

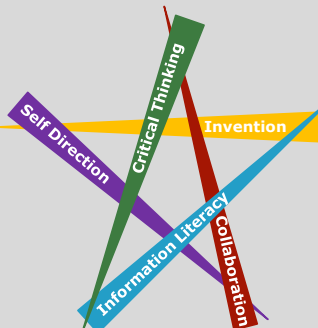
**Curriculum Development Course at a Glance
Planning for High School Science**

Content Area	Science	Grade Level	High School
Course Name/Course Code	Earth 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
Planning for High School Science**

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
Earth's Place in the Universe	7-9 weeks	1
Earth's Changing Surface	7-9 weeks	2
Our Changing Climate	7-9 weeks	3
Conservation and Use of Resources	7-9 weeks	4

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

Unit Title	Earth's Place in the Universe		Length of Unit	7-9 weeks
Focusing Lens(es)	Interactions	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.HS-S.3-GLE.1 SC09-GR.HS-S.3-GLE.2 SC09-GR.HS-S.1-GLE.1	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> How would the planet's atmosphere, biosphere, and geosphere differ if the types of energies and forces (gravity, solar phenomena, or electromagnetic radiation) impacting Earth were different? (SC09-GR.HS-S.3-GLE.2-EO.a,b) How would life be different if Earth did not interact with a moon? As scientists search for "earth-like" planets, what are they looking for? 			
Unit Strands	Earth Science, Physical Science			
Concepts	Interactions, Scale, History, Technology, Systems, Energy, Exploration, Motion, Forces, Geosphere, Atmosphere, Biosphere			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
There are interactions at various levels of systems (Earth-Moon-Sun, Solar system, galaxy clusters, Universe) due to forces and energy. (SC09-GR.HS-S.1-GLE.1-EO.c,d,e;IQ.1;RA.1;NS.3) and (SC09-GR.HS-S.3-GLE.2-EO.a,c;IQ.1,2,3;RA.1;N.1)	<p>What forces affect the universe, solar system and Earth? (SC09-GR.HS-S.1-GLE.1-EO.b,c,d;IQ.1,2;RA.1,2;NS.1,2,3) and (SC09-GR.HS-S.3-GLE.2-EO.a,b,c;IQ.1,2,3;RA.1;N.1)</p> <p>What are the sources of energy driving interactions in the Universe, solar system and Earth? (SC09-GR.HS-S.1-GLE.1-EO.d) and (SC09-GR.HS-S.3-GLE.1-EO.b) and (SC09-GR.HS-S.3-GLE.2-EO.a,b,c,d;IQ.1,2,3;RA.1;N.1)</p> <p>How do mass and distance affect gravitational forces between objects? (SC09-GR.HS-S.1-GLE.1-EO.d) and (SC09-GR.HS-S.3-GLE.2-EO.a,b,c;IQ.1;NS.1)</p> <p>What are Newton's Laws of Motion? (SC09-GR.HS-S.1-GLE.1-EO.a,b,c,d;IQ.1,2;NS.1)</p>	<p>How do laws of motion explain the formation and structure of the Universe, solar system and Earth? (SC09-GR.HS-S.1-GLE.1-EO.b,c,d;IQ.1,2;RA.1,2;N.1,2,3) and (SC09-GR.HS-S.3-GLE.2-EO.a,b,c;IQ.1,2,3;RA.1;N.1)</p> <p>What role does gravity play in the formation and structure of the Universe, solar system and Earth? (SC09-GR.HS-S.1-GLE.1-EO.d) and (SC09-GR.HS-S.3-GLE.2-EO.a,b,c;IQ.1;N.1)</p> <p>What relationships exist between energy forms? (SC09-GR.HS-S.3-GLE.2-EO.a,b,c)</p>
Earth's interaction with different forces and energies influence the planet's atmosphere, geosphere, and biosphere (SC09-GR.HS-S.3-GLE.2-EO.a,b)	What are the extraterrestrial forces and energies that impact the Earth?	<p>How does the Earth's interaction with solar radiation affect climate patterns?</p> <p>How do Earth's interactions with meteors provide possible explanations about mass extinctions? (SC09-GR.HS-S.3-GLE.2-EO.c,d)</p>

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

<p>Advances in technology drive exploration and shape knowledge about history, scale and size of the universe, solar system and Earth. (SC09-GR.HS-S.3-GLE.1-EO.a,b,c,d,e;IQ.2,3;RA.2;N.1) and (SC09-GR.HS-S.3-GLE.2-EO.a,d;RA.2;N.2)</p>	<p>What technology is used to explore the universe, solar system Earth? (SC09-GR.HS-S.3-GLE.2-EO.d;RA.2;N.2)</p> <p>What evidence is used to interpret the history of the Universe, solar system and Earth? (SC09-GR.HS-S.3-GLE.1-EO.a,b,c,d,e;RA.1,2;N.1,2)</p>	<p>How do we know the age of the universe, solar system and Earth? (SC09-GR.HS-S.3-GLE.1-EO.a,b,c;IQ.1-RA.1,2-N.2)</p> <p>How have advances in technology changed our understanding of the universe, solar system and Earth? (SC09-GR.HS-S.3-GLE.1-EO.d,e;RA.2;N.1,2)</p> <p>What are the costs and benefits of exploring space? (SC09-GR.HS-S.3-GLE.1-EO.e;N.2)</p> <p>Why or why not invest in the exploration of space? (SC09-GR.HS-S.3-GLE.1-EO.e;N.2)</p> <p>How can understanding the history of the Earth shape future community development? (SC09-GR.HS-S.3-GLE.1-EO.d,e;RA.2;N.1,2)</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"> • Events that have shaped the history of the Universe, Earth and Solar system (Life Cycle of Stars) (SC09-GR.HS-S.3-GLE.1-EO.a,b,c,d;IQ.1,2,3;RA.1;N.2) • Age of the Earth, Sun and universe (SC09-GR.HS-S.3-GLE.1-EO.a,b,c,d;IQ.1,2,3;RA.1;N.2) • Geologic principles (original horizontality, superposition, cross-cutting relationships, index fossils) (SC09-GR.HS-S.3-GLE.1-EO.a,b,c;IQ.3;RA.1,2) • Geographic mapping systems, satellites, rovers and telescopes used to gather information about the Earth's and Universe's structure and history (SC09-GR.HS-S.3-GLE.1-EO.a,b,c;IQ.3;RA.2;N.1) • Gravity is a function of mass and distance between two objects (SC09-GR.HS-S.1-GLE.1-EO.d) • The influence of the mass of an object on space and time (SC09-GR.HS-S.1-GLE.1-EO.d) • How the electromagnetic spectrum positively and negatively impacts Earth's systems (SC09-GR.HS-S.3-GLE.1-EO.a,b,c;IQ.3;N.1) • Newton's Laws of Motion (SC09-GR.HS-S.1-GLE.1-EO.a,b,c;RA.1;N.1) • Fusion reactions (SC09-GR.HS-S.3-GLE.2-EO.a,b,c;IQ.2;RA.1;N.1) • Scale of size and time involved with formation of the Universe and Earth (SC09-GR.HS-S.3-GLE.1-EO.a,b,c,e;IQ.1,2) • The reasons why life can exist in varying and different environments (i.e. Archaea) 	<ul style="list-style-type: none"> • Develop, communicate and justify an evidence based conclusion concerning the history of the Universe and Earth (SC09-GR.HS-S.3-GLE.1-EO.a,b,c,d;IQ.1,2,3;RA.1;N.2) • Analyze and interpret data regarding direct and indirect evidence to observe/infer the history of the Universe and Earth (SC09-GR.HS-S.3-GLE.1-EO.a,b,c,d;IQ.1,2,3;RA.1;N.2) • Use information from a variety of sources to investigate the history of the Universe and Earth (SC09-GR.HS-S.3-GLE.1-EO.a,b,c,d,e;IQ.1,2,3;RA.1,2;N.2) • Use technology (geographic mapping systems, satellites, rovers and telescopes) to gather and analyze data about the structure and history of the Universe, Solar system and Earth (SC09-GR.HS-S.3-GLE.1-EO.a,b,c;IQ.3;RA.2;N.1) • Interpret the geologic history of an area (SC09-GR.HS-S.3-GLE.1-EO.a,b,c;IQ.3;RA.1,2) • Use the EM spectrum to make inferences about the history and structure of the Universe (SC09-GR.HS-S.3-GLE.1-EO.a,b,c;IQ.3;N.1) • Identify the limitations of Newton's Laws in extreme situations (SC09-GR.HS-S.1-GLE.1-EO.e)

**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>Technology is used to analyze and interpret evidence that the laws of physics shape the history, structure and interactions of our universe, solar system and planet.</p>
<p>Academic Vocabulary:</p>	<p>interpret data, evidence-based explanation, evidence-based prediction, ethically use information, uncertainty, develop, communicate, justify, technology, assumption, natural phenomena, scientific claim, law, theory, scale, cross-cutting relationships</p>
<p>Technical Vocabulary:</p>	<p>Newton’s laws of motion, force, mass, acceleration, gravitation, velocity, speed, law, theory, geology, geologic history, fusion, fission, universe, solar system, original horizontality, superposition, fossils, telescopes, satellite imagery, electromagnetic spectrum, GIS, GPS, galaxy, nebula, nova, supernova, HR diagram, stellar evolution, geosphere, biosphere, atmosphere</p>

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

Unit Title	Earth's Changing Surface		Length of Unit	7-9 weeks
Focusing Lens(es)	Systems	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.HS-S.3-GLE.3, SC09-GR.HS-S.3-GLE.6 SC09-GR.HS-S.1-GLE.1	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> Why would destroying natural coastal barriers (ex. mangrove swamps) contribute to extreme weather across many systems? How would rebuilding places destroyed by natural hazards contribute to re-building of the system? Why do people build cities along plate boundaries? 			
Unit Strands	Earth Science, Physical Science			
Concepts	Change, Systems, Plate Tectonics, Structure, Impacts, Landforms			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
The structure of the Earth, shaped by plate tectonics, influences how organisms live, use resources and develop into communities (SC09-GR.HS-S.3-GLE.3-EO.a,b,c;IQ.1,2,4;N.2,4)	<p>What are the types of plate boundaries and their associated landforms?</p> <p>What causes plate movement? (SC09-GR.HS-S.1-GLE.1;RA.3)</p>	<p>How has plate tectonics shaped biological systems (human civilization, biomes/ecosystems) (SC09-GR.HS-S.3-GLE.3-EO.a,b,c;IQ.1,4;N.4)</p> <p>What will the earth look like in the future? (SC09-GR.HS-S.3-GLE.3-EO.a,b,c;IQ.1,4;N.2,4)</p>
Physical, chemical and biological processes change landforms by altering the chemical and physical structure of rock. (SC09-GR.HS-S.3-GLE.6-EO.a,b,c;IQ.1,2,3;RA.2,3;N.1,3)	<p>What systems result in a change of landforms?</p>	<p>What are the positive and negative changes on Earth's geosphere due to water, air, gravity and biological activity? (SC09-GR.HS-S.3-GLE.6-EO.a,b,c,d;IQ.2,3;RA.3;N.3)</p>
Plate tectonic theory allows for prediction of natural hazards and their impacts. (SC09-GR.HS-S.3-GLE.3-EO.a,b,c;IQ.4;N.3) and (SC09-GR.HS-S.3-GLE.7-EO.a,b,c;IQ.1,2,3;RA.1,2,3,4;N.1)	<p>What natural hazards are associated with plate boundaries and landforms?</p>	<p>How do local, national and global organizations collaborate to plan for natural hazards caused by plate tectonics?</p>
Advances in technology continually refine the theory of plate tectonics and improve measurement of changes to landforms. (SC09-GR.HS-S.3-GLE.3-EO.d;IQ.2;RA.1;N.1,4) and (SC09-GR.HS-S.3-GLE.6-EO.d;RA.1,2;N.3)	<p>What technology has been used to develop the theory of plate tectonics?</p>	<p>How have scientists discovered the interior structure of the Earth?</p>

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

Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> • The theory of plate tectonics and how it explains the Earth’s geological features (SC09-GR.HS-S.3-GLE.3-EO.a,b,c,d;IQ.1,4;RA.1;N.2,4) • The causes of plate movement (slab pull, mantle convection, and?) (SC09-GR.HS-S.3-GLE.3-EO.b,d;IQ.3;RA.1;N.2,4) and (SC09-GR.HS-S.1-GLE.1;RA.3) • The interactions between tectonics plates and the resulting landforms and natural hazards (SC09-GR.HS-S.3-GLE.3-EO.b,d;IQ.3;RA.1;N.2,4) and (SC09-GR.HS-S.3-GLE.7-EO.a,b,c;IQ.1,2,3;RA.1,2,3,4;N.1) • Geophysical technology and its relationship to current theory of plate tectonics (SC09-GR.HS-S.3-GLE.3-EO.d;RA.1;N.4) • Layers of the Earth and how they are identified (SC09-GR.HS-S.3-GLE.3-EO.b;IQ.2) • The changes to Earth’s surface that result from water, air, gravity and biological activity (SC09-GR.HS-S.3-GLE.6-EO.a,b,c,d;IQ.1,2,3;RA.1,2,3;N.1,2,3) 	<ul style="list-style-type: none"> • Read a topographic map, geologic map and digital map resources (GIS) to interpret landforms and predict impacts of human activity (SC09-GR.HS-S.3-GLE.6-EO.b,d;RA.1,3;N.3) • Predict landforms and/or natural hazards found at a specific plate boundary (SC09-GR.HS-S.3-GLE.3-EO.b,d;IQ.3;RA.1;N.2,4) and (SC09-GR.HS-S.3-GLE.7-EO.a,b,c;IQ.1,2,3;RA.1,2,3,4;N.1) • Identify physical, chemical and human impacts on Earth’s surface (ex. Soil erosion) (SC09-GR.HS-S.3-GLE.6-EO.a,b,c,d;IQ.1,2,3;RA.1,2,3;N.1,2,3) • Identify landforms created by geologic activity (SC09-GR.HS-S.3-GLE.3-EO.a,b,c,d;IQ.1,4;RA.1;N.2,4)

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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>The Earth’s surface changes in response to plate tectonics as well as physical, chemical and biological activity on the surface.</p>
<p>Academic Vocabulary:</p>	<p>interpret data, evidence-based explanation, evidence-based prediction, ethically use information, uncertainty, develop, communicate, justify, technology, assumption, natural phenomena, scientific claim, critically evaluate, computer model, consequences, testable question, falsifiable hypothesis, respectfully discuss, conceptual interpretations, innovation, fluctuation, agriculture, reproducible results, mitigate</p>
<p>Technical Vocabulary:</p>	<p>physical change, chemical change, geophysical, biological activity, plate tectonics, geosphere, remote sensing, GIS, landforms, plate boundaries, plate, geographical features, convergent, divergent, transform,</p>

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

Unit Title	Our Changing Climate?		Length of Unit	7-9 weeks
Focusing Lens(es)	Systems, change	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.HS-S.3-GLE.4 SC09-GR.HS-S.3-GLE.7 SC09-GR.HS-S.1-GLE.6	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • What role should technology play in controlling the negative effects of climate change? • To what extent should humans alter their behavior in response to climate change? 			
Unit Strands	Earth Science, Physical Science			
Concepts	Energy, Change, Climate, Hazards, Predicting, Factors, Systems, Technology, Ecosystem			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Changes in climate result from alterations in the Earth's energy balance which can have a positive or negative impact on ecosystems (SC09-GR.HS-S.3-GLE.4-EO.a,d,e,f;IQ.1,2,3;N.3)	What is Earth's energy balance? What factors changes earth's energy balance?	How can changes in the ocean cause climate change? (SC09-GR.HS-S.3-GLE.4-EO.a,b,c;IQ.1)
Climate results from a complex system of factors related to energy transfer (ex. Earth-Moon-Sun system) (SC09-GR.HS-S.3-GLE.4-EO.a,b,c,f;IQ.1,2,4;RA.1,2,3;N.1,3)	What factors control climate?	How does climate change impact all of Earth's systems?
Technology enhances scientist's ability to predict climate change and the resulting potential for natural hazards which can influence response and survival rates. (SC09-GR.HS-S.3-GLE.4-EO.d,e,f;IQ.1,3,4,5;RA.1,2,3;N.1,2,3)	How do we predict change in climate?) What natural hazards result from climate and climate change? (SC09-GR.HS-S.3-GLE.7-EO.a, b, c; IQ.1, 2, 3, 4; RA.1, 2, 3, 4; N.1) What technology is used to monitor and predict changes in climate? (SC09-GR.HS-S.3-GLE.4-EO.f;RA.1,3,4;N.1,2)	How does climate and climate change result in natural hazards? (SC09-GR.HS-S.3-GLE.7-EO.a,b,c;IQ.1,2,3,4;RA.1,2,3,4;N.1) How is climate change expected to change the incidence of natural hazards? (SC09-GR.HS-S.3-GLE.7-EO.a,b,c;IQ.1,2,3,4;RA.1,2,3,4;N.1) How can predictions of climate change be used to plan for natural hazards? (SC09-GR.HS-S.3-GLE.4-EO.d,e,f;IQ.1,3,4,5;RA.1,2,3;N.1,2,3) and (SC09-GR.HS-S.3-GLE.7-EO.a,b,c; IQ.1,2,3,4; RA.1,2,3,4; N.1)

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

Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> Climate is a result of energy transfer (SC09-GR.HS-S.3-GLE.4-EO.a;IQ.2;RA.2) and (SC09-GR.HS-S.1-GLE.6-EO.a,b,c) Factors that affect climate (Earth’s axial tilt, physical location, proximity to water, elevation, latitude) (SC09-GR.HS-S.3-GLE.4-EO.a,c,d,e;IQ.1,2;RA.2,3;N.1,2) Mechanisms and potential impacts of climate change (SC09-GR.HS-S.3-GLE.4-EO.a,b,c,d,e,f;IQ.1,2,3,4,5;RA.2,3;N.1,2,3) and (SC09-GR.HS-S.3-GLE.7-EO.a,b,c;IQ.1,2,3,4;RA.1,2,4;N.1) How advances in technology have provided evidence for understanding climate and climate change (SC09-GR.HS-S.3-GLE.4-EO.f;RA.3;N.1,2,3) and (SC09-GR.HS-S.3-GLE.7-EO.c;IQ.1,3;RA.1,2,4;N.1) The different spheres of the earth (biosphere, hydrosphere, geosphere, atmosphere) (SC09-GR.HS-S.3-GLE.4-EO.a) 	<ul style="list-style-type: none"> Critically analyze evidence and assumptions concerning climate change (SC09-GR.HS-S.3-GLE.4-EO.e;IQ.1,2,3;RA.1,2,3;N.1,3) Use a location to predict the climate (SC09-GR.HS-S.3-GLE.4-EO.c;IQ.2;N.1,3) Make predictions about the impact of climate change and natural hazards on human activity (SC09-GR.HS-S.3-GLE.4-EO.d,f;IQ.4,5;RA.3;N.1,2,3) and (SC09-GR.HS-S.3-GLE.7-EO.c;IQ.1,2,3,4;RA.1,2,3,4) Explain and describe transfers of energy between spheres (SC09-GR.HS-S.3-GLE.4-EO.a)

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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>Predictions of natural hazards, climate and climate change should be based on the critical analysis of data.</p>
<p>Academic Vocabulary:</p>	<p>interpret data, evidence-based explanation, evidence-based prediction, ethically use information, uncertainty, develop, communicate, justify, technology, assumption, natural phenomena, scientific claim, critically evaluate, computer model, peer</p>
<p>Technical Vocabulary:</p>	<p>weather, climate, geosphere, atmosphere, hydrosphere, biosphere, seasons, geophysical location, landmass, latitude, elevation, climate change, weather stations, buoys, satellites, radar, sediment core, tree rings, technological solutions, natural hazard, energy conversion, energy transformation, hurricane, tornado, blizzard, flood, wildfire,</p>

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

Unit Title	Conservation and Use of Resources		Length of Unit	7-9 weeks
Focusing Lens(es)	Sustainability Interdependence	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.HS-S.3-GLE.5 SC09-GR.HS-S.1-GLE.6	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • What are the costs and benefits of using an inefficient technology such as the internal combustion engine? • Is nuclear energy a viable option for supplying electricity? • Does the short-term benefit of using easily available resources outweigh the long term impacts? 			
Unit Strands	Earth Science, Physical Science			
Concepts	Resources, Impacts, Cost/Benefit Analysis, Sustainability, Energy, Efficiency, Systems			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
The exploration, development and consumption of resources generate social, environmental, political and economic impacts (SC09-GR.HS-S.3-GLE.5-EO.a,b,d;RA.1,2;N.1,2)	How are resources explored, developed and consumed? (SC09-GR.HS-S.3-GLE.5-EO.a; IQ.1,3; RA.1) What are the impacts of exploring, developing and consuming resources? (SC09-GR.HS-S.3-GLE.5-EO.a; IQ.1,3; RA.1)	How do humans use resources? (SC09-GR.HS-S.3-GLE.5-EO.b; IQ.1; RA.2) What impacts do locally available resources have on communities? (SC09-GR.HS-S.3-GLE.5-EO.b; IQ.1; RA.2)
Efficient use of resources produces sustainable systems (SC09-GR.HS-S.3-GLE.5-EO.c,d;RA.1,2) and (SC09-GR.HS-S.1-GLE.6-EO.a,b;IQ.1,2;RA.1,2)	What are examples of the efficient use of resources? (SC09-GR.HS-S.3-GLE.5-EO.d;IQ.1,3; RA.1,2) How does the law of conservation of energy help us solve problems involving complex systems? (SC09-GR.HS-S.1-GLE.6-EO.a,b;IQ.1,2;RA.1,2)	How can humans reduce the impact of resource use? (SC09-GR.HS-S.3-GLE.5-EO.d;IQ.1,2;RA.1,2) How does public presentation of information regarding efficiency data affect the sustainability of the system? (SC09-GR.HS-S.3-GLE.5-EO.d;N.2)
Advances in technology result in more efficient use of energy resources (SC09-GR.HS-S.3-GLE.5-EO.c,d;IQ.1,3;RA.1,2;N.1) and (SC09-GR.HS-S.1-GLE.6-EO.a,b;RA.1,2)	What technological advances have increased energy and resource efficiency? (SC09-GR.HS-S.3-GLE.5-EO.c;RA.1,2)	What advances in technology have reduced pollution, waste and ecosystem degradation caused by extraction and consumption. (SC09-GR.HS-S.3-GLE.5-EO.c;RA.1,2) What has driven the advances in technology to create more efficient use? (SC09-GR.HS-S.3-GLE.5-EO.c;RA.1,2) and (SC09-GR.HS-S.1-GLE.6-EO.a,b;RA.1,2)

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

Decisions about the exploration, development and consumption of resources all contain implicit judgments about the of the costs and benefits for communities (SC09-GR.HS-S.3-GLE.5-EO.a,b,d;IQ.4;N.1,2)	How are the costs and benefits or resource use quantified and analyzed? SC09-GR.HS-S.3-GLE.5-EO.a,b,d;IQ.3;N.1)	What are the advantages and disadvantages of using different types of energy?
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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"> Differences between renewable and nonrenewable resources (Examples: energy, minerals, water) (SC09-GR.HS-S.3-GLE.5-EO.a;IQ.4) How resources are explored, developed and consumed (Ex. Mineral development, water supply and treatment, energy collection/distribution) (SC09-GR.HS-S.3-GLE.5-EO.a,b,c,d;IQ.1,2,3;RA.1,2;N.1) Impacts of resource exploration, development and consumption (SC09-GR.HS-S.3-GLE.5-EO.a,b,c,d;IQ.2,3,4;RA.1,2;N.1) Limitations of resources (SC09-GR.HS-S.3-GLE.5-EO.d;IQ.1,2;RA.1,2;N.2) Energy conservation and energy transformations (SC09-GR.HS-S.1-GLE.6-EO.a,b,c,e;IQ.1,2;RA.1,2;N.1,2) 	<ul style="list-style-type: none"> Compare and contrast the exploration, development and consumption of renewable and nonrenewable resources. (SC09-GR.HS-S.3-GLE.5-EO.a,d; IQ.1,2,3; RA.2) Create a plan to reduce impacts of resource use. (SC09-GR.HS-S.3-GLE.5-EO.c) Analyze and interpret data to evaluate the positive and negative impacts of development and consumption of resources. (SC09-GR.HS-S.3-GLE.5-EO.d; N.2) Communicate an evidence-based conclusion concerning the positive and negative impacts of resource development and consumption. (SC09-GR.HS-S.3-GLE.5-EO.a,d; IQ.1,2,3; RA.2) Analyze and interpret data to evaluate the efficiency of energy transformations (SC09-GR.HS-S.1-GLE.6-EO.a,c; IQ.1) Evaluate scientific claims in popular media and peers (SC09-GR.HS-S.3-GLE.5-EO.d; N.2)

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>	
A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):	<i>Analyze and interpret data to communicate the positive and negative impacts of resource exploration, development and consumption. (SC09-GR.HS-S.3-GLE.5-EO.a,b,d-IQ.4) (SC09-GR.HS-S.1-GLE.6-EO.?)</i>
Academic Vocabulary:	develop, communicate, critically evaluate, justify, evidence-based, analyze, interpret, infer, degradation, popular media, peers
Technical Vocabulary:	development, exploration, consumption, renewable resource, nonrenewable resource, geosphere, hydrosphere, biosphere, atmosphere, environmental impact, sustainable use, pollution, ecosystem, extraction, energy conservation, energy transformation, falsifiable hypothesis