **20**
Module and Lessons	**STEELS Standards Unit 1**	
Module 5: *The Periodic Table and Periodic Law* (November 30 – January 8) **Encounter the Phenomena:** *What can we learn from the period table?* **Lesson 1:** *Development of the Modern Periodic Table* **Lesson 2:** *Classification of Elements* **Lesson 3:** *Periodic Trends* **Nature of Science:** The Evolving Periodic Table **Module Wrap-up:** Revisit the phenomena; Go Further Data Analysis; Module Vocabulary Practice and Module Test **Revisit Unit Phenomena:** How do Fireworks get their colors? **STEM Unit Project:** Utilizing Properties of Matter in Construction Presentation **Related Gizmos** **•Covalent Bonds •Ionic Bonds •Periodic Trends •Electrons and Chemical Reactions - High School STEM CASE** **•Melting Points •Polarity and Intermolecular Forces** **•Sticky Molecules** **•Feel the Heat •Reaction Energy**	**Students develop understanding toward the following Performance Expectations (PEs). (Note: Not all elements of the PEs may be fully developed within this unit.)** 3.2.9-12.A Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. 3.2.9-12.C Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. 3.2.9-12.G Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. 3.2.9-12.N Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials 3.5.9-12.Y (ETS) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. 3.5.9-12.I (ETS) Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.	

Unit 2: *Chemical Bonding and Reactions*	**Module:** 6	**Instructional Periods:** 15
Module and Lessons	**Hands-on Investigations and Materials**	**STEELS Standards**
Module 6: *Ionic Compounds and Metals* (January 11 – February 5) **Unit Phenomena:** *How can understanding bonding and reactions support fire safety?* **Encounter the Phenomena:** *Why do some crystals form cubes?* **STEM Unit Project:** *Design a Water Purification System* **Lesson 1:** *Ion Formation* **Lesson 2:** *Ionic Bonds and Ionic Compounds* **Lesson 3:** *Names and Formulas for Ionic Compounds* **Lesson 4:** *Metallic Bonds and Properties of Metals* **Engineering & Technology:** *From Salty to Fresh* **Module Wrap-up:** Revisit the phenomena; Go Further Data Analysis; Module Vocabulary Practice and Module Test	**Module 6** **Launch Lab:** *What compounds conduct electricity in solution?* **Materials** conductivity tester pipette, disposable pipette, disposable sodium chloride (table salt) sucrose (table sugar) water, distilled **Laboratory:** *Properties of Ionic Compounds* **Materials** beaker, 100 -mL burner, Bunsen clay triangle conductivity indicator, crucible hammer, hand lens, lithium chloride (LiCl) NaCl, coarse grain NaCl, fine grain ring stand sucrose (table sugar) water, distilled wire gauze squares **Vernier Lab**: *Conductivity* **Materials** aluminum chloride (AlCl 3), 1 M balance, laboratory beaker, 150 -mL beaker, 400 -mL beaker, 50 -mL CBL unit clamp, test tube computer conductivity probe graduated cylinder, 100 -mL graduated cylinder, 50 -mL link cable magnesium chloride (MgCl 2), 1 M, microspatula pencil, grease pipette, plastic beral ring stand, sodium chloride (NaCl), fine grain	**Build to Performance Expectations:** 3.2.9-12.C Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties Related Gizmos •Covalent Bonds •Ionic Bonds •Periodic Trends •Electrons and Chemical Reactions - High School STEM CASE 3.2.9-12.B Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles Related Gizmos •Melting Points •Polarity and Intermolecular Forces •Sticky Molecules 3.2.9-12.D Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. Related Gizmos •Feel the Heat •Reaction Energy 3.2.9-12.N Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials. Related Gizmos **Master Performance Expectations:** 3.2.9-12.L Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. Related Gizmos •Coulomb Force (Static) •Gravitational Force •Pith Ball Lab 3.2.9-12.S Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. Related Gizmos •Charge Launcher •Electromagnetic Induction •Magnetic Induction •Magnetism

	sodium chloride (NaCl), 1 M stirring rod, glass sucrose (table sugar) test tube rack test tube, wash bottle water, distilled weighing dishes	•Pith Ball Lab •Polarity and Intermolecular Forces •Sticky Molecules **Disciplinary Core Ideas:** 3.2 Physical Science Structure and Properties of Matter Types of Interactions Relationship between Energy and Forces **Science & Engineering Practices:** Gizmos SEP Graphic Organizers Asking Questions Planning and Carrying Out Investigations Use Mathematical and Computational Thinking Developing and Using Models Constructing Explanations and Designing Solutions Obtaining, Evaluating and Communicating Information **Cross-cutting Concepts:** Gizmos CCC Graphic Organizers Structure and Function Patterns Energy and Matter

Unit 2: *Chemical Bonding and Reactions*	**Module:** 7	**Instructional Periods:** 15
Module and Lessons	**Hands-on Investigations and Materials**	**STEELS Standards**
Module 7: *Covalent Bonding* (February 8 - February 26) **Encounter the Phenomena:** *Why does water expand when it freezes?* **Lesson 1:** *The Covalent Bond* **Lesson 2:** *Naming Molecules* **Lesson 3:** *Molecular Structures* **Lesson 4:** *Molecular Shapes* **Lesson 5:** *Electronegativity*	**Module 7** **Launch Lab:** *What type of compound is used to make a super ball?* ***Materials*** cup, paper food coloring, red graduated cylinder, 50 -mL hydrochloric acid (HCl), 0.1 M, paper towels, sodium silicate solution splint, wooden **Quick Investigation**: *Compare Melting Points*	**Master Performance Expectations:** 3.2.9-12.C Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. Related Gizmos •Covalent Bonds •Ionic Bonds •Periodic Trends •Electrons and Chemical Reactions - High School STEM CASE 3.2.9-12.L Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. Related Gizmos •Coulomb Force (Static) •Gravitational Force •Pith Ball Lab

and Polarity **Science & Society:** *Plastics: The Good, The Bad, and the Ugly* **Module Wrap-up:** Revisit the phenomena; Go Further Data Analysis; Module Vocabulary Practice and Module Test	***Material*** aluminum pie pan, disposable, 9-inch hot plate marker, permanent Paraffin, sodium chloride (table salt), sucrose (table sugar) **Laboratory:** *Covalent Bonding in Medicines* ***Materials*** plastic molecular model set	3.2.9-12.N Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials. Related Gizmos •Feel the Heat 3.2.9-12.S Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. Related Gizmos •Charge Launcher •Electromagnetic Induction •Magnetic Induction •Magnetism •Pith Ball Lab •Polarity and Intermolecular Forces •Sticky Molecules **Disciplinary Core Ideas:** 3.2 Physical Science Structure and Properties of Matter Chemical Reactions Types of Interactions Relations Between Energy and Forces **Science & Engineering Practices:** **Gizmos SEP Graphic Organizers** Asking Questions Planning and Carrying Out Investigations Analyzing and Interpreting Data Use Mathematical and Computational Thinking Developing and Using Models Constructing Explanations and Designing Solutions Engaging in Argument from Evidence **Cross-cutting Concepts:** **Gizmos CCC Graphic Organizers** Patterns Structure and Function Cause and Effect

Unit 2: *Chemical Bonding and Reactions*	**Module:** 8	**Instructional Periods:** 20
Module and Lessons	**Hands-on Investigations and Materials**	**STEELS Standards**
Module 8: *Chemical Reactions* (March 1 – April 9) **Encounter the Phenomena:** *What happens to food when you cook it?* **Lesson 1:** *Reactions and Equations* **Lesson 2:** *Classifying Chemical Reactions* **Lesson 3:** *Reactions in Aqueous Solutions* **Science & Society***: How one Women led the FDA to save lives* **Module Wrap-up:** *Revisit the phenomena; Go Further Data Analysis; Module Vocabulary Practice and Module Test*	**Module 8** **Launch Lab:** *How do you know when a chemical change has occurred?* **Materials** ammonia (NH 3), 0.1 M beaker, 100 -mL effervescent antacid tablet, 25-ml graduated cylinder, pipette, dropping glass stirring rod, thermometer, universal indicator, distilled water **Laboratory:** *Single - Replacement Reactions* **Materials** copper strips copper(II) sulfate (CuSO 4), 0.2 M hydrochloric acid (HCl), 3 M lead (1 -cm × 3 -cm strip) lead(II) nitrate (Pb(NO 3) 2), 0.2 M magnesium sulfate (MgSO 4), 0.2 M sandpaper, fine (10 cm × 10 cm) silver nitrate (AgNO 3), 0.2 M test tube rack test tubes zinc strip **Quick Investigation:** *Observe a*	**Build to Performance Expectations:** 3.2.9-12.F Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. Related Gizmos •Equilibrium and Concentration •Equilibrium and Pressure •Ocean Carbon Equilibrium - High School STEM CASE 3.2.9-12.G Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.Related Gizmos •Balancing Chemical Equations •Chemical Changes •Chemical Equations •Moles •Stoichiometry •Water Crisis - High School STEM CASE **Expand on Performance Expectation:** 3.2.9-12.C Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. 3.5.9-12.W Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs. Related Gizmos •Covalent Bonds •Ionic Bonds •Periodic Trends •Electrons and Chemical Reactions - High School STEM CASE **Disciplinary Core Ideas:** 3.2 Physical Science

	Precipitate -Forming Reaction **Materials** balance, 150 ml beaker, 100 ml graduated cylinder, magnesium sulfate heptahydrate (Epsom salts), sodium hydroxide pellets, glass stirring rod, distilled water	Structure and Properties of Matter Chemical Reactions 3.5 Technology & Engineering **Science & Engineering Practices: Gizmos SEP Graphic Organizers** Asking Questions Planning and Carrying Out Investigations Analyzing and Interpreting Data Use Mathematical and Computational Thinking Developing and Using Models Constructing Explanations and Designing Solutions Engaging in Argument from Evidence **Cross-cutting Concepts: Gizmos CCC Graphic Organizers** Patterns Stability and Change Energy and Matter

Unit 2: *Chemical Bonding and Reactions*	**Module:** 9	**Instructional Periods:** 20
Module and Lessons	**Hands-on Investigations and Materials**	**STEELS Standards**
Module 9: *The Mole* (April 12 – May 7) **Encounter the Phenomena:** *What happens to food when you cook it?* **Lesson 1:** *Measuring Matter* **Lesson 2:** *Mass and the Mole* **Lesson 3:** *Moles and Compounds* **Lesson 4:** *Empirical and Molecular Formulas* **Lesson 5:** *Formulas of Hydrates* **Science & Society:** *Making Cents* **Module Wrap-up:** *Revisit the phenomena; Go Further Data Analysis; Module Vocabulary Practice and Module Test*	**Module 9** **Launch Lab:** *How much is a mole?* **Materials** gumdrops, small marshmallows, mini - sized paper clip, metric ruler **Laboratory:** *Estimating the Size of a Mole* **Materials** balance, laboratory graduated cylinder, 100 -mL paper, notebook split peas **Quick Investigation:** *Analyze Chewing Gum* **Materials:** balance, laboratory beaker, 250 -mL gum, chewing paper towel scissors screen, window stirring rod, glass water weighing paper **Inquiry Into Chemistry: Solve It:** *Mystery of the Missing Mass* **Materials:** Bunsen burner, crucible holder,	**Build to Performance Expectation:** 3.2.9-12.G Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. Related Gizmos •Balancing Chemical Equations •Chemical Changes •Chemical Equations •Moles •Stoichiometry •Water Crisis - High School STEM CASE **Disciplinary Core Ideas:** 3.2 Physical Science Structure and Properties of Matter Chemical Reactions **Science & Engineering Practices:** Gizmos SEP Graphic Organizers Asking Questions Planning and Carrying Out Investigations Analyzing and Interpreting Data Use Mathematical and Computational Thinking Developing and Using Models Constructing Explanations and Designing Solutions **Cross-cutting Concepts:** Gizmos CCC Graphic Organizers Energy and Matter

	crucible, magnesium sulfate heptahydrate (Epsom salts), ring stand ring, small iron tongs, crucible, washing soda	Scale, proportion, and quantity

Unit 2: *Chemical Bonding and Reactions*	**Module:** 10	**Instructional Periods:** 20
Module and Lessons	**Hands-on Investigations and Materials**	**STEELS Standards**
Module 10: *Stoichiometry* (May 10 – June 8) **Encounter the Phenomena:** *How much carbon dioxide did this field of corn need to grow?* **Lesson 1:** *Defining Stoichiometry* **Lesson 2:** *Stoichiometry Calculations* **Lesson 3:** *Limiting Reactants* **Lesson 4:** *Percent Yield* **Nature of Science:** *The Stoichiometry That Just Might Save Your Life* **Module Wrap-up:** *Revisit the phenomena; Go Further Data Analysis; Module*	**Module 10** **Launch Lab:** *What evidence can you observe that a reaction is taking place?* **Materials** beaker, 100 -mL graduated cylinder, 10 -mL potassium permanganate ($KMnO_4$), 0.01M sodium hydrogen sulfite solution, 0.01M stirring rod, glass **ChemLAB:** *Determine the Mole Ratio* **Materials** balance, laboratory beaker, 150 -mL beaker, 400 -mL copper(II) sulfate pentahydrate, graduated cylinder, 100 -mL hot plate, iron filings (20 mesh) stirring rod, glass tongs, beaker, distilled water, weighing paper	**Master Performance Expectation:** 3.2.9-12.G Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. Related Gizmos •Unit Conversions •Unit Conversions 2 •Balancing Chemical Equations •Chemical Changes •Chemical Equations •Moles •Stoichiometry •Water Crisis - High School STEM CASE •Limiting Reactants • **Disciplinary Core Ideas:** 3.2 Physical Science Chemical Reactions **Science & Engineering Practices:** **Gizmos SEP Graphic Organizers** Asking Questions Planning and Carrying Out Investigations Analyzing and Interpreting Data Use Mathematical and Computational Thinking Developing and Using Models

Vocabulary Practice and Module Test **Revisit Unit Phenomena:** *How can understanding chemical bonding and reactions support fire safety?* **STEM Unit Project:** *Design a Water Purification System*	**Laboratory:** *Determining Reaction Ratios* **Materials** ammonium hydroxide (NH 4OH), 1.0 M barium hydroxide (Ba(OH) 2), 1.0 M beaker, 150 -mL burette, 50 -mL clamp, burette, 125 -mL Erlenmeyer flask, funnel, glass graduated cylinder, 50 -mL hydrochloric acid (HCl), 1 M phenolphthalein ring stand sodium hydroxide (NaOH), 1.0 M wash bottle **Laboratory:** *Observing a Limiting Reactant* **Materials** hydrochloric acid (HCl), 6 M magnesium ribbon, test tube holder, test tube rack test tube, 20 × 150 -mm **Laboratory:** *Stoichiometry of a Chemical Reaction* **Materials** balance, centigram microplate, 24 -well paper towel, thin-stem pipette, water	Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information **Cross-cutting Concepts:** **Gizmos CCC Graphic Organizers** Energy and Matter Cause and Effect Scale, proportion, and quantity