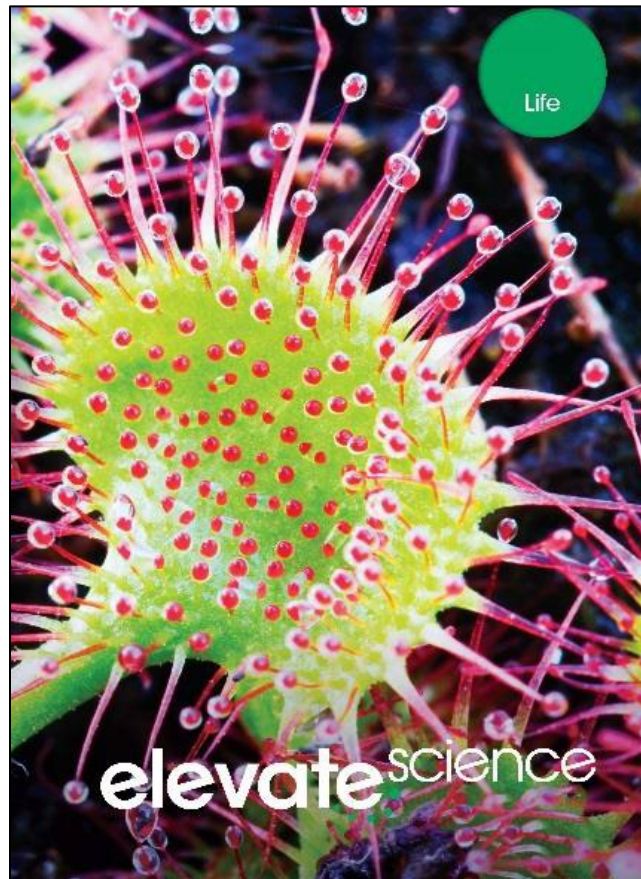


A Correlation of
Elevate Science
Life, ©2019



To the

Colorado
Academic Standards for Science 2020
Middle School Life Science

**A Correlation of Elevate Science: Life ©2019 to the
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Introduction

This document demonstrates how ***Elevate Science* ©2019** meet the Colorado Academic Standards for Science 2020, Middle School. Correlation page references are to the Student and Teacher's Editions and cited at the page level.

Elevate Science Middle Grades – where exploration is the heart of science! Designed to address the rigors of new science standards, students will experience science up close and personal, using real-world, relevant phenomena to solve project-based problems. Our newest program 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 arguments. The blended print and digital curriculum covers all Next Generation Science Standards at every grade level.

Elevate Science helps teachers transform learning, promote innovation, and manage their classroom.

Transform science classrooms by immersing students in active, three-dimensional learning. *Elevate Science* engages students with real-world tasks, open-ended Quests, uDemonstrate performance-based labs, and in the engineering/design process with uEngineer It! investigations.

- A new 3-D learning model enhances best practices.
- Engineering-focused features infuse STEM learning.
- Phenomena-based activities put students at the heart of a Quest for knowledge.

Innovate learning by focusing on 21st century skills.

Students are encouraged to think, collaborate, and innovate! With ***Elevate Science***, students explore STEM careers, experience engineering activities, and discover our scientific and technological world. The content, strategies, and resources of *Elevate Science* equip the science classroom for scientific inquiry and science and engineering practices.

- Problem-based learning Quests put students on a journey of discovery.
- STEM connections help integrate curriculum.
- Coding and innovation engage students and build 21st century skills.

Manage the classroom with confidence.

Teachers will lead their class in asking questions and engaging in argumentation. Evidence-based assessments provide new options for monitoring student understanding.

- Professional development offers practical point-of-use support.
- Embedded standards in the program allow for easy integration.
- ELL and differentiated instruction strategies help instructors reach every learner.
- Interdisciplinary connections relate science to other subjects.

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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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. All living things are made up of cells, which is the smallest unit that can be said to be alive.	
Evidence Outcomes:	
Students Can:	
Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (MS-LS1-1) (Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and nonliving things, and understanding that living things may be made of one cell or many and varied cells.)	SE/TE: Characteristics of Living Things, 5-7 Life Produces More Life, 8-9 Structure and Function of Cells, 62-69 Topic 2 Review and Assess Q1-3, 118
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Academic Context and Connections	
<i>Colorado Essential Skills and Science and Engineering Practices:</i>	
Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (Planning and Carrying Out Investigations) (Entrepreneurial: Inquiry/Analysis)	SE/TE: uDemonstrate Lab, 190-193
Develop and use a model to describe phenomena. (Developing and Using Models) (Civic/Interpersonal: Collaboration/Teamwork)	SE/TE: Lesson 1 Check Q6, 70 Model It!, 77 Model It!, 86 Hands-On Lab, 87
Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (Engaging in Argument from Evidence) (Entrepreneurial: Critical thinking/Problem solving)	SE/TE: Topic 3 Quest: 128-129, 149, 162, 175, 185, 189 Lesson 1 Check Q8, 138 Reading Check, 144 Literacy Connection, 153 Reading Check, 161 Lesson 3 Check Q2, 162 Topic 3 Review and Assess – Evidence-Based Assessment Q5, 188-189 uDemonstrate Lab, 190-193
Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (Engaging in Argument from Evidence) (Entrepreneurial: Critical thinking/Problem solving)	SE/TE: Topic 3 Quest: Peak Performance Plan, 128-129, 149, 162, 175, 185, 189 Lesson 1 Check Q8, 138 Reading Check, 144 Literacy Connection, 153 Reading Check, 161 Lesson 3 Check Q2, 162 Topic 3 Review and Assess – Evidence-Based Assessment Q5, 188-189 uDemonstrate Lab, 190-193
<i>Elaboration on the GLE:</i>	
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<p align="center">Colorado Academic Standards for Science Middle School Life Science</p>	<p align="center">Elevate Science Life, ©2019</p>
<p>LS1.A Structure and Function: All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).</p>	<p>SE/TE: Living Things, 5-7 Viruses, Bacteria, and Fungi, 26-36 Structure and Function of Cells, 62-70 Cell Structures, 72-81</p>
<p><i>Cross Cutting Concepts:</i></p>	
<p>Scale, Proportion, and Quantity: Phenomena that can be observed at one scale may not be observable at another scale.</p>	<p>SE/TE: Math Toolbox, 69 Extreme Close-Up, Figure 7, 69 Levels of Organization, Figure 6, 80 uDemonstrate Lab, 122-125</p>
<p>Structure and Function: Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts; therefore complex natural structures/systems can be analyzed to determine how they function.</p>	<p>SE/TE: Form and Function, 39 Plant Structure, 41 Structure of Animals, 44 Invertebrates, Figure 6, 45 Lesson 4 Check Q4, 49 Lesson 1 Check Q5, 70 Animal and Plan Cell Differences, Figure 2, 74-75 Interactivity, 76 Video, 78 Interactivity, 79 No Lungs Necessary, Figure 3, 85 Quest Check-In, 89 Topic 2, Review and Assess Q9, 118-119 Topic 2 Review and Assess – Evidence Based Assessment Q2, 120-121</p>

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Prepared Graduates:	
Systems and System Models: Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.	SE/TE: Topic 1 Review and Assess Q4, 50 The Essential Question, 127 Topic 3 Quest: Peak Performance Plan, 128-129, 149, 162, 175, 185, 189 Model It!, 135 Model It!, 181 Topic 3 Review and Assess Q2&4, 188-189
Grade Level Expectation:	
2. Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring.	
Evidence Outcomes:	
Students Can:	
Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. (MS-LS1-4) (Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.)	SE/TE: Essential Question, 195 Plant Structures for Reproduction, 208-216 Literacy Connection, 213 Male and Female Cones, Figure 5, 213 Reading Check, 215 Animal Behaviors for Reproduction, 218-226 Parenting Behavior, Figure 3, 222 External Fertilization, Figure 4, 223 Working Together, Figure 5, 224 Digital Activities: Research Animal Crossings, To Cross or Not to Cross

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Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. (MS-LS1-5) (Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large-breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.) (Boundary Statement: Does not include genetic mechanisms, gene regulation or biochemical processes.)	SE/TE: Essential Question, 195 Genes and the Environment, 205-206 Growth and Development of Organisms, 229 Environmental Conditions, 232 External and Internal Factors, 235-236 Case Study, 238-239 Topic 4 Review and Assess, 240-241 Topic 4 Review and Assess – Evidence-Based Assessment, 242-243
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Use an oral and written argument supported by empirical evidence and scientific reasoning to support and refute an explanation or a model for a phenomenon or a solution to a problem. (Engaging in Argument from Evidence) (Entrepreneurial: Critical thinking/Problem solving)	SE/TE: Topic 4 Quest: Construction Without Destruction, 196-197, 216, 226, 237, 243 Reading Check, 201 Lesson 1 Check Q4-5, 207 Literacy Connection, 213 Connect It!, 218 Connect It!, 228 Write About It, 232 Case Study, 238-239 Topic 4 Review and Assess Q1-17, 240-241 Topic 4 Review and Assess – Evidence-Based Assessment, 242-243
Construct a scientific explanation base on valid and reliable evidence obtained from sources and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Creativity/Innovation)	SE/TE: Hypothesis of Continental Drift, 157-159 It's All Connected, 165 The Theory of Plate Tectonics, 167-170
Elaboration on the GLE:	
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<p style="text-align: center;">Colorado Academic Standards for Science Middle School Life Science</p>	<p style="text-align: center;">Elevate Science Life, ©2019</p>
<p>LS1:B Growth and Development of Organisms: Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. Animals engage in characteristic behaviors that increase the odds of reproduction. Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. Genetic factors as well as local conditions affect the growth of the adult plant.</p>	<p>SE/TE: Essential Question, 195 Asexual and Sexual Reproduction, 199-201 Model It!, 200 Math Toolbox, 201 Inherited Traits, 202-204 Model It!, 203 Lesson 1 Check, 207 Plant Structures for Reproduction, 208-216 Literacy Connection, 213 Male and Female Cones, Figure 5, 213 Reading Check, 215 Topic 4 Review and Assess Q1-5, 240-241 Animal Behaviors for Reproduction, 218-226 Parenting Behavior, Figure 3, 222 External Fertilization, Figure 4, 223 Working Together, Figure 5, 224 Patterns of Inheritance, 348-357 Chromosomes and Inheritance, 360-368 Topic 7 Review and Assessment Q1-10, 402-403</p>
<p><i>Cross Cutting Concepts:</i></p>	
<p>Cause and Effect: Cause - and - effect relationships may be used to predict phenomena in natural systems.</p>	<p>SE/TE: Lesson 4 Check Q2, 237 Topic 4 Review and Assess Q16, 241 Topic 4 Review and Assess – Evidence-Based Assessment Q3, 243 uDemonstrate Lab, 244-247</p>

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Grade Level Expectation:	
3. Sustaining life requires substantial energy and matter inputs.	
Evidence Outcomes:	
Students Can:	
Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. (MS-LS1-6) (Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.) (Boundary Statement: Does not include the biochemical mechanisms of photosynthesis.)	SE/TE: The Essential Question, 59 Photosynthesis, 98-106 Marsh Plants, Figure 7, 105 Lesson 5 Check, Q3, 106 Connect It!, 272-273
Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. (MS-LS1-7) (Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.) (Boundary Statement: Assessment does not include details of the chemical reactions for photosynthesis or respiration.)	SE/TE: Cellular Respiration, 108-115 Reading Check, Figure 3, 112
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Critical thinking/Problem solving)	SE/TE: Topic 4, Review and Assess – Evidence Based Assessment Q4, 242-243
Develop and use a model to describe phenomena and unobservable mechanisms. (Developing and Using Models) (Personal: Initiative/Self-direction)	SE/TE: Topic 2 Review and Assess – Evidence-Based 2-Assessment Q1, 120-121 Model It!, 135
Elaboration on the GLE:	

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Students can answer the question: How do organisms detect, process, and use information about the environment?	SE/TE: Response to Surroundings, 7 Human Organ Systems, 134 Organ Systems in the Human Body, 136-137 Stimulus and Response, 143 Plan It!, 143 Controlling Processes, 176-185 Model It!, 181 Topic 3 Review and Assess, 186-187 Q13-16 uDemonstrate Lab, 190-193
LS1:C Organization for Matter and Energy Flow in Organisms: Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.	SE/TE: The Essential Question, 59 Photosynthesis, 98-106 Marsh Plants, Figure 7, 105 Lesson 5 Check, Q3, 106 Topic 1 Review and Assess Q13-18 Connect It!, 272-273
PS3:D Energy in Chemical Processes and Everyday Life: The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials.	SE/TE: Cellular Respiration, 108-115 Reading Check, Figure 3, 112
Cross Cutting Concepts:	
Energy and Matter: Within a natural system, the transfer of energy drives the motion and/or cycling of matter.	SE/TE: Energy From the Sun, 100 An Energy Chain, Figure 2, 100 Model It!, 101 Photosynthesis, 102-103 Connect It!, 108 Using Energy, 109 Comparing Two Energy Processes, 112 Related Processes, Figure 3, 112
Grade Level Expectation:	

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4. Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain.	
Evidence Outcomes:	
Students Can:	
Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (MS-LS1-8)(Boundary Statement: Does not include mechanisms for the transmission of this information.)	SE/TE: Life Science Human Organ Systems, 134 Organ Systems in the Human Body, 136-137 Stimulus and Response, 143 Plan It!, 143 Controlling Processes, 176-185 Model It!, 181 Topic 3 Review and Assess, 186-187 Q13-16 uDemonstrate Lab, 190-193
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence (Obtaining, Evaluating, and Communicating Information) (Professional: Information Literacy)	SE/TE: Reading Check, 131 Reading Check, 133 Reading Check, 137 Literacy Connection, 142 Reading Check, 144 Reading Check, 148 Using Genetic Information, Figure 9, 400 Literacy Connection, 457 Interactivity, 458 Lesson 5 Check Q3, 464 Extraordinary Science, 465
Connections to Nature of Science: Scientific Knowledge is Based on Empirical Evidence. Science knowledge is based upon logical connections between evidence and explanations.	SE/TE: Connect It!, 90 Scrambled Mitosis, Figure 4, 95 Connect It!, 98 Marsh Plants, Figure 7, 105
Elaboration on the GLE:	
Students can answer the question: How do organisms detect, process, and use information about the environment?	SE/TE: Human Organ Systems, 134 Organ Systems in the Human Body, 136-137 Stimulus and Response, 143 Plan It!, 143 Controlling Processes, 176-185 Model It!, 181 uDemonstrate Lab, 190-193

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LS1:D Information Processing: Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.	SE/TE: Human Organ Systems, 134 Organ Systems in the Human Body, 136-137 Stimulus and Response, 143 Plan It!, 143 Controlling Processes, 176-185 Model It!, 181 uDemonstrate Lab, 190-193
<i>Cross Cutting Concepts:</i>	
Cause and Effect: Cause and effect relationships may be used to predict phenomena in natural systems and phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.	SE/TE: Lesson 2 Check Q4, 149 Connect It, 176 Lesson 5 Check Q3, 185
Connections to Engineering, Technology and Applications of Science: Interdependence of Science, Engineering, and Technology. Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.	SE/TE: uEngineer It!, 139 Careers, 163 uEngineer It!, 379 Genetic Engineering, 394-397 DNA Technologies, 399 Topic 7 Review and Assess – Evidence-Based Assessment, 404-405
Connections to Nature of Science: Science is a Human Endeavor. Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.	SE/TE: Lesson 1 Check Q7&8, 138 Case Study Q2, 150-151

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Prepared Graduates:	
6. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.	
Grade Level Expectation:	
5. Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving	
Evidence Outcomes:	
Students Can:	
Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (MS-LS2-1) (Clarification Statement: Emphasis is on cause - and - effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.)	SE/TE: Essential Question, 249 Topic 5 Quest: Mystery at Pleasant Pond, 250-251, 259, 270, 280, 285 The Essential Question, 291 Interactions in Ecosystems, 294-303 Model It!, 298 Math Toolbox, 299 Ecosystem Disruptions and Population Survival, 308-309 Lesson Check-in, 310 Labs: Design and Model an Animal Crossing
Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. (MS-LS2-2) (Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.)	SE/TE: Organisms and Habitats, 253 The Value of Biodiversity, 313-315 Factors Affecting Biodiversity, 316-318
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Analyze and interpret data to provide evidence for phenomena. (Analyzing and Interpreting Data) (Entrepreneurial: Critical thinking/Problem solving)	SE/TE: Math Toolbox, 256 Lesson 1 Check Q2-3, 259 Case Study, 260-261 Energy Pyramid, Figure 5, 268 Math Toolbox, 269

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Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Creativity/Innovation)	SE/TE: Math Toolbox, 256 Lesson 1 Check Q2-3, 259 Case Study, 260-261 Energy Pyramid, Figure 5, 268 Math Toolbox, 269 Topic 7 Review and Assess – Evidence-Based Assessment, 404-405 Evidence in the Fossil Record, 402-403
<i>Elaboration on the GLE:</i>	
Students can answer the question: How do organisms interact with the living and nonliving environments to obtain matter and energy?	SE/TE: Growth and Development of Organisms, 229 Environmental Conditions, 232 External and Internal Factors, 235-236 Case Study, 238-239 Living Things and the Environment, 252-259 Design It!, 254 Limited Space, Figure 5, 258 Case Study, 260-261
LS2:A Interdependent Relationships in Ecosystems: Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. Growth of organisms and population increases are limited by access to resources.	SE/TE: Growth and Development of Organisms, 229 Environmental Conditions, 232 External and Internal Factors, 235-236 Case Study, 238-239 Living Things and the Environment, 252-259 Design It!, 254 Limited Space, Figure 5, 258 Case Study, 260-261 Organisms and Habitats, 253-254 Factors that Limit Population Growth, 258 Energy and Matter Transfer, 266-269 Math Toolbox, 279 Competition and Predation, 297-299
<i>Cross Cutting Concepts:</i>	
Cause and Effect: Cause - and - effect relationships may be used to predict phenomena in natural or designed systems.	SE/TE: Emigration, Figure 4, 257 Limited Space, Figure 5, 258 Quest Check-In, 259 Lesson 2 Check Q5, 270
Patterns: Patterns can be used to identify cause and effect relationships.	SE/TE: How Plants Respond to Light, Figure 2, 230-231 Topic 4 Review and Assess Q5, 240-241 Case Study, 260-261 Lesson 1 Check Q2, 303 Case Study, 324-325

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<p>Connections to Engineering, Technology, and Applications of Science</p>	<p>SE/TE: uDemonstrate Lab, 244-247 uEngineer It!, 271 Extraordinary Science, 281 uEngineer It!, 335</p>
<p>Influence of Science, Engineering, and Technology on Society and the Natural World: The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.</p>	<p>SE/TE: uDemonstrate Lab, 244-247 uEngineer It!, 271 Extraordinary Science, 281 uEngineer It!, 335</p>
<p>Connections to Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems. Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science Addresses Questions About the Natural and Material World. Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.</p>	<p>SE/TE: Energy Flow in Ecosystems, 262–270 Cycles of Matter, 272–280 Biodiversity, 312–323 Ecosystem Services, 326–334</p>

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Grade Level Expectation:	
6. Ecosystems are sustained by the continuous flow of energy, originating primarily from the sun, and the recycling of matter and nutrients within the system.	
Evidence Outcomes:	
Students Can:	
Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (MS-LS2-3) (Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.) (Boundary Statement: Assessment does not include the use of chemical reactions to describe the processes.)	SE/TE: Energy Flow in Ecosystems, 262-270 Cycles of Matter, 272-280
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Develop a model to describe phenomena (Developing and Using Models) (Personal: Initiative/Self-direction)	SE/TE: Life and Death in an Alaskan Stream, 264 Model It!, 267 Model It!, 274 Lesson 3 Check Q3, 280
Connections to Nature of Science: Scientific Knowledge is Based on Empirical Evidence. Science disciplines share common rules of obtaining and evaluating empirical evidence.	SE/TE: Math Toolbox, 269 Topic 5 Review and Assess – Evidence-Based Assessment, 284-285 Case Study, 324-325
Elaboration on the GLE:	
Students can answer the question: How do matter and energy move through an ecosystem?	SE/TE: Energy Flow in Ecosystems, 262-270 Cycles of Matter, 272-280
LS2:B Cycle of Matter and Energy Transfer in Ecosystems: Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.	SE/TE: Energy Flow in Ecosystems, 262-270 Model It!, 267 Math Toolbox, 269 Cycles of Matter, 272-280

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<i>Cross Cutting Concepts:</i>	
Energy and Matter: The transfer of energy can be tracked as energy flows through a natural system.	SE/TE: Energy Flow in Ecosystems, 262-270 Model It!, 267 Math Tool Box, 269
Connections to Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems. Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.	SE/TE: Energy Flow in Ecosystems, 262-270 Math Toolbox, 269 Lesson 2 Check Q4, 271 Cycles of Matter, 272-280 Math Toolbox, 279 Evidence in the Fossil Record, 443–453
Connections to Engineering, Technology, and Applications of Science: Influence of Science, Engineering, and Technology on Society and the Natural World. The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.	SE/TE: Biodiversity, 312–323 Ecosystem Services, 326–334

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Grade Level Expectation:	
7. Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem	
Evidence Outcomes:	
Students Can:	
Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (MS-LS2-4) (Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.)	SE/TE: Energy Flow in Ecosystems, 262-270 Interactions in Ecosystems, 294-303 Math Toolbox, 299 Digital Activities: Research Animal Crossings, To Cross or Not to Cross
Evaluate competing design solutions for maintaining biodiversity and ecosystem services. (MS-LS2-5) (Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.)	SE/TE: Design It!, 333 uEngineer It!, 335 Digital Activities: Community Opinions, Research Animal Crossings, To Cross or Not to Cross Labs: Design and Model an Animal Crossing
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem and evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (Engaging in Argument from Evidence) (Entrepreneurial: Critical thinking/Problem solving)	SE/TE: Lesson 2 Check Q2, 310 Lesson 3 Check Q5, 323
Connections to Nature of Science: Scientific Knowledge is Based on Empirical Evidence. Science disciplines share common rules of obtaining and evaluating empirical evidence.	SE/TE: Dynamic and Resilient Ecosystems 304–310 Factors Affecting Biodiversity, 316-318

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<i>Elaboration on the GLE:</i>	
Students can answer the question: What happens to ecosystems when the environment changes?	SE/TE: Case Study, 238-239 Topic 4 Review and Assess – Evidence-Based Assessment, 242-243 Case Study, 260, 261 Dynamic and Resilient Ecosystems 304–310 Factors Affecting Biodiversity, 316-318
LS2:C Ecosystem Dynamics, Functioning, and Resilience: Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.	SE/TE: Case Study, 238-239 Topic 4 Review and Assess – Evidence-Based Assessment, 242-243 Case Study, 260–261 Dynamic and Resilient Ecosystems 304–310 Factors Affecting Biodiversity, 316-318
<i>Cross Cutting Concepts:</i>	
Stability and Change: Small changes in one part of a system might cause large changes in another part.	SE/TE: Dynamic and Resilient Ecosystems 304–310 Biodiversity, 312–323
Connections to Nature of Science: Science Addresses Questions About the Natural and Material World. Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.	SE/TE: Case Study, 260-261
Prepared Graduates:	

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7. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.	
Grade Level Expectation:	
8. Heredity explains why offspring resemble, but are not identical to, their parents and is a unifying biological principle. Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes.	
Evidence Outcomes:	
Students Can:	
Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. (MS-LS3-1) (Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.) (Boundary Statement: Does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.)	SE/TE: Case Study, 358-359 Genetic Coding and Protein Synthesis, 370-378 Types of Mutations, 384-385 Model It!, 209 Environmental Factors, 386-387 Mutations in Reproduction, 388-390 Proteins, 460-461
Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. (MS-LS3-2) (Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause - and - effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.)	SE/TE: Patterns of Inheritance, 348-357 Case Study, 358-359 Chromosomes and Inheritance, 360-368
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Develop and use a model to describe phenomena. (Developing and Using Models) (Personal: Initiative/Self-direction)	SE/TE: Math Toolbox, 353-355 Math Toolbox, 363 Model It!, 364 Design It!, 373 Model It!, 377 Lesson 3 Check Q7, 378

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Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (Obtaining, Evaluating, and Communicating Information) (Professional: Information Literacy)	SE/TE: Case Study, 358-359 Make Meaning, 362 Read and Comprehend, 363 Literacy Connection, 365 Reading Check, 372 Literacy Connection, 393 Natural Selection, 424-432
<i>Elaboration on the GLE:</i>	
Students can answer the questions: How are the characteristics of one generation related to the previous generation? Why do individuals of the same species vary in how they look, function, and behave?	SE/TE: Patterns of Inheritance, 348-357 Case Study, 358-359 Chromosomes and Inheritance, 360-368 Trait Variations, 380-383
LS3:A Inheritance of Traits: Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits.	SE/TE: Chromosomes and Inheritance, 360-368 Genetic Coding and Protein Synthesis, 370-378 Trait Variations, 380-391 Topic 7 Review and Assessment, 402-405
LS3:B Variation of Traits: In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism.	SE/TE: Quest Check-In, 368 Genetic Coding and Protein Synthesis, 370-378 Trait Variations, 380-391 Topic 7 Review and Assess, 402-405 Genes and Natural Selection, 430-431 Mutations, 260-261 Quest Check-In, 441 Quest Check-In, 464 Topic 8 Review and Assess, 466-467
<i>Cross Cutting Concepts:</i>	
Cause and Effect: Cause - and - effect relationships may be used to predict phenomena in natural systems.	SE/TE: Swapping Genetic Material, Figure 5, 365 Lesson 5 Check, 401
Structure and Function: Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function.	SE/TE: Structure of DNA and RNA, Figure 4, 374 Lesson 3 Check, Q2, 378

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Interdependence of Science, Engineering, and Technology: Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.	SE/TE: Genetic Technologies, 392-431
Connections to Nature of Science: Science Addresses Questions About the Natural and Material World. Scientific knowledge can describe the consequences of actions but does not make the decisions that society takes.	SE/TE: Probability and Heredity, 353-355 Genetic Technologies, 392-431
Prepared Graduates:	
8. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.	
Grade Level Expectation:	
9. Fossils are mineral replacements, preserved remains, or traces of organisms that lived in the past.	
Evidence Outcomes:	
Students Can:	
Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. (MS-LS4-1) (Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.) (Boundary Statement: Does not include the names of individual species or geological eras in the fossil record.)	SE/TE: Evidence in the Fossil Record, 442-455
Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. (MS-LS4-2) (Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.)	SE/TE: Reading the Past, Figure 4, 418 Evidence in the Fossil Record, 442-455 Other Evidence of Evolution, 442-455

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Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. (MS-LS4-3) (Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.) (Boundary Statement: Comparisons are limited to gross appearance of anatomical structures in embryological development.)	SE/TE: Comparisons of Anatomy, 448 Birds and Dinosaurs, Figure 6, 448 Math Toolbox, 449
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Analyzing data progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis and analyze and interpret data to determine similarities and differences in findings. (Analyzing and Interpreting Data) (Entrepreneurial: Inquiry/Analysis)	SE/TE: Math Toolbox, 383 Topic 7 Review and Assess – Evidence-Based 7- Assessment, 402-403 uDemonstrate Lab, 406-409 Math Toolbox, 461 Topic 8, Review and Assess – Evidence-Based 8- Assessment, 468-469
Constructing explanations and designing solutions to include constructing explanations and designing solutions supported by multiple sources. (Constructing Explanations and Designing Solutions) (Civic/Interpersonal: Civic engagement)	SE/TE: Topic 7 Quest: Funky Fruits, 346-347, 357, 368, 391, 405 Design It! 377
Elaboration on the GLE:	
Students can answer the question: What evidence shows that different species are related?	SE/TE: Beginning and End of a Species, 450 Genetic Evidence for a Common Ancestor, 458- 459 Family Tre Based on DNA, Figure 2, 458-459 Proteins, 460-461 Gene Transfer Between Species, 462-463 Topic 8 Review and Assess – Evidence-Based 8- Assessment, 468-469

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<p>LS4:A Evidence of Common Ancestry and Diversity: The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy.</p>	<p>SE/TE: Early Study of Evolution, 414-423 U Engineer It!, 433 Evidence in the Fossil Record, 442-455 Extraordinary Science, 465</p>
<p><i>Cross Cutting Concepts:</i></p>	
<p>Patterns: Graphs, charts, and images can be used to identify patterns in data.</p>	<p>SE/TE: Math Toolbox, 383 Topic 7 Review and Assess – Evidence-Based Assessment, 404-405</p>
<p>Connections to Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems. Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.</p>	<p>SE/TE: Math Toolbox, 383 Evidence in the Fossil Record, 442-453</p>

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Grade Level Expectation:	
10. Genetic variations among individuals in a population give some individuals an advantage in surviving and reproducing in their environment.	
Evidence Outcomes:	
Students Can:	
Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. (MS-LS4-4) (Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.)	SE/TE: Case Study, 358-359 Traits and Variation, 380-391 Quest Check-In, 391 Natural Selection, 424-432 The Process of Evolution, 434-441
Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms. (MS-LS4-5) (Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.)	SE/TE: Artificial Selection, 393 Genetic Engineering, 394 Practical Uses for DNA, 398-399 Lesson 5 Check, 401 Topic 7 Review and Assess, Q16-19, 403
Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. (MS-LS4-6) (Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time.) (Boundary Statement: Does not include Hardy-Weinberg calculations.)	SE/TE: Math Toolbox, 428 Math Toolbox, 449 Case Study, 454-455 Math Toolbox, 461
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Construct an explanation that includes qualitative or quantitative relationships between variables that describe phenomena. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Creativity/Innovation)	SE/TE: Topic 7 Review and Assess – Evidence-Based Assessment, 404-405 Early Study of Evolution, 414-423 Lesson 1 Check Q5, 423 Natural Selection, 424-432 Lesson 2 Check Q5 Evidence in the Fossil Record, 442-453 Lesson 4 Check, Q4, 453

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Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (Obtaining, Evaluating, and Communicating Information) (Professional: Information/Communication Technology)	SE/TE: Evidence in the Fossil Record, 442-454 Other Evidence of Evolution, 456-465
<i>Elaboration on the GLE:</i>	
Students can answer the question: What evidence shows that different species are related?	SE/TE: Beginning and End of a Species, 450 Genetic Evidence for a Common Ancestor, 458-459 Family Tre Based on DNA, Figure 2, 458-459 Proteins, 460-461 Gene Transfer Between Species, 462-463 Topic 8 Review and Assess – Evidence-Based Assessment, 468-469
LS4:B Natural Selection: Natural selection leads to the predominance of certain traits in a population, and the suppression of others. In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring.	SE/TE: Artificial Selection, 393 Natural Selection 424–432 How Natural Selection Works, 427 Fancy Pigeons, Figure 2, 426 Topic 8 Review and Assess Qs 6-10, 466-467
<i>Cross Cutting Concepts:</i>	
Cause and Effect: Phenomena may have more than one cause, and some cause - and - effect relationships in systems can only be described using probability.	SE/TE: Probability and Heredity, 353-355 Math Tool Box, 353-355
Connections to and Interdependence of Engineering, Technology, and Applications of Science: Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.	SE/TE: Genetic Technologies, 392-401 Using Technology to Study Evolution, 457-461
Connections to Nature of Science: Science Addresses Questions About the Natural and Material World. Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.	SE/TE: Probability and Heredity, 353-355 Genetic Technologies, 392-431

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Grade Level Expectation:	
11. Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions.	
Evidence Outcomes:	
Students Can:	
Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. (MS-LS4-6) (Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time.) (Boundary Statement: Does not include Hardy Weinberg calculations.)	SE/TE: Connect It!, 424 Overproduction, Figure 3, 427 Math Toolbox, 428 Model It!, 429 Natural Selection, 424-432 Math Toolbox, 449 Math Toolbox, 461 Topic 8 Review and Assess – Evidence Based Assessment, 468-469
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Identifying patterns in large data sets and using mathematical concepts to support explanations and arguments. Use mathematical representations to support scientific conclusions and design solutions. (Using Mathematics and Computational Thinking) (Entrepreneurial: Critical thinking/Problem solving)	SE/TE: Overproduction, Figure 3, 427 Math Toolbox, 428 Math Toolbox, 461 Topic 8 Review and Assess – Evidence Based Assessment, 468-469
Elaboration on the GLE:	
Students can answer the question: How does genetic variation among organisms affect survival and reproduction?	SE/TE: Case Study, 358-359 Environmental Factors, 386-387 How Natural Selection Works, 427 Processes of Evolution, 435-438 Quest Check-In 441
LS4:C Adaptation: Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.	SE/TE: Adaptation and Survival, 295-296 Adaptations, 298 Model It! 298 Competition and Predation, 297-299 Symbiotic Relationships, 300-302 Natural Selection, 424-432 The Process of Evolution, 434-441
Cross Cutting Concepts:	
Cause and Effect: Phenomena may have more than one cause, and some cause - and - effect relationships in systems can only be described using probability.	SE/TE: Probability and Heredity, 353-355 Lesson 1 Check Q3, 357

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Connections to Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems. Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation	SE/TE: Math Toolbox, 383 Evidence in the Fossil Record, 443-453
Grade Level Expectation:	
12. Biodiversity is the wide range of existing life forms that have adapted to the variety of conditions on Earth, from terrestrial to marine ecosystems.	
Evidence Outcomes:	
Students Can:	
Evaluate competing design solutions for maintaining biodiversity and ecosystem services. (MS-LS2-5) (Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.)	SE/TE: Topic 6 Quest: To Cross or Not to Cross, 292-293, 303, 310, 323, 339 Design It!, 333 uEngineer It!, 335 Digital Activities: Research Animal Crossings, To Cross or Not to Cross
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (Engaging in Argument from Evidence) (Personal: Initiative/Self-direction)	SE/TE: Secondary Succession, Figure 3, 307 Lesson 2 Check Q2, 310 Lesson 3 Check Q5, 323
Elaboration on the GLE:	
Students can answer the question: How does the environment influence populations of organisms over multiple generations?	SE/TE: Factors That Limit Population Growth, 258 The Essential Question, 291 Interactions in Ecosystems, 294-303 Math Toolbox, 299 Mutualism and Commensalism, Figure 5, 301 Succession, 305-310 Case Study, 324-325

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LS4:D Biodiversity and Humans: Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on — or example, water purification and recycling.	SE/TE: Biodiversity, 312-323 Economic Value, 256 Human Impact, Figure 6, 319 Biodiversity, 331 Human Activities, 332 Conservation, 333 Lesson 4 Check, 334
<i>Cross Cutting Concepts:</i>	
Patterns: Patterns can be used to identify cause and effect relationships. -Graphs, charts, and images can be used to identify patterns in data.	SE/TE: Case Study, 324-325
Energy and matter: Matter is conserved because atoms are conserved in physical and chemical processes.-Within a natural system, the transfer of energy drives the motion and/or cycling of matter.	SE/TE: Living Things and Energy, 99-101 Photosynthesis, 102-103 Expressing Photosynthesis, 104-105 Math Toolbox, 105 Quest Connection, 272 Connect It!, 272-273 Ecosystem in a Jar, Figure 1, 273 Conservation of Matter and Energy, 272
Interdependence of Science, Engineering, and Technology: Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.	SE/TE: Life Science uEngineer It!, 217 u Engineer It!, 335
Connections to Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems. Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Addresses Questions About the Natural and Material World. Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.	SE/TE: Probability and Heredity, 353-355 Genetic Technologies, 392-431

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