Marking Period 1 (MP1)	Science Curriculum Pacing Guide Grade HS CHEM + HONORS
MP1 **Standards for Science Content**	HS-PS1-1. 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. HS-PS1-2. 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. HS-PS1-3. 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 HS-PS1-4. 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. HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects). HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media HS-PS4-3. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-3: 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
MP1 **Topics**	Structure and Properties of Matter
MP1 **Skills/Concepts**	The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions. Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them.
MP1 **Core Materials**	McGraw Hill - Inspire Chemistry

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Marking Period 2 (MP2)	Science Curriculum Pacing Guide Grade HS CHEM + HONORS
MP2 **Standards for Science Content**	HS-PS1-1. 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. HS-PS1-2. 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. HS-PS1-3. 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. HS-PS 1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. Determine the mass of reactants required to produce the desired mass of product for a given reaction. HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects). HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3. 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 HS-ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem
MP2 **Topics**	Unit 1: Structure and Properties of Matter Unit 2: Chemical Bonding and Reactions
MP2 **Skills/Concepts**	Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them. Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.
MP2 **Core Materials**	McGraw Hill - Inspire Chemistry

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Marking Period 3 (MP3)	Science Curriculum Pacing Guide Grade HS CHEM + HONORS
MP3 **Standards for Science Content**	HS-PS1-1. 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. HS-PS1-2. 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. HS-PS1-3. 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. HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. HS-PS 1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. Determine the mass of reactants required to produce the desired mass of product for a given reaction. HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. HS-PS3-1. Create a computation model to calculate the changes in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system is known HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects). HS-PS3-4. Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperatures are combined within a closed system results in a more uniform energy distribution among the components in the system. HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants HS-ETS 1-3. 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.
MP3 **Topics**	Unit 2 - Chemical Bonding and Reactions; Unit 3 - Matter, Energy, and Equilibrium
MP3 **Skills/Concepts**	Unit 2 focuses on Chemical Bonding and introduces the foundational concepts of ionic and covalent bonding, essential for understanding how atoms combine to form compounds. Emphasizing reactions, balancing, and types of reactions, rather than reaction stoichiometry, allows students to focus on the qualitative aspects of chemical changes, helping them understand why reactions occur and how different elements interact. Unit 2 enhances problem-solving and quantitative reasoning skills, allowing students to apply stoichiometric calculations to predict the outcomes of chemical reactions, which is vital for real-world applications in fields like medicine and industry. Unit 3 focuses on Chemical Bonding and introduces chemical reactions and stoichiometry, and the relationship between matter, energy, and gas laws—which are essential for students to develop a comprehensive understanding of fundamental chemistry concepts. Unit 3, focused on gas behavior and energy transformations, builds foundational knowledge in thermodynamics, critical for understanding processes like respiration, weather systems, and energy conversion in technologies. The study of energy and chemical changes allows students to explore how energy is transferred and conserved during reactions, helping them understand concepts like enthalpy, entropy, and the laws of thermodynamics. These principles are key to understanding reaction rates, which students investigate by examining factors like temperature, concentration, and catalysts that influence how quickly or slowly chemical reactions occur. Equilibrium provides a critical context for students to analyze reversible reactions and the conditions under which systems shift between different states of balance, a concept that is both conceptually rich and practically significant in fields such as environmental science and industrial chemistry. •Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons. •The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter
MP3 **Core Materials**	Inspire Chemistry (McGraw Hill)

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Marking Period 4(MP4)	Science Curriculum Pacing Guide Grade HS CHEM + HONORS
MP4	HS-PS1-1. 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.
Standards for Science Content	HS-PS1-2. 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.
	HS-PS1-3. 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.
	HS-PS1-4. 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.
	HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
	HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.
	HS-PS 1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. Determine the mass of reactants required to produce the desired mass of product for a given reaction.
	HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.
	HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.
	HS-PS-3-1. Create a computational model to calculate the changes in the energy of one component in a system when the change in energy of the of the other component and energy flows in and out of the system is known.
	HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects).
	HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
	HS-PS3-4. Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperatures are combined within a closed system results in a more uniform energy distribution among the components in the system.
	HS-PS4-4. Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter

	HS-ETS1-1.Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
	HS-ETS 1-3. 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
Skills/Concepts	Unit 3 – Matter, Energy, and Equilibrium focuses on Chemical Bonding and introduces chemical reactions and stoichiometry, and the relationship between matter, energy, and gas laws—which are essential for students to develop a comprehensive understanding of fundamental chemistry concepts. Unit 3, focused on gas behavior and energy transformations, builds foundational knowledge in thermodynamics, critical for understanding processes like respiration, weather systems, and energy conversion in technologies. The study of energy and chemical changes allows students to explore how energy is transferred and conserved during reactions, helping them understand concepts like enthalpy, entropy, and the laws of thermodynamics. These principles are key to understanding reaction rates, which students investigate by examining factors like temperature, concentration, and catalysts that influence how quickly or slowly chemical reactions occur. Equilibrium provides a critical context for students to analyze reversible reactions and the conditions under which systems shift between different states of balance, a concept that is both conceptually rich and practically significant in fields such as environmental science and industrial chemistry. Unit 4: Nuclear Chemistry This unit explores the structure and stability of atomic nuclei and the processes of radioactive decay and nuclear reactions. Students learn about half-life, nuclear energy, and the conversion of mass to energy while examining applications in medicine, energy production, and environmental science. The unit promotes scientific literacy by helping students evaluate the benefits and risks of nuclear technology and strengthens quantitative and critical thinking skills. Big Idea 4: The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter. Big Idea 5: Any bond or intermolecular attraction that can be formed can be broken. These two processes are in a dynamic competition, sensitive to initial conditions and external perturbations. Big Idea 6: The changes in the composition of the nucleus of the atom results in large amount of energy released during the processes of fission, fusion, and radioactive decay
MP4 **Core Materials**	Inspired Chemistry (McGraw Hill)