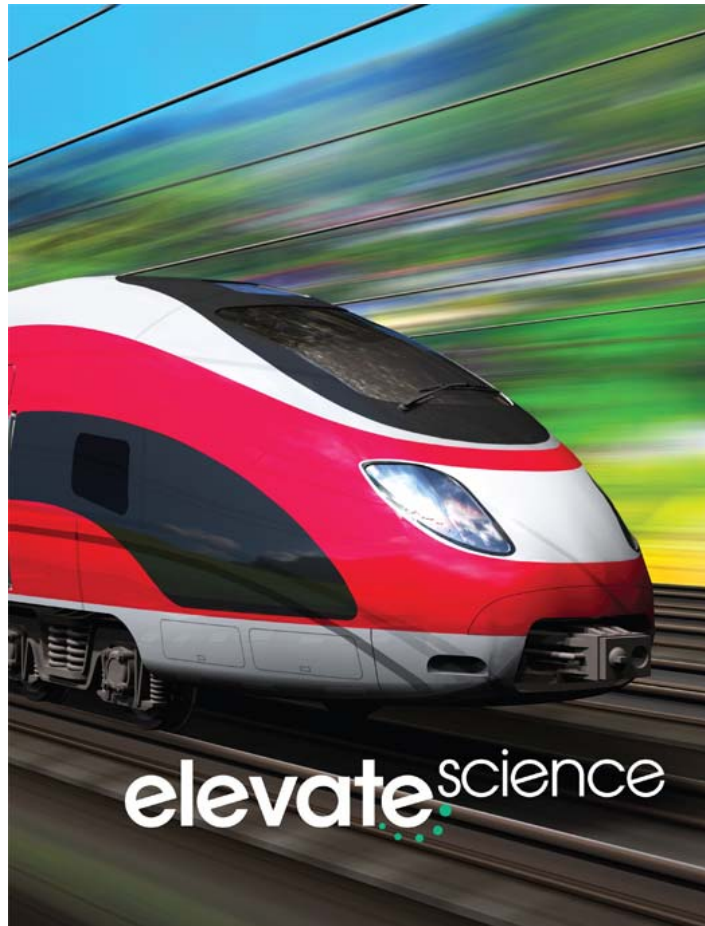


A Correlation of
Elevate Science
Grade 4, ©2019



To the
**Colorado 2020 Academic Standards
for Science**
Grade 4

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Introduction

The following document demonstrates how the ***Elevate Science, ©2019*** program supports Colorado 2020 Academic Standards for Science, Grade 4. For each standard, correlation references are to the Student Edition and Teacher Edition where applicable.

Elevate Science is a comprehensive K-5 science program that focuses on active, student-centered learning. It builds students' critical thinking, questioning, and collaboration skills, and fuels interest in STEM and creative problem solving while supporting literacy development for elementary-age learners. Developed to support Next Generation Science Standards (NGSS), ***Elevate Science*** integrates three dimensional learning of the Scientific and Engineering Practices, Crosscutting Concepts (CCC), and Disciplinary Core Ideas (DCIs).

The ***Elevate Science*** blended print and digital curriculum engages students in phenomena-based inquiry and hands-on investigations.

- Problem-based learning Quests put students on a journey of discovery
- Engineering-focused features infuse STEM learning
- Coding and innovation engage students and build 21st century skills

The Teacher's Edition of ***Elevate Science*** helps elementary educators teach science with confidence: Scaffolding, ELD, differentiated instruction, and an instructional organization based upon the 5E learning model, (Engage, Explore, Explain, Extend/Elaborate, Evaluate), provide all the support needed for successful teaching practices. Professional development offers point-of-use support. A full-view approach to inquiry and testing provides new options for a variety of hands-on labs and assessments for three-dimensional learning.

Elevate Science prepares students for the challenges of tomorrow, building strong reasoning skills and critical thinking strategies as they engage in explorations, formulate claims, and gather and analyze data that promote evidence-based argument. Designed for today's classroom, preparing students for tomorrow's world. ***Elevate Science*** promises to:

- Elevate thinking.
- Elevate learning.
- Elevate teaching

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Colorado 2020 Academic Standards for Science, Grade 4	Elevate Science Grade 4, ©2019
1. Physical Science	
Prepared Graduates:	
3. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.	
Grade Level Expectation:	
1. The faster an object moves the more energy it has.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Use evidence to construct an explanation relating the speed of an object to the energy of that object. (4-PS3-1) <i>(Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.) (Boundary Statement: Does not include quantitative measures of changes in speed of an object or on any precise or quantitative definition of energy.)</i></p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 uConnect Lab: How can you compare the energy of objects?, 4 Topic 1 uInvestigate Lab: How does starting height affect an object's energy?, 7 Topic 1 Motion and Energy, 12 Topic 1 uBe a Scientist, Force and Speed, 12 Topic 1 Quest Check-In: Energy, Speed, and Motion, 13 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 uInvestigate Lab: How does electric energy flow in circuits?, 35 Topic 1 Evidence-Based Assessment: Questions 3, 5, 47 Topic 1 uDemonstrate Lab: What affects energy transfer?, 48-49</p>

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Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Use evidence (e.g., measurements, observations, patterns) to construct an explanation (Constructing Explanations and Designing Solutions) (Entrepreneurial: Inquiry/Analysis)</p>	<p>SE/TE: Topic 1 uConnect Lab: How can you compare the energy of objects?, 4 Topic 1 uInvestigate Lab: How does starting height affect an object’s energy?, 7 Topic 1 uBe a Scientist, Force and Speed, 12 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Other Energy Changes: Model It!, 20 Topic 1 Quest Connection, 20 Topic 1 Evidence-Based Assessment: Question 6, 5, 47 Topic 1 uDemonstrate Lab: What affects energy transfer?, 48-49</p> <p>TE Only: Topic 1 Focus on Mastery!: Constructing Explanations, 13</p>
<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the questions: What is energy?</p>	<p>SE/TE: Topic 1 The Essential Question: What is energy, and how it is related to motion?, 1 Topic 1 uInvestigate Lab: How does starting height affect an object’s energy?, 7 Topic 1 Lesson 1 Check: Question 2, 12 Topic 1 Quest Check-In: Energy, Speed, and Motion, 13</p> <p>TE Only: Topic 1 Differentiated Instruction: Support Struggling Students, 12</p>

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<p>2. PS3:A Definitions of Energy: The faster a given object is moving, the more energy it possesses. Energy can be moved from place to place by moving objects or through sound, light or electric currents.</p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 Literacy Connection: Cause and Effect, 5 Topic 1 Lesson 3 Collisions: Sports Connection, 16 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 Topic 1 STEM Quest Check-In Lab: How does modeling help you understand a collision?, 22-23 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42</p>
<i>Cross Cutting Concepts:</i>	
<p>1. Energy and Matter: Energy can be transferred in various ways and between objects.</p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 Literacy Connection: Cause and Effect, 5 Topic 1 Topic 1 Energy, 8 Topic 1 Quest Connection: How can energy be transferred in a car?, 8 Topic 1 Lesson 3 Collisions: Sports Connection, 16 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 Topic 1 STEM Quest Check-In Lab: How does modeling help you understand a collision?, 22-23 Topic 1 Sound Energy, 30 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42 Topic 1 uDemonstrate Lab: What affects energy transfer?, 48-49</p>

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Grade Level Expectation:	
2. Energy can be moved from place to place.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat and electric currents. (4-PS3-2) (Boundary Statement: Does not include quantitative measurement of energy.)</p>	<p>SE/TE: Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 Topic 1 Sound Energy, 30 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 Sound Energy, 30 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 uInvestigate Lab: How does electric energy flow in circuits?, 35 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42</p>
Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause - and - effect relationships. (Asking Questions and Defining Problems) (Entrepreneurial: Inquiry/Analysis).</p>	<p>SE/TE: Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Quest Connection, 21 Topic 1 Lesson 2 Check: Question 2, 21 Topic 1 uDemonstrate Lab: What affects energy transfer?, 48-49 Science and Engineering Practices Handbook: Science Practices, Ask Questions, 294 Science and Engineering Practices Handbook: Engineering Practices, Defining Problem, EM10</p>

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<p>2. Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (Planning and Carrying Out Investigations) (Personal: Personal responsibility).</p>	<p>SE/TE: Topic 1 uConnect Lab: How can you compare the energy of objects?, 4 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 uInvestigate Lab: How does heat move?, 25 Topic 1 uInvestigate Lab: How does electric energy flow in circuits?, 35 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7 Science and Engineering Practices Handbook: Engineering Practices, Using Models and Prototype, EM12 Science and Engineering Practices Handbook: Optimizing Solutions, EM13</p>
<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the questions: What is meant by conservation of energy? How is energy transferred between objects or systems?</p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 Literacy Connection: Cause and Effect, 5 Topic 1 Energy, 8 Topic 1 Quest Connection: How can energy be transferred in a car?, 8 Topic 1 Collisions: Sports Connection, 16 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 STEM Quest Check-In Lab: How does modeling help you understand a collision?, 22-23 Topic 1 Visual Literacy Connection: How is energy transferred, 26-27 Topic 1 Sound Energy, 30 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42 Topic 1 uDemonstrate Lab: What affects energy transfer?, 48-49</p>

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<p>2. PS3:B Conservation of Energy and Energy Transfer: Energy is present whenever there are moving objects, sound, light or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. Light also transfers energy from place to place. Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.</p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 Literacy Connection: Cause and Effect, 5 Topic 1 Energy in Motion, 9 Topic 1 Lesson 3 Collisions: Sports Connection, 16 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 Topic 1 STEM Quest Check-In Lab: How does modeling help you understand a collision?, 22-23 Topic 1 Light Energy, 29 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42 Topic 1 Evidence-Based Assessment: Questions 1- 6, 46-47 Topic 2 Visual Literacy Connection: Is renewable energy all around?, 76-77</p>

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<i>Cross Cutting Concepts:</i>	
<p>1. Energy and Matter: Energy can be transferred in various ways and between objects</p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 Literacy Connection: Cause and Effect, 5 Topic 1 Energy, 8 Topic 1 Quest Connection: How can energy be transferred in a car?, 8 Topic 1 Lesson 3 Collisions: Sports Connection, 16 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 Topic 1 STEM Quest Check-In Lab: How does modeling help you understand a collision?, 22-23 Topic 1 Sound Energy, 30 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42 Topic 1 uDemonstrate Lab: What affects energy transfer?, 48-49</p>
Grade Level Expectation:	
3. When objects collide contact forces transfer so as to change objects' motion.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Ask questions and predict outcomes about the changes in energy that occur when objects collide. (4-PS3-3) <i>(Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.) (Boundary Statement: Does not include quantitative measures of energy.)</i></p>	<p>SE/TE: Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 Science and Engineering Practices Handbook: Science Practices, Ask Questions, 294</p>

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Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause - and - effect relationships (Asking Questions and Defining Problems) (Personal: Personal responsibility).</p>	<p>SE/TE: Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Quest Connection, 20 Science and Engineering Practices Handbook: Science Practices, Ask Questions, 294 Science and Engineering Practices Handbook: Engineering Practices, Defining Problem, EM10</p>
<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the question: How are forces related to energy?</p>	<p>SE/TE: Topic 1 Motion and Energy, 12 Topic 1 uBe a Scientist: Force and Speed, 12 Topic 1 Lesson 1 Check: Question 2, 12 Topic 1 Quest Check-In: Energy, Speed, and Motion, 13 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 19</p>
<p>2. PS3:C Relationships Between Energy and Forces: When objects collide, the contact forces transfer energy so as to change the objects' motions.</p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 Literacy Connection: Cause and Effect, 5 Topic 1 Lesson 3 Collisions: Sports Connection, 16 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 Topic 1 STEM Quest Check-In Lab: How does modeling help you understand a collision?, 22-23 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42</p>

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<i>Cross Cutting Concepts:</i>	
<p>1. Energy and Matter: Energy can be transferred in various ways and between objects.</p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 Literacy Connection: Cause and Effect, 5 Topic 1 Energy, 8 Topic 1 Question Connection: How can energy be transferred in a car?, 8 Topic 1 Lesson 3 Collisions: Sports Connection, 16 Topic 1 uInvestigate Lab: How does energy transfer between objects?, 17 Topic 1 Visual Literacy Connection: Energy Changes in a Collision, 18-19 Topic 1 Other Energy Changes, 20-21 Topic 1 STEM Quest Check-In Lab: How does modeling help you understand a collision?, 22-23 Topic 1 Sound Energy, 30 Topic 1 Quest Check-In: Crash It!, 32 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42 Topic 1 uDemonstrate Lab: What affects energy transfer?, 48-49</p>

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Grade Level Expectation:	
4. Energy can be produced, used or released by converting stored energy.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Apply scientific ideas to design, test and refine a device that converts energy from one form to another. (4-PS3-4) (Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.) (Boundary Statement: Does not include quantitative measures of changes in speed of an object or on any precise or quantitative definition of energy.)</p>	<p>SE/TE: Topic 1 STEM Quest Check-In Lab: How can an electric circuit help prevent collisions?, 40-41 Topic 2 STEM ulnvestigate Lab: How can a potato provide energy to a light bulb?, 57 Topic 2 STEM ulnvestigate Lab: How does a windmill capture wind energy?, 75 Topic 2 STEM Quest Check-In Lab: How can the Sun make a motor work?, 80</p>
Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Apply scientific ideas to solve design problems. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Inquiry/Analysis).</p>	<p>SE/TE: Topic 1 STEM Quest Check-In Lab: How can an electric circuit help prevent collisions?, 40-41 Topic 2 STEM ulnvestigate Lab: How can a potato provide energy to a light bulb?, 57 Topic 2 STEM Quest Check-In Lab: How can you use a pattern to produce motion?, 72-73 Topic 2 STEM ulnvestigate Lab: How does a windmill capture wind energy?, 75 Topic 2 STEM Quest Check-In Lab: How can the Sun make a motor work?, 80 Topic 2 Quest Findings STEM: Power from the People, 92 Science and Engineering Practices Handbook: Science Practices, Constructing Explanations, EM6 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7 Science and Engineering Practices Handbook: Engineering Practices, Defining Problem, EM10 Science and Engineering Practices Handbook: Engineering Practices, Designing Solutions, EM11</p>

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<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the questions: How do food and fuel provide energy? If energy is conserved, why do people say it is produced or used?</p>	<p>SE/TE: Topic 2 Using Energy, 58 Topic 2 Fuels, 58 Topic 2 Fossil Fuel, 66 Topic 2 Coal, 66 Topic 2 Quest Connection, 67 Topic 2 Petroleum, 67 Topic 2 Nuclear Fuel, 71</p>
<p>2. PS3:D Energy in Chemical Processes and Everyday Life: The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use.</p>	<p>SE/TE: Topic 2 Plan It!, 59 Topic 2 Visual Literacy Connection: How is electrical power generated from chemical energy, 60-61 Topic 2 Storing Chemical Energy, 62 Topic 2 Quest Connection, 62 Topic 2 Lesson 1 Check: Question 2, 62</p>
<i>Cross Cutting Concepts:</i>	
<p>1. Energy and Matter: Energy can be transferred in various ways and between objects.</p>	<p>SE/TE: Topic 1 Quest Kickoff: Energy Changes in Collisions, How can you design a safe car?, 2-3 Topic 1 Literacy Connection: Cause and Effect, 5 Topic 2 STEM ulnvestigate Lab: How can a potato provide energy to a light bulb?, 57 Topic 2 STEM ulnvestigate Lab: How does a windmill capture wind energy?, 75 Topic 2 STEM Quest Check-In Lab: How can the Sun make a motor work?, 80 Topic 1 Quest Findings: STEM Energy Changes in Collisions, 42</p>
<p>2. Influence of Engineering, Technology and Science on Society and the Natural World: Engineers improve existing technologies or develop new ones.</p>	<p>SE/TE: Topic 1 STEM Quest Check-In Lab: How can an electric circuit help prevent collisions?, 40-41 Topic 2 Lesson 4 Environmental Impacts of Energy Use, 84 Topic 2 Quest Findings STEM: Power from the People, 92</p>

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3. Science is a Human Endeavor: Most scientists and engineers work in teams. Science affects everyday life.	SE/TE: Topic 1 STEM Quest Check-In Lab: How can an electric circuit help prevent collisions?, 40-41 Topic 2 Lesson 3 Renewable Energy Sources: Engineering Connection, 74 Topic 2 Quest Findings STEM: Power from the People, 92
Prepared Graduates:	
4. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.	
Grade Level Expectation:	
5. Waves are regular patterns of motion.	
Evidence Outcomes	
<i>Students Can:</i>	
a. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. (4-PS4-1) Clarification Statement: Examples of models could include diagrams, analogies and physical models using wire to illustrate wavelength and amplitude of waves.) (Boundary Statement: Does not include interference effects, electromagnetic waves, non-periodic waves or quantitative models of amplitude and wavelength.)	SE/TE: Topic 3 uInvestigate Lab: How does a wave carry energy?, 107 Topic 3 uInvestigate Lab: What patterns can waves make?, 117 Topic 3 Visual Literacy Connection: How do wave patterns move?, 120-121 Topic 3 uInvestigate Lab: How can information from waves be translated?, 117 Topic 3 uDemonstrate Lab: How can you model a light or sound wave?, 148-149

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Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Develop a model using an analogy, example or abstract representation to describe a scientific principle. (Developing and Using Models) ((Personal: Initiative/Self-direction).</p>	<p>SE/TE: Topic 3 uConnect Lab: How do we describe waves? 104 Topic 3 uInvestigate Lab: How does a wave carry energy?, 107 Topic 3 uDemonstrate Lab: How can you model a light or sound wave?, 148-149 Science and Engineering Practices Handbook: Science Practices, Constructing Explanations, EM6 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7 Science and Engineering Practices Handbook: Engineering Practices, Using Models and Prototype, EM12 Science and Engineering Practices Handbook: Engineering Practices, Optimizing Solutions, EM13</p> <p>TE Only: Topic 3 Focus on Mastery: Developing and Using Models, 113</p>
<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the question: What are the characteristic properties and behaviors of waves?</p>	<p>SE/TE: Topic 3 Waves and Information: The Essential Question, How do we use waves to communicate?, 101 Topic 3 uConnect Lab: How do we describe waves?, 104 Topic 3 uInvestigate Lab: How does a wave carry energy?, 107 Topic 3 Wave Characteristics, 109 Topic 3 Visual Literacy Connection: How does a wave move?, 110-111</p>

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<p>2. PS4:A Wave Properties: Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets the beach. Waves of the same type can differ in amplitude (height of waves) and wavelength (spacing between wave peaks).</p>	<p>SE/TE: Topic 3 uConnect Lab: How do we describe waves?, Science Practice, 104 Topic 3 Lesson 1 Properties of Waves: Sports Connection, 106 Topic 3 Visual Literacy Connection: How does a wave move?, 110-111 Topic 3 uInvestigate Lab: What patterns can waves make?, 117 Topic 3 uBe a Scientist: Ripples, 118 Topic 3 Wave Patterns, 119 Topic 3 Visual Literacy Connection: How do wave patterns move?, 120-121 Topic 3 Waves Can Combine, 122 Topic 3 Lesson 2 Check: Question 1, 122</p>
<i>Cross Cutting Concepts:</i>	
<p>1. Patterns: Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.</p>	<p>SE/TE: Topic 3 uInvestigate Lab: What patterns can waves make?, 117 Topic 3 Patterns in Wave Characteristics, 118 Topic 3 Wave Patterns, 119 Topic 3 Visual Literacy Connection: How do wave patterns move?, 120-121 Topic 3 Lesson 2 Check: Questions 1, 2, 122</p>
Grade Level Expectation:	
6. An object can be seen when light reflected from its surface enters the eyes.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. (4-PS4-2) <i>(Boundary Statement: Does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision or how the retina works.)</i></p>	<p>SE/TE: Topic 3 uInvestigate Lab: How is light reflected?, 125 Topic 3 Assessment: Question 6, 145 Science and Engineering Practices Handbook: Science Practices, Developing and Using Models, EM6</p>

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Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Develop a model to describe phenomena. (Developing and Using Models) (Personal: Initiative/Self-direction).</p>	<p>SE/TE: Topic 3 uInvestigate Lab: How is light reflected?, 125 Topic 3 Design It!, 127 Topic 3 Assessment: Question 6, 145 Topic 3 uDemonstrate Lab: How can you model a light or sound wave?, 148-149 Science and Engineering Practices Handbook: Science Practices, Developing and Using Models, EM6 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7 Science and Engineering Practices Handbook: Engineering Practices, Optimizing Solutions, EM13</p>
<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the questions: What is light? How can one explain the varied effects that involve light? What other forms of electromagnetic radiation are there?</p>	<p>SE/TE: Topic 3 Waves, 108 Topic 3 uInvestigate Lab: How is light reflected?, 125 Topic 3 Properties of Light Waves, 126 Topic 3 uBe a Scientist: Light Reflection, 127 Topic 3 Waves Outside the Visible Spectrum, 136 TE Only: Topic 3 21st Century Skills: Interpersonal and Collaborate Skills, 131</p>
<p>2. PS4:B Electromagnetic Radiation: An object can be seen when light reflected from its surface enters the eyes.</p>	<p>SE/TE: Topic 3 Seeing Objects, 127 Topic 3 Design It!, 127 Topic 3 Waves You Cannot See, 131 Topic 3 Assessment: Question 6, 145</p>

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<i>Cross Cutting Concepts:</i>	
1. Cause and Effect: Cause - and - effect relationships are routinely identified.	SE/TE: Topic 3 Visual Literacy Connection: How does your eye see color?, 128-129 TE Only: Topic 3 Focus on Mastery, Cause and Effect, 128 Topic 3 Synthesize: Document, Enrichment Activity, 130
Grade Level Expectation:	
7. Patterns can encode, send, receive and decode information.	
Evidence Outcomes	
<i>Students Can:</i>	
a. Generate and compare multiple solutions that use patterns to transfer information. (4-PS4-3) (Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1s and 0s representing black and white to send information about a picture and using Morse code to send text.)	SE/TE: Topic 3 uEngineer It! Design STEM: Crack the Code, 114-115 Topic 3 Lesson 4 Check: Question 2, 139 Science and Engineering Practices Handbook: Engineering Practices, Optimizing Solutions, EM13
Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
1. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Inquiry/Analysis).	SE/TE: Topic 3 uEngineer It! Design STEM: Crack the Code, 114-115 Topic 3 Quest Check-In: Compare Codes, 140 Science and Engineering Practices Handbook: Science Practices, Constructing Explanations, EM6 Science and Engineering Practices Handbook: Engineering Practices, Optimizing Solutions, EM13 TE Only: Topic 3 Differentiated Instruction: Support Struggling Students and Advanced Learners, 140

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<i>Elaboration on the GLE:</i>	
1. Students can answer the question: How are instruments that transmit and detect waves used to extend human senses?	<p>SE/TE: Topic 3 Question It!, 137 Topic 3 How do cell phone calls work?, 137 Topic 3 Assessment: The Essential Question, How do we use waves to communicate?, 145</p> <p>TE Only: Topic 3 21st Century Skills: Understanding Current Science and Technology, 137 Topic 3 Synthesize: Document: Enrichment Activity, 138 Topic 3 Differentiated Instruction: Support Struggling Students, 139</p>
2. PS4:C Information Technologies and Instrumentation: Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information -- convert it from digitized form to voice -- and vice versa.	<p>SE/TE: Topic 3 How do cell phone calls work?, 137 Topic 3 Lesson 4 Check: Question 2, 139 Topic 3 Assessment: Question 2, 144 Science and Engineering Practices Handbook: Science Practices, Digital Tools, EM1</p> <p>TE Only: Topic 3 21st Century Skills: Understanding Current Science and Technology, 137</p>
<i>Cross Cutting Concepts:</i>	
1. Patterns: Similarities and Differences in patterns can be used to sort and classify designed products.	<p>SE/TE: Topic 3 Digital and Analog Signals, 138 Topic 3 Quest Connection, 138 Topic 3 Evidenced-Based Assessment: Question 3, 147</p> <p>TE Only: Topic 3 Focus on Mastery: Patterns, 138</p>
2. Interdependence of Science and Engineering, and Technology: Knowledge of relevant scientific concepts and research findings is important in engineering.	<p>SE/TE: Topic 3 Technology Mimics Life, 139 Topic 3 Engineering Practices Toolbox: Design Solutions, 139</p> <p>TE Only: Topic 3 Synthesize: Document, Enrichment Activity, 138</p>

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2. Life Science	
Prepared Graduates:	
5. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior and reproduction.	
Grade Level Expectation:	
1. Organisms have both internal and external structures that serve various functions.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction. (4-LS1-1) (Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lungs, brain and skin.) (Boundary Statement: Stress at this level is on understanding the macroscale systems and their functions, not the microscopic scale.)</p>	<p>SE/TE: Topic 7 uConnect Lab: How do your eyes respond to differences in lighting?, 280 Topic 7 Quest Check-In Lab: How can you observe a plant’s vascular system in action?, 290-291 Topic 7 uInvestigate Lab: How can you compare the stomachs of cows and dogs?, 301 Topic 7 Solve It with Science: Why do animals shed their exoskeletons?, 315 Topic 7 uInvestigate Lab: How can you locate an object using only sound?, 317 Topic 7 Evidence-Based Assessment: Question 5, 331 Topic 8 uInvestigate Lab: How can you test the strength of a bone?, 351 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7 Topic 8 uInvestigate Lab: How are intestines arranged inside your body?, 367 Topic 8 uDemonstrate Lab: How do your sensory organs gather information? 382-383 Science and Engineering Practices Handbook: Science Practices, Developing and Using Models, EM6</p>

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<p>b. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. (4-LS1-2) <i>(Clarification Statement: Emphasis is on systems information transfer.) (Boundary Statement: Does not include the mechanisms by which the brain stores and recalls information or the mechanism of how sensory receptors function.)</i></p>	<p>SE/TE: Topic 7 uInvestigate Lab: How can you locate an object using only sound?, 317 Topic 7 uDemonstrate Lab: How do earthworms respond to stimuli?, 332-333 Topic 7 uEngineer It Model STEM: Eye See You!, 324-325 Topic 7 uDemonstrate Lab: How do earthworms respond to stimuli?, 332-333 Topic 8 Quest Kickoff: Make a Human Body Road Map, 336-337 Topic 8 uInvestigate Lab: Which parts of the body are more sensitive?, 359 Topic 8 STEM Quest Check-In Lab: How can you test signals to and from your brain?, 364-365 Science and Engineering Practices Handbook: Science Practices, Developing and Using Models, EM6</p>
Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Construct and argument with evidence, data, and/or a model. (Engaging in Argument from Evidence) (Personal: Initiative/Self-direction)</p>	<p>SE/TE: Topic 7 uConnect Lab: How do your eyes respond to differences in lighting?, 280 Topic 7 Quest Check-In Lab: How can you observe a plant’s vascular system in action?, 290-291 Topic 7 Solve It with Science: Why do animals shed their exoskeletons?, 315 Topic 7 Evidence-Based Assessment: Question 5, 331 Topic 8 uInvestigate Lab: How can you test the strength of a bone?, 351 Topic 8 uDemonstrate Lab: How do your sensory organs gather information? 382-383 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7</p>

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<p>2. Use a model to test interactions concerning the functioning of a natural system (Engaging in Argument from Evidence) (Personal: Initiative/Self-direction)</p>	<p>SE/TE: Topic 7 Quest Check-In: Lobster Claws, My Model, 314 Topic 7 uEngineer It Model STEM: Eye See You!, 325-326 Topic 7 uDemonstrate Lab: How do earthworms respond to stimuli?, 332-333 Topic 8 uInvestigate Lab: How are intestines arranged inside your body?, 367 Science and Engineering Practices Handbook: Science Practices, Developing and Using Models, EM6 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7</p>
<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the question: How do internal and external structures support the survival, growth, behavior and reproduction of plants and animals?</p>	<p>SE/TE: Topic 7 Structures and Functions: The Essential Question, How do plant and animal structures support growth and survival?, 277 Topic 7 Structures and Functions: The Essential Question, How do plant and animal structures support growth and survival?, 277 Topic 7 Lesson 4 Check: Question 1, 313</p>

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<p>2. LS1:A Structure and Function: Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction.</p>	<p>SE/TE: Topic 7 Structures and Functions: The Essential Question, How do plant and animal structures support growth and survival?, 277 Topic 7 uConnect Lab: How do your eyes respond to differences in lighting?, 280 Topic 7 uInvestigate Lab: What parts are inside a flower?, 283 Topic 7 Each organism is a system., 284-285 Topic 7 Quest Check-In Lab: How can you observe a plant’s vascular system in action?, 290-291 Topic 7 External Structures of a Plant, 294 Topic 7 Visual Literacy Connection: Which structures do flowering plants use to reproduce?, 296-297 Topic 7 Animal Structures for Support, 302 Topic 7 Structure of the Animal Heart, 303 Topic 7 Structure of the Animal Brain, 306 Topic 7 Lesson 4 External Structures and Functions of Animals, 308-313 Topic 7 Behaviors and Survival, 322 Topic 7 Assessment: Questions 1-7, 328-329 Topic 7 Evidence-Based Assessment, Questions 1-5, 330-331 Topic 7 uDemonstrate Lab: How do earthworms respond to stimuli?, 332-333 Topic 8 uDemonstrate Lab: How do your sensory organs gather information? 382-383</p>

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<p>3. LS1:D Information Processing: Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.</p>	<p>SE/TE: Topic 7 uInvestigate Lab: How can you locate an object using only sound?, 317 Topic 7 Visual Literacy Connection: How do elephants respond to stimuli?, 318-319 Topic 7 uDemonstrate Lab: How do earthworms respond to stimuli?, 332-333 Topic 7 Animal Responses to smell, 320 Topic 7 uBe a Scientist: Test Your Senses, 320 Topic 7 Quest Check-In: sound Off!, 323 Topic 8 Quest Kickoff: Make a Human Body Road Map, 336-337 Topic 8 uInvestigate Lab: Which parts of the body are more sensitive?, 359 Topic 8 Visual Literacy Connection: What are sensory organs?, 360-361 Topic 8 STEM Quest Check-In Lab: How can you test signals to and from your brain?, 364-365</p>
<i>Cross Cutting Concepts:</i>	
<p>1. Systems and System Models: A system can be described in terms of its components and their interactions.</p>	<p>SE/TE: Topic 7 Each organism is a system., 284-285 Topic 8 Tissues, Organs, and Organ Systems, 342 Topic 8 Respiratory System, 343 Topic 8 Circulatory System, 344-345 Topic 8 How Oxygen Gets to Your Cells, 346 Topic 8 Skeletal System, 352: How do we skate on ice?, 354-355 Topic 8 Skin 356 Topic 8 Muscular System, 353 Topic 8 Visual Literacy Connection: How do we skate on ice?, 354-355 Topic 8 Lesson 3 Nervous System: Engineering Connection, 358 Topic 8 uDemonstrate Lab: How do your sensory organs gather information? 382-383</p>

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3. Earth and Space Science	
Prepared Graduates:	
11. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.	
Grade Level Expectation:	
1. Earth has changed over time.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. (4-ESS1-1) (Clarification Statement: Examples of evidence from patterns could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from water to land over time; and a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.) (Boundary Statement: Does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers, and should only include relative time.)</p>	<p>SE/TE: Topic 6 Quest Kickoff: Dig for the Truth, 244-245 Topic 6 uInvestigate Lab: What patterns do fossils follow?, 249 Topic 6 Rock Formations, 251 Topic 6 Rock Strata Can Change, 251 Topic 6 STEM Math Connection: Canyonlands, 255 Topic 6 uInvestigate Lab: How can rock layers show change?, 259 Topic 6 Fossil Clues on Earth, 260 Topic 6 Index Fossils, 261 Topic 6 Crosscutting Concepts Toolbox, Patterns, 261 Topic 6 Visual Literacy Connection: How can layers of rock change?, 262-263 Topic 6 Comparing Rock Layers, 264 Topic 6 Quest Findings: Dig for the Truth, 268 Topic 6 Assessment: The Essential Question, 271 Topic 6 Evidence-Based Assessment: Questions 1-6, 272-273 Topic 6 uDemonstrate Lab: How can you correlate rock layers?, 274-275</p>

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Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Identify the evidence that supports particular points in an explanation. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Creativity and Innovation)</p>	<p>SE/TE: Topic 6 uInvestigate Lab: What patterns do fossils follow?, 249 Topic 6 STEM Math Connection: Canyonlands, 255 Topic 6 uInvestigate Lab: How can rock layers show change?, 259 Topic 6 Quest Findings: Dig for the Truth, 268 Topic 6 uDemonstrate Lab: How can you correlate rock layers?, 274-275 Science and Engineering Practices Handbook: Science Practices, Constructing Explanations, EM6 Science and Engineering Practices Handbook: Engineering Practices, Optimizing Solutions, EM13</p>
<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the question: How can water, ice, wind and vegetation change the land?</p>	<p>SE/TE: Topic 4 Lesson 4 Weathering and Erosion: STEM Connection, 184 Topic 4 uInvestigate Lab: How can a rock wear away?, 185 Topic 4 Chemical Weathering, 186 Topic 4 uBe a Scientist: Weathering, 186 Topic 4 Physical Weathering, 187 Topic 4 Quest Connection, 187 Topic 4 Erosion, 188 Topic 4 Movement of Particles, 189 Topic 4 Changes in Landforms Over Time, 191 Topic 4 STEM Quest Check-in: How does water affect landforms?, 192 Topic 4 Extreme Science: Powerful Plants, 193 Topic 4 Assessment: Question 6, 197 Topic 4 Evidence-Based Assessment: Questions 1-5, 198-199</p>

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<p>2. ESS1:C The History of the Planet Earth: Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers.</p>	<p>SE/TE: Topic 6 uInvestigate Lab: What patterns do fossils follow?, 249 Topic 6 STEM Math Connection: Canyonlands, 255 Topic 6 uInvestigate Lab: How can rock layers show change?, 259 Topic 6 Quest Check-In Lab: What does a core sample tell us?, 266-267 Topic 6 Quest Findings: Dig for the Truth, 268 Topic 6 Assessment: Question 5, 270 Topic 6 Evidence-Based Assessment: Questions 1-6, 272-273 Topic 6 uDemonstrate Lab: How can you correlate rock layers?, 274-275</p>
<i>Cross Cutting Concepts:</i>	
<p>1. Patterns: Patterns can be used as evidence to support an explanation.</p>	<p>SE/TE: Topic 6: uConnect Lab: Where are fossils found in rock layers?, 246 Topic 6 uInvestigate Lab: What patterns do fossils follow?, 249 Topic 6 uInvestigate Lab: How can rock layers show change?, 259 Topic 6 Quest Check-In Lab: What does a core sample tell us?, 266-267 Topic 6 Quest Findings: Dig for the Truth, 268 Topic 6 uDemonstrate Lab: How can you correlate rock layers?, 274-275</p>
<p>2. Scientific Knowledge Assumes an Order and Consistency in Natural Systems: Science assumes consistent patterns in natural systems.</p>	<p>SE/TE: Topic 6: uConnect Lab: Where are fossils found in rock layers?, 246 Topic 6 uInvestigate Lab: What patterns do fossils follow?, 249 Topic 6 uInvestigate Lab: How can rock layers show change?, 259 Topic 6 Crosscutting Concepts Toolbox, Patterns, 261 Topic 6 uDemonstrate Lab: How can you correlate rock layers?, 274-275 Topic 6 Quest Check-In Lab: What does a core sample tell us?, 266-267</p>

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Grade Level Expectation:	
2. Four major earth systems interact.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. (4-ESS2-1) <i>(Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling and volume of water flow.) (Boundary Statement: Limited to a single form of weathering or erosion.)</i></p>	<p>SE/TE: Topic 4 Quest Kickoff: Does X Mark the Spot? That's Up to You!, 152-153 Topic 4 uConnect Lab: How can rain affect land?, 154 Topic 4 Metamorphic Rocs, 177 Topic 4 Quest Connection, 177 Topic 4 uInvestigate Lab: How can a rock wear away?, 185 Topic 4 Chemical Weathering, 186 Topic 4 uBe a Scientist: Weathering, 186 Topic 4 Physical Weathering, 187 Topic 4 Quest Connection, 187 Topic 4 Erosion, 188 Topic 4 STEM Quest Check-in: How does water affect landforms?, 192 Topic 4 Quest Findings: does X Mark the Spot? That's Up to You!, 194</p>

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Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomena. (Planning and Carrying out Investigations) (Entrepreneurial: Inquiry/Analysis)</p>	<p>SE/TE: Topic 4 uConnect Lab: How can rain affect land?, 154 Topic 4 uInvestigate Lab: How can you classify minerals?, 175 Topic 4 Metamorphic Rocs, 177 Topic 4 Quest Connection, 177 Topic 4 uInvestigate Lab: How can a rock wear away?, 185 Topic 4 STEM Quest Check-in: How does water affect landforms?, 192 Topic 4 uDemonstrate Lab: How can you identify minerals?, 200-201 Science and Engineering Practices Handbook: Science Practices, Using Math, EM5 Science and Engineering Practices Handbook: Engineering Practices, Using Models and Prototype, EM12 Science and Engineering Practices Handbook: Engineering Practices, Optimizing Solutions, EM13</p>
<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the questions: What patterns of Earth's features can be determined with the use of maps? How do living organisms alter Earth's processes and structures?</p>	<p>SE/TE: Topic 4 Map Ring of Fire: Crosscutting Concepts Toolbox Patterns, 169 Topic 4 Visual Literacy Connection: How can a physical map help me locate different landforms?, 170-171 Topic 4 Extreme Science: Powerful Plants, 193 Topic 4 Assessment: The Essential Question, 197</p>

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<p>2. ESS2:A Earth Materials and Systems: Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms and gravity break rocks, soils and sediments into smaller particles and move them around.</p>	<p>SE/TE: Topic 4 uConnect Lab: How can rain affect land?, 154 Topic 4 Lesson 4 Weathering and Erosion: STEM Connection, 184 Topic 4 uInvestigate Lab: How can a rock wear away?, 185 Topic 4 Chemical Weathering, 186 Topic 4 uBe a Scientist: Weathering, 186 Topic 4 Physical Weathering, 187 Topic 4 Quest Connection, 187 Topic 4 Erosion, 188 Topic 4 Movement of Particles, 189 Topic 4 Changes in Landforms Over Time, 191 Topic 4 STEM Quest Check-in: How does water affect landforms?, 192 Topic 4 Extreme Science: Powerful Plants, 193 Topic 4 Quest Findings: does X Mark the Spot? That's Up to You!, 194 Topic 4 Assessment: Question 6, 197 Topic 4 Evidence-Based Assessment: Questions 1-5, 198-199</p>
<p>3. ESS2:E Biogeology: Living things affect the physical characteristics of their regions.</p>	<p>SE/TE: Topic 4 Extreme Science: Powerful Plants, 193</p>
<i>Cross Cutting Concepts:</i>	
<p>1. Cause and Effect: Cause - and - effect relationships are routinely identified, tested, and used to explain change.</p>	<p>SE/TE: Topic 4 uInvestigate Lab: How can a rock wear away?, 185 Topic 4 Changes in Landforms Over Time, 191 Topic 4 Lesson 4 Check: Question 1, 191 Topic 4 STEM Quest Check-in: How does water affect landforms?, 192 Topic 5 Long-Term Effects of Hazards, 229 Science Practice Toolbox, Cause and Effect, 229</p>

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Grade Level Expectation:	
3. Earth's physical features occur in patterns.	
Evidence Outcomes	
<i>Students Can:</i>	
<p>a. Analyze and interpret data from maps to describe patterns of Earth's features. (4-ESS2-2) <i>(Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes and earthquakes.)</i></p>	<p>SE/TE: Topic 4 Quest Kickoff: Does X Mark the Spot? That's Up to You!, 152-153 Topic 4 uInvestigate Lab: How do tools help us?, 157 Topic 4 Read a Map, 158 Topic 4 visual Literacy Connection: How can you see the same place in different ways?, 160-161 Topic 4 Resource Maps, 162 Topic 4 uEngineer It! Design STEM: Take a Hike!, 164-165 Topic 4 Map Ring of Fire: Crosscutting Concepts Toolbox Patterns, 169 Topic 4 Visual Literacy Connection: How can a physical map help me locate different landforms?, 170-171</p>
Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Analyze and interpret data to make sense of phenomena using logical reasoning. (Analyze and Interpret Data) (Entrepreneurial: Critical thinking/Problem solving)</p>	<p>SE/TE: Topic 4 uInvestigate Lab: How do tools help us?, 157 Topic 4 uInvestigate Lab: Where are major landforms?, 167 Science and Engineering Practices Handbook: Science Practices, Analyzing and Interpreting Data, EM4 TE Only: Topic 4 Focus on Mastery: Analyzing and Interpreting Data, 160</p>

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<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the question: Why do the continents move, and what causes earthquakes and volcanoes?</p>	<p>SE/TE: Topic 5 Earthquakes, 210 Topic 5 uBe a Scientist: Earthquake Evidence, 210 Topic 5 Visual Literacy Connection: What happens during a tsunami?, 212 Topic 5 Volcanoes, 214 Topic 5 Interactivity, 214 Topic 5 Solve It With Science: Where is the greatest earthquake risk?, 225</p>
<p>2. ESS2.B: Plate Tectonics and Large-Scale System Interactions: The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth.</p>	<p>SE/TE: Topic 4 Lesson 1 Maps and Data: Sports Connection, 156 Topic 4 Read a Map, 158 Topic 4 Types of Maps, 159 Topic 4 visual Literacy Connection: How can you see the same place in different ways?, 160-161 Topic 4 Resource Maps, 162 Topic 4 uEngineer It! Design STEM: Take a Hike!, 164-165 Topic 4 Patterns of Mountains, 168 Topic 4 Science Practice Toolbox: Cite Evidence, 168 Topic 4 Patterns of Earthquakes and Volcanoes, 169 Topic 4 Crosscutting Concepts Toolbox: Patterns, 169 Topic 4 Visual Literacy Connection: How can a physical map help me locate different landforms?, 170-171 Topic 4 Patterns Under the Ocean, 172 Topic 4 Quest Check-In: A Changing Landscape, 173 Topic 4 Assessment: Question, 196 Topic 5 Solve It With Science: Where is the greatest earthquake risk?, 225</p>

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<i>Cross Cutting Concepts:</i>	
1. Patterns: Patterns can be used as evidence to support an explanation.	SE/TE: Topic 4 Patterns of Mountains, 168 Topic 4 Science Practice Toolbox: Cite Evidence, 168 Topic 4 Patterns of Earthquakes and Volcanoes, 169 Topic 4 Crosscutting Concepts Toolbox: Patterns, 169 Topic 4 Patterns Under the Ocean, 172
Grade Level Expectation:	
4. Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	
Evidence Outcomes	
<i>Students Can:</i>	
a. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. (4-ESS3-1) <i>(Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.)</i>	SE/TE: Topic 2 uConnect Lab: How are resources used?, 54 Topic 2 Literacy Connection: Use Text Features, Energy of the Future, Wave Energy, Solar Energy, 55 Topic 2 Impact of Transporting Fuels, 90 Topic 2 Lesson 4 Check: Question 1, 90 Topic 2 Quest Check-In: Impact Inspections, 91 Topic 2 uDemonstrate Lab: How can energy resource usage change?, 98-99
Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
1. Obtain and combine information from books and other reliable media to explain phenomena (Obtaining, Evaluating, and Communicating Information) (Entrepreneurial: Critical thinking/Problem solving)	SE/TE: Topic 2 Crosscutting Concepts Toolbox: Energy and Matter, 66 TE Only: Topic 2 Literacy Connection: eText, Leveled Readers, STEM Engineering Reader, 55 Topic 2 Differentiated Instruction: Support Advanced Learners, 70 Topic 2 21 st Century Skills: Critical Thinking, 71 Topic 2 Focus on Mastery!: Asking Questions, 76

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<i>Elaboration on the GLE:</i>	
1. Students can answer the question: How do humans depend on Earth's resources?	SE/TE: Topic 2 uConnect Lab: How are resources used?, 54 Topic 2 Lesson 2 Check: Question 2, 71 Topic 2 visual Literacy Connection: Is renewable energy all around?, 76-77 Topic 4 Resource Maps, 162
2. ESS3.A: Natural Resources: Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.	SE/TE: Topic 2 uConnect Lab: How are resources used?, 54 Topic 2 Using Energy, 58 Topic 2 Fossil Fuels, 66 Topic 2 Coal, 66 Topic 2 Petroleum, 67 Topic 2 Visual Literacy Connection: Where do Fossil Fuels come from?, 68-69 Topic 2 Natural Gas, 70 Topic 2 Nuclear Fuel, 71 Topic 2 uBe a Scientist: Make It Turn, 71 Topic 2 visual Literacy Connection: Is renewable energy all around?, 76-77 Topic 2 Lesson 4 Environmental Impacts of Energy Use: STEM Connection, 84 Topic 2 Impact of Transporting Fuels, 90 Topic 2 Lesson 4 Check: Question 1, 90 Topic 2 Quest Check-In: Impact Inspections, 91
<i>Cross Cutting Concepts:</i>	
1. Cause and Effect: Cause - and - effect relationships are routinely identified and used to explain change.	SE/TE: Topic 2 Crosscutting Concepts Toolbox: Energy and Matter, 66 Topic 2 Design It!, 70 Topic 2 Lesson 4 Environmental Impacts of Energy Use: STEM Connection, 84
2. Interdependence of Science, Engineering and Technology: Knowledge of relevant scientific concepts and research findings is important in engineering.	SE/TE: Topic 2 Lesson 3 Renewable Energy Sources: Engineering Connection, 74 TE Only: Topic 2 Differentiated Instruction: Support Advanced Learners, 70

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<p>3. Influence of Science, Engineering and Technology on Society and the Natural World: Over time, people's needs and wants change, as do their demands for new and improved technologies.</p>	<p>SE/TE: Topic 2 Literacy Connection: Use Text Features, Energy of the Future, Wave Energy, Solar Energy, 55 Topic 2 Nuclear Fuel, 71 Topic 2 Lesson 3 Renewable Energy Sources: Engineering Connection, 74 TE Only: Topic 2 Differentiated Instruction: Support Advanced Learners, 70</p>
<p>Grade Level Expectation:</p>	
<p>5. A variety of hazards result from natural process; humans cannot eliminate natural hazards but can reduce their impacts' effect.</p>	
<p>Evidence Outcomes</p>	
<p><i>Students Can:</i></p>	
<p>a. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. (4-ESS3-2) (Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.) (Boundary: Limited to earthquakes, floods, tsunamis, and volcanic eruptions.)</p>	<p>SE/TE: Topic 5 uConnect Lab: How can you reduce the impact of rapidly sliding soil?, 206 Topic 5 Quest Check-In: Beware: Hot Ash!, 215 Topic 5 STEM uInvestigate Lab: Where should you build an earthquake-safe structure, 227 Topic 5 Plan It!, 228 Topic 5 STEM Quest Check-In Lab: How can you reduce hazard damage?, 232-233 Topic 5 Quest Findings: Protect the City! Hazard Incoming!, 234 Topic 5 STEM uDemonstrate Lab: How can homes be designed to be more earthquake resistant?, 240-241</p>

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Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
<p>1. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Critical Thinking/Problem solving)</p>	<p>SE/TE: Topic 5 Quest Kickoff: Protect the City! Hazard Incoming!, 204-205 Topic 5 uConnect Lab: How can you reduce the impact of rapidly sliding soil?, 206 Topic 5 Quest Connection: Describe, 211 Topic 5 Quest Check-In: Beware: Hot Ash!, 215 Topic 5 STEM Quest Check-In Lab: How can you reduce hazard damage?, 232-233 Topic 5 Quest Findings: Protect the City! Hazard Incoming!, 234 Topic 5 STEM uDemonstrate Lab: How can homes be designed to be more earthquake resistant?, 240-241 Science and Engineering Practices Handbook: Science Practices, Developing and Using Models, EM6 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7 Science and Engineering Practices Handbook: Engineering Practices, Defining Problem, EM10 Science and Engineering Practices Handbook: Engineering Practices, Designing Solutions, EM11</p>

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<i>Elaboration on the GLE:</i>	
<p>1. Students can answer the question: How do natural hazards affect individuals and societies?</p>	<p>SE/TE: Topic 5 Quest Kickoff: Protect the City! Hazard Incoming!, 204-205 Topic 5 Lesson 1 Tectonic Hazards: Curriculum Connection, 208 Topic 5 Hazards of Earthquakes, 211 Topic 5 Literacy Toolbox: Cause and Effect, 211 Topic 5 Volcanoes, 214 Topic 5 Lesson 1 Check: Question 2, 214 Topic 5 Quest Check-In: Beware: Hot Ash!, 215 Topic 5 Interactivity, 216 Topic 5 uInvestigate Lab: How does snow sliding quickly down a mountain impact people?, 219 Topic 5 Quest Check-In Water Warnings, 224 Topic 5 When Hazards Strike, 231 Topic 5 Lesson 3 Check: Question 2, 231 Topic 5 Assessment: The Essential Question: What impact do natural hazards have?, 237</p>

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<p>2. ESS3.B: Natural Hazards: A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts.</p>	<p>SE/TE: Topic 5 Quest Kickoff: Protect the City! Hazard Incoming!, 204-205 Topic 5 uConnect Lab: How can you reduce the impact of rapidly sliding soil?, 206 Topic 5 Lesson 3 Impacts of Natural Hazards: Engineering Connection, 226 Topic 5 STEM Quest Check-In Lab: How can you reduce hazard damage?, 232-233 Topic 5 STEM uDemonstrate Lab: How can homes be designed to be more earthquake resistant?, 240-241</p> <p>Science and Engineering Practices Handbook: Science Practices, Developing and Using Models, EM6 Science and Engineering Practices Handbook: Science Practices, Engaging in Arguments from Evidence, EM7 Science and Engineering Practices Handbook: Engineering Practices, Defining Problem, EM10 Science and Engineering Practices Handbook: Engineering Practices, Designing Solutions, EM11</p>
<i>Cross Cutting Concepts:</i>	
<p>1. Interdependence of Science, Engineering and Technology: Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks and to meet societal demands.</p>	<p>SE/TE: Topic 5 Lesson 3 Impacts of Natural Hazards: Engineering Connection, 226 Topic 5 Career Connection: Volcanologist, 235</p>

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<p>2. Cause and Effect: Cause - and - effect relationships are routinely identified, tested, and used to explain change.</p>	<p>SE/TE: Topic 5 Quest Kickoff: Protect the City! Hazard Incoming!, 204-205 Topic 5 Literacy Connection: Cause and Effect, 207 Topic 5 Lesson 1 Tectonic Hazards: Curriculum Connection, 208 Topic 5 uInvestigate Lab: How can a large wave affect land?, 209 Topic 5 Earthquakes: Reading Check, Cause and Effect, 210 Topic 5 Literacy Toolbox: Cause and Effect, 211 Topic 5 Quest Connection: Describe, 211 Topic 5 Lesson 1 Check: Question 1, 214 Topic 5 Lesson 2 Weather Hazards: Sports Connection, Reading Check, Cause and Effect, 218 Topic 5 uInvestigate Lab: How does snow sliding quickly down a mountain impact people?, 219 Topic 5 Quest Connection, 222 Topic 5 Lesson 2 Check: Question 2, 223 Topic 5 Short-Term Effects of Hazards: Reading Check, Cause and Effect, 228 Topic 5 Long-Term Effects of Hazards, 228 Topic 5 Science Practice Toolbox: Cause and Effect, 229 Topic 5 Evidence-Based Assessment: Questions 2, 5 TE Only: Topic 5 Focus on Mastery: Cause and Effect, 212, 223, 228 Topic 5 Differentiated Instruction: Support Advanced Learners, 222</p>