Nevada's Academic Content Standards Alignment Form: Science

Directions

1) Download or make a copy of this document.
2) Save this document using the following naming convention: Vendor-Name_ContentArea_StandAlign_Year_Purpose (*example:* NDE-Publishing_SocialStudies_2025_DistanceEducation)
3) Complete the "Information" section below.
4) Complete the worksheet(s) for the grade level(s) of the course(s) you are submitting by selecting the appropriate tab below. Columns 'B' and 'C' should be completed in their entirety.
5) Please leave columns 'E' and 'F' blank. These columns are reserved for the Nevada Department of Education to leave feedback on whether or not a standard has been met.

Information	
Vendor or Entity Name:	PASCO Certified Version of OpenSciEd High School Chemistry
Submission Date:	June 2026
Content Area:	Chemistry
Course Name(s) and Number(s):	Chemistry-3100/Chemistry Honors-31004
Grade Level(s) or Band(s):	Grades 9-12

Nevada's Academic Content Standards Alignment Form for Chemistry

Nevada Academic Content Standards for Chemistry	Provide Direct Links or Specific Locations Where the Standard is Located in Your Materials.	Provide Direct Links or Specific Locations Where the Standard is Assessed.	For NDE Use Only Determination (Meets/Does Not Meet)	For NDE Use Only Reviewer Comments/Justification
HS-PS1 Matter and Its Interactions				
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.	Chemistry Unit 2, Lessons 5,9: https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view Chemistry Unit 3, Lessons 7,8,9,15: https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view?usp=sharing In Unit 2 students figure out that atoms contain substructures with different charges to help explain lightning production due to polarization differences between the air and ground. They use a simplified atomic model, the paperclip model, to aid in sensemaking. In Unit 3 students build upon atomic structure and evaluate the usefulness of multiple atomic models (e.g., Lewis Dot, electron shell, and electric cloud). Students develop the periodic table using patterns in similarities between atomic characteristics.	Chemistry Unit 2, Lessons 5,9: https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx Chemistry Unit 3, Lessons 7,8,9,15: https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy In Unit 2 students figure out that atoms contain substructures with different charges to help explain lightning production due to polarization differences between the air and ground. They use a simplified atomic model, the paperclip model, to aid in sensemaking. In Unit 3 students build upon atomic structure and evaluate the usefulness of multiple atomic models (e.g., Lewis Dot, electron shell, and electric cloud). Students develop the periodic table using patterns in similarities between atomic characteristics.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 3, Lessons 6-9,15: https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view In Unit 3, students figure out the periodic table orders elements horizontally by the number of protons in the atom’s nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. These patterns can be used to explain the outcome of a simple chemical reaction.	Chemistry Unit 3, Lessons 6-9,15: https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy In Unit 3, students figure out the periodic table orders elements horizontally by the number of protons in the atom’s nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. These patterns can be used to explain the outcome of a simple chemical reaction.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 2, Lessons 1,6,8,11,12,13,14: https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view Chemistry Unit 3, Lessons 2,4,8,9, 10,13,14: https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view?usp=sharing In Unit 2 students use contact forces between material objects to explain differences in how lighting is/isn't able to travel through different materials (e.g., wood, metal, air). In Unit 3 the focus of force thinking is at the atomic scale to develop explanations of atomic bonds.	Chemistry Unit 2, Lessons 1,6,8,11,12,13,14: https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx Chemistry Unit 3, Lessons 2,4,8,9, 10,13,14: https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy In Unit 2 students use contact forces between material objects to explain differences in how lighting is/isn't able to travel through different materials (e.g., wood, metal, air). In Unit 3 the focus of force thinking is at the atomic scale to develop explanations of atomic bonds.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 5, Lessons 2,4,5,6,8: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 5 students figure out how the stability of substances, or ease of reaction, is related to bond energies of the molecules in the substance. The	Chemistry Unit 5, Lessons 2,4,5,6,8: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 5 students figure out how the stability of substances, or ease of reaction, is related to bond energies of the molecules in the substance. The	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 4, Lessons 8,11: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view In Unit 4 students figure out how rates of chemical reactions can change as a result of changes in concentration or temperature of the substances involved in the chemical reaction.	Chemistry Unit 4, Lessons 8,11: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 In Unit 4 students figure out how rates of chemical reactions can change as a result of changes in concentration or temperature of the substances involved in the chemical reaction.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 4, Lessons 3,4,6,7,10,11,14,15: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view In Unit 4, students use a simulation and data to determine that some reactions are reversible and will eventually stabilize at an equilibrium level. Students design and conduct an investigation to test how temperature or concentration affect how much product a reaction makes. Students develop a model to explain how this occurs.	Chemistry Unit 4, Lessons 3,4,6,7,10,11,14,15: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 In Unit 4, students use a simulation and data to determine that some reactions are reversible and will eventually stabilize at an equilibrium level. Students design and conduct an investigation to test how temperature or concentration affect how much product a reaction makes. Students develop a model to explain how this occurs.	Meets Standard	There is clear evidence in this instructional material that students define the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	Chemistry Unit 4, Lessons 4,8,19,15: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view In Unit 4, students will consider if equations account for conservation of mass. Students will determine how much base is needed to neutralize the ocean for the effects of acidification.	Chemistry Unit 4, Lessons 4,8,19,15: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 In Unit 4, students will consider if equations account for conservation of mass. Students will determine how much base is needed to neutralize the ocean for the effects of acidification.	Meets Standard	There is clear evidence in this instructional material that students use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical 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.	Chemistry Unit 5, Lesson 11: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 5 students develop models to illustrate the changes in the composition of the nucleus and the energy released during fission.	Chemistry Unit 5, Lesson 11: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 5 students develop models to illustrate the changes in the composition of the nucleus and the energy released during fission.	Meets Standard	There is clear evidence in this instructional material that students 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-PS3 Energy				
HS-PS3-1. Create a computational model to calculate the change 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 are known.	Chemistry Unit 1, Lessons10,12: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view Chemistry Unit 5, Lessons 3,7: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 1 students use energy transfers between the atmosphere, hydrosphere, and cryosphere to explain rising sea levels. Additionally, they use mathematical representations to show energy conservation as energy is transferred between the three spheres. In Unit 5 students quantitatively reason about energy transfer and how positions of charged particles result in a release in energy during chemical reactions.	Chemistry Unit 1, Lessons10,12: https://docs.google.com/document/d/1SiIqxdYGTZsIKWOvSFoHKfIeXSUk6IRUWcXOfUOv0Zg/edit?tab=t.0#bookmark=id.m08yq8id4d1n Chemistry Unit 5, Lessons 3,7: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 1 students use energy transfers between the atmosphere, hydrosphere, and cryosphere to explain rising sea levels. Additionally, they use mathematical representations to show energy conservation as energy is transferred between the three spheres. In Unit 5 students quantitatively reason about energy transfer and how positions of charged particles result in a release in energy during chemical reactions.	Meets Standard	There is clear evidence in this instructional material that students create a computational model to calculate the change 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 are 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 motions of particles (objects) and energy associated with the relative position of particles (objects).	Chemistry Unit 2, Lessons 10,11,12: https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view Chemistry Unit 5, Lessons 1,3,9: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 2 students identify that energy is present when lightning strikes and represent energy transfer at the microscopic level via particle motion and fields. In Unit 5 students trace the different ways energy is manifested during combustion reactions and examine energy relationships at a microscopic scale to build understanding of how batteries work.	Chemistry Unit 2, Lessons 10,11,12: https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx Chemistry Unit 5, Lessons 1,3,9: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 2 students identify that energy is present when lightning strikes and represent energy transfer at the microscopic level via particle motion and fields. In Unit 5 students trace the different ways energy is manifested during combustion reactions and examine energy relationships at a microscopic scale to build understanding of how batteries work.	Meets Standard	There is clear evidence in this instructional material that students develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position 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.	This Performance Expectation will be addressed in the Physics or Physics Honors course that students will take after Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 2 (https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view). Students model energy transfers within a dropper system in Lessons 2-4 as a small scale system and then apply their learning to a lightning as a large scale system in Lesson 11.	This Performance Expectation will be addressed in the Physics or Physics Honors course that students will take after Chemistry or Chemistry Honors. (https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 2 (https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view). Students model energy transfers within a dropper system in Lessons 2-4 as a small scale system and then apply their learning to a lightning as a large scale system in Lesson 11.	Meets Standard	There is clear evidence in this instructional material that students 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 temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	Chemistry Unit 1, Lessons 6,10,13: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 2, students will plan and conduct an investigation to support their understanding of the solution of using a berm to slow the melting of the Ilussiat Glacier in Greenland. Students will use simulations and hands-on investigations.	Chemistry Unit 1, Lessons 6,10,13: https://docs.google.com/document/d/1SiIqxdYGTZsIKWOvSFoHKfIeXSUk6IRUWcXOfUOv0Zg/edit?tab=t.0#bookmark=id.m08yq8id4d1n In Unit 2, students will plan and conduct an investigation to support their understanding of the solution of using a berm to slow the melting of the Ilussiat Glacier in Greenland. Students will use simulations and hands-on investigations.	Meets Standard	There is clear evidence in this instructional material that students plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

HS-PS3-5. 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.	Chemistry Unit 2, Lesson 10: https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view Chemistry Unit 5, Lessons 4-7, 11: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 2 students develop understanding and generalize ideas that energy is stored in electric fields which is established by forces between particles as those particles move between systems. Throughout C.5 students develop understanding and connect changes in stored energy in a field to particle movement as they work to explain chemical bonds breaking and reforming.	Chemistry Unit 2, Lesson 10: https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx Chemistry Unit 5, Lessons 4-7, 11: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 2 students develop understanding and generalize ideas that energy is stored in electric fields which is established by forces between particles as those particles move between systems. Throughout C.5 students develop understanding and connect changes in stored energy in a field to particle movement as they work to explain chemical bonds breaking and reforming.	Meets Standard	There is clear evidence in this instructional material that students 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.
HS-LS1 From Molecules to Organisms: Structures and Processes				
HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view) In Chemistry Unit 3, students apply that they have learned about elements and polarity to a medicine to construct and explanation about how the structure of the protein changes the function it carries out in the human body.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy) In Chemistry Unit 3, students apply that they have learned about elements and polarity to a medicine to construct and explanation about how the structure of the protein changes the function it carries out in the human body.	Meets Standard	There is clear evidence in this instructional material that students construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 2 (https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view) In Unit 2, Lessons 13 and 14, students investigate electrolytes and salts, modeling how they dissolve in water, and relating them to conduction in the nervous system.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 2 (https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx) In Unit 2, Lessons 13 and 14, students investigate electrolytes and salts, modeling how they dissolve in water, and relating them to conduction in the nervous system.	Meets Standard	There is clear evidence in this instructional material that students develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 1 (https://drive.google.com/file/d/1BkG95uBGFojkjXjGABifGdfthmLflPLr/view) In Chemistry Unit 1, Lessons 5-7, students analyze data from investigations to differentiate between positive and negative feedback mechanisms/loops. They apply this understanding to a transfer task concerning chemical feedback loops in Earth's systems.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 1 (https://docs.google.com/document/d/1SiIqxdYGTZsIKWOvSFoHKfIeXSUk6IRUWcXOfUOv0Zg/edit?tab=t.0#bookmark=id.m08yq8id4d1n) In Chemistry Unit 1, Lessons 5-7, students analyze data from investigations to differentiate between positive and negative feedback mechanisms/loops. They apply this understanding to a transfer task concerning chemical feedback loops in Earth's systems.	Meets Standard	There is clear evidence in this instructional material that students plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 4 (https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view) In Chemistry Unit 4, Lesson 10, students use a model of the life cycle of an oyster to illustrate the importance that calcium plays in oyster development.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 4 (https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5) In Chemistry Unit 4, Lesson 10, students use a model of the life cycle of an oyster to illustrate the importance that calcium plays in oyster development.	Meets Standard	There is clear evidence in this instructional material that students use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 1 (https://drive.google.com/file/d/1BkG95uBGFojkjXjGABifGdfthmLfIPLr/view) In Chemistry Unit 1, Lessons 5-7, students analyze data from investigations to differentiate between positive and negative feedback mechanisms/loops. They apply this understanding to a transfer task concerning chemical feedback loops in Earth's systems. In lesson 7, they use the feedback loops as a model to show cycling of energy and carbon through Earth's systems, including photosynthesis.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 1 (https://docs.google.com/document/d/1SiIqxdYGTZsIKWOvSFoHKfIeXSUk6IRUWcXOfUOv0Zg/edit?tab=t.0#bookmark=id.m08yq8id4d1n) In Chemistry Unit 1, Lessons 5-7, students analyze data from investigations to differentiate between positive and negative feedback mechanisms/loops. They apply this understanding to a transfer task concerning chemical feedback loops in Earth's systems. In lesson 7, they use the feedback loops as a model to show cycling of energy and carbon through Earth's systems, including photosynthesis.	Meets Standard	There is clear evidence in this instructional material that students use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view) In Chemistry Unit 3, biological molecules are included in materials for survival that are investigated throughout the unit.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy) In Chemistry Unit 3, biological molecules are included in materials for survival that are investigated throughout the unit.	Meets Standard	There is clear evidence in this instructional material that students construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view) In Chemistry Unit 3, biological molecules are included in materials for survival that are investigated throughout the unit.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy) In Chemistry Unit 3, biological molecules are included in materials for survival that are investigated throughout the unit.	Meets Standard	There is clear evidence in this instructional material that students use a model to illustrate that cellular respiration is a chemical process that by the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
HS-ETS1 Engineering Design				
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.	Chemistry Unit 4, Lessons 10, 12, 14, 15: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view Chemistry Unit 5, Lessons 1,3,9: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 4 students identify how chemical engineering might be used to develop solutions to problems. In C.5 students consider how fuel choices for vehicle transportation can minimize pollution.	Chemistry Unit 4, Lessons 10, 12, 14, 15: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 Chemistry Unit 5, Lessons 1,3,9: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 4 students identify how chemical engineering might be used to develop solutions to problems. In C.5 students consider how fuel choices for vehicle transportation can minimize pollution.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 4, Lessons 10, 12, 14, 15: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view In Unit 4 students figure out that criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.	Chemistry Unit 4, Lessons 10, 12, 14, 15: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 In Unit 4 students figure out that criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.	Meets Standard	There is clear evidence in this instructional material that students 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.	This Performance Expectation will be addressed in the Biology or Biology Honors course that students will take before Chemistry or Chemistry Honors and the Physics or Physics Honors course taken after. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 5, Lessons 1,3,9: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 5 students take into consideration a range of constraints and they consider how fuel choices for vehicle transportation can minimize pollution.	This Performance Expectation will be addressed in the Biology or Biology Honors course that students will take before Chemistry or Chemistry Honors and the Physics or Physics Honors course taken after. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 5, Lessons 1,3,9: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 5 students take into consideration a range of constraints and they consider how fuel choices for vehicle transportation can minimize pollution.	Meets Standard	There is clear evidence in this instructional material that students 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.	This Performance Expectation will be addressed in the Physics or Physics Honors course that students will take after Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 5, Lessons 1,3,9: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 5 students take into consideration a range of constraints and they consider how fuel choices for vehicle transportation can minimize pollution.	This Performance Expectation will be addressed in the Physics or Physics Honors course that students will take after Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 5, Lessons 1,3,9: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 5 students take into consideration a range of constraints and they consider how fuel choices for vehicle transportation can minimize pollution.	Meets Standard	There is clear evidence in this instructional material that students 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.

Nevada's Academic Content Standards Alignment Form for Chemistry

Nevada Academic Content Standards for Chemistry	Provide Direct Links or Specific Locations Where the Standard is Located in Your Materials.	Provide Direct Links or Specific Locations Where the Standard is Assessed.	**For NDE Use Only** Determination (Meets/Does Not Meet)	**For NDE Use Only** Reviewer Comments/Justification
HS-PS1 Matter and Its Interactions				
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.	Chemistry Unit 2, Lessons 5,9: https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view Chemistry Unit 3, Lessons 7,8,9,15: https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view?usp=sharing In Unit 2 students figure out that atoms contain substructures with different charges to help explain lightning production due to polarization differences between the air and ground. They use a simplified atomic model, the paperclip model, to aid in sensemaking. In Unit 3 students build upon atomic structure and evaluate the usefulness of multiple atomic models (e.g., Lewis Dot, electron shell, and electric cloud). Students develop the periodic table using patterns in similarities between atomic characteristics.	Chemistry Unit 2, Lessons 5,9: https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx Chemistry Unit 3, Lessons 7,8,9,15: https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy In Unit 2 students figure out that atoms contain substructures with different charges to help explain lightning production due to polarization differences between the air and ground. They use a simplified atomic model, the paperclip model, to aid in sensemaking. In Unit 3 students build upon atomic structure and evaluate the usefulness of multiple atomic models (e.g., Lewis Dot, electron shell, and electric cloud). Students develop the periodic table using patterns in similarities between atomic characteristics.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 3, Lessons 6-9,15: https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view In Unit 3, students figure out the periodic table orders elements horizontally by the number of protons in the atom’s nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. These patterns can be used to explain the outcome of a simple chemical reaction.	Chemistry Unit 3, Lessons 6-9,15: https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy In Unit 3, students figure out the periodic table orders elements horizontally by the number of protons in the atom’s nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. These patterns can be used to explain the outcome of a simple chemical reaction.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 2, Lessons 1,6,8,11,12,13,14: https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view Chemistry Unit 3, Lessons 2,4,8,9, 10,13,14: https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view?usp=sharing In Unit 2 students use contact forces between material objects to explain differences in how lighting is/isn't able to travel through different materials (e.g., wood, metal, air). In Unit 3 the focus of force thinking is at the atomic scale to develop explanations of atomic bonds.	Chemistry Unit 2, Lessons 1,6,8,11,12,13,14: https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx Chemistry Unit 3, Lessons 2,4,8,9, 10,13,14: https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy In Unit 2 students use contact forces between material objects to explain differences in how lighting is/isn't able to travel through different materials (e.g., wood, metal, air). In Unit 3 the focus of force thinking is at the atomic scale to develop explanations of atomic bonds.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 5, Lessons 2,4,5,6,8: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 5 students figure out how the stability of substances, or ease of reaction, is related to bond energies of the molecules in the substance. The	Chemistry Unit 5, Lessons 2,4,5,6,8: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 5 students figure out how the stability of substances, or ease of reaction, is related to bond energies of the molecules in the substance. The	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 4, Lessons 8,11: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view In Unit 4 students figure out how rates of chemical reactions can change as a result of changes in concentration or temperature of the substances involved in the chemical reaction.	Chemistry Unit 4, Lessons 8,11: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 In Unit 4 students figure out how rates of chemical reactions can change as a result of changes in concentration or temperature of the substances involved in the chemical reaction.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 4, Lessons 3,4,6,7,10,11,14,15: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view In Unit 4, students use a simulation and data to determine that some reactions are reversible and will eventually stabilize at an equilibrium level. Students design and conduct an investigation to test how temperature or concentration affect how much product a reaction makes. Students develop a model to explain how this occurs.	Chemistry Unit 4, Lessons 3,4,6,7,10,11,14,15: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 In Unit 4, students use a simulation and data to determine that some reactions are reversible and will eventually stabilize at an equilibrium level. Students design and conduct an investigation to test how temperature or concentration affect how much product a reaction makes. Students develop a model to explain how this occurs.	Meets Standard	There is clear evidence in this instructional material that students define the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	Chemistry Unit 4, Lessons 4,8,19,15: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view In Unit 4, students will consider if equations account for conservation of mass. Students will determine how much base is needed to neutralize the ocean for the effects of acidification.	Chemistry Unit 4, Lessons 4,8,19,15: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 In Unit 4, students will consider if equations account for conservation of mass. Students will determine how much base is needed to neutralize the ocean for the effects of acidification.	Meets Standard	There is clear evidence in this instructional material that students use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical 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.	Chemistry Unit 5, Lesson 11: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 5 students develop models to illustrate the changes in the composition of the nucleus and the energy released during fission.	Chemistry Unit 5, Lesson 11: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 5 students develop models to illustrate the changes in the composition of the nucleus and the energy released during fission.	Meets Standard	There is clear evidence in this instructional material that students 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-PS3 Energy				
HS-PS3-1. Create a computational model to calculate the change 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 are known.	Chemistry Unit 1, Lessons10,12: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view Chemistry Unit 5, Lessons 3,7: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 1 students use energy transfers between the atmosphere, hydrosphere, and cryosphere to explain rising sea levels. Additionally, they use mathematical representations to show energy conservation as energy is transferred between the three spheres. In Unit 5 students quantitatively reason about energy transfer and how positions of charged particles result in a release in energy during chemical reactions.	Chemistry Unit 1, Lessons10,12: https://docs.google.com/document/d/1SiIqxdYGTZsIKWOvSFoHKfIeXSUk6IRUWcXOfUOv0Zg/edit?tab=t.0#bookmark=id.m08yq8id4d1n Chemistry Unit 5, Lessons 3,7: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 1 students use energy transfers between the atmosphere, hydrosphere, and cryosphere to explain rising sea levels. Additionally, they use mathematical representations to show energy conservation as energy is transferred between the three spheres. In Unit 5 students quantitatively reason about energy transfer and how positions of charged particles result in a release in energy during chemical reactions.	Meets Standard	There is clear evidence in this instructional material that students create a computational model to calculate the change 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 are 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 motions of particles (objects) and energy associated with the relative position of particles (objects).	Chemistry Unit 2, Lessons 10,11,12: https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view Chemistry Unit 5, Lessons 1,3,9: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 2 students identify that energy is present when lightning strikes and represent energy transfer at the microscopic level via particle motion and fields. In Unit 5 students trace the different ways energy is manifested during combustion reactions and examine energy relationships at a microscopic scale to build understanding of how batteries work.	Chemistry Unit 2, Lessons 10,11,12: https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx Chemistry Unit 5, Lessons 1,3,9: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 2 students identify that energy is present when lightning strikes and represent energy transfer at the microscopic level via particle motion and fields. In Unit 5 students trace the different ways energy is manifested during combustion reactions and examine energy relationships at a microscopic scale to build understanding of how batteries work.	Meets Standard	There is clear evidence in this instructional material that students develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position 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.	This Performance Expectation will be addressed in the Physics or Physics Honors course that students will take after Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 2 (https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view). Students model energy transfers within a dropper system in Lessons 2-4 as a small scale system and then apply their learning to a lightning as a large scale system in Lesson 11.	This Performance Expectation will be addressed in the Physics or Physics Honors course that students will take after Chemistry or Chemistry Honors. (https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 2 (https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view). Students model energy transfers within a dropper system in Lessons 2-4 as a small scale system and then apply their learning to a lightning as a large scale system in Lesson 11.	Meets Standard	There is clear evidence in this instructional material that students 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 temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	Chemistry Unit 1, Lessons 6,10,13: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 2, students will plan and conduct an investigation to support their understanding of the solution of using a berm to slow the melting of the Ilussiat Glacier in Greenland. Students will use simulations and hands-on investigations.	Chemistry Unit 1, Lessons 6,10,13: https://docs.google.com/document/d/1SiIqxdYGTZsIKWOvSFoHKfleXSUk6IRUWcXOfUOv0Zg/edit?tab=t.0#bookmark=id.m08yq8id4d1n In Unit 2, students will plan and conduct an investigation to support their understanding of the solution of using a berm to slow the melting of the Ilussiat Glacier in Greenland. Students will use simulations and hands-on investigations.	Meets Standard	There is clear evidence in this instructional material that students plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

HS-PS3-5. 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.	Chemistry Unit 2, Lesson 10: https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view Chemistry Unit 5, Lessons 4-7, 11: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 2 students develop understanding and generalize ideas that energy is stored in electric fields which is established by forces between particles as those particles move between systems. Throughout C.5 students develop understanding and connect changes in stored energy in a field to particle movement as they work to explain chemical bonds breaking and reforming.	Chemistry Unit 2, Lesson 10: https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx Chemistry Unit 5, Lessons 4-7, 11: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 2 students develop understanding and generalize ideas that energy is stored in electric fields which is established by forces between particles as those particles move between systems. Throughout C.5 students develop understanding and connect changes in stored energy in a field to particle movement as they work to explain chemical bonds breaking and reforming.	Meets Standard	There is clear evidence in this instructional material that students 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.
HS-LS1 From Molecules to Organisms: Structures and Processes				
HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view) In Chemistry Unit 3, students apply that they have learned about elements and polarity to a medicine to construct and explanation about how the structure of the protein changes the function it carries out in the human body.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy) In Chemistry Unit 3, students apply that they have learned about elements and polarity to a medicine to construct and explanation about how the structure of the protein changes the function it carries out in the human body.	Meets Standard	There is clear evidence in this instructional material that students construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 2 (https://drive.google.com/file/d/1Khs1KtBjXlFnp9wwiLVOnIZoehv86-2q/view) In Unit 2, Lessons 13 and 14, students investigate electrolytes and salts, modeling how they dissolve in water, and relating them to conduction in the nervous system.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 2 (https://docs.google.com/document/d/1ZNzWizP-6VQ8PiChNdCIcv1Ky8BKyBeqHp8s-9WP_Og/edit?tab=t.0#bookmark=id.v5msazw1v0gx) In Unit 2, Lessons 13 and 14, students investigate electrolytes and salts, modeling how they dissolve in water, and relating them to conduction in the nervous system.	Meets Standard	There is clear evidence in this instructional material that students develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 1 (https://drive.google.com/file/d/1BkG95uBGFojkjXjGABifGdfthmLfIPLr/view) In Chemistry Unit 1, Lessons 5-7, students analyze data from investigations to differentiate between positive and negative feedback mechanisms/loops. They apply this understanding to a transfer task concerning chemical feedback loops in Earth's systems.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 1 (https://docs.google.com/document/d/1SiIqxdYGTZsIKWOvSFoHKfIeXSUk6IRUWcXOfUOv0Zg/edit?tab=t.0#bookmark=id.m08yq8id4d1n) In Chemistry Unit 1, Lessons 5-7, students analyze data from investigations to differentiate between positive and negative feedback mechanisms/loops. They apply this understanding to a transfer task concerning chemical feedback loops in Earth's systems.	Meets Standard	There is clear evidence in this instructional material that students plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 4 (https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view) In Chemistry Unit 4, Lesson 10, students use a model of the life cycle of an oyster to illustrate the importance that calcium plays in oyster development.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 4 (https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5) In Chemistry Unit 4, Lesson 10, students use a model of the life cycle of an oyster to illustrate the importance that calcium plays in oyster development.	Meets Standard	There is clear evidence in this instructional material that students use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 1 (https://drive.google.com/file/d/1BkG95uBGFojkjXjGABifGdfthmLfIPLr/view) In Chemistry Unit 1, Lessons 5-7, students analyze data from investigations to differentiate between positive and negative feedback mechanisms/loops. They apply this understanding to a transfer task concerning chemical feedback loops in Earth's systems. In lesson 7, they use the feedback loops as a model to show cycling of energy and carbon through Earth's systems, including photosynthesis.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 1 (https://docs.google.com/document/d/1SiIqxdYGTZsIKWOvSFoHKfIeXSUk6IRUWcXOfUOv0Zg/edit?tab=t.0#bookmark=id.m08yq8id4d1n) In Chemistry Unit 1, Lessons 5-7, students analyze data from investigations to differentiate between positive and negative feedback mechanisms/loops. They apply this understanding to a transfer task concerning chemical feedback loops in Earth's systems. In lesson 7, they use the feedback loops as a model to show cycling of energy and carbon through Earth's systems, including photosynthesis.	Meets Standard	There is clear evidence in this instructional material that students use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view) In Chemistry Unit 3, biological molecules are included in materials for survival that are investigated throughout the unit.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy) In Chemistry Unit 3, biological molecules are included in materials for survival that are investigated throughout the unit.	Meets Standard	There is clear evidence in this instructional material that students construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://drive.google.com/file/d/1UNPTXsGxn4_MMAIt0cmFaCiIglaFhk7l/view) In Chemistry Unit 3, biological molecules are included in materials for survival that are investigated throughout the unit.	This Performance Expectation will be addressed in the Biology of Biology Honors course that students will take before Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 3 (https://docs.google.com/document/d/1EEeTe63-wS8aUMhXffifVwfpUQtC7FLcnxhz5ZnfNOw/edit?tab=t.0#bookmark=id.dvkii1pp45uy) In Chemistry Unit 3, biological molecules are included in materials for survival that are investigated throughout the unit.	Meets Standard	There is clear evidence in this instructional material that students use a model to illustrate that cellular respiration is a chemical process that by the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
HS-ETS1 Engineering Design				
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.	Chemistry Unit 4, Lessons 10, 12, 14, 15: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view Chemistry Unit 5, Lessons 1,3,9: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 4 students identify how chemical engineering might be used to develop solutions to problems. In C.5 students consider how fuel choices for vehicle transportation can minimize pollution.	Chemistry Unit 4, Lessons 10, 12, 14, 15: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 Chemistry Unit 5, Lessons 1,3,9: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 4 students identify how chemical engineering might be used to develop solutions to problems. In C.5 students consider how fuel choices for vehicle transportation can minimize pollution.	Meets Standard	There is clear evidence in this instructional material that students 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.	Chemistry Unit 4, Lessons 10, 12, 14, 15: https://drive.google.com/file/d/1_XaC8fN6cZcHd8CeXRKEnxijY3M8LVnn/view In Unit 4 students figure out that criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.	Chemistry Unit 4, Lessons 10, 12, 14, 15: https://docs.google.com/document/d/1rAPOGkIpE3yDl7Ln32EOCmpp8KGnX20d1wTE03TelQI/edit?tab=t.0#bookmark=id.nmj9gd5qkoo5 In Unit 4 students figure out that criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.	Meets Standard	There is clear evidence in this instructional material that students 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.	This Performance Expectation will be addressed in the Biology or Biology Honors course that students will take before Chemistry or Chemistry Honors and the Physics or Physics Honors course taken after. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 5, Lessons 1,3,9: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 5 students take into consideration a range of constraints and they consider how fuel choices for vehicle transportation can minimize pollution.	This Performance Expectation will be addressed in the Biology or Biology Honors course that students will take before Chemistry or Chemistry Honors and the Physics or Physics Honors course taken after. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 5, Lessons 1,3,9: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 5 students take into consideration a range of constraints and they consider how fuel choices for vehicle transportation can minimize pollution.	Meets Standard	There is clear evidence in this instructional material that students 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.	This Performance Expectation will be addressed in the Physics or Physics Honors course that students will take after Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 5, Lessons 1,3,9: https://drive.google.com/file/d/1h5YdCdP6oYhD5YZeZmltlPUTnPgD3uNo/view In Unit 5 students take into consideration a range of constraints and they consider how fuel choices for vehicle transportation can minimize pollution.	This Performance Expectation will be addressed in the Physics or Physics Honors course that students will take after Chemistry or Chemistry Honors. (https://drive.google.com/file/d/1ExJq-kwzdcRIWuyuufwq4jTkKUch8fkz/view?usp=sharing) Further, the elements of this Performance Expectation are explicitly addressed in Chemistry Unit 5, Lessons 1,3,9: https://docs.google.com/document/d/1h1VlbNKQ-chOiUZQ5YFGxDwrMtCrIJs8KKSspeABS5Y/edit?tab=t.0#bookmark=id.tf0pgqzxwpm In Unit 5 students take into consideration a range of constraints and they consider how fuel choices for vehicle transportation can minimize pollution.	Meets Standard	There is clear evidence in this instructional material that students 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.