

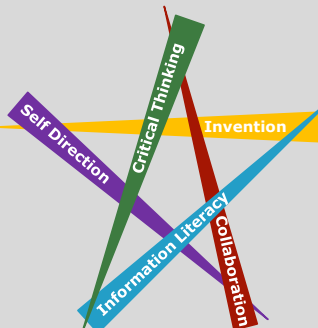
**Curriculum Development Course at a Glance
Planning for High School Science**

Content Area	Science	Grade Level	High School
Course Name/Course Code	Physical Science		
Standard	Grade Level Expectations (GLE)	GLE Code	
1. Physical Science	1. Newton’s laws of motion and gravitation describe the relationships among forces acting on and between objects, their masses, and changes in their motion – but have limitations	SC09-GR.HS-S.1-GLE.1	
	2. Matter has definite structure that determines characteristic physical and chemical properties	SC09-GR.HS-S.1-GLE.2	
	3. Matter can change form through chemical or nuclear reactions abiding by the laws of conservation of mass and energy	SC09-GR.HS-S.1-GLE.3	
	4. Atoms bond in different ways to form molecules and compounds that have definite properties	SC09-GR.HS-S.1-GLE.4	
	5. Energy exists in many forms such as mechanical, chemical, electrical, radiant, thermal, and nuclear, that can be quantified and experimentally determined	SC09-GR.HS-S.1-GLE.5	
	6. When energy changes form, it is neither created not destroyed; however, because some is necessarily lost as heat, the amount of energy available to do work decreases	SC09-GR.HS-S.1-GLE.6	
2. Life Science	1. Matter tends to be cycled within an ecosystem, while energy is transformed and eventually exits an ecosystem	SC09-GR.HS-S.2-GLE.1	
	2. The size and persistence of populations depend on their interactions with each other and on the abiotic factors in an ecosystem	SC09-GR.HS-S.2-GLE.2	
	3. Cellular metabolic activities are carried out by biomolecules produced by organisms	SC09-GR.HS-S.2-GLE.3	
	4. The energy for life primarily derives from the interrelated processes of photosynthesis and cellular respiration. Photosynthesis transforms the sun’s light energy into the chemical energy of molecular bonds. Cellular respiration allows cells to utilize chemical energy when these bonds are broken.	SC09-GR.HS-S.2-GLE.4	
	5. Cells use the passive and active transport of substances across membranes to maintain relatively stable intracellular environments	SC09-GR.HS-S.2-GLE.5	
	6. Cells, tissues, organs, and organ systems maintain relatively stable internal environments, even in the face of changing external environments	SC09-GR.HS-S.2-GLE.6	
	7. Physical and behavioral characteristics of an organism are influenced to varying degrees by heritable genes, many of which encode instructions for the production of proteins	SC09-GR.HS-S.2-GLE.7	
	8. Multicellularity makes possible a division of labor at the cellular level through the expression of select genes, but not the entire genome	SC09-GR.HS-S.2-GLE.8	
	9. Evolution occurs as the heritable characteristics of populations change across generations and can lead populations to become better adapted to their environment	SC09-GR.HS-S.2-GLE.9	

**Curriculum Development Course at a Glance
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3. Earth Systems Science	1. The history of the universe, solar system and Earth can be inferred from evidence left from past events	SC09-GR.HS-S.3-GLE.1
	2. As part of the solar system, Earth interacts with various extraterrestrial forces and energies such as gravity, solar phenomena, electromagnetic radiation, and impact events that influence the planet's geosphere, atmosphere, and biosphere in a variety of ways	SC09-GR.HS-S.3-GLE.2
	3. The theory of plate tectonics helps to explain geological, physical, and geographical features of Earth	SC09-GR.HS-S.3-GLE.3
	4. Climate is the result of energy transfer among interactions of the atmosphere, hydrosphere, geosphere, and biosphere	SC09-GR.HS-S.3-GLE.4
	5. There are costs, benefits, and consequences of exploration, development, and consumption of renewable and nonrenewable resources	SC09-GR.HS-S.3-GLE.5
	6. The interaction of Earth's surface with water, air, gravity, and biological activity causes physical and chemical changes	SC09-GR.HS-S.3-GLE.6
	7. Natural hazards have local, national and global impacts such as volcanoes, earthquakes, tsunamis, hurricanes, and thunderstorms	SC09-GR.HS-S.3-GLE.7

Colorado 21st Century Skills



Critical Thinking and Reasoning: *Thinking Deeply, Thinking Differently*

Information Literacy: *Untangling the Web*

Collaboration: *Working Together, Learning Together*

Self-Direction: *Own Your Learning*

Invention: *Creating Solutions*

**Reading & Writing Standards for Literacy
in Science and Technical Subjects 6 - 12**

Reading Standards

- Key Ideas & Details
- Craft And Structure
- Integration of Knowledge and Ideas
- Range of Reading and Levels of Text Complexity

Writing Standards

- Text Types & Purposes
- Production and Distribution of Writing
- Research to Construct and Present Knowledge
- Range of Writing

Unit Titles	Length of Unit/Contact Hours	Unit Number/Sequence
Motion and Force	7-9 weeks	1
Characteristics of Matter	6-8 weeks	2
Chemical Reactions	7-9 weeks	3
Forms and Transformation of Energy	8-9 weeks	4

**Curriculum Development Overview
Unit Planning for High School Science**

Unit Title	Motion and Force		Length of Unit	7-9 Weeks
Focusing Lens(es)	Cause and effect	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.HS-S.1-GLE.1 SC09-GR.HS-S.3-GLE.3	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • What are the pros and cons related to building cars out of less dense materials? • How does an understanding of the laws of motion create a safer and/or more dangerous world? 			
Unit Strands	Physical Science			
Concepts	Mass, Velocity, Motion, Acceleration, Force, Friction, Law, Theory, Gravitation, Matter, Inertia, Momentum			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Laws of motion and gravitation capture (in formula) how forces affect the motion of matter (SC09-GR.HS-S.1-GLE.1-EO.b,c; IQ.1; N.1)	<p>What are the different ways that motion can be affected by force? (Speed up, slow down, change direction, have no effect).</p> <p>What determines which kind of motion results from a force? (SC09-GR.HS-S.1-GLE.1;IQ.1) and (SC09-GR.HS-S.1-GLE.1;IQ.2)</p>	What are some causes of forces? How do forces affect velocity and acceleration? (SC09-GR.HS-S.1-GLE.1-E.O.b)
Unbalanced forces cause motion to change (SC09-GR.HS-S.1-GLE.1-E.O.a,b; N.1)	<p>How is force related to mass and acceleration ($F=ma$)? What determines how much force is needed to move an object? (SC09-GR.HS-S.1-GLE.1-EO.a,b;N.1)</p>	<p>How can you build a 150 story building without it falling over?</p> <p>How do structural engineers determine if a building or bridge will collapse or keep a sound structure?</p>
An object can increase or decrease in acceleration without impacting velocity. (SC09-GR.HS-S.1-GLE.1-EO.a,b)	<p>How can acceleration change but not velocity? How can you decrease velocity and still increase acceleration?</p>	What designs in consumer products are influenced by the relationship between velocity and acceleration?

**Curriculum Development Overview
Unit Planning for High School Science**

<p>The relationship between force and friction leads engineers to employ more efficient technological designs (ex. automobiles). (SC09-GR.HS-S.1-GLE.1-EO.a,b,c)</p>	<p>What type of surface would be needed for an object to slide freely? (SC09-GR.HS-S.1-GLE.1-EO.c) Why do skiers put wax on their skis? What is the difference between a scientific Theory and a common theory or hypothesis? (SC09-GR.HS-S.1-GLE.1;N.3) What is the difference between a scientific Law and a social law? (SC09-GR.HS-S.1-GLE.1;N.3)</p>	<p>What would happen if there was no air resistance? How would you determine that an observation has become a Law? (SC09-GR.HS-S.1-GLE.1;N.3)</p>
<p>Objects traveling at the same velocity exemplify the direct relationship between inertia and momentum. (SC09-GR.HS-S.1-GLE.1-EO.a,c)</p>	<p>A semi-truck and a small car are traveling at the same speed, which has a greater momentum? Which has a greater inertia?</p>	<p>Why is it important for cars to have seatbelts? (SC09-GR.HS-S.1-GLE.1;IQ.2)</p>

<p>Critical Content: My students will Know...</p>	<p>Key Skills: My students will be able to (Do)...</p>
<ul style="list-style-type: none"> • Newton’s laws of motion. (SC09-GR.HS-S.1-GLE.1-EO.a,b,c,d) • The law of universal gravitation. (SC09-GR.HS-S.1-GLE.1-EO.a,b,c,d) • The position, velocity, and acceleration of moving objects. (SC09-GR.HS-S.1-GLE.1-EO.a) • How and why acceleration is produced by a net force. (SC09-GR.HS-S.1-GLE.1-EO.b) • The effects of action-reaction force pairs on the motion of two interacting objects. (SC09-GR.HS-S.1-GLE.1-EO.c;RA.1,2,3) • The limitations of Newton’s laws of motion. (SC09-GR.HS-S.1-GLE.1-EO.d) • The difference between law and theory. (SC09-GR.HS-S.1-GLE.1;N.3) • The relationship between mass, acceleration and force. (SC09-GR.HS-S.1-GLE.1-EO.a,b;NS.1) • The forces present in the Earth that lead to plate tectonics. (SC09-GR.HS-S.1;RA.3) and (SC09-GR.HS-S.3-GLE.3-EO.c) • The significant differences between scientific and social laws. (SC09-GR.HS-S.1-GLE.1;N.3) • The significant differences between scientific Theories and “common theories” (SC09-GR.HS-S.1-GLE.1;N.3) 	<ul style="list-style-type: none"> • Gather, analyze, and interpret data and create graphs of objects in motion(SC09-GR.HS-S.1-GLE.1-EO.a;N.2,4) • Develop, communicate, justify, and predict the outcome of Newton’s Second Law. (SC09-GR.HS-S.1-GLE.1-EO.b;RA.1,2,3;N.1,2,4) • Develop, communicate, justify, and predict the outcome of Newton’s Third Law. (SC09-GR.HS-S.1-GLE.1-EO.c;RA.2,3;N.1,2,4) • Examine the effect of Newton’s law of universal gravitation to a system of two bodies. (SC09-GR.HS-S.1-GLE.1-EO.d;N.1,2,3,4)

**Curriculum Development Overview
Unit Planning for High School Science**

<p>Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: <i>“Mark Twain exposes the hypocrisy of slavery through the use of satire.”</i></p>	
<p>A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):</p>	<p>The type of motion, acceleration, and velocity of an object are dependent on the net force acting on that object.</p>
<p>Academic Vocabulary:</p>	<p>analyze, interpret, synthesize, justify, limitations, minimize, differentiate, disciplines of science</p>
<p>Technical Vocabulary:</p>	<p>forces, motion, acceleration, velocity, net force, gravitation, interplanetary, momentum, inertia, mass, speed, law, theory</p>

**Curriculum Development Overview
Unit Planning for High School Science**

Unit Title	Characteristics of Matter		Length of Unit	6-7 weeks
Focusing Lens(es)	Structure Patterns	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.HS-S.1-GLE.2 SC09-GR.HS-S.1-GLE.4	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • How would the structure and possibly the function of a periodic table change if it were to be created for the first time today? • How has modern technology changed the model of the atom? • If elements combined randomly, without any patterns, what would the implications be for the structure of the universe? • What are the philosophical implications of the “cloud model” of an atom? • How are patterns in nature represented in patterns found in the periodic table? 			
Unit Strands	Physical Science			
Concepts	Classification, Matter, Chemical Composition, Properties, Periodic Table, Bonding, Patterns, Elements, Compounds			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
All matter in the universe follows predictable patterns based on chemical composition (SC09-GR.HS-S.1-GLE.2-EO.a,b,c,d;RA.1,2,3;N.1,2) and (SC09-GR.HS-S.1-GLE.4-EO.b,c;RA.1;N.1,2)	What is the difference between an atom and a molecule? (SC09-GR.HS-S.1-GLE.4-EO.b) How can the periodic table be used to predict chemical reactions? (SC09-GR.HS-S.1-GLE.4-EO.b,c,e) What is the difference and relationship between pure substances and compounds?	How do atoms relate to elements? (SC09-GR.HS-S.1-GLE.4-EO.b) What happens if you change number of protons in an atom?
Physical and chemical properties define the structure of the periodic table which allows patterns to emerge and inferences to be made.(SC09-GR.HS-S.1-GLE.2-EO.b,c;RA.1,2,3,4;N.1,2) and (SC09-GR.HS-S.1-GLE.4-EO.b,c,d,e;N.1,2)	What physical and chemical patterns can be observed in the properties of elements and groups in the periodic table? (SC09-GR.HS-S.1-GLE.4-EO.b,e) How is the molecular structure related to the physical and chemical properties of matter? (SC09-GR.HS-S.1-GLE.4-EO.b) Do all elements follow the patterns in the periodic table?	How can consumers use the periodic table to make informed decisions regarding the purchase of household chemicals? Why are physical properties of semiconductors so important to specific industries?

**Curriculum Development Overview
Unit Planning for High School Science**

<p>Elements predictably bond to form compounds due to patterns based on definite properties. (SC09-GR.HS-S.1-GLE.4-EO.a,b,c,d;RA.1,2,3;N.1,2)</p>	<p>How can patterns in the periodic table be used to predict if an atom will gain, lose, or share electrons? What role do electrons play in different types of chemical bonds? (SC09-GR.HS-S.1-GLE.4;IQ.2)</p>	<p>What would be the implications if elements randomly combined? Why does one element want to lose an electron and another want to accept one? (SC09-GR.HS-S.1-GLE.4-EO.c,d;IQ.2) What role does the structure of valence electrons play in an element's chemical properties? (SC09-GR.HS-S.1-GLE.4-EO.c,d;IQ.2)</p>
<p>The structure of matter determines characteristic physical and chemical properties. (SC09-GR.HS-S.1-GLE.2-EO.b,c)</p>	<p>How do the bond angles of a molecule determine if the molecule is polar or non-polar? (SC09-GR.HS-S.1-GLE.4-EO.c,d;IQ.2)</p>	<p>How do the inter and intra molecular bonds determine physical and chemical properties?</p>

<p>Critical Content: My students will Know...</p>	<p>Key Skills: My students will be able to (Do)...</p>
<ul style="list-style-type: none"> • Current model of an atom (SC09-GR.HS-S.1-GLE.2-EO.a;N.1,2) • Chemical and physical properties of elements (i.e. density, melting point, boiling point, and conductivity). (SC09-GR.HS-S.1-GLE.2-EO.b,c;RA.1,2,3,4;N.1,2) and (SC09-GR.HS-S.1-GLE.4-EO.b,c;RA.1,3;N.1,2) • Differences between atoms, elements, and compounds, and pure substances and mixtures. (SC09-GR.HS-S.1-GLE.2-EO.c,d;RA.2,3,4;N.1,2) • Current models of chemical bonding (i.e. ionic, covalent, polar). (SC09-GR.HS-S.1-GLE.4-EO.a,d,e;RA.1,2;N.1,2) • The role electrons play in atomic bonding (SC09-GR.HS-S.1-GLE.4-EO.d;RA.2,3;N.1,2) and (SC09-GR.HS-S.1-GLE.2-EO.a,c;RA.4;N.1,2) • Bonding type based on an elements position on the periodic table. (SC09-GR.HS-S.1-GLE.4-EO.a,d,e;RA.1,2;N.1,2) • The composition of matter • The composition of compounds • Elements' position on the periodic table. (SC09-GR.HS-S.1-GLE.2-EO.c) • The difference between atoms and molecules, elements and compounds, and pure substances and mixtures. (SC09-GR.HS-S.1-GLE.2-EO.d) 	<ul style="list-style-type: none"> • Develop, communicate, and justify current models of an atom and chemical bonds. (SC09-GR.HS-S.1-GLE.2-EO.a;N.1,2) and (SC09-GR.HS-S.1-GLE.4-EO.a,d,e;RA.1,2;N.1,2) • Gather, analyze, and interpret data of chemical and physical properties of elements. (SC09-GR.HS-S.1-GLE.2-EO.b,c;RA.1,2,3,4;N.1,2) and (SC09-GR.HS-S.1-GLE.4-EO.b,c;RA.1,3;N.1,2) • Use the periodic table to predict physical and chemical properties of elements. (SC09-GR.HS-S.1-GLE.2-EO.c;RA.1;N.1,2) • Predict the type of bonding that will occur among elements based on their position on the periodic table. (SC09-GR.HS-S.1-GLE.4-EO.e;N.1,2) • Define, describe, and compare atoms, elements, compounds, pure substances, and mixtures. (SC09-GR.HS-S.1-GLE.2-EO.a,d;RA.1,2;N.1,2)

**Curriculum Development Overview
Unit Planning for High School Science**

<p>Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: <i>“Mark Twain exposes the hypocrisy of slavery through the use of satire.”</i></p>	
<p>A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):</p>	<p>The periodic table can be used to predict properties and bonding. Ionic bonds transfer electrons and covalent bonds share electrons. An atom is made up of protons which have a positive charge, neutrons which have no charge, and electrons which have a negative charge.</p>
<p>Academic Vocabulary:</p>	<p>gather, justify, analyze, develop, communicate, interpret, define, subscript, superscript, coefficient,</p>
<p>Technical Vocabulary:</p>	<p>atom, element, compound, mixture, homogenous, heterogeneous, pure substance, subatomic particles, proton, neutron, electron, valence electrons, energy levels, melting point, boiling point, conductivity, density, physical properties, chemical properties, molecular structure, metals, nonmetals, alloys, metalloids, oxidation numbers, law of conservation of mass, ionic, covalent.</p>

**Curriculum Development Overview
Unit Planning for High School Science**

Unit Title	Chemical and Nuclear Reactions		Length of Unit	7-8 weeks
Focusing Lens(es)	Transformations	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.HS-S.1-GLE.3	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • How has man's ability to control chain reactions transformed the shape of society? • What are the social and political consequences of Einstein's assertion that mass and energy are equivalent? • What might be the geopolitical consequences as rare earth metals are transformed or depleted? 			
Unit Strands	Physical science			
Concepts	Chemical Reactions, Nuclear Reactions, Products, Conservation of Mass			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Chemical reactions form products useful to people (i.e. cooking, cleaning, etc) (SC09-GR.HS-S.1-GLE.3-EO. a,b,c;;RA.1,2;N.1,3,4)	How can the reactants and products be predicted for different types of chemical and nuclear reactions? What patterns of chemical reactions exist?	What are some examples of how you use chemical reactions each day? What would the implications be if chemical reactions did not obey the law of conservation of mass? Why do chain reactions occur?
The conservation of mass governs chemical reactions owing to the constancy of energy and matter in the universe therefore the law of conservation of mass governs chemical reactions (SC09-GR.HS-S.1-GLE.3-EO. a,b,c,d;RA.1,2;N.1,3,4)	Why must chemical reactions be balanced? Why should a subscript never be changed to balance an equation?	What happens when percent yield is not equal to one hundred percent? How can one use careful measurements of the mass of reactants and products to predict or derive a chemical formula for an unknown substance?
Different types of reactions (nuclear and chemical) transform reactants into products which contribute to the sustainability of life. (SC09-GR.HS-S.1-GLE.3-EO. a,b;;RA.1,2,3;N.1,3,4)	How are chemical reactions distinguished from nuclear reactions? How can you distinguish between different types of chemical reactions? How can you distinguish between different types of nuclear reactions?	What are the benefits and the dangers of using radioactive substances? How are different types of reactions used to create consumer products? How have human's need for/consumption of energy shaped the natural world and/or changed the relationship with natural resources? What are the pros and cons of recycling from both the conservation of matter and the conservation of energy lens?

**Curriculum Development Overview
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Critical Content: My students will Know ...	Key Skills: My students will be able to (Do) ...
<ul style="list-style-type: none"> • Reasons why chemical reactions must obey the laws of conservation of energy and mass. (SC09-GR.HS-S.1-GLE.3-EO.a,d;N.1,3,4) • The chemical reactions that reactants undergo to form products. (SC09-GR.HS-S.1-GLE.3-EO. a,b,c,d;RA.1,2,3;N.1,3,4) • Different types of chemical and nuclear reactions (synthesis, decomposition, combustion, replacement, fusion and fission). (SC09-GR.HS-S.1-GLE.3-EO.a) • The ways in which chemical reactions differ from nuclear reactions (SC09-GR.HS-S.1-GLE.3;IQ.2) 	<ul style="list-style-type: none"> • Interpret and balance chemical equations. (SC09-GR.HS-S.1-GLE.3-EO. a,d;N.1,3,4) • Predict products when given a set of reactants. (SC09-GR.HS-S.1-GLE.3-EO. a,b,c,d;RA.1,2,3;N.1,3,4) • Use the law of conservation of mass to balance a chemical equation. (SC09-GR.HS-S.1-GLE.3-EO.a,d;N.1,3,4) • Identify different types of reactions. (SC09-GR.HS-S.1-GLE.3-EO. A;N.3,4)

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<p>A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):</p>	<p>I must end up with the same number of atoms in my products as I started with in my reactants.</p>
<p>Academic Vocabulary:</p>	<p>Subscript, superscript, coefficient, recognize, analyze, predict, implications, conflicting,</p>
<p>Technical Vocabulary:</p>	<p>Reactants, products, conservation of mass, synthesis, decomposition, combustion, replacement, fusion, fission, chemical reaction, nuclear reaction</p>

**Curriculum Development Overview
Unit Planning for High School Science**

Unit Title	Forms and transformations of energy		Length of Unit	8-9 weeks
Focusing Lens(es)	Change	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.HS-S.1-GLE.5 SC09-GR.HS-S.1-GLE.6	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • What are the advantages and disadvantages of using various energy sources? • What are the potential implications of current energy studies on science and our society? • How do the media influence perceptions of the use of different energy forms? • How do politics play a role in shaping energy policies? 			
Unit Strands	Physical Science			
Concepts	Energy, Forms, Transformation, Conservation, Work			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
The diversity of forms of energy in our physical world plays a significant role in living systems and Earth's systems. (SC09-GR.HS-S.1-GLE.5-EO.a,c,d;RA.1,3) and (SC09-GR.HS-S.1-GLE.6-EO.a,d;RA.1)	What are the most common forms of energy in our physical world? What is the difference between potential and kinetic energy? What is mechanical energy? What are the different forms of potential energy? What measurements are necessary to calculate the energy in a system? What are the forms of energy in a space shuttle What is the relationship between work and energy?	Is thermal energy the same as heat energy? Which has more energy, a bathtub full of an unknown liquid or a teacup filled with boiling water? How does energy play a role in living systems? What makes some forms of energy hard to measure? How far can an electric car travel on the energy contained in 1kg of coal?
Energy is transformed in order to be available for a variety of work. (SC09-GR.HS-S.1-GLE.6-EO.a,b,c,e; N.2,3)	How can energy be quantified and experimentally determined? Why is it necessary to transform energy? What makes an energy form renewable or nonrenewable? What role does energy play in living systems? How does energy in the Earth drive plate tectonics. How does solar energy from the sun drive weather? (SC09-GR.HS-S.1-GLE.6-EO.a,b,c,e;N.2,3) What type of energy can you get from a book sliding across a table?(SC09-GR.HS-S.1-GLE.6-EO.a,b,c,e;N.2,3)	How many energy transformations occur from the burning of a fossil fuel to turning a light on in your home? Why is an understanding of energy transformations necessary in designing clean energy systems? How is energy transformed throughout the duration of a roller coaster ride?

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<p>Because energy can only be transformed, not created (i.e., the amount of energy in the universe is constant) it must be conserved. (SC09-GR.HS-S.1-GLE.5;RA.2) and (SC09-GR.HS-S.1-GLE.6-EO.a,b,c;RA.1,2;N.1,2,3)</p>	<p>How is energy conserved in transforming one form of energy to another? How is the amount of energy available to do work changed when some energy is lost as heat during transformation?</p>	<p>How does the law of conservation of energy help us solve problems involving complex systems? Why is it incorrect to say that energy is 'lost' in a transformation?</p>
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<p>Critical Content: My students will Know...</p>	<p>Key Skills: My students will be able to (Do)...</p>
<ul style="list-style-type: none"> • That energy exists in different forms (potential, kinetic, mechanical, chemical, electrical, radiant, thermal, nuclear, etc.). (SC09-GR.HS-S.1-GLE.5-a,c,d-RA.1,3) (SC09-GR.HS-S.1-GLE.6-a,d-RA.1) • How/why energy is conserved. (SC09-GR.HS-S.1-GLE.6-EO.a,b,c,e-N.2,3) • How/why energy is transformed. (SC09-GR.HS-S.1-GLE.5-RA.2) (SC09-GR.HS-S.1-GLE.6-EO.a,b,c-RA.1,2-N.1,2,3) 	<ul style="list-style-type: none"> • Identify the difference between potential and kinetic energy (SC09-GR.HS-S.1-GLE.5-EO.a,c,d-RA.2) • Develop, communicate, and justify and evidence-based scientific explanation regarding the potential and kinetic nature of mechanical energy. (SC09-GR.HS-S.1-GLE.5-EO.a,b-RA.2) • Measure, calculate, and graph the amount of energy in a system. (SC09-GR.HS-S.1-GLE.5-EO.a,b) • Identify different forms of energy (mechanical, chemical, electrical, radiant, thermal, and nuclear. (SC09-GR.HS-S.1-GLE.5-a,c,d-RA.1,3) (SC09-GR.HS-S.1-GLE.6-a,d-RA.1) • Use direct and indirect evidence to develop and support claims about the conservation of energy in a variety of systems. (SC09-GR.HS-S.1-GLE.6-EO.a,b,c,e-N.2,3) • Describe energy transformations both quantitatively and qualitatively. (SC09-GR.HS-S.1-GLE.5-RA.2) (SC09-GR.HS-S.1-GLE.6-EO.a,b,c,e-N.2,3) • Examine energy conservation and loss. (SC09-GR.HS-S.1-GLE.6-EO.a,b,c,e-N.2,3)

Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline.
 EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: *“Mark Twain exposes the hypocrisy of slavery through the use of satire.”*

<p>A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):</p>	<p>The amount of energy in the universe is constant but can be transformed. Everything that has mass possesses potential energy that can be converted into other forms of energy.</p>
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<p>Academic Vocabulary:</p>	<p>justify, develop, communicate, calculate, evidence-based, qualitative, quantitative, direct, indirect, transformation, conservation</p>
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<p>Technical Vocabulary:</p>	<p>potential, kinetic, mechanical, chemical, electrical, radiant, thermal, nuclear, energy, elastic, gravitational, work, joules, conduction, convection, kilogram, Newtons, Kelvin, Celsius, heat, temperature, friction,</p>
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