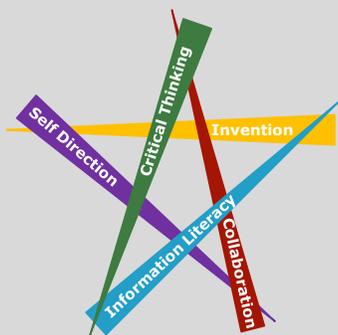


**Curriculum Development Course at a Glance
Planning for 4th Grade Science**

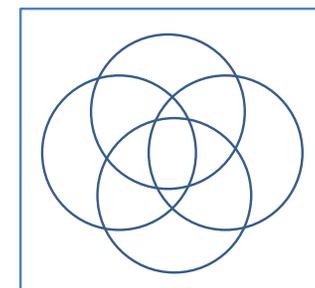
Content Area	Science	Grade Level	4 th Grade
Course Name/Course Code			
Standard	Grade Level Expectations (GLE)	GLE Code	
1. Physical Science	1. Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical	SC09-GR.4-S.1-GLE.1	
2. Life Science	1. All living things share similar characteristics, but they also have differences that can be described and classified	SC09-GR.4-S.2-GLE.1	
	2. Comparing fossils to each other or to living organisms reveals features of prehistoric environments and provides information about organisms today	SC09-GR.4-S.2-GLE.2	
	3. There is interaction and interdependence between and among living and nonliving components of systems	SC09-GR.4-S.2-GLE.3	
3. Earth Systems Science	1. Earth is part of the solar system, which includes the Sun, Moon, and other bodies that orbit the Sun in predictable patterns that lead to observable paths of objects in the sky as seen from Earth	SC09-GR.4-S.3-GLE.1	

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*

Intragrated Curriculum Design: This intradisciplinary approach matches basic elements in each of the science strands – physical, life, earth systems sciences - forming overlaps in instruction of certain topics and concepts in an authentic integrated model.



Unit Titles	Length of Unit/Contact Hours	Unit Number/Sequence
Forms of Energy	4-6 weeks	1
Evidence of Life	5-7 weeks	2
Leaving a footprint: Habitats and Ecosystems	6-9 weeks	3
Solar Systems	4-6 weeks	4

**Curriculum Development Overview
Unit Planning for 4th Grade Science**

Unit Title	Evidence of Life		Length of Unit	5-7 weeks
Focusing Lens(es)	Compare/Contrast	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.4-S.2-GLE.1 SC09-GR.4-S.2-GLE.2	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> What would a future generation say about current times/lives if they were to uncover a microwave oven, cell phone, or windmill at some future date? 			
Unit Strands	Life Science			
Concepts	needs, organism, similarities, differences, traits, characteristics, classification, fossils, prehistoric, environment, comparing, evidence			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Records of past natural cycles and processes, such as fossil evidence, predict the potential behavior of current environmental systems (SC09-GR.4-S.2-GLE.1-EO.b; IQ.1; N.1) and (SC09-GR.4-S.2-GLE.2-EO. a.1,2, b, c; IQ. 1)	What is fossil evidence? (SC09-GR.4-S.2-GLE.2-EO. a.1,2, c; IQ. 1) What are the similarities and differences between living organisms and fossils? (SC09-GR.4-S.2-GLE.1-EO.b) and (SC09-GR.4-S.2-GLE.2-EO. a.1,2)	What conditions would most likely lead to something becoming a fossil? (SC09-GR.4-S.2-GLE.2-EO.b, d) What are some things fossils can't tell us? (SC09-GR.4-S.2-GLE.2; IQ.1) At what point do things become fossils? (SC09-GR.4-S.2-GLE.2; IQ.2)
Organisms' traits, structures and other characteristics allow scientists to classify them and group them with similar organisms. (SC09-GR.4-S.2-GLE.1-EO.b, c, d; IQ. 2; N.1,2)	What is a trait? (SC09-GR.4-S.2-GLE.1-EO.c) By what characteristics are organisms classified? (SC09-GR.4-S.2-GLE.1-EO.b,d; IQ.1; N.2)	How are individuals in a related species similar and different? (SC09-GR.4-S.2-GLE.1-EO.b,d; IQ.1; N.2)
Variations in traits, structure and characteristics determine how organisms fulfill basic needs. (SC09-GR.4-S.2-GLE.1-EO.a-d; IQ. 2)	How do plants and animals fulfill their basic needs? (SC09-GR.4-S.2-GLE.1-EO.a; IQ.2)	How could traits and structures of an organism determine the fulfillment of basic needs? (SC09-GR.4-S.2-GLE.1-EO.a; IQ.2)

**Curriculum Development Overview
Unit Planning for 4th Grade Science**

Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> • The survival needs of plants and animals (SC09-GR.4-S.2-GLE.1-EO.a; RA. 1) • Traits inherited from parents (SC09-GR.4-S.2-GLE.1-EO.c; IQ.2) • The characteristics that living things share(SC09-GR.4-S.2-GLE.1-EO.c; IQ.1; N.1) • Similarities and differences among organisms (SC09-GR.4-S.2-GLE.1-EO.b; IQ.2; N.1) • The similarities between fossils and living organisms (SC09-GR.4-S.2-GLE.2-EO. a.2; IQ.1) • Fossil evidence of prehistoric life (SC09-GR.4-S.2-GLE.2-EO.a.1,c; IQ.1,2; N.3) • The ways in which fossils provide information about prehistoric environments (SC09-GR.4-S.2-GLE.2-EO.b; RA.1; N.1, 2) 	<ul style="list-style-type: none"> • Identify the basic needs for organisms to survive (SC09-GR.4-S.2-GLE.1-EO.a; RA.1) • Identify traits and characteristics of plants and animals (SC09-GR.4-S.2-GLE.1-EO.c; IQ.2) • Classify and sort plants and animals according to traits, structures and other characteristics (SC09-GR.4-S.2-GLE.1-EO.c; IQ.2) • Classify and sort fossils according to traits, structures and other characteristics (SC09-GR.4-S.2- GLE.2-EO. a.2; IQ.1) • Make predictions about past environments based on fossil evidence (SC09-GR.4-S.2-GLE.2-EO.b; RA.1; N.1, 2, 3)

<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>I can explain that fossils are evidence of past life and environments.</i> <i>I can classify organisms by traits, structures and other characteristics.</i></p>
<p>Academic Vocabulary:</p>	<p>explain, evidence, interpret, analyze, evaluate, question, investigate, study</p>
<p>Technical Vocabulary:</p>	<p>fossils, organisms, traits, survive, variations, characteristics, prehistoric, environment, classification, living and nonliving organisms, plants, animals, extinct, structures, liquefy, living, non-living</p>

**Curriculum Development Overview
Unit Planning for 4th Grade Science**

Unit Title	Forms of Energy		Length of Unit	4-6 weeks
Focusing Lens(es)	Systems Transformations	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.4-S.1-GLE.1	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • How do we know that energy exists within a system such as in an electrical circuit? (SC09-GR.4-S.1-GLE.1; IQ.1) • How can we justify the use of our nonrenewable resources? (SC09-GR.4-S.1-GLE.1-EO.d; N.3) • How can we better manage our sources of energy? What if we do not? (SC09-GR.4-S.1-GLE.1-EO.d; N.4) 			
Unit Strands	Physical Science			
Concepts	energy, systems, transformation, renewable, nonrenewable, sources, circuits, forms, electricity			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
All forms of energy transfer through a predictable pathway which allows organisms to harness them (SC09-GR.4-S.1-GLE.1-EO.d; RA.2,3)	<p>What are the pathways that energy travels? (SC09-GR.4-S.1-GLE.1-EO.b; IQ.2)</p> <p>What are the components of an energy system?</p>	<p>Why is energy useful to our way of life? (SC09-GR.4-S.1-GLE.1-EO.b; RA.1,2,3)</p> <p>Which energy is the most useable and most effective? (SC09-GR.4-S.1-GLE.1-EO.b; RA.1,2,3)</p> <p>What are the similarities and differences between solar and electrical energy? (SC09-GR.4-S.1-GLE.1-EO.b; RA.1,2,3)</p> <p>How can heat be transferred from one object to another?(SC09-GR.4-S.1-GLE.1; IQ.2)</p>
Humans' current faster consumption of nonrenewable versus renewable resources will require reconsideration (and innovation) around resource usage (SC09-GR.4-S.1-GLE.1-EO.d; RA.1,2,3)	<p>What are our renewable and nonrenewable resources? (SC09-GR.4-S.1-GLE.1-EO.d)</p>	<p>Why do we need to conserve our nonrenewable resources? (SC09-GR.4-S.1-GLE.1-EO.d)</p> <p>How can we more effectively utilize our renewable resources? (SC09-GR.4-S.1-GLE.1-EO.d)</p>
The many forms of energy come from a variety of sources that determine their use. (SC09-GR.4-S.1-GLE.1-EO.a;RA.1)	<p>What are the various forms of energy? (SC09-GR.4-S.1-GLE.1-EO.a)</p> <p>What are the various sources of energy? (SC09-GR.4-S.1-GLE.1-EO.a)</p>	<p>How are the forms of energy harnessed? (SC09-GR.4-S.1-GLE.1-EO.a; IQ.1,2)</p> <p>Is there an order of importance in the forms of energy? (SC09-GR.4-S.1-GLE.1-EO.a; RA.1, 2, 3)</p> <p>How would limited sources affect the availability of energy? (SC09-GR.4-S.1-GLE.1-EO.d;RA.1,2)</p>

**Curriculum Development Overview
Unit Planning for 4th Grade Science**

Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> • The various forms of energy (light, heat, sound, magnetic, chemical and electric, and potential and kinetic) (SC09-GR.4-S.1-GLE.1-EO.a) • The components of an electric circuit, (SC09-GR.4-S.1-GLE.1-EO.b) • The transferable nature of energy (SC09-GR.4-S.1-GLE.1-EO.c; RA.2,3) • The real world applications for using transferable energy in transportation, manufacturing and technology (SC09-GR.4-S.1-GLE.1; RA.3) 	<ul style="list-style-type: none"> • Model or diagram an electrical circuit (SC09-GR.4-S.1-GLE.1-EO.b) • Classify various forms of energy with pictures of everyday objects/examples (SC09-GR.4-S.1-GLE.1-EO.d;RA.1,2)

<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>I can identify the various forms of energy, and describe its transformation from the source where it is produced.</i></p>
<p>Academic Vocabulary:</p>	<p>hypothesis, identify, describe, data, conclusion, predict, locate information, explain, evaluate, create,</p>
<p>Technical Vocabulary:</p>	<p>energy, circuit, source, current, energy transformation, electrical, light, heat, sound, renewable, non-renewable,</p>

**Curriculum Development Overview
Unit Planning for 4th Grade Science**

Unit Title	Solar System		Length of Unit	4-6 weeks
Focusing Lens(es)	Patterns Relationships	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.4-S.3-GLE.1	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • What would happen if the patterns of movement for the Sun and Moon across the sky were different? (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1) • How would the solar system change if Earth and other objects did not orbit the Sun? (SC09-GR.4-S.3-GLE.1-EO.a,d; IQ.2) • Why do we study the solar system? (SC09-GR.4-S.3-GLE.1-EO.a; IQ.3) • How has the study of the solar system influenced literature or music? 			
Unit Strands	Earth Science			
Concepts	predictable patterns, phases, components of the solar system, orbits, revolutions, sunrise, sunset, seasons			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
The planets and moons of the solar system travel in predictable patterns which impact all aspects of Earth life. (SC09-GR.4-S.3-GLE.1-EO.a,b,d; RA.1)	What are the components of the solar system? (SC09-GR.4-S.3-GLE.1-EO.a, b) What are the similarities and differences between the orbit of the earth around the sun and the orbit of the moon around the earth? (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1; RA.1,3)	What are the relationships with regard to the components of the solar system? (SC09-GR.4-S.3-GLE.1-EO.a, b; RA.1)
Phases of the moon occur in a predictable pattern which directly influences the “behavior” of oceans, animals, and humans. (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1)	What are the phases of the moon?	What are the relationships with regard to the earth and the moon?
The revolution of earth dictates sunrise (day) and sunset (night) (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1; N.1)	What is revolution? (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1) How does the earth rotate? (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1)	How does earth’s revolution cause the appearance of the sun moving across the sky? (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1)
Seasons occur predictably due to the earth’s tilt and orbit around the sun. (SC09-GR.4-S.3-GLE.1-EO.c; RA.3; N.1)	How does the earth’s tilt and orbit cause the seasons? (SC09-GR.4-S.3-GLE.1-EO.c; IQ.3)	What are the relationships with regard to the earth and sun? (SC09-GR.4-S.3-GLE.1-EO.c; IQ.3)

**Curriculum Development Overview
Unit Planning for 4th Grade Science**

Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> • The components of the solar system (SC09-GR.4-S.3-GLE.1-EO.a; RA.1,2) • The connections between Sunrise and sunset and the rotation of the earth on its axis (SC09-GR.4-S.3-GLE.1-EO.a; RA.3) • The phases of the moon (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1; N.1) • The universe as a system with interdependent parts (SC09-GR.4-S.3-GLE.1-EO.b,d; N.2) • The relationship between seasons and the Earth’s tilt on its axis and orbit around the sun (SC09-GR.4-S.3-GLE.1-EO.d) 	<ul style="list-style-type: none"> • Model or diagram the phases of the moon (SC09-GR.4-S.3-GLE.1-EO.c; IQ.1; N.1) • Interpret data about the components of the solar system (SC09-GR.4-S.3-GLE.1-EO.a; RA.1, 2) • Compare Earth to other objects orbiting the sun (SC09-GR.4-S.3-GLE.1-EO.d; IQ.2; N.2) • Develop a scientific explanation regarding relationships of the components of the solar system (SC09-GR.4-S.3-GLE.1-EO.a,d; IQ.2,3; RA.1,2)

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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>I can identify the components of the solar system and explain the relationships among the components. I can predict Earth’s observable patterns such as phases of the moon, seasons, sunrise and sunset.</i></p>
<p>Academic Vocabulary:</p>	<p>gather, analyze, interpret, data, components, investigate, relationships, predictable, patterns</p>
<p>Technical Vocabulary:</p>	<p>phases, seasons, solar system, sunrise, sunset, orbit, axis, space, revolutions, comets, moon, earth, planets, waning, waxing, quarter, full moon, new moon</p>

**Curriculum Development Overview
Unit Planning for 4th Grade Science**

Unit Title	Leaving a footprint		Length of Unit	6 -8 weeks
Focusing Lens(es)	Systems	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.4-S.2-GLE.3	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • How are resources shared among organisms in a specific ecosystem or habitat? (SC09-GR.4-S.2-GLE.3-EO.b,d; IQ.1) • How do nonliving components of an ecosystem influence living components? (SC09-GR.4-S.2-GLE.3-EO.b,d; IQ.2) • Why do ecosystems need to be protected? (SC09-GR.4-S.2-GLE.3-EO.f; IQ.4; RA.1,2) 			
Unit Strands	Life Science			
Concepts	conservation, preservation, adaptation, interdependence, cycles, endangerment, energy, habitat, ecosystem, environment, food chain, change, balance, biotic, abiotic			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Interdependence among living and nonliving components creates a balance in the cycle of resources (an ecosystem) (SC09-GR.4-S.2-GLE.3-EO.d; IQ. 1,2; RA.2; N.2)	What are nonliving components in an ecosystem? (everything else is a living component)	How would an ecosystem be affected if components are removed or out of balance?
Living and nonliving components determine the unique characteristics of each habitat (SC09-GR.4-S.2-GLE.3-EO.a-d; IQ.1,2)	What are the living components of a given habitat? (SC09-GR.4-S.2-GLE.3-EO.d; IQ. 1,2; RA.2; N.2) How are a desert and an ocean similar and different? (SC09-GR.4-S.2-GLE.3-EO.d; IQ. 1,2; RA.2; N.2)	Why are there different habitats around the world? (SC09-GR.4-S.2-GLE.3-EO.c)
External influences (including climate, available resources, non-native species, etc.) determine how organisms adapt to their environment (SC09-GR.4-S.2-GLE.3-EO.a,e,f; IQ.3,4; N.1)	What are external influences that could affect an environment? (SC09-GR.4-S.2-GLE.3-EO.e; IQ.3,4; RA.1)	What could happen to a given habitat in the instance of a natural disaster? (SC09-GR.4-S.2-GLE.3-EO.e; IQ.3,4; RA.1)
Humans, more than any other animal, have the power to make decisions that contribute to the protection or endangerment of ecosystems (SC09-GR.4-S.2-GLE.3-EO.e,f; RA.1,2)	What is preservation? (SC09-GR.4-S.2-GLE.3-EO.e; IQ.3,4; RA.1) What does it mean to be endangered? (SC09-GR.4-S.2-GLE.3-EO.f) How are humans currently endangering and/or preserving habitats around the world? (SC09-GR.4-S.2-GLE.3-EO.f)	How can decisions made by people impact an ecosystem? (SC09-GR.4-S.2-GLE.3-EO.e; IQ.3,4; RA.1) How can you positively impact a local ecosystem? (SC09-GR.4-S.2-GLE.3-EO.e; IQ.3,4; RA.1)

**Curriculum Development Overview
Unit Planning for 4th Grade Science**

The cycle of energy in a food chain always includes living (biotic) and nonliving (abiotic) resources (SC09-GR.4-S.2-GLE.3-EO.d; IQ.1-4; RA.2)	Where does energy come from? (SC09-GR.4-S.2-GLE.3-EO.b; IQ.1) What are nonliving resources? (SC09-GR.4-S.2-GLE.3-EO.b, d; IQ.1,2)	What would happen if the sun's energy no longer reached the earth? (SC09-GR.4-S.2-GLE.3-EO.b; IQ.3) Why would removing water impact an ecosystem? (SC09-GR.4-S.2-GLE.3-EO.b; IQ.4)
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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"> Adaptations that organisms make in relation to their habitat (SC09-GR.4-S.2-GLE.3-EO.a) Unique aspects of habitats (SC09-GR.4-S.2-GLE.3-EO.b) The living and nonliving components of habitats (SC09-GR.4-S.2-GLE.3-EO.d; IQ.2,4; RA.1,2) The consumption and use of natural resources (SC09-GR.4-S.2-GLE.3-EO.f; IQ.1,3; RA.1,2) The food chain as part of an ecosystem (SC09-GR.4-S.2-GLE.3-EO.c,d; IQ.1,2) Positive and negative impacts on an ecosystems (endangered habitats and preservation efforts) (SC09-GR.4-S.2-GLE.3-EO.c,d,e,f; IQ.3,4; RA.1,2; N.1) 	<ul style="list-style-type: none"> Compare and contrast habitats (SC09-GR.4-S.2-GLE.3-EO.c) Evaluate how resources are used and consumed (SC09-GR.4-S.2-GLE.3-EO.d; IQ.1-4) Make a plan to positively impact a local ecosystem (SC09-GR.4-S.2-GLE.3-EO.e; RA.1,2) Identify energy flow in a food chain of a particular ecosystem (SC09-GR.4-S.2-GLE.3-EO.c,d; IQ.1-4)

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A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):	<i>I can explain the relationship between living and nonliving parts of an ecosystem. I understand that plants and animals adapt to live and interact within specific habitats.</i>
Academic Vocabulary:	interdependence, interaction, resources, impact, evidence, compare, contrast,
Technical Vocabulary:	ocean, tropical rainforest, forest, tundra, grasslands, desert, prey, predator, ecosystems, habitat, endangered, consume, adaptations, nonliving (abiotic) and living (biotic) components, solar energy, Food chain, organism, natural phenomena (flood, fire, earthquake), pollution, conservation, preservation