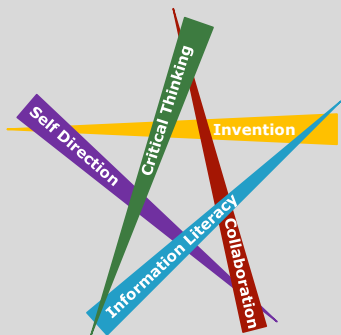


**Curriculum Development Course at a Glance
Planning for 8th Grade Science**

Content Area	Science	Grade Level	8 th Grade
Course Name/Course Code			
Standard	Grade Level Expectations (GLE)	GLE Code	
1. Physical Science	1. Identify and calculate the direction and magnitude of forces that act on an object, and explain the results in the object's change of motion	SC09-GR.8-S.1-GLE.1	
	2. There are different forms of energy, and those forms of energy can be changed from one form to another – but total energy is conserved	SC09-GR.8-S.1-GLE.2	
	3. Distinguish between physical and chemical changes, noting that mass is conserved during any change	SC09-GR.8-S.1-GLE.3	
	4. Recognize that waves such as electromagnetic, sound, seismic, and water have common characteristics and unique properties	SC09-GR.8-S.1-GLE.4	
2. Life Science	1. Human activities can deliberately or inadvertently alter ecosystems and their resiliency	SC09-GR.8-S.2-GLE.1	
	2. Organisms reproduce and transmit genetic information (genes) to offspring, which influences individuals' traits in the next generation	SC09-GR.8-S.2-GLE.2	
3. Earth Systems Science	1. Weather is a result of complex interactions of Earth's atmosphere, land and water, that are driven by energy from the sun, and can be predicted and described through complex models	SC09-GR.8-S.3-GLE.1	
	2. Earth has a variety of climates defined by average temperature, precipitation, humidity, air pressure, and wind that have changed over time in a particular location	SC09-GR.8-S.3-GLE.2	
	3. The solar system is comprised of various objects that orbit the Sun and are classified based on their characteristics	SC09-GR.8-S.3-GLE.3	
	4. The relative positions and motions of Earth, Moon, and Sun can be used to explain observable effects such as seasons, eclipses, and Moon phases	SC09-GR.8-S.3-GLE.4	

**Curriculum Development Course at a Glance
Planning for 8th Grade Science**

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
Genetics and the Human Influence on Genes	7-9 weeks	1
Our Place in Space	9-10 weeks	2
Transfers and Transformations of Energy	7-9 weeks	3
Matter Responds to Energy	7-9 weeks	4

**Curriculum Development Overview
Unit Planning for 8th Grade Science**

Unit Title	Our Place in Space		Length of Unit	9-10 weeks
Focusing Lens(es)	System	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.8-S.1-GLE.1 SC09-GR.8-S.1-GLE.2 SC09-GR.8-S.1-GLE.4 SC09-GR.8-S.3-GLE.2 SC09-GR.8-S.3-GLE.3 SC09-GR.8-S.3-GLE.4	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • How would multiple visible moons in the night sky affect the solar system? • Should more money be allocated for space exploration? • How would a different tilt of the earth affect energy consumption in Colorado? 			
Unit Strands	Physical Science, Earth Science, RWL – Oral Expression and Listening, RWL – Reading for All Purposes; RWL – Writing and Composition, RWL – Research and Reasoning, Math – Data Analysis, Statistics, and Probability			
Concepts	Change, Scale, Organization, Energy/Matter, Models, Patterns, Motion, Cycle, Systems, Inquiry, Investigation, Force, Transformation, gravity			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
The Earth and the pattern of its moon within the solar system create cycles of tides, eclipses, and phases of the moon which impact where and how people live. (SC09-GR.8-S.3-GLE.4-EO.b)	What are three ways the position of the moon affects seasons. (SC09-GR.8-S.3-GLE.4-EO.a,b; IQ.1)	How would tides be different if the Earth had no moons? Two moons? (SC09-GR.8-S.3-GLE.4-EO.a,b; IQ.1)
Earth's shape and tilt determine the amount of solar energy that reaches different latitudes which affects length of day, climate, and seasonal patterns. (SC09-GR.8-S.3-GLE.2-EO.b,c)	How does the shape and tilt of the earth influence climate in Colorado? (SC09-GR.8-S.3-GLE.2-EO.b) What are the energy transformations involved in the solar energy impacting the planet? (SC09-GR.8-S.1-GLE.2-EO.c) What are the main climates on Earth and how are they defined by temperature and precipitation? (SC09-GR.8-S.3-GLE.2; IQ.2)	How would different tilts of the Earth impact seasonal changes? (SC09-GR.8-S.3-GLE.2-EO.b) How does energy transform from one form to another? (SC09-GR.8-S.1-GLE.2-EO.c) How do electromagnetic waves transfer energy that affects climate and life? (SC09-GR.8-S.1-GLE.4-EO.a; RA.3)

**Curriculum Development Overview
Unit Planning for 8th Grade Science**

<p>Gravitational force accounts for patterns of motion of objects within the solar system and tides. (SC09-GR.8-S.3-GLE.3-EO.f)</p>	<p>What major forces maintain the orbit of objects in the solar system? (SC09-GR.8-S.1-GLE.1-EO.a) What makes pathways predictable for orbit? (SC09-GR.8-S.3-GLE.4-EO.a) and (SC09-GR.8-S.3-GLE.3-EO.f) How does gravity affect tides? (SC09-GR.8-S.3-GLE.4-EO.a; IQ.2)</p>	<p>What evidence indicates a force has acted on a system? (SC09-GR.8-S.1-GLE.1-EO.a) Is it possible for a force to act on a system without having an effect? (SC09-GR.8-S.1-GLE.1-EO.a)</p>
<p>Changing models reflect changing ideas of the organization and scale of the solar system. (SC09-GR.8-S.3-GLE.4-EO.a,f; N.3)</p>	<p>What are historic and current models of the Earth's place in the solar system? (SC09-GR.8-S.3-GLE.3-EO.d; RA.1; N.2) What are the different objects that comprise the solar system? (SC09-GR.8-S.3-GLE.3-EO.a; IQ.1)</p>	<p>How does understanding our place in the solar system help predict future events? (SC09-GR.8-S.3-GLE.3-EO.d; RA.1; N.2) How is the solar system changing over time? (SC09-GR.8-S.3-GLE.3-EO.d;N.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"> • Different forms of energy and how they can transfer or transform from one form to another. (SC09-GR.8-S.1-GLE.1-EO.a,b,c) • Electromagnetic energy that provides energy for climate and life. • Earth's variety of climates defined primarily by precipitation and temperature (SC09-GR.8-S.3-GLE.2-EO.b,c) • The solar system and its numerous objects including planets, sun, moons, asteroids, comets, and dwarf planets (SC09-GR.8-S.3-GLE.3-EO.a) • The predictable orbits of objects in the solar system. (SC09-GR.8-S.3-GLE.4-EO.f) • Relative positions of the Earth, moon and sun and how they help explain natural phenomena such as tides, eclipses (moon and sun) and moon phases. (SC09-GR.8-S.3-GLE.4-EO.b) • Earth's tilt and the ways in which it accounts for variations in amounts of direct light and its relationship to the seasons (SC09-GR.8-S.3-GLE.2-EO.b,c) • The continual changes to our understanding of the solar system due to scientific investigations and advances in data collection (SC09-GR.8-S.3-GLE.3; N.2) 	<ul style="list-style-type: none"> • Gather, analyze, and interpret data to describe the different forms of energy (SC09-GR.8-S.1-GLE.1-EO.a) • Construct a scale model of the solar system and use it to explain the motion of objects (SC09-GR.8-S.3-GLE.3-EO.a) • Describe methods and equipment used to explore the solar system and beyond. (SC09-GR.8-S.3-GLE.3-EO.b) • Design an investigation that involves direct observation, models, data sets, and/or simulations to study objects in the sky (SC09-GR.8-S.3-GLE.3-EO.c,e,f) • Analyze and interpret data to explain why we have seasons (SC09-GR.8-S.3-GLE.4-EO.b) • Use models to explain the relative motions of the Earth, moon, and sun over time (SC09-GR.8-S.3-GLE.4-EO.c) • Research, critique, and communicate scientific theories that explain how the solar system formed (SC09-GR.8-S.3-GLE.3-EO.d)

**Curriculum Development Overview
Unit Planning for 8th Grade 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><i>A model can be interpreted to explain the phases of the moon. Through analyzing data, I can determine the relationship between latitude and climate and can predict the degree of seasonal variation.</i></p>
<p>Academic Vocabulary:</p>	<p>interpret, compare and contrast, identify, critique, evaluate, analyze, models, evidence, distinguishing characteristics, scientific investigation, net</p>
<p>Technical Vocabulary:</p>	<p>climate, revolution, rotate, season, tide, eclipse, scale model, gibbous, waxing/waning, dwarf planet, gravity, star, axis, relative, latitude, longitude, absorption, reflection, heliocentric, satellite, orbit, force, motion, inertia, radiation, hemisphere, electromagnetic, angle of insolation, neap tide, spring tide, tidal force, precipitation,</p>

**Curriculum Development Overview
Unit Planning for 8th Grade Science**

Unit Title	Transfers and Transformation of Energy		Length of Unit	7-9 weeks
Focusing Lens(es)	Relationships	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.8-S.1-GLE.2 SC09-GR.8-S.1-GLE.4 SC09-GR.8-S.2-GLE.1 SC09-GR.8-S.3-GLE.1	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • How would global climate change affect the weather? • How would life be different if energy could not transform? • How are waves harmful or helpful to society? • How would weather be different if heat did not move in predictable patterns? 			
Unit Strands	Physical Science, Life Science, RWL – Oral Expression and Listening, RWL – Reading for All Purposes; RWL – Writing and Composition, RWL – Research and Reasoning, Math – Data Analysis, Statistics, and Probability			
Concepts	Energy, Conservation, Waves, Change, Transformation, Variation, Ecosystems, Patterns, Weather, Interactions, Resources			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Predictable patterns of energy allow humans to transform and harness it for personal use (SC09-GR.8-S.1-GLE.2-EO.a; RA.3,4)	What are different ways that living things obtain and use energy? (SC09-GR.8-S.1-GLE.2-EO.a) What are the different forms of energy that humans use? (SC09-GR.8-S.1-GLE.2-EO.a) What are the properties of light? (SC09-GR.8-S.1-GLE.4-EO.d; RA.4)	Is there a limit to how many times energy can be transferred? (SC09-GR.8-S.1-GLE.2; IQ.3) In order to preserve global ecosystems, should humans have a limited energy budget? (SC09-GR.8-S.2-GLE.1-EO.a,b; IQ.1; RA.1)
Energy from waves transforms into useable resources which allows organisms to gather information from environmental surroundings (SC09-GR.8-S.1-GLE.2; RA.1) and (SC09-GR.8-S.1-GLE.4; RA.5)	What forms of energy travel as waves? (SC09-GR.8-S.1-GLE.4; RA.3; N.1) What are the different types of waves? (SC09-GR.8-S.1-GLE.4-EO.a; IQ.1) How can waves be described (i.e. amplitude, frequency, wavelength, and speed)? (SC09-GR.8-S.1-GLE.4-EO.b; RA.2)	How are light and sound waves similar and different? (SC09-GR.8-S.1-GLE.4-EO.c; RA.1,2) How are pitch and frequency related in sound? (SC09-GR.8-S.1-GLE.4-EO.c; RA.1,2)
Human energy production and consumption choices can directly and indirectly change societies and ecosystems, impacting life as we know it (SC09-GR.8-S.2-GLE.1-EO.a,b,d; IQ.1; RA.1)	What are examples of renewable or non-renewable energy sources? (SC09-GR.8-S.1-GLE.2-EO.a)	What factors should be considered when making energy production and consumption choices? (SC09-GR.8-S.1-GLE.2-EO.a) and (SC09-GR.8-S.2-GLE.1-EO.a,b,d; IQ.1; RA.1)

**Curriculum Development Overview
Unit Planning for 8th Grade Science**

<p>Weather patterns result from complex interactions of matter and energy in the atmosphere (SC09-GR.8-S.3-GLE.1)</p>	<p>How do scientists measure and describe weather? (SC09-GR.8-S.3-GLE.1-EO.c; RA.1, N.1) What factors define weather? (SC09-GR.8-S.3-GLE.1-EO.a; IQ.3) What are some safety concerns associated with severe weather? (SC09-GR.8-S.3-GLE.1-EO.a; IQ.3; RA.3; N.2)</p>	<p>Why does weather vary from day to day? (SC09-GR.8-S.3-GLE.1; IQ.1) What are the strengths and limitations of different types of weather models? (SC09-GR.8-S.3-GLE.1; IQ.2) How is weather predicted? (SC09-GR.8-S.3-GLE.1-EO.b, IQ.2,3; RA.2,3)</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"> • Different forms of energy and how they can be transferred from one form to another, while total energy is conserved. (SC09-GR.8-S.1-GLE.2-EO.a,b,c) • Different types of waves that can be described through amplitude, frequency, wavelength, and speed. (SC09-GR.8-S.1-GLE.4-EO.a,b) • Why and how heat moves from hotter to colder areas through convection, conduction, and radiation. • The relationship between pitch and frequency in sound. (SC09-GR.8-S.1-GLE.4-EO.c) • The properties of light: absorption, reflection, and refraction (SC09-GR.8-S.1-GLE.4-EO.d) • Human activities that use energy to alter and impact ecosystems (SC09-GR.8-S.2-GLE.1-EO.a,b,c,d,e) • Factors that define weather: precipitation, humidity, air pressure and temperature • Safety concerns associated with severe weather (SC09-GR.8-S.3-GLE.1-EO.a) • Models of interacting variables used to predict weather (SC09-GR.8-S.3-GLE.1-EO.c; RA.2) 	<ul style="list-style-type: none"> • Gather, analyze and interpret data and develop an analysis describing forms of energy and energy transfer. (SC09-GR.8-S.1-GLE.2-EO.a,b) • Use research-based models to describe energy transfer and predict amounts of energy transferred (SC09-GR.8-S.1-GLE.2-EO.c) • Compare and contrast different types of waves through describing changing properties (SC09-GR.8-S.1-GLE.4-EO.a,b,c) • Develop and design a scientific investigation regarding absorption, reflection, and refraction of light (SC09-GR.8-S.1-GLE.4-EO.d) • Develop, communicate, and justify an evidence-based explanation through analysis and interpretation of data from a variety of resources, while recognizing and inferring potential bias, focusing on of how human use of energy may alter ecosystems (SC09-GR.8-S.2-GLE.1-EO.a,b,c,d,e) • Observe and gather data for various weather conditions and compare to historical data for that date and location (SC09-GR.8-S.3-GLE.1-EO.b) • Differentiate between basic and severe weather condition (SC09-GR.8-S.3-GLE.1-EO.a) • Evaluate and use models to develop and communicate a weather prediction. (SC09-GR.8-S.3-GLE.1-EO.c; N.1)

**Curriculum Development Overview
Unit Planning for 8th Grade 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><i>Energy exists in various forms and is conserved as it is transformed. (SC09-GR.8-S.1-GLE.2)</i> <i>Different types of waves share characteristics and also have unique properties. (SC09-GR.8-S.1-GLE.4)</i> <i>Various forms of energy production and consumption can deliberately or inadvertently impact biotic and abiotic environments. (SC09-GR.8-S.2-GLE.1)</i> <i>Weather happens because of interactions of energy and matter in the atmosphere, which can be described through models. (SC09-GR.8-S.3-GLE.1)</i></p>
<p>Academic Vocabulary:</p>	<p>mechanisms, predict, analyze, interpret, transformation, investigation, compare, contrast, properties, alter, impact, issue, interpret, justify, evidence, bias, design, critique, models, inquiry</p>
<p>Technical Vocabulary:</p>	<p>potential energy (gravitational, nuclear, chemical, mechanical) kinetic energy (mechanical, chemical, radiant, nuclear, thermal, electrical, sound) waves, medium, conservation, renewable, nonrenewable, heat, conduction, convection, radiation, electromagnetic, pitch, frequency, amplitude, frequency, pitch, absorption, reflection, refraction, precipitation, atmosphere, front, humidity, wind, pressure, tornado, hurricane, tsunami, buoy, satellites, radar, forecast</p>

**Curriculum Development Overview
Unit Planning for 8th Grade Science**

Unit Title	Matter Responds to Energy		Length of Unit	7-9 weeks
Focusing Lens(es)	Interdependence Change	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.8-S.1-GLE.1 SC09-GR.8-S.1-GLE.3 SC09-GR.8-S.2-GLE.1 MA09-GR.8-S.2-GLE.3	
Inquiry Questions (Engaging- Debatable):	<ul style="list-style-type: none"> • How can matter change energy? • Would a world with only physical changes (versus chemical change) differ from Earth? • Would life be easier or harder if mass was not conserved? (SC09-GR.8-S.1-GLE.3; IQ.3) • Do humans have a unique responsibility to the ecosystems in which they live? (SC09-GR.8-S.2-GLE1; IQ.1) 			
Unit Strands	Physical Science, Life Science, RWL – Oral Expression and Listening, RWL – Reading for All Purposes; RWL – Writing and Composition, RWL – Research and Reasoning, Math –Patterns, Functions, and Algebraic Structures, Math – Data Analysis, Statistics, and Probability			
Concepts	Change, Energy/Matter, Conservation, Ecosystem, Models, Force, Motion, Mass			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Functions, words, tables, and graphs facilitate the modeling of relationships between forces and motion. (SC09-GR.8-S.1-GLE.1-EO.a,b,c) and (SC09-GR.8-S1-GLE1; N1)	What relationships exist among force, mass, speed, and acceleration. (SC09-Gr.8-S.1-GLE.1-EO.a) How do speed and acceleration related to net force? (SC09-Gr.8-S.1-GLE.1-EO.a)	How do engineers take forces into account when designing moving objects, such as roller coasters and rockets? (SC09-Gr.8-S.1-GLE.1; RA.1, 2) How are energy and force related?
Energy can rearrange matter through chemical changes. (SC09-Gr.8-S.1-GLE.3-EO.a)	What indicates a chemical change is occurring?	How do products of chemical changes compare to reactants?
Physical and chemical changes (despite their different properties) conserve mass. (SC09-Gr.8-S.1-GLE.3-EO.a, c, d)	What indicates a physical change is occurring? (SC09-Gr.8-S.1-GLE.3-EO.a) What evidence can show whether mass has been conserved after a chemical or physical change? (SC09-Gr.8-S.1-GLE.3-EO.b,c,d; IQ.2,3)	What evidence can indicate whether a change is physical or chemical? (SC09-Gr.8-S.1-GLE.3; IQ.1) Why are physical and chemical changes necessary? (SC09-Gr.8-S.1-GLE.3-EO.a,b) What does conservation mean within the context of physical and chemical change? (SC09-Gr.8-S.1-GLE.3-EO.b,c,d; IQ.2,3)
Different ideas about how human activity changes ecosystems impacts conservation efforts within communities. (SC09-Gr.8-S.2-GLE.1-EO.a, b, c, d, e; RA 1)	What human activities impact ecosystems?	How can human activities affect local ecosystems? (SC09-Gr.8-S.2-GLE.1-EO.b, d, e; RA 1) How can bias influence explanations about human impact on ecosystems? (SC09-Gr.8-S.2-GLE.1-EO.c)

**Curriculum Development Overview
Unit Planning for 8th Grade Science**

Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> The relationship between speed and acceleration as net forces acting on the object. (SC09-Gr.8-S.1-GLE.1-EO.a, b, c) The current understanding of forces and how they have changed over time as we refine understanding through scientific investigations and advances in data collection. (SC09-Gr.8-S.1-GLE.1; N.1) Similarities and distinctive characteristics of physical and chemical changes. (SC09-Gr.8-S.1-GLE.3-EO.a) How and why mass is conserved in physical and chemical changes. (SC09-Gr.8-S.1-GLE.3-EO.c,d) The (potential) impacts of human activity on ecosystems. (SC09-Gr.8-S.2-GLE.1-EO.a, b, d; RA.1) Functions (as rules) assign each input exactly one output. (SC09-Gr.8-S.2 –GLE.3-EO.a) The relationships between appropriate levels of detail in research and the ability of other scientists to reproduce a result. (SC09-Gr.8-S.1-GLE.3; N.1) 	<ul style="list-style-type: none"> Predict and evaluate movement of objects by examining forces acting on it. (SC09-Gr.8-S.1-GLE.1-E.O a) Use mathematical expressions to describe the movement of objects. (SC09-Gr.8-S.1-GLE.1-EO.b) Develop and design investigations to answer questions about speed, acceleration, and motion. (SC09-Gr.8-S.1-GLE.1-EO.b; N.2) Evaluate the reproducibility of an experiment. (SC09-Gr.8-S.1-GLE.3; N.1) Gather, analyze, and interpret data that show mass is conserved in a given chemical or physical change. (SC09-Gr.8-S.1-GLE.3-EO.c,d) Critically evaluate scientific claims in popular media and peer-generated explanations regarding interactions in ecosystems, and determine if the evidence presented is appropriate and sufficient to support the claims. (SC09-Gr.8-S.2-GLE.1; N.1) Recognize and infer bias in print and digital resources while researching an environmental issue. (SC09-Gr.8-S.2-GLE.1-EO.c) Solve a function through a table, graph, or equation. (MA09-Gr.8-S.2 –GLE.3-EO.a.i)

<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><i>Energy can move or change matter, but not create or destroy it.</i> <i>Matter can change its form or composition by physical or chemical change.</i> <i>Human activities change ecosystems in different ways.</i> <i>People disagree about evidence concerning human impacts on the environment.</i></p>
<p>Academic Vocabulary:</p>	<p>similar, different, formula, model, equation, balanced equation, scientific law, bias, inquiry, investigation, develop, communicate, infer, solve, expressions, critically, reproducibility, evaluate, experimental, examine</p>
<p>Technical Vocabulary:</p>	<p>force, balanced force, unbalanced force, net force, speed, acceleration, mass, distance, velocity, position, states of matter, phase changes, temperature, freeze, thaw, evaporate, condense, chemical bonds, atom, molecule, Law of Conservation of Mass, reactant, product, kilogram</p>

**Curriculum Development Overview
Unit Planning for 8th Grade Science**

Unit Title	Genetics and the Human Influence on Genes		Length of Unit	7-9 weeks
Focusing Lens(es)	Interactions	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.8-S.2-GLE.1 SC09-GR.8-S.2-GLE.2	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • How will genetic engineering be used when humans reach outer space? (SC09-GR.8-S.2-GLE.1,2-EO.a,b,c,d,e) • Is genetic variation a positive or negative societal trait? • Would discrimination occur if ALL genotypes were expressed as phenotypes? • Do the benefits outweigh the risks of genetic technology (cloning, gene therapy, and genetically modified foods)? (SC09-GR.8-S.2-GLE.2; IQ.3) 			
Unit Strands	Life Science, RWL – Oral Expression and Listening, RWL – Reading for All Purposes; RWL – Writing and Composition, RWL – Research and Reasoning, Math – Data Analysis, Statistics, and Probability			
Concepts	Variation, Heredity, Interaction, Evolution, System, Population, Organism, Genetics			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Organisms interact to reproduce and transmit genetic information to offspring, which is then, in turn, passed to future offspring. (SC09-GR.8-S.2-GLE.1-EO.a,b,c,d,e)	<p>How are traits passed from one generation to the next? (SC09-GR.8-S2-GLE.2; IQ.1)</p> <p>What is the difference between genotype and phenotype? (SC09-GR.8-S2-GLE.2-EO.d,e)</p> <p>How do organisms evolve over time?</p>	How can certain traits be passed to offspring, while others are not? (SC09-GR.8-S.2-GLE.2-EO.c,d; IQ.1,2)
An organism’s variation reflects heredity due to the nature of genetics. (SC09-GR.8-S.2-GLE.2-EO.a,b,c,d,e)	<p>How does heredity influence an offspring’s variation? (SC09-GR.8-S.2-GLE.2-EO.a,b; IQ.2)</p> <p>What is a Punnett Square? How do you use one? (SC09-GR.8-S.2-GLE.2-EO.c,d; IQ.2,3; N.1)</p>	How can patterns in the inheritance of traits be used to predict the frequency of traits appearing in offspring? (SC09-GR.8-GLE.2; IQ.3)
Human technology and activities can alter systems of heredity and interaction which could impact society for future generations. (SC09-GR.8-S.2-GLE.1-EO.a,b) and (SC09-GR.8-S.2-GLE.2-EO.a,b; RA.1,2)	What is the human role in genetic heredity of food items (plants and animal food)? (SC09-GR.8-S.2-GLE.2; RA.1; N.2)	What applications do genetic modifications have in agriculture and medicine? (SC09-GR.8-S.2-GLE.2; RA.1,2; N.2)

**Curriculum Development Overview
Unit Planning for 8th Grade Science**

Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> • How the ideas and beliefs about genetics have developed over time as new technologies and applications have been developed. (SC09-GR.8-S.2-GLE.2-EO.a,b,c; RA.1; N.2) • The role of environment in the expression of genes. (SC09-GR.8-S.2-GLE.2-EO.c,d,e; N.1,3) • The classification of genotype and phenotype based on parent genotype and phenotype (including sex-linked traits, pedigrees, codominance, and karyotype). (SC09-GR.8-S.2-GLE.2-EO.d,e) • The definition and uses of a Punnett Square. (SC09-GR.8-S.2-GLE.2-EO.d,e) 	<ul style="list-style-type: none"> • Critically evaluate the benefits and risks of the technology associated with genetics. (SC09-GR.8-S.2-GLE.2-EO.a,b,c; RA.1; N.2) • Evaluate various models of DNA inheritance and genes based strengths and weaknesses (SC09-GR.8-S.2-GLE.2-EO.c,d,e; N.1,3) • Develop, communicate, and justify an evidence based scientific explanation for passing genetic information from one generation to the next. (SC09-GR.8-S.2-GLE.2-EO.a,b,c; N.1,2) • Use models, diagrams, and computer simulations to predict offspring phenotypes and genotypes based on parent genotypes. (SC09-GR.8-S.2-GLE.2-EO.d,e)

<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><i>Traits of individuals are influenced by genes and/or environment (SC09-GR.8-S.2-GLE.2)</i></p>
<p>Academic Vocabulary:</p>	<p>simulation, analyze, interpret, evidence (direct and indirect), scientific investigation, distinguishing characteristics, models, critique, evaluate, compare and contrast</p>
<p>Technical Vocabulary:</p>	<p>traits, biotechnology, heredity, RNA (ribonucleic acid), DNA (deoxyribonucleic acid), phenotype, genotype, Punnett square, dominant, recessive, genetic technology, gene</p>