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Elevate Science
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To the

Colorado 2020 Academic Standards for Science

Grades 6-8

Pearson

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Introduction

This document demonstrates how ***Elevate Science ©2019*** meets the Colorado 2020 Academic Standards for Science, Grades 6-8. Correlation page references are to the Student and Teacher's Editions and cited at the page level.

Pearson is proud to introduce ***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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1. Physical Science	
Prepared Graduates:	
1. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.	
Grade Level Expectations:	
1. The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter and phases changes.	
Evidence Outcomes:	
Students Can:	
Develop models to describe the atomic composition of simple molecules and extended structures. (MS PS1-1) (Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3-D ball and stick structures, or computer representations showing different molecules with different types of atoms.) (Boundary Statement: Does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete description of all individual atoms in a complex molecule or extended structure.)	**SE/TE:** **Elevate Science Course 3:** Atomic Theory, 4–13 Case Study-Unlocking the Power of the Atom, 14–15 The Periodic Table, 16–37 Types of Bonds, 38–47 uDemonstrate Lab-Shedding Light on Ions, 60–63 See also: **Elevate Science Course 1:** Describing and Classifying Matter, 4–12 Topic 1 Review and Assess, 36–37

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Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. (MS-PS1-2) (Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.) (Boundary statement: Limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability and odor.)	**SE/TE:** **Elevate Science Course 3:** Quest Check-in, 27 Evidence of Chemical Reactions, 82–83 Connect It!, 90 Model It!, 92 Interactivity, 93 Quest Check-In 97 Topic 2 Review and Assess 108–109 uDemonstrate Lab-Evidence of Chemical Change, 112–115 See also: **Elevate Science Course 1:** Describing and Classifying Matter, 4–12
Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. (MS-PS1-3) (Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods and alternative fuels.) (Boundary Statement: Limited to qualitative information.)	**SE/TE:** **Elevate Science Course 3:** Producing Useful Materials, 98–105 Case Study-Is Plastic Really Fantastic?, 106–107 Topic 2 Review and Assess, 109
Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. (MS-PS1-4) (Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawing and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide and helium.)	**SE/TE:** **Elevate Science Course 1:** Solids, Liquids, and Gases 42–43 Quest-How can you use solids, liquids, and gases to lift a car?, 44–45 States of Matter, 46–54, Engineer It!, From “Ink” to Objects: 3D Printing, 55 Changes of State, 56–64 Extraordinary Science-Freeze that Scalpel!, 65 Gas Behavior, 66– 75 Case Study-Rising to the Occasion: Charles Law in the Oven, 76–77 Topic 2 Review and Assess, 78–79, 80–81 uDemonstrate Lab-Melting Ice, 82–85

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Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Develop a model to predict and/or describe phenomena. (Developing and using models) (Personal: Initiative/Self-direction)	**SE/TE:** **Elevate Science Course 1:** Model It!, 50 Model It!, 63 Model It!, 71 Topic 2 Review and Assess Q2&3, 81 uDemonstrate Lab-Melting Ice, 82–85
Analyze and interpret data to determine similarities and differences in findings. (Analyzing and interpreting data) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 1:** Math Toolbox-Energy in Chemical Reactions, 31 uDemonstrate Lab – Help Out Wildlife 38-41 uDemonstrate Lab – Testing Thermal Conductivity, 170–173
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 support or not supported by evidence (Obtaining, Evaluating, and Communication Information) (Professional: Information literacy)	**SE/TE:** **Elevate Science Course 3:** Producing Useful Materials, 98–105 Connect It!,98 Academic Vocabulary, 99 Literacy Connection, 103 Lesson Check Q5, 105
Connection to Nature of Science: Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**Elevate Science Course 1:** Case Study-An Epic Disaster, 22-23 **Elevate Science Course 2:** Connect It! 32 Math Toolbox, 47 Lesson 5 Check Q3,7,8

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Elaboration on the GLE:	
Students can answer the question: How do particles combine to form the variety of matter one observes?	**SE/TE:** **Elevate Science Course 3:** Atoms and the Periodic Table, xviii–1 Atomic Theory, 4–13 The Periodic Table, 16–28 Types of Bonds, 38–47 Acids and Bases, 48–54 **Elevate Science Course 1:** Describing and Classifying Matter, 4–12
PS1:A Structure and Properties of Matter: Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. Solids may be formed from molecules, or they may be extended structures with repeating sub-units (e.g., crystals). Each pure substance has characteristic physical and chemical properties that can be used to identify it. Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.	**SE/TE:** **Elevate Science Course 3:** Atoms and the Periodic Table, xviii–1 Atomic Theory, 4–13 The Periodic Table, 16–28 Types of Bonds, 38–47 Acids and Bases, 48–54 Physical and Chemical Properties Quest Check-In, 27 Evidence of Chemical Reactions, 82–83 Connect It!, 90 Model It!, 92 Chemical Reactions and Equations, 93 Topic 2 Review, 108–109, uDemonstrate Lab – Evidence of Chemical Change, 112–115 **Elevate Science Course 1:** States of Matter, 46–54 Changes of State, 56–64

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Scale, Proportion and Quantity: Time, space and energy phenomena can be observed at various scales using models to study systems that are too small or too large.	**SE/TE:** **Elevate Science Course 3:** Atomic Theory, 4–13 The Periodic Table, 16–27 Types of Bounds, 38–47 **Elevate Science Course 1:** Plate Tectonics and Earth's Surface, 340–349 Earthquakes and Tsunami Hazards, 352–362
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Structure and Function: Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.	**SE/TE:** **Elevate Science Course 3:** Mixtures and Solutions, 98–105 **Elevate Science Course 1:** Plants and Animals 472–483
Cause and Effect: Cause - and - effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** **Elevate Science Course 3:** Describing Motion 120–127 Speed, Velocity, and Acceleration, 128–137 Newton's Laws of Motion, 140–148 Friction and Gravitational Interactions, 150–158 Topic 3 Review – Evidence-Based Assessment, 162–163 **Elevate Science Course 1:** States of Matter 46–54 Changes of State, 56–64 The Atmosphere Around You, 222–229

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Influence of Science, Engineering, and Technology on Society and the Natural World: The uses of technology and any limitation on their use are driven by individual and 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:** **Elevate Science Course 1:** uEngineer It!-Impact on Society , 33 uEngineer It!-Impact on Society, 471 **Elevate Science Course 3:** uEngineer It!-Impact on Society, 37 uEngineer It!-Impact on Society, 203
Grade Level Expectation:	
2. Reacting substances rearrange to form different molecules, but the number of atoms is conserved. Some reactions release energy and others absorb energy.	
Evidence Outcomes:	
Students Can:	
Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. (MS-PS1-2) (Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.) (Boundary statement: Limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability and odor.)	
Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (MS PS 1-5) (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations or intermolecular forces.)	**SE/TE:** **Elevate Science Course 3:** Modeling Chemical Reactions, 90–97

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Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (MS PS1-6) (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time and temperature of substance in testing the device.)	**SE/TE:** **Elevate Science Course 3:** Quest Kickoff and Quest Check-Ins 66–67, 76, 88, 97, 105, 111 Changes in Energy & Energy Graphs for Chemical Reactions, 84, 85 **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 138–139, 154, 165, 169 Topic 4 Review and Assess, 166–167 uDemonstrate Lab – Testing Thermal Conductivity, 170–173
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Develop a model to describe unobservable mechanisms. (Developing and Using Models) (Entrepreneurial: Creativity/Innovation)	**SE/TE:** **Elevate Science Course 3:** Model It! – Models of Atoms, 9 Lesson 1 Check Q-5, 13 Lesson 3 Check Q-2, 36 Model It! – How Ions Form, 40 Lesson 4 Check Q3, 47 uDemonstrate Lab, 60–63 **Elevate Science Course 1:** Topic 5 Review and Assessment Q17, 211 Model It!, 237 Lesson 2 Check Q5, 238

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Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. (Constructing Explanation and Designing Solutions) (Entrepreneurial: Creativity/Innovation)	**SE/TE:** **Elevate Science Course 1:** uDemonstrate Lab, 38–41 uEngineer It!, 55 uEngineer It!, 107 uDemonstrate Lab, 322–325 **Elevate Science Course 3:** Quest Kickoff and Projects 66–67, 76, 88. 97, 105, 111 Design It!, 412 Science and Engineering Practices Handbook, 534, 535
Connections to Nature of Science: Laws are regularities or mathematical descriptions of natural phenomena.	**SE/TE:** **Elevate Science Course 3:** Law of Conservation of Mass, 94 Math Toolbox, 95 Topic 2 Review and Assess – Evidence-Based Assessment, 110-111
Elaboration on the GLE:	
Students can answer the questions: How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?	**SE/TE:** **Elevate Science Course 3:** Evidence of Chemical Reactions, 82–83 Modeling Chemical Reactions, 90-96 Model It!, 92 Hands-On Lab, 93 Quest Check-In, 97 Topic 2 Review and Assess Q11-13, 108–109, uDemonstrate Lab, 112–115 **Elevate Science Course 1:** Chemical Change in Matter, 27-29

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PS1:B Chemical Reactions: Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. The total number of each type of atom is conserved, and thus the mass does not change. Some chemical reactions release energy, others store energy.	**SE/TE:** **Elevate Science Course 3:** Quest Check-In, 27 Model It!, 80 Chemical Change, 80 Changes in Energy, 84-85 Model It!, 92 Law of Conservation of Mass, 94-96 Quest Check-In, 97
Cross Cutting Concepts:	
Energy and Matter: Matter is conserved because atoms are conserved in physical and chemical processes. The transfer of energy can be tracked as energy flows through a designed or natural system.	**SE/TE:** **Elevate Science Course 3:** Evidence of Chemical Reactions82-83 Changes in Energy, 84 Energy Graphs for Chemical Reactions, 85
Prepared Graduates:	
2. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.	
Grade Level Expectation:	
3. Motion is described relative to a reference frame that must be shared with others and is determined by the sum of the forces acting on it. The greater the mass of the object, the greater the force needed to achieve the same change in motion.	
Evidence Outcomes:	
Students Can:	
Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. (MS-PS-2-1) (Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.) (Boundary Statement: Limited to vertical or horizontal interactions in one dimension.)	**SE/TE:** **Elevate Science Course 3:** uEngineer It!, 149 uDemonstrate It Lab, 164–167 Quest Kickoff and Quest Check-ins, 118-199, 127, 137, 148, 158, 163

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Plan an investigation to provide evidence that the change in an objects motion depends on the sum of the forces on the object and the mass of the object. (MS-PS-2-2) (Clarification Statement: Emphasis is on balanced [Newton's First Law] and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion [Newton's Second Law], frame of reference and specification of units.) (Boundary Statement: Limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.)	**SE/TE:** **Elevate Science Course 3:** Describing Motion and Force, 120–127 Newton's Second Law of Motion, 142-144 164–167 uDemonstrate It Lab, 164–167
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Apply scientific ideas or principles to design an object, tool, process, or system. (Constructing Explanation and Designing Solutions) (Personal: Personal responsibility)	**SE/TE:** **Elevate Science Course 3:** uEngineer It!, 149 uDemonstrate It Lab, 164–167
Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded and how many data are needed to support a claim. (Planning and Carrying Out Investigations) (Personal: Initiative/Self-direction)	**SE/TE:** **Elevate Science Course 3:** Describing Motion and Force, 120–127 Newton's Second Law of Motion, 142-144 164–167 uDemonstrate It Lab, 164–167
Connections to Nature of Science: Science is knowledge based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** **Elevate Science Course 3:** Lesson 1 Check, 127 Q2 Lesson 2 Check, 137 Q3 & Q5 Lesson 4 Check, 158 Q5 Topic 3 Review and Assess, 162-163, Q1, Q4, Q5
Elaboration on the GLE:	
Students can answer the question: How can one predict an object's continued motion,	**SE/TE:** **Elevate Science Course 3:**

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changes in motion or stability?	Describing Motion and Force, 120–127 Speed, Velocity, and Acceleration, 128–137 Newton's Laws of Motion, 140–148, uDemonstrate Lab, 164–167
PS2:A Forces and Motion: For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared.	**SE/TE:** **Elevate Science Course 3:** Quest Kickoff and Quest Check-Ins, 118–119, 127, 137, 148, 158, 163 Newton's Third Law, 145–147 Topic 3 Assessment Q's 10-13, 161 uDemonstrate Lab, 164–167
Cross Cutting Concepts:	
Systems and System Models: Models can be used to represent systems and their interactions - such as inputs, processes and outputs - and energy and matter flows within systems.	**SE/TE:** **Elevate Science Course 3:** uEngineer It!, 149 uDemonstrate Lab, 164–167
Stability and Change: Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales.	**SE/TE:** **Elevate Science Course 3:** Describing Motion and Force, 120–127 Speed, Velocity, and Acceleration, 128–137 Newton's Laws of Motion, 140–148, Topic 3 Review – Evidence-Based Assessment, 162-163
Prepared Graduates:	
Connections to Engineering, Technology and Applications of Science: The uses 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.	

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Grade Level Expectation:	
4. Forces that act a distance (gravitational, electric, and magnetic) can be explained by force fields that extend through space and can be mapped by their effect on a test object.	
Evidence Outcomes:	
Students Can:	
Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. (MS-PS2-3) (Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.) (Boundary Statement: Limited to questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.)	**SE/TE:** **Elevate Science Course 2:** Essential Question, 451 Quest Kickoff, 452 Question It!, 457 Model It!, 475 Math Toolbox, 476 Question It!, 486 Math Toolbox, 48 Case Study, 490-491
Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. (MS-PS2-4) (Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.) (Boundary Statement: Does not include Newton's Law of Gravitation or Kepler's Laws.)	**SE/TE:** **Elevate Science Course 3:** Factors that Affect Gravity, 154-155 Energy, Forces, and Motion, 156-157 Lesson 4 Check Q5, 158

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Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. (MS-PS2-5) (Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically charged strips of tape, and electrically-charged pith balls. Examples of investigations could include firsthand experiences or simulations.) (Boundary Statement: Assessment is limited to electric and magnetic fields, and limited to qualitative evidence for the existence of fields.)	**SE/TE:** **Elevate Science Course 2:** Quest Kickoff and Quest Check-In, 452-453, 462, 471, 478, 489 Topic 9 Review and Assess, Evidence-Based Assessment, 494-495 uDemonstrate Lab, 496-499
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and when appropriate, frame a hypothesis based on observations and scientific principles. (Asking Questions and Defining Problems) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 2:** Essential Question, 451 Quest Kickoff, 452 Question It!, 457 Model It!, 475 Math Toolbox, 476 Question It!, 486 Math Toolbox, 48 Case Study, 490-491
Construct and present oral and written arguments 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. (Engage in Argument from Evidence) (Entrepreneurial: Critical thinking/Problem solving)	**SE/TE:** **Elevate Science Course 3:** Factors that Affect Gravity, 154-155 Energy, Forces, and Motion, 156-157 Lesson 4 Check Q5, 158

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Conduct an investigation and evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation. (Planning and Carrying Out Investigations) (Personal: initiative/Self-direction)	**SE/TE:** **Elevate Science Course 2:** Quest Kickoff and Quest Check-In, 452-453, 462, 471, 478, 489 Topic 9 Review and Assess, Evidence-Based Assessment, 494-495 uDemonstrate Lab, 496-499
Connections to Nature of Science: Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** **Elevate Science Course 2:** Question It!, 457 Hands-On Lab, 466 Lesson 2 Check Q4, 471 Lesson 4 Check Q3, 489 Topic 9 Review and Assess Q5, 492 Topic 9 Review and Assess-Evidence-Based Assessment Q3, 495 uDemonstrate Lab, 496-499
Elaboration on the GLE:	
Students can answer the question: What underlying forces explain the variety of interactions observed?	**SE/TE:** **Elevate Science Course 2:** Topic 9 Electricity and Magnetism, 450-499
PS2:B Types of Interactions: Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass — e.g., Earth and the sun. Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively).	**SE/TE:** **Elevate Science Course 2:** Electromagnetic Principles, 473 Magnetic Fields and Currents, 474-475 Model It!, 475 Math Toolbox, 476 Solenoids and Electromagnets, 476-477 **Elevate Science Course 3:** Factors that Affect Gravity, 154-155 Extraordinary Science, 159 Topic 3 Review and Assessment-Evidence-Based Assessment, 162-163

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Cross Cutting Concepts:	
Cause and Effect: Cause - and - effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** **Elevate Science Course 2:** Model It!, 475 Math Toolbox, 476 Solenoids and Electromagnets, 476-477 Lesson 3 Check Q2, 478
Systems and Systems Models: Models can be used to represent systems and their interactions--such as inputs, processes and outputs -- and energy and matter flows within systems.	**SE/TE:** **Elevate Science Course 2:** Quest Kickoff and Quest Check-In, 452-453, 462, 471, 478, 489 Model It!, 475 Topic 9 Review and Assess, Evidence-Based Assessment, 494-495 uDemonstrate Lab, 496-499
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:	
5. Kinetic energy can be distinguished from the various forms of potential energy.	
Evidence Outcomes:	
Students Can:	
Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and the speed of an object. (MS-PS3-1) (Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a wiffle ball versus a tennis ball.)	**SE/TE:** **Elevate Science Course 1:** Math Toolbox, 102 **Elevate Science Course 3:** Model It!, 157

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Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. (MS-PS-3-2) (Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster car at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a classmate's hair. Examples of models could include representations, diagrams, pictures, and written descriptions of systems.) (Boundary Statement: Limited to two objects and electric, magnetic, and gravitational interactions.)	**SE/TE:** **Elevate Science Course 2:** Potential Energy Figure 4, 457 Balloon and Paper, Figure 9, 461 Lesson 1 Check Q4 Visualizing Magnetic Fields, Figure 4, 467 Model It!, 469Lesson 2 Check Q5, 471 Model It!, 475 Lesson 3 Check, 478
Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. (MS-PS3-3) (Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.) (Boundary Statement: Does not include calculating the total amount of thermal energy transferred.)	**SE/TE:** **Elevate Science Course 3:** Quest Kickoff and Quest Check-Ins 66–67, 76, 88, 97, 105, 111 Changes in Energy & Energy Graphs for Chemical Reactions, 84, 85 **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 138–139, 154, 165, 169 Topic 4 Review and Assess, 166–167 uDemonstrate Lab – Testing Thermal Conductivity, 170–173

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Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. (MS-PS3-4) (Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.) (Boundary Statement: Does not include calculating the total amount of thermal energy transferred.)	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 138–139, 154, 165, 169 Topic 4 Review and Assess, 166–167 uDemonstrate Lab – Testing Thermal Conductivity, 170–173
Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. (MS-PS3–5) (Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.) (Boundary Statement: Does not include calculations of energy.)	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 88-89, 99, 106, 116, 125, 131 Lesson 4 Check Q4&5, 125

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Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Construct and interpret graphical displays of data to identify linear and nonlinear relationships. (Analyzing and Interpreting Data) (Entrepreneurial: Critical thinking/Problem solving)	**SE/TE:** **Elevate Science Course 1:** Calculating Kinetic Energy, 102 Math Toolbox, 102 **Elevate Science Course 2:** Math Toolbox, 143 Math Toolbox, 165 Math Toolbox, 178, Case Study, 180–181 **Elevate Science Course 3:** Math Toolbox, 126 Math Toolbox, 131
Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (Planning and Carrying Out Investigations) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 1:** uDemonstrate Lab, 170-173 **Elevate Science Course 3:** uDemonstrate Lab, 60–63
Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 88-89, 99, 106116, 125, 131

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Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (Engaging in Argument from Evidence) (Entrepreneurial: Critical thinking/Problem solving)	**SE/TE:** **Elevate Science Course 1:** Cite Textual Evidence, 110 Question It!, 112 Lesson 3 Check Q5, 116 **Elevate Science Course 3:** Reading Check – Write Arguments, 153 Topic 3 Review and Assess – Evidence-Based Assessment Q2-5, 162-163
Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence: Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** **Elevate Science Course 1:** Question It!, 112 Lesson 3 Check Q5 Math Toolbox, 123Lesson 4 Check Q4&5, 125 **Elevate Science Course 2:** Literacy Connection, 470, Lesson 2 Check Q4, 471 Math Toolbox, 476 **Elevate Science Course 3:** Math Toolbox, 126
Elaboration on the GLE:	
Students can answer the question: What is energy?	**SE/TE:** **Elevate Science Course 1:** Energy, Motion and Work, 90-99 Kinetic Energy and Potential Energy, 100-107 Other Forms of Energy, 108-116

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PS3:A Definitions of Energy: Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed. A system of objects may also contain stored (potential) energy, depending on their relative positions. Temperature is a measure of the average kinetic energy of particles of matter. The relationships between the temperature and total energy of a system depends on the types, states, and amounts of matter present.	**SE/TE:** **Elevate Science Course 1:** Energy, Motion, Force and Work, 90–99 Kinetic Energy and Potential Energy, 100–106 Thermal Energy, 111 Thermal Energy, Heat, and Temperature, 140-146
Cross Cutting Concepts:	
Scale, proportion and quantity: Proportional relationships (e.g., speed as the relation of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.	**SE/TE:** **Elevate Science Course 1:** Math Toolbox, 95 Work Related to Energy, 96-98 Lesson 1 Chrck Q4, 99 Math Toolbox, 102 Calculating Kinetic Energy, 102 Gravitational Potential Energy, 104 **Elevate Science Course 3:** Speed, Velocity, and Acceleration, 128-137 Math Toolbox, 131
Prepared Graduates:	
Energy and Matter: Energy may take different forms (e.g., energy in fields, thermal energy, energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.	

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Grade Level Expectation:	
6. Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter.	
Evidence Outcomes:	
Students Can:	
Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. (MS PS3-3) (Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.) (Boundary Statement: Does not include calculating the total amount of thermal energy transferred.)	**SE/TE:** **Elevate Science Course 3:** Quest Kickoff and Quest Check-Ins 66–67, 76, 88, 97, 105, 111 Changes in Energy & Energy Graphs for Chemical Reactions, 84, 85 **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 138–139, 154, 165, 169 Topic 4 Review and Assess, 166–167 uDemonstrate Lab – Testing Thermal Conductivity, 170–173
Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. (MS-PS3-4) (Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.) (Boundary Statement: Does not include calculating the total amount of thermal energy transferred.)	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 138–139, 154, 165, 169 Hands-On Lab, 142, 150, 160 uDemonstrate Lab, 170-173

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Construct, use, and present arguments to support the claim that when kinetic energy of an object changes, energy is transferred to or from the object. (MS-PS3-5) (Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.) (Boundary Statement: Does not include calculations of energy.)	**SE/TE:** **Elevate Science Course 1:** The Essential Question, 87 Quest Kickoff and Quest Check-In, 88-89, 99, 106116, 125, 131 Connect It!, 90 Kinetic Energy, 101-102 Energy Changes Form, 119-121 uDemonstrate Lab, 132-135
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. (Construct Explanations and Designing Solutions) (Civic/Interpersonal: Civic-Engagement)	**SE/TE:** **Elevate Science Course 3:** uEngineer It! 149 uDemonstrate Lab, 164-167
Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (Planning and Carrying Out Investigations) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 1:** uDemonstrate Lab, 132-135 Hands-On Lab, 142 uDemonstrate Lab – Testing Thermal Conductivity, 170–173 Science and Engineering Practices Handbook, 494-499
Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (Engaging in Argument from Evidence) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 1:** Reading Check, 108 Question It!, 112 Lesson 3 Check Q5, 116 Lesson 4 Check Q4&5, 125 uDemonstrate Lab, 170-173 **Elevate Science Course 3:** Literacy Connection, 155 Lesson 4 Check Q5, 159 uDemonstrate Lab, 164-167

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Connections to Nature of Science: Scientific knowledge is based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** **Elevate Science Course 1:** Energy at the Cookout, 114-115 Reading Check, 145 Lesson 1 Check Q6 & 7, 146 Math Toolbox, 151 Question It!, 153Lesson 2 Check Q6, 154 **Elevate Science Course 3:** Lesson 4 Check Q3-5 Topic 3 Review and Assess Q1&2, 162-163
Elaboration on the GLE:	
Students can answer the questions: What is meant by conservation of energy? How is energy transferred between objects or systems?	**SE/TE:** **Elevate Science Course 1:** Energy Changes Form, 119-121 Energy Changes and the Law of Conservation, 122-124 Topic 3 Review Q's 10-18, 129 Energy Conservation, 152
PS3:B Conservation of Energy and Energy Transfer: When the motion energy of an object changes, there is inevitably some other change in energy at the same time. The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. Energy is spontaneously transferred out of hotter regions or objects and into colder ones.	**SE/TE:** **Elevate Science Course 1:** Work Related to Energy and Power, 96-98 Quest Kickoff and Quest Check-In, 138–139, 154, 165, 169 Thermal Energy and Amount of Matter, Figure 8, 145 Types of Heat Transfer. 149-151
Cross Cutting Concepts:	
Energy and Matter: The transfer of energy can be tracked as energy flows through a designed or natural system. Energy may take different forms (e.g., energy in fields, thermal energy, energy of motion).	**SE/TE:** **Elevate Science Course 1:** Energy Changes Form, 119-121 Math Toolbox, 123 Topic 3 Review Q's 15-18, 129 Topic 3 Review and Assess, 130-131
Prepared Graduates:	
Scale, Proportion, and Quantity: Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.	

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Grade Level Expectation:	
7. When two objects interact, each one exerts a force on the other that can cause energy to be transferred to and from the object.	
Evidence Outcomes:	
Students Can:	
Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. (MS-PS3-2) (Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster car at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a classmate's hair. Examples of models could include representations, diagrams, pictures, and written descriptions of systems.) (Boundary Statement: Limited to two objects and electric, magnetic, and gravitational interactions.)	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 88-89, 99, 106, 116, 125, 131 Kinetic Energy, 101-102 Potential Energy, 103-105 Topic 3 Review and Assessment Q4, 128 **Elevate Science Course 3:** Energy, Forces, and Motion, 156-157

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Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Construct and interpret graphical displays of data to identify linear and nonlinear relationships. (Developing and Using Models) (Personal: Initiative/Self-direction)	
Elaboration on the GLE:	
Students can answer the question: How are forces related to energy?	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 88-89, 99, 106 116, 125, 131 Energy in Motion and Force, 91-92 Work Related to Energy and Power, 96-98 Math Toolbox, 102 Figure 4, Energy at the Cookout, 114-115 **Elevate Science Course 2:** Electric Force, Fields, and Energy, 455-457 Energy in Circuits, 459 Magnetic Force and Energy, 465-466
PS3:C Relationship Between Energy and Forces: When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object. For example, when energy is transferred to an Earth-object system as an object is raised, the gravitational field energy of the system increases. This energy is released as the object falls; the mechanism of this release is the gravitational force. Likewise, two magnetic and electrically charged objects interacting at a distance exert forces on each other that can transfer energy between the interacting objects.	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-In, 88-89, 99, 106, 116, 125, 131 Gravitational Potential Energy, 104 Elastic Potential Energy, 105 **Elevate Science Course 2:** Electric Force, Fields, and Energy, 455-457 Static Electricity, 460-461 **Elevate Science Course 3:** How Forces Affect Motion, 123-126 Newton's Laws of Motion, 140-147 Factors that Affect Gravity, 154-155 Energy, Forces and Motion, 156-157

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Cross Cutting Concepts:	
Systems and System Models: Models can be used to represent systems and their interactions - such as inputs, processes, and outputs - and energy and matter flows within systems.	**SE/TE:** **Elevate Science Course 1:** Model It!, 98 **Elevate Science Course 2:** Lesson 1 Check Q4, 462 Model It!, 469 Lesson 2 Check Q5, 471 **Elevate Science Course 3:** Model It!, 157
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:	
8. A simple wave model has a repeating pattern with specific wavelength, frequency, and amplitude and mechanical waves need a medium through which they are transmitted. This model can explain many phenomena which include light and sound.	
Evidence Outcomes:	
Students Can:	
Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in the wave. (MS PS4-1) (Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.) (Boundary Statement: Does not include electromagnetic waves and is limited to standard repeating waves.)	**SE/TE:** **Elevate Science Course 2:** Properties of Waves, 396-397 Math Toolbox, 398 Lesson 1 Check Q2 & Q4
Develop and use a model to describe that waves are reflected, absorbed or transmitted through various materials. (MS-PS4-2) (Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.) (Boundary Statement: Limited to qualitative applications pertaining to light and mechanical waves.)	**SE/TE:** **Elevate Science Course 2:** Hands-On Lab, 396 Lesson 1 Check Q3, 399 Reflection, Refraction, and Absorption, 403-405 Plan It!, 404

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Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Use mathematical representations to describe and/or support scientific conclusions and design solutions. (Use Mathematics and Computational Thinking) (Entrepreneurial: Critical thinking/Problem solving)	**SE/TE:** **Elevate Science Course 2:** Properties of Waves, 396-397 Math Toolbox, 398 Lesson 1 Check Q2 & Q4 uDemonstrate Lab, 446-449
Connections to Nature of Science: Science knowledge is based upon logical and conceptual connections between evidence and explanations.	**SE/TE:** **Elevate Science Course 2:** Case Study, 400-401 Connect It!, 402 Lesson 2 Check Q4, 410 Topic 8 Review and Assess Q5 & Q9, 442
Elaboration on the GLE:	
Students can answer the question: What are the characteristic properties and behaviors of waves?	**SE/TE:** **Elevate Science Course 2:** Wave Properties, 392-399 Wave Interactions, 402-410
PS4:A Wave Properties: A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. A sound wave needs a medium through which it is transmitted. Geologists use seismic waves and their reflection at interfaces between layers to probe structures deep in the planet.	**SE/TE:** **Elevate Science Course 2:** Properties of Waves, 396-397 Wave Interference, 406-409 The Behavior of Sound, 413-415 Factors Affecting the Speed of Sound, 416
Cross Cutting Concepts:	
Patterns: Graphs and charts can be used to identify patterns in data.	**SE/TE:** **Elevate Science Course 1:** Math Toolbox, 123 Case Study, 126-127 **Elevate Science Course 2:** Types of Interference, Figure 4, 406-407 Standing Waves, Figure 6, 408 Model It!, 415 Model It!, 425

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Grade Level Expectation:	
9. A wave model of light is useful to explain how light interacts with objects through a variety of properties.	
Evidence Outcomes:	
Students Can:	
Develop and use a model to describe that waves are reflected, absorbed or transmitted through various materials. (MS-PS4-2) (Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.) (Boundary Statement: Limited to qualitative applications pertaining to light and mechanical waves.)	**SE/TE:** **Elevate Science Course 2:** Reflection, Refraction, and Absorption, 403-405 Plan It!, 404 Lesson 2 Check Q1-4, 410 Model It!, 415 Lesson 3 Check Q7, 421 Model It!, 425 Light and Color, Figure 2, 434 Convex Mirror Image, Figure 6, 437 Model It!, 438
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: Personal responsibility)	**SE/TE:** **Elevate Science Course 2:** Reflection, Refraction, and Absorption, 403-405 Plan It!, 404 Lesson 2 Check Q1-4, 410 Model It!, 415 Lesson 3 Check Q7, 421 Model It!, 425 Light and Color, Figure 2, 434 Convex Mirror Image, Figure 6, 437 Model It!, 438

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Elaboration on the GLE:	
Students can answer the question: How can one explain the varied effects that involve light?	**SE/TE:** **Elevate Science Course 2:** Model the Electromagnetic Wave Behavior, 424-425 Model It!, 425, Math Toolbox, 427 Visible Light, 428 Light, 432-440 Lesson 5 Check, 441 Topic 8 Review and Assess Q15-Q18, 443 Topic 8 Review and Assess – Evidence-Based Assessment, 444-445
PS4:B Electromagnetic Radiation: When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. Lenses and prisms are applications of this effect. A wave model of light is useful for explaining brightness, color and the frequency dependent bending of light at a surface between media (prisms). However, because light can travel through space, it cannot be a matter wave, like sound or water waves.	**SE/TE:** **Elevate Science Course 2:** Models of Electromagnetic Wave Behavior, 424-425 Particle Model of Light, 425 Light, Color, and Objects, 433-435 Reflecting Light, 436-438 Lenses, 439-440
Cross Cutting Concepts:	
Structure and Function: Structures can be designed to serve particular functions by taking into account properties of different materials and how materials can be shaped and used.	**SE/TE:** **Elevate Science Course 2:** uEngineer It!, 411 Loudness and Pitch, 417-419 Color Filters, 435 Lenses, 439-440 **Elevate Science Course 3:** Lesson 4 Check Q4, 105

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Grade Level Expectation:	
10. Designed technologies can transmit digital information as wave pulses.	
Evidence Outcomes:	
Students Can:	
Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. (MS-PS4-3) (Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in Wi-Fi devices, and conversion of stored binary patterns to make sound or text on a computer screen.) (Boundary Statement: Does not include binary counting or the specific mechanism of any given device.)	**SE/TE:** **Elevate Science Course 2:** Essential Question, 501 Quest Kickoff and Quest Check-Ins, 502-503, 512, 523, 534, 539 Electronic Signals, 516 Analog and Digital Signals, 518-520 Transmitting Signals Advantages of Digital Signals, 532-533 Topic 10 Review and Assessment - Evidence-Based Assessment, 538-539 uDemonstrate Lab. 540-543
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings. (Obtaining, Evaluating, and Communicating Information) (Professional: Communication)	**SE/TE:** **Elevate Science Course 2:** Write About It, 509 uEngineer It!, 513 Literacy Connection, 518 Interactivity, 519 Case Study, 524-525 Extraordinary Science, 535 Topic 10 Review and Assess Q's 7,8,15, 536-537 Topic 10 Review and Assess – Evidence-Based Assessment Q4, 538-539 uDemonstrate Lab, 540-543

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Elaboration on the GLE:	
Students can answer the question: How are instruments that transmit and detect waves used to extend human senses?	**SE/TE:** **Elevate Science Course 2:** Radiosurgery, Figure 8, 429 uEngineer It!, 479 uDemonstrate Lab, 496-499 Electromagnetic Signals, 517 Transmitting Signals 521-522 Communication Systems, 529-531 Advantages of Digital Signals, 532-533 Extraordinary Science, 535
PS4:C Information Technologies and Instrumentation: Appropriately designed technologies (e.g., radio, television, cell-phones, wired and wireless computer networks) make it possible to detect and interpret many types of signals that cannot be sensed directly. Designers of such devices must understand both the signal and its interactions with matter. Many modern communication devices use digitized signals (sent as wave pulses) as a more reliable way to encode and transmit information.	**SE/TE:** **Elevate Science Course 2:** Radiosurgery, Figure 8, 429 uEngineer It!, 479 uDemonstrate Lab, 496-499 Electromagnetic Signals, 517 Transmitting Signals 521-522 Communication Systems, 529-531 Advantages of Digital Signals, 532-533 Extraordinary Science, 535
Cross Cutting Concepts:	
Structure and Function: Structures can be designed to serve particular functions.	**SE/TE:** **Elevate Science Course 2:** uEngineer It!, 513 Hands-On Lab, 520 Roger That!, Figure 3, 530-531 Bandwidth, 533

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Connections to Engineering, Technology, and Applications of Science: Technologies extend the measurement, exploration, modeling and computational capacity of scientific investigations.	**SE/TE:** **Elevate Science Course 2:** Radiosurgery, Figure 8, 429 uEngineer It!, 479 uDemonstrate Lab, 496-499 Electromagnetic Signals, 517 Transmitting Signals 521-522 Communication Systems, 529-531 Advantages of Digital Signals, 532-533 Extraordinary Science, 535
Connections to Nature of Science: Advances in technology influence the progress of science and science has influenced advances in technology.	**SE/TE:** **Elevate Science Course 2:** Radiosurgery, Figure 8, 429 uEngineer It!, 479 uDemonstrate Lab, 496-499 Electromagnetic Signals, 517 Transmitting Signals 521-522 Communication Systems, 529-531 Advantages of Digital Signals, 532-533 Extraordinary Science, 535
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. 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:** **Elevate Science Course 2:** Structure and Function of Cells, 4-11 Topic 1 Review and Assess Q1-3, 60 **Elevate Science Course 1:** The Essential Question, 435 Characteristics of Living Things, 439-441 Life Produces More Life, 442-443

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Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function. (MS LS1-2) (Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.) (Boundary Statement: Organelle structure/function relationships is limited to the cell wall and cell membrane. Function of the other organelles is limited to their relationship to the whole cell. Does not include the biochemical function of cells or cell parts.)	**SE/TE:** **Elevate Science Course 2:** Cell Structures, 14-23
Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (MS-LS1-3) (Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.) (Boundary Statement: Does not include the mechanism of one body system independent of others. Limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.)	**SE/TE:** **Elevate Science Course 2:** Cells Working Together, 21-22 Human Body Systems, 68-80 Lesson 1 Check Q8, 80 Systems Interacting, 82-91 Managing Materials, 106-117 Controlling Processes, 118-127 Topic 2 Review and Assess – Evidence-Based Assessment, Q5, 130-131 uDemonstrate Lab, 132-135
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
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:** **Elevate Science Course 2:** uDemonstrate Lab, 132-135

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Develop and use a model to describe phenomena. (Developing and Using Models) (Civic/Interpersonal: Collaboration/Teamwork)	**SE/TE:** **Elevate Science Course 2:** Lesson 1 Check Q6, 12 Model It!, 19 Model It!, 28 Hands-On Lab, 29
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:** **Elevate Science Course 2:** Quest Kick Off and Checks, 70-71, 91, 104, 117, 127, 131 Lesson 1 Check Q8, 80 Reading Check, 86 Literacy Connection, 95 Reading Check, 103 Lesson 3 Check Q2, 104 Topic 2 Review and Assess – Evidence-Based Assessment Q5, 130-131 uDemonstrate Lab, 132-135
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:** **Elevate Science Course 2:** Quest Kick Off and Checks, 70-71, 91, 104, 117, 127, 131 Lesson 1 Check Q8, 80 Reading Check, 86 Literacy Connection, 95 Reading Check, 103 Lesson 3 Check Q2, 104 Topic 2 Review and Assess – Evidence-Based Assessment Q5, 130-131 uDemonstrate Lab, 132-135

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Elaboration on the GLE:	
Students can answer the question: How do the structures of organisms enable life's functions?	**SE/TE:** **Elevate Science Course 2:** Cell Structures, 14-23 Obtaining and Removing Materials, 24-31 Cell Division, 32-39 **Elevate Science Course 1:** Characteristics of Living Things, 439-441 Life Produces More Life, 442-443
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).	**SE/TE:** **Elevate Science Course 2:** Structure and Function of Cells, 4-12 Cell Structures, 14-23 **Elevate Science Course 1:** Living Things, 438-447 Viruses, Bacteria, and Fungi, 460-470
Cross Cutting Concepts:	
Scale, Proportion, and Quantity: Phenomena that can be observed at one scale may not be observable at another scale.	**SE/TE:** **Elevate Science Course 2:** Math Toolbox, 11 Extreme Close-Up, Figure 7, 11 Levels of Organization, Figure 6, 22 uDemonstrate Lab, 64-67

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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.	**SE/TE:** **Elevate Science Course 2:** Lesson 1 Check Q5, 12 Animal and Plan Cell Differences, Figure 2, 16-17 Interactivity, 18 Video, 20 Interactivity, 21 No Lungs Necessary, Figure 3, 27 Quest Check-In, 31 Topic 1, Review and Assess Q9, 60-61 Topic 1 Review and Assess – Evidence Based Assessment Q2, 62-63 **Elevate Science Course 1:** Form and Function, 473 Plant Structure, 475 Structure of Animals, 478 Invertebrates, Figure 6, 479 Lesson 4 Check Q4, 483
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:** **Elevate Science Course 2:** The Essential Question, 69 Quest Kick Off and Checks, 70-71, 91, 104, 117, 127, 131 Model It!, 77 Model It!, 123 Topic 2 Review and Assess Q2&4, 130-131 **Elevate Science Course 1:** Topic 10 Review and Assess Q4, 484

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Grade Level Expectation:	
2. Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring.	**SE/TE:** **Elevate Science Course 3:** Patterns of Inheritance, 172-181 Chromosomes and Inheritance, 184-192 Topic 4 Review and Assessment Q1-10, 226-227 **Elevate Science Course 2:** Asexual and Sexual Reproduction, 141-143 Model It!, 142 Math Toolbox, 143 Inherited Traits, 144-146 Model It!, 145 Lesson 1 Check, 149 Topic 3 Review and Assess Q1-5
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:** **Elevate Science Course 2:** Essential Question, 137 Plant Structures for Reproduction, 150-158 Literacy Connection, 155 Male and Female Cones, Figure 5, 155 Reading Check, 157 Animal Behaviors for Reproduction, 160-168 Parenting Behavior, Figure 3, 164 External Fertilization, Figure 4, 165 Working Together, Figure 5, 166

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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:** **Elevate Science Course 2:** Essential Question, 137 Genes and the Environment, 147-148 Growth and Development of Organisms, 171 Environmental Conditions, 174 External and Internal Factors, 177-178 Case Study, 180-181 Topic 3 Review and Assess, 182-183 Topic 3Review and Assess – Evidence-Based Assessment, 184-185
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:** **Elevate Science Course 2:** Quest Kickoff, Quest Check-In and Quest Findings, 138-139, 158, 168, 179, 185 Reading Check, 143 Lesson 1 Check Q4-5, 149 Literacy Connection, 155 Connect It!, 160 Connect It!, 170 Write About It, 174 Case Study, 180-181 Topic 3 Review and Assess Q1-17, 182-183Topic 3 Review and Assess – Evidence-Based Assessment, 184-185

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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:** **Elevate Science Course 1:** Hypothesis of Continental Drift, 331-333 It's All Connected, 339 The Theory of Plate Tectonics, 341-344 Science and Engineering Practices Handbook, 598 **Elevate Science Course 2:** Science and Engineering Practices Handbook, 548 **Elevate Science Course 3:** Developing a Theory, 248 The Fossil Record, 267-269Determining the Relative Age of Rocks, 304-306 Science and Engineering Practices Handbook, 528
Elaboration on the GLE:	
Students can answer the question: How do organisms grow and develop?	**SE/TE:** **Elevate Science Course 2:** Growth and Development of Organisms, 171-174 Animal Growth, 175-178

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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.	**SE/TE:** **Elevate Science Course 3:** Patterns of Inheritance, 172-181 Chromosomes and Inheritance, 184-192 Topic 4 Review and Assessment Q1-10, 226-227 **Elevate Science Course 2:** Essential Question, 137 Asexual and Sexual Reproduction, 141-143 Model It!, 142 Math Toolbox, 143 Inherited Traits, 144-146 Model It!, 145 Lesson 1 Check, 149 Plant Structures for Reproduction, 150-158 Literacy Connection, 155 Male and Female Cones, Figure 5, 155 Reading Check, 157 Topic 3 Review and Assess Q1-5, 182-183 Animal Behaviors for Reproduction, 160-168 Parenting Behavior, Figure 3, 164 External Fertilization, Figure 4, 165 Working Together, Figure 5, 166
Cross Cutting Concepts:	
Cause and Effect: Cause - and - effect relationships may be used to predict phenomena in natural systems.	**SE/TE:** **Elevate Science Course 2:** Lesson 4 Check Q2, 179Topic 3 Review and Assess Q16, 183 Topic 3 Review and Assess – Evidence-Based Assessment Q3, 185 uDemonstrate Lab, 186-189

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Grade Level Expectation:	
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:** **Elevate Science Course 2:** The Essential Question, 1 Photosynthesis, 40-48 Marsh Plants, Figure 7, 47 Lesson 5 Check, Q3, 48 Topic 1 Review and Assess Q13-18 Connect It!, 214-215
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:** **Elevate Science Course 2:** Cellular Respiration, 50-57 Reading Check, Figure 3, 54
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:** **Elevate Science Course 1:** Plate Tectonics and Earth's Surface, 340–349 Lesson 2 Check Q5, 349 **Elevate Science Course 2:** Topic 3, Review and Assess – Evidence Based Assessment Q4, 184-185 **Elevate Science Course 3:** Determining the Age of Rocks, 302-309 Lesson 1 Check Q4, 309 Geologic Time Scale, 312-318 Lesson 2 Check Q5, 318

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Develop and use a model to describe phenomena and unobservable mechanisms. (Developing and Using Models) (Personal: Initiative/Self-direction)	**SE/TE:** **Elevate Science Course 2:** Topic 1 Review and Assess – Evidence-Based Assessment Q1, 62-63 Model It!, 77 Lesson 2 Check Q7 **Elevate Science Course 3:** Model It!, 305 Question It!, 317
Elaboration on the GLE:	
Students can answer the question: How do organisms detect, process, and use information about the environment?	**SE/TE:** **Elevate Science Course 1:** Response to Surroundings, 441 **Elevate Science Course 2:** Human Organ Systems, 76 Organ Systems in the Human Body, 78-79 Stimulus and Response, 85 Plan It!, 85 Controlling Processes, 118-127 Model It!, 123 Lesson 5 Check Q1-5 Topic 2 Review and Assess, 128-129 Q13-16 uDemonstrate Lab, 132-135
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:** **Elevate Science Course 2:** The Essential Question, 1 Photosynthesis, 40-48 Marsh Plants, Figure 7, 47 Lesson 5 Check, Q3, 48 Topic 1 Review and Assess Q13-18 Connect It!, 214-215

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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:** **Elevate Science Course 2:** Cellular Respiration, 50-57 Reading Check, Figure 3, 54
Cross Cutting Concepts:	
Energy and Matter: Within a natural system, the transfer of energy drives the motion and/or cycling of matter.	**SE/TE:** **Elevate Science Course 2:** Energy From the Sun, 42 An Energy Chain, Figure 2, 42 Model It!, 43 Photosynthesis, 44-45 Connect It!, 50 Using Energy, 51 Comparing Two Energy Processes, 54 Related Processes, Figure 3, 54 Topic 1 Review and Assess Q13-22
Grade Level Expectation:	
4. Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain.	

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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:** **Elevate Science Course 1:** Response to Surroundings, 441 **Elevate Science Course 2:** Human Organ Systems, 76 Organ Systems in the Human Body, 78-79 Stimulus and Response, 85 Plan It!, 85 Controlling Processes, 118-127 Model It!, 123 Lesson 5 Check Q1-5 Topic 2 Review and Assess, 128-129 Q13-16 uDemonstrate Lab, 132-135
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:** **Elevate Science Course 2:** Reading Check, 73 Reading Check, 75 Reading Check, 79 Literacy Connection, 84 Reading Check, 86 Reading Check, 90 Topic 2 Review Q 112, 15, 16, 128-129 **Elevate Science Course 3:** Using Genetic Information, Figure 9, 224 Literacy Connection, 281 Interactivity, 282 Lesson 5 Check Q3, 288 Extraordinary Science, 289

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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:** **Elevate Science Course 2:** Connect It!, 32 Scrambled Mitosis, Figure 4, 37 Connect It!, 40 Marsh Plants, Figure 7, 47 Lesson 5 Check Q3-7-8, 48
Elaboration on the GLE:	
Students can answer the question: How do organisms detect, process, and use information about the environment?	**SE/TE:** **Elevate Science Course 1:** Response to Surroundings, 441 **Elevate Science Course 2:** Human Organ Systems, 76 Organ Systems in the Human Body, 78-79 Stimulus and Response, 85 Plan It!, 85 Controlling Processes, 118-127 Model It!, 123 Lesson 5 Check Q1-5 Topic 2 Review and Assess, 128-129 Q13-16 uDemonstrate Lab, 132-135
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.	**Elevate Science Course 2:** Human Organ Systems, 76 Organ Systems in the Human Body, 78-79 Stimulus and Response, 85 Plan It!, 85 Controlling Processes, 118-127 Model It!, 123 Lesson 5 Check Q1-5 Topic 2 Review and Assess, 128-129 Q13-16 uDemonstrate Lab, 132-135

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Cross Cutting Concepts:	
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:** **Elevate Science Course 2:** Lesson 2 Check Q4, 91 Connect It, 118 Lesson 5 Check Q3, 127
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:** **Elevate Science Course 1:** (check carefully) uEngineer It!, 471 **Elevate Science Course 2:** uEngineer It!, 81 Careers, 105 **Elevate Science Course 3:** uEngineer It!, 203 Genetic Engineering, 218-221 DNA Technologies, 223Topic 4 Review and Assess Q16-19 Topic 4 Review and Assess – Evidence-Based Assessment, 228-229
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:** **Elevate Science Course 2:** Lesson 1 Check Q7&8, 80 Case Study Q2, 92-93 **TE Only:** Document, 71
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.	

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Grade Level Expectation:	
5. Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving	**SE/TE:** **Elevate Science Course 2:** Growth and Development of Organisms, 171 Environmental Conditions, 174 External and Internal Factors, 177-178Case Study, 180-181 Living Things and the Environment, 194=201 Design It!, 196 Limited Space, Figure 5, 200 Case Study, 202-203
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:** **Elevate Science Course 2:** Essential Question, 191 Quest Kickoff, Quest Check-ins and Quest Findings, 192-193, 201, 212, 222, 227 The Essential Question, 233 Interactions in Ecosystems, 236-245 Model It!, 240 Math Toolbox, 241 Ecosystem Disruptions and Population Survival, 250-251 Lesson Check-in, 252
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:** **Elevate Science Course 2:** Organisms and Habitats, 195 The Value of Biodiversity, 255-257 Factors Affecting Biodiversity, 258-260

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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:** **Elevate Science Course 2:** Math Toolbox, 198 Lesson 1 Check Q2-3, 201 Case Study, 202-203 Energy Pyramid, Figure 5, 210 Math Toolbox, 211
Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Creativity/Innovation)	**SE/TE:** **Elevate Science Course 2:** Math Toolbox, 198 Lesson 1 Check Q2-3, 201 Case Study, 202-203 Energy Pyramid, Figure 5, 210 Math Toolbox, 211 **Elevate Science Course 3:** Topic 4 Review and Assess – Evidence-Based Assessment, 228-229 Evidence in the Fossil Record, 266-227
Elaboration on the GLE:	
Students can answer the question: How do organisms interact with the living and nonliving environments to obtain matter and energy?	**SE/TE:** **Elevate Science Course 2:** Growth and Development of Organisms, 171 Environmental Conditions, 174 External and Internal Factors, 177-178Case Study, 180-181 Living Things and the Environment, 194=201 Design It!, 196 Limited Space, Figure 5, 200 Case Study, 202-203

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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:** **Elevate Science Course 2:** Growth and Development of Organisms, 171 Environmental Conditions, 174 External and Internal Factors, 177-178Case Study, 180-181 Living Things and the Environment, 194=201 Design It!, 196 Limited Space, Figure 5, 200 Case Study, 202-203 Organisms and Habitats, 195-196 Factors that Limit Population Growth, 200 Energy and Matter Transfer, 208-211 Math Toolbox, 221 Competition and Predation, 239-241
Cross Cutting Concepts:	
Cause and Effect: Cause - and - effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** **Elevate Science Course 2:** Emigration, Figure 4, 199 Limited Space, Figure 5, 200 Quest Check-In, 201 Lesson 2 Check Q5, 212
Patterns: Patterns can be used to identify cause and effect relationships.	**SE/TE:** **Elevate Science Course 2:** How Plants Respond to Light, Figure 2, 172-173 Topic 3 Review and Assess Q5, 182-183 Case Study, 202-203 Lesson 1 Check Q2, 245 Case Study, 266-267
Connections to Engineering, Technology, and Applications of Science	**SE/TE:** **Elevate Science Course 2:** uDemonstrate Lab, 186-189 uEngineer It!, 213 Extraordinary Science, 223 uEngineer It!, 277

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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:** **Elevate Science Course 2:** uDemonstrate Lab, 330–333 Balancing Need, 344 Global to Local, 355 Land as Resource, 357–358 Topic 7 Review and Assess, 380–381
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.	**SE/TE:** **Elevate Science Course 2:** Energy Flow in Ecosystems, 204–212 Cycles of Matter, 214–222 Biodiversity, 254–265 Ecosystem Services, 268–276
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:** **Elevate Science Course 2:** Energy Flow in Ecosystems, 204-212 Cycles of Matter, 214-222

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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:** **Elevate Science Course 2:** Life and Death in an Alaskan Stream, 206 Model It!, 209 Model It!, 216 Lesson 3 Check Q3, 222
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:** **Elevate Science Course 2:** Math Toolbox, 211 Topic 4 Review and Assess – Evidence-Based Assessment, 226-227 Case Study, 266-267
Elaboration on the GLE:	
Students can answer the question: How do matter and energy move through an ecosystem?	**SE/TE:** **Elevate Science Course 2:** Energy Flow in Ecosystems, 204-212 Cycles of Matter, 214-222
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:** **Elevate Science Course 2:** Energy Flow in Ecosystems, 204-212 Model It!, 209 Math Tool box, 211 Cycles of Matter, 214-222

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Cross Cutting Concepts:	
Energy and Matter: The transfer of energy can be tracked as energy flows through a natural system.	**SE/TE:** **Elevate Science Course 2:** Energy Flow in Ecosystems, 204-212 Model It!, 209 Math Tool Box, 211
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:** **Elevate Science Course 2:** Energy Flow in Ecosystems, 204-212 Math Tool box, 211 Lesson 2 Check Q4, 212 Cycles of Matter, 214-222 Math Toolbox, 221 **Elevate Science Course 3:** Evidence in the Fossil Record, 267–277
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:** **Elevate Science Course 2:** Biodiversity, 254–265 Ecosystem Services, 268–276
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	**SE/TE:** **Elevate Science Course 2:** Case Study, 202–203 Case Study, 232–233 Dynamic and Resilient Ecosystems 246–252 Factors Affecting Biodiversity, 258-260 Human Impact, 261-264

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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:** **Elevate Science Course 2:** Energy Flow in Ecosystems, 204-212 Interactions in Ecosystems, 236-245 Math Toolbox, 241
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:** **Elevate Science Course 2:** Design It!275 uEngineer It!, 277
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:** **Elevate Science Course 2:** Lesson 2 Check Q2, 252 Lesson 3 Check Q5, 265
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:** **Elevate Science Course 2:** Dynamic and Resilient Ecosystems 246–252 Factors Affecting Biodiversity, 258-260

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Elaboration on the GLE:	
Students can answer the question: What happens to ecosystems when the environment changes?	**SE/TE:** **Elevate Science Course 2:** Case Study, 180-181 Topic 3 Review and Assess – Evidence-Based Assessment, 184-185 Case Study, 202–203 Case Study, 232–233 Dynamic and Resilient Ecosystems 246–252 Factors Affecting Biodiversity, 258-260
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:** **Elevate Science Course 2:** Case Study, 180-181 Topic 3 Review and Assess – Evidence-Based Assessment, 184-185 Case Study, 202–203 Case Study, 232–233 Dynamic and Resilient Ecosystems 246–252 Factors Affecting Biodiversity, 258-260
Cross Cutting Concepts:	
Stability and Change: Small changes in one part of a system might cause large changes in another part.	**SE/TE:** **Elevate Science Course 2:** Dynamic and Resilient Ecosystems 246–252 Biodiversity, 254–265

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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:** **Elevate Science Course 2:** Nonrenewable Energy Resources, 290-299 Renewable Energy Resources, 300-306 Mineral Resources, 308-315 Water Resources, 318-324 Population Growth and Resource Consumption, 338-345 Air Pollution, 346-354 Impacts on Land, 356-367 Water Pollution, 370-378 Topic 7 Review and Assessment, 380-383 uDemonstrate Lab, 384-387
Prepared Graduates:	
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:** **Elevate Science Course 3:** Case Study, 182-183 Genetic Coding and Protein Synthesis, 194-202 Types of Mutations, 208-209 Model It!, 209Environmental Factors, 210-211 Mutations in Reproduction, 212-214 Proteins, 284-285

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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:** **Elevate Science Course 3:** Patterns of Inheritance, 172-181 Case Study, 182-183 Chromosomes and Inheritance, 184-192 **Elevate Science Course 1:** Reproduction, 441
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:** **Elevate Science Course 3:** Math Toolbox, 177-179 Math Toolbox, 187 Model It!, 188 Design It!, 197 Model It!, 201 Lesson 3 Check Q7, 202
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:** **Elevate Science Course 3:** Case Study, 182-183 Make Meaning, 186 Read and Comprehend, 187 Literacy Connection, 189 Reading Check, 196 Literacy Connection, 217 Natural Selection, 248-256
Elaboration on the GLE:	
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:** **Elevate Science Course 3:** Patterns of Inheritance, 172-181 Case Study, 182-183 Chromosomes and Inheritance, 184-192 Trait Variations, 204-207

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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:** **Elevate Science Course 3:** Chromosomes and Inheritance, 184-192 Genetic Coding and Protein Synthesis, 194-202 Trait Variations, 204-215 Topic 4 Review and Assessment, 226-229
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:** **Elevate Science Course 3:** Quest Check-In, 192 Genetic Coding and Protein Synthesis, 194-202 Trait Variations, 204-215 Topic 4 Review and Assess, 226-227 Genes and Natural Selection, 254-255 Mutations, 260-261Quest Check-In, 265 Quest Check-In, 288 Topic Review and Assess, 290-291
Cross Cutting Concepts:	
Cause and Effect: Cause - and - effect relationships may be used to predict phenomena in natural systems.	**SE/TE:** **Elevate Science Course 3:** Swapping Genetic Material, Figure 5, 189 Lesson 5 Check, 225
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:** **Elevate Science Course 3:** Structure of DNA and RNA, Figure 4, 198 Lesson 3 Check, Q2, 202
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:** **Elevate Science Course 3:** Genetic Technologies, 216-255

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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:** **Elevate Science Course 3:** Probability and Heredity, 177-179 Genetic Technologies, 216-255
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:** **Elevate Science Course 3:** Evidence in the Fossil Record, 266-279 Connect It!, 302 Determining the Relative Age of Rocks, 304-306 Model It!, 305 Quest Check-In, 318 Topic 6 Review and Assess, 330-331 uDemonstrate Lab, 334-337
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:** **Elevate Science Course 3:** Reading the Past, Figure 4, 242 Evidence in the Fossil Record, 266-279 Other Evidence of Evolution, 266-279 Case Study, 310-311 uDemonstrate Lab, 334-337

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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:** **Elevate Science Course 3:** Comparisons of Anatomy, 272 Birds and Dinosaurs, Figure 6, 272 Math Toolbox, 273
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:** **Elevate Science Course 3:** Math Toolbox, 207 Topic 4 Review and Assess – Evidence-Based Assessment, 226-227 uDemonstrate Lab, 230-233 Math Toolbox, 285 Topic 5, Review and Assess – Evidence-Based Assessment, 292-293
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:** **Elevate Science Course 3:** Quest Kickoff and Quest Check-Ins and Quest Findings, 170-171, 181, 192, 215, 229 Design It! 201 Connect It!, 302, Lesson 1 Check, 309 Case Study, 310-311

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Elaboration on the GLE:	
Students can answer the question: What evidence shows that different species are related?	**SE/TE:** **Elevate Science Course 3:** Beginning and End of a Species, 274 Genetic Evidence for a Common Ancestor, 282-283 Family Tre Based on DNA, Figure 2, 282-283 Proteins, 284-285 Gene Transfer Between Species, 286-287 Topic 5 Review and Assess – Evidence-Based Assessment, 292-293
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.	**SE/TE:** **Elevate Science Course 3:** Early Study of Evolution, 238-247 U Engineer It!, 257 Evidence in the Fossil Record, 266-279 Extraordinary Science, 289 Determining the Age of Rocks, 302-309
Cross Cutting Concepts:	
Patterns: Graphs, charts, and images can be used to identify patterns in data.	**SE/TE:** **Elevate Science Course 3:** Math Toolbox, 207 Topic 4 Review and Assess – Evidence-Based Assessment, 228-229
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:** **Elevate Science Course 3:** Math Toolbox, 207 Evidence in the Fossil Record, 266-277

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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:** **Elevate Science Course 3:** Case Study, 182-183 Traits and Variation, 204-215 Quest Check-In, 215 Natural Selection, 248-256 The Process of Evolution, 258-265
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:** **Elevate Science Course 3:** Genetic Technologies, 216-225
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:** **Elevate Science Course 3:** Math Toolbox, 252 Math Toolbox, 273 Case Study, 278-279 Math Toolbox, 285

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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:** **Elevate Science Course 3:** Topic 4 Review and Assess – Evidence-Based Assessment, 228-229 Early Study of Evolution, 238-247 Lesson 1 Check Q5, 247 Natural Selection, 248-256 Lesson 2 Check Q5 Evidence in the Fossil Record, 266-277Lesson 4 Check, Q4, 277
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:** **Elevate Science Course 3:** Evidence in the Fossil Record, 266-278 Other Evidence of Evolution, 280-289
Elaboration on the GLE:	
Students can answer the question: What evidence shows that different species are related?	**SE/TE:** **Elevate Science Course 3:** Beginning and End of a Species, 274 Genetic Evidence for a Common Ancestor, 282-283 Family Tre Based on DNA, Figure 2, 282-283 Proteins, 284-285 Gene Transfer Between Species, 286-287 Topic 5 Review and Assess – Evidence-Based Assessment, 292-293

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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:** **Elevate Science Course 3:** Artificial Selection, 217 Natural Selection 248–256 How Natural Selection Works, 251 Fancy Pigeons, Figure 2, 250 Topic 5 Review and Assess Qs 6-10, 290-291
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:** **Elevate Science Course 3:** Probability and Heredity, 177-179 Math Tool Box, 177-179
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:** **Elevate Science Course 3:** Genetic Technologies, 216-225 Using Technology to Study Evolution, 281-285
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:** **Elevate Science Course 3:** Probability and Heredity, 177-179 Genetic Technologies, 216-255
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.	

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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:** **Elevate Science Course 3:** Connect It!, 248 Overproduction, Figure 3, 251 Math Toolbox, 252 Model It!, 253 Natural Selection, 248-256 Math Toolbox, 273 Math Toolbox, 285 Topic 5 Review and Assess – Evidence Based Assessment, 292-293
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:** **Elevate Science Course 3:** Overproduction, Figure 3, 251 Math Toolbox, 252 Math Toolbox, 285 Topic 5 Review and Assess – Evidence Based Assessment, 292-293
Elaboration on the GLE:	
Students can answer the question: How does genetic variation among organisms affect survival and reproduction?	**SE/TE:** **Elevate Science Course 3:** Case Study, 182-183 Environmental Factors, 210-211How Natural Selection Works, 251 Processes of Evolution, 259-262 Quest Check-In 265

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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:** **Elevate Science Course 3:** Natural Selection, 248–256 The Process of Evolution, 258–265 Quest Check-In, **Elevate Science Course 2:** Adaptation and Survival, 237-238 Adaptations, 240 Model It! 240 Competition and Predation, 239-241 Symbiotic Relationships, 242-244
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:** **Elevate Science Course 3:** Probability and Heredity, 177-179 Lesson 1 Check Q3, 181
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:** **Elevate Science Course 3:** Math Toolbox, 207 Evidence in the Fossil Record, 267-277
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:** **Elevate Science Course 2:** Quest Kickoff, Quest Check-Ins, and Quest Findings, 234-235, 245, 252,265, 281 Design It!, 275 uEngineer It!, 277 Engineering and Design Process, 552-555

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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:** **Elevate Science Course 2:** Secondary Succession, Figure 3, 249 Lesson 2 Check Q2, 252 Lesson 3 Check Q5, 265
Elaboration on the GLE:	
Students can answer the question: How does the environment influence populations of organisms over multiple generations?	**SE/TE:** **Elevate Science Course 2:** Factors That Limit Population Growth, 200 The Essential Question, 233 Interactions in Ecosystems, 236-245 Math Toolbox, 241 Mutualism and Commensalism, Figure 5, 243 Succession, 247-252 Case Study, 266-267
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:** **Elevate Science Course 2:** Biodiversity, 254-265 Economic Value, 256Human Impact, Figure 6, 261 Biodiversity, 273 Human Activities, 274 Conservation, 275 Lesson 4 Check, 276
Cross Cutting Concepts:	
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:** **Elevate Science Course 2:** Case Study, 266-267 Evidence Based Assessment Q3, 328-319
Energy and matter: Matter is conserved because atoms are conserved in physical and chemical processes.-Within a natural system,	**SE/TE:** **Elevate Science Course 1:** Conservation of Mass, 28

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the transfer of energy drives the motion and/or cycling of matter.	**Elevate Science Course 2:** **SE/TE:** 50–57 Living Things and Energy, 41-43Photosynthesis, 44-45 Expressing Photosynthesis, 46-47 Math Toolbox, 47 Quest Connection, 214 Connect It!, 214-215 Ecosystem in a Jar, Figure 1, 215 Conservation of Matter and Energy, 214
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:** **Elevate Science Course 2:** uEngineer It!, 159 u Engineer It!, 277 uEngineer It!, 379 uEngineer It! 513
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:** **Elevate Science Course 3:** Probability and Heredity, 177-179 Genetic Technologies, 216-255

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3. Earth and Space Science	
Prepared Graduates:	
9. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth's place in it.	
Grade Level Expectation:	
1. Motion is predictable in both solar systems and galaxies.	
Evidence Outcomes:	
Students Can:	
Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. (MS-ESS1-1) (Clarification Statement: Examples of models can be physical, graphical, or conceptual.)	**SE/TE:** **Elevate Science Course 3:** Earth's Movements in Space, 440-448 Phases and Eclipses, 450-458 Topic 9 Review and Assess Q7-19, 460-461 Topic 9 Review and Assess – Evidence-Based Assessment, 462-463 uDemonstrate Lab, 464-467
Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. (MS-ESS1-2) (Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical [such as the analogy of distance along a football field or computer visualizations of elliptical orbits] or conceptual [such as mathematical proportions relative to the size of familiar objects such as students' school or state].) (Boundary Statement: Does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.)	**SE/TE:** **Elevate Science Course 3:** Gravity and Orbits, 445-447 Solar System Formation, 482 Topic 10 Review and Assess – Evidence-Based Assessment, 518-519

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Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Develop and use a model to describe phenomena. (Develop and Use Models) (Personal: Initiative/Self-direction)	**SE/TE:** **Elevate Science Course 3:** Design It!, 442, Model It!, 455 Topic 9 Review and Assess Q19, 461 Topic 9 Review and Assess – Evidence-Based Assessment, 462-463
Elaboration on the GLE:	
Students can answer the question: What is the universe, and what goes on in stars?	**SE/TE:** **Elevate Science Course 3:** Comparing the Sun and Planets, 475-476 Structure of the Sun, 477-478 Features of the Sun, 479 Stars, 496-505 The Universe, 510-511 Understanding the Universe, 512-513
ESS1:A The Universe and Its Stars: Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.	**SE/TE:** **Elevate Science Course 3:** (check dup citations) Stars, 496-505 Movement in Space 428-437 Extraordinary Science, 515
Cross Cutting Concepts:	
Patterns: Patterns can be used to identify cause and-effect relationships.	**SE/TE:** **Elevate Science Course 3:** Lesson 2 Check Q2, 448 Topic 9 Review and Assess Q6&11, 460-461 Topic 9 Review and Assess – Evidence-Based Assessment, 462-463 uDemonstrate Lab, 464-467
Systems and system models: Models can be used to represent systems and their interactions.	**SE/TE:** **Elevate Science Course 3:** Connect It!, 472-473 Case Study, 484-485 Connect It!, 486-487 Model It!, 508

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Prepared Graduates:	
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.	
Grade Level Expectation:	
2. The solar system contains many varied objects held together by gravity. Solar system models explain and predict eclipses, lunar phases, and seasons.	
Evidence Outcomes:	
Students Can:	
Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. (MS-ESS1-2) (Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical [such as the analogy of distance along a football field or computer visualizations of elliptical orbits] or conceptual [such as mathematical proportions relative to the size of familiar objects such as students' school or state].) (Boundary Statement: Does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.)	**SE/TE:** **Elevate Science Course 3:** Gravity and Orbits, 445-447 Solar System Formation, 482 Topic 10 Review and Assess – Evidence-Based Assessment, 518-519

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Analyze and interpret data to determine scale properties of objects in the solar system. (MS-ESS1-3) (Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers [such as crust and atmosphere], surface features [such as volcanoes], and orbital radius. Examples of data include statistical information, drawings and photographs, and models.) (Boundary Statement: Does not include recalling facts about properties of the planets and other solar system bodies.)	**SE/TE:** **Elevate Science Course 3:** Math Toolbox, 474 The Solar System, Figure 7, 480-481
Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. (MS-ESS1-1) (Clarification Statement: Examples of models can be physical, graphical, or conceptual.)	**SE/TE:** **Elevate Science Course 3:** Design It!, 442 The Seasons, 443-444 The Appearance of the Moon, 451-454 Model It!, 455 uDemonstrate Lab, 464-467
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Develop and use a model to describe phenomena. (Develop and Use Models) (Personal: Initiative/Self-direction)	**SE/TE:** **Elevate Science Course 3:** Design It!, 442 The Seasons, 443-444 The Appearance of the Moon, 451-454 Model It!, 455 uDemonstrate Lab, 464-467
Analyze and interpret data to determine similarities and differences in findings. (Analyze and Interpret Data) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 3:** Math Toolbox, 474 The Solar System, Figure 7, 480-481 Topic 10 Review and Assess – Evidence-Based Assessment, 518-519

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Elaboration on the GLE:	
Students can answer the question: What are the predictable patterns caused by Earth's movement in the solar system?	**SE/TE:** **Elevate Science Course 3:** Earth's Movement in Space, 440-448
ESS1:B Earth and the Solar System: The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. The solar system appears to have formed from a disk of dust and gas, drawn together by gravity.	**SE/TE:** **Elevate Science Course 3:** Earth's Movements in Space, 440-448 Phases and Eclipses, 450-458 Topic 9 Review and Assess Q7-19, 460-461 Topic 9 Review and Assess – Evidence-Based Assessment, 462-463 uDemonstrate Lab, 464-467 Understanding the Solar System, 473-476 The Solar System, Figure 7, 480-481 Case Study, 484-485
Cross Cutting Concepts:	
Patterns: Patterns can be used to identify cause-and-effect relationships.	**SE/TE:** **Elevate Science Course 3:** Lesson 2 Check Q2, 448 Topic 9 Review and Assess Q6&11, 460-461 Topic 9 Review and Assess – Evidence-Based Assessment, 462-463 uDemonstrate Lab, 464-467
Scale: Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	**SE/TE:** **Elevate Science Course 3:** Math Toolbox, 474 The Solar System, Figure 7, 480-481 UDemonstrate Lab, 520-523

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Modeling: Models can be used to represent systems and their interactions.	**SE/TE:** **Elevate Science Course 3:** Design It!, 442 The Seasons, 443-444 The Appearance of the Moon, 451-454 Model It!, 455 uDemonstrate Lab, 464-467\
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:** **Elevate Science Course 3:** Collect Space Data, 487-489 History of Space Exploration, Figure 3&4), 490-493
Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.	**SE/TE:** **Elevate Science Course 3:** Motions of the Moon, 452 Eclipses, 455 Math Toolbox, 456 Topic 9 Review and Assess, 460-461
Prepared Graduates:	
10. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.	

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Grade Level Expectation:	
3. Rock strata and the fossil record can be used as evidence to organize the relative occurrence of major historical events in Earth's history.	
Evidence Outcomes:	
Students Can:	
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. (MS-ESS1-4) (Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent [such as the last Ice Age or the earliest fossils of homo sapiens] to very old [such as the formation of Earth or the earliest evidence of life]. Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.) (Boundary Statement: Does not include recalling the names of specific periods or epochs and events within them.)	**SE/TE:** **Elevate Science Course 3:** The Essential Question, 299 Determining the Age of Rocks, 302-309 Case Study, 310-311 Geologic Time Scale, 312-318 Major Events in Earth's History, 320-328
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: Creativity/Innovation)	**SE/TE:** **Elevate Science Course 3:** Determining the Age of Rocks, 302-309 Case Study, 310-311 Geologic Time Scale, 312-318 uDemonstrate Lab, 334-337

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Elaboration on the GLE:	
Students can answer the question: How do people reconstruct and date events in Earth's planetary history?	**SE/TE:** **Elevate Science Course 3:** Determining the Age of Rocks, 302-309 Case Study, 310-311 Geologic Time Scale, 312-318 Major Events in Earth's History, 320-328 Topic 6 Review and Assess, 330-331
ESS1:C The History of Planet Earth: The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.	**SE/TE:** **Elevate Science Course 3:** The Essential Question, 299 Determining the Age of Rocks, 302-309 Case Study, 310-311 Geologic Time Scale, 312-318 Major Events in Earth's History, 320-328 Topic 6 Review and Assess, 330-331
Cross Cutting Concepts:	
Scale, Proportion, and Quantity: Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	**SE/TE:** **Elevate Science Course 3:** Model It!, 305 Math Toolbox, 308 The Geologic Time Scale, Figure 2, 314-315 How Scientists Organize Earth's History, Figure 5, 327

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Grade Level Expectation:	
4. Energy flows and matter cycles within and among Earth's systems, including the sun and Earth's interior as primary energy sources. Plate tectonics is one result of these processes.	
Evidence Outcomes:	
Students Can:	
Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (MS-ESS2-1) (Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.) (Boundary Statement: Does not include the identification and naming of minerals.)	**SE/TE:** **Elevate Science Course 1:** Hands-On Lab, 174 The Essential Question, 175 Matter and Energy in Earth's System 178-184 The Earth System, 179-181 System Feedback, 182-183 Model It!, 182 Global to Local, 185 Topic 5 Review and Assessment, 210-211 The Cycling of Earth's Material, 311-314 Earth's Interior, 280–290 uEngineer It, 291 Rocks, 302-309 Cycling of Rocks, 310-315 Topic 7 Review and Access, 318-319
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2) (Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large [such as slow plate motions or the uplift of large mountain ranges] or small [such as rapid landslides or microscopic geochemical reactions], and how many geoscience processes [such as earthquakes, volcanoes, and meteor impacts] usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.)	**SE/TE:** **Elevate Science Course 1:** Plate Tectonics and Earth's Surface, 340–349 Case Study, 350-351 Earthquakes and Tsunami Hazards, 352–362 Volcanoes and Earth's Surface, 364–373 Topic 8 Review and Assess, 374-375 Topic 8 Review and Assess – Evidence-Based Assessment, 376-377 uDemonstrate Lab, 378-381 Weathering and Soil, 386-394 Erosion and Deposition, 396-402 Water Erosion, 404-413 Glacial and Wave Erosion, 416-425 uDemonstrate Lab, 430-433

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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:** **Elevate Science Course 1:** Hands-On Lab, 174 Model It!, 182 Model It!193 Topic 5 Review and Assess Q17, 210-211 Model It!286 Mantle Convection, Figure 7, 287
Elaboration on the GLE:	
Students can answer the question: How do Earth's major systems interact?	**SE/TE:** **Elevate Science Course 1:** Earth's Spheres, 180-181 Earth's Spheres, Figure 2, 180-181
ESS2:A Earth's Materials and Systems: All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.	**SE/TE:** **Elevate Science Course 1:** The Earth System, 179-181 Earth's Interior, 280–290 Rocks, 302-309 Cycling of Rocks, 310-315 Plate Tectonics and Earth's Surface, 340–349 Case Study, 350-351 Earthquakes and Tsunami Hazards, 352–362 Volcanoes and Earth's Surface, 364–373 Weathering and Soil, 386-394 Erosion and Deposition, 396-402 Water Erosion, 404-413 Glacial and Wave Erosion, 416-425
Cross Cutting Concepts:	
Stability and change: Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.	**SE/TE:** **Elevate Science Course 1:** System Feedback, 182 Math Toolbox, 183 How Rocks Form, 305-308 The Cycling of Earth's Materials, 311-314

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Grade Level Expectation:	
5. Plate tectonics is the unifying theory that explains movements of rocks at Earth's surface and geological history.	
Evidence Outcomes:	
Students Can:	
Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (MS-ESS2-3) (Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents [including continental shelves], and the locations of ocean structures [such as ridges, fracture zones, and trenches].) (Boundary Statement: Does not include paleomagnetic anomalies in oceanic and continental crust.)	**SE/TE:** **Elevate Science Course 1:** Evidence of Plate Motion, 330-338 It's All Connected, 339 Plate Tectonics and Earth's Surface, 340–349 Case Study, 350-351 Earthquakes and Tsunami Hazards, 352–362 Volcanoes and Earth's Surface, 364–373
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: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 1:** Evidence of Plate Motion, 330-338 It's All Connected, 339 Plate Tectonics and Earth's Surface, 340–349
Connections to the Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence. Science findings are frequently revised and/or reinterpreted based on new evidence.	**SE/TE:** **Elevate Science Course 1:** Evidence of Plate Motion, 330-338
Elaboration on the GLE:	
Students can answer the question: Why do the continents move, and what causes earthquakes and volcanoes?	**SE/TE:** **Elevate Science Course 1:** Plate Tectonics and Earth's Surface, 340–349 Case Study, 350-351 Earthquakes and Tsunami Hazards, 352–362 Volcanoes and Earth's Surface, 364–373

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ESS2:B Plate Tectonics and Large-Scale Systems and Interactions: Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.	**SE/TE:** **Elevate Science Course 1:** Plate Tectonics and Earth's Surface, 340–349 Case Study, 350-351 Earthquakes and Tsunami Hazards, 352–362 Volcanoes and Earth's Surface, 364–373
Cross Cutting Concepts:	
Patterns: Patterns in rates of change and other numerical relationships can provide information about natural systems.	**SE/TE:** **Elevate Science Course 1:** Evidence of Plate Motion, 330-338 Connect It!, 330 It's All Connected, 339 Plate Tectonics and Earth's Surface, 340–349
Grade Level Expectation:	
6. Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	

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Evidence Outcomes:	
Students Can:	
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2) (Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large [such as slow plate motions or the uplift of large mountain ranges] or small [such as rapid landslides or microscopic geochemical reactions], and how many geoscience processes [such as earthquakes, volcanoes, and meteor impacts] usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.)	**SE/TE:** **Elevate Science Course 1:** The Earth System, 179-181 Earth's Interior, 280–290 Rocks, 302-309 Cycling of Rocks, 310-315 Plate Tectonics and Earth's Surface, 340–349 Case Study, 350-351 Earthquakes and Tsunami Hazards, 352–362 Volcanoes and Earth's Surface, 364–373 Weathering and Soil, 386-394 Erosion and Deposition, 396-402 Water Erosion, 404-413 Glacial and Wave Erosion, 416-425
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (MS-ESS2-4) (Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.) (Boundary Statement: Does not include a quantitative understanding of the latent heats of vaporization and fusion.)	**SE/TE:** **Elevate Science Course 1:** Hands-On Lab, 174 Water and Rock Cycles, 179 The Hydrosphere, 198-207 Case Study, 208-209 Topic 5 Review and Assess, 211Topic 5, Review and Assess, Evidence-Based Assessment, 212-213 uDemonstrate Lab, 214-217 Hands-On Lab, 218 Water in the Atmosphere, 230-238 Topic 6 Review and Assessment, 268 uDemonstrate Lab, 272-275

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Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. (MS-ESS2-5) (Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather [defined by temperature, pressure, humidity, precipitation, and wind] at a fixed location to change over time and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students [such as weather maps, diagrams, and visualizations] or obtained through laboratory experiments [such as with condensation].) (Boundary Statement: Does not include recalling the names of cloud types or weather symbols used on weather maps of the reported diagrams from weather stations.)	**SE/TE:** **Elevate Science Course 1:** Essential Question, 219 The Atmosphere Around You, 222-229 Air Masses, 240-247 Predicting Weather Change, 248-254 Career-Meteorologist, 255 Case Study, 266-267 Topic 6 Review and Assess, 268-269 Topic 6 Review and Assess – Evidence-Based Assessment, 270-271
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (MS-ESS2-6) (Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps, and globes, or digital representations.) (Boundary Statement: Does not include the dynamics of the Coriolis effect.)	**SE/TE:** **Elevate Science Course 1:** The Essential Question, 219 The Atmosphere Around You, 222-229 Energy in the Atmosphere, 227-228 Lesson 1, Check, Q6, 229 Global Patterns and Local Weather, 251 **Elevate Science Course 3:** Local and Global Winds, 355-357 Model It!,, 356 Global Wind Patterns, 359 Patterns of Circulation in the Ocean, 362-369

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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 nature 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:** **Elevate Science Course 1:** Evidence of Plate Motions, 330-338 It's All Connected, 339 The Theory of Plate Tectonics, 341-344 Lesson 2 Check Q5, 349 Case Study, 350-351
Develop a model to describe unobservable mechanisms. (Developing and using models) (Personal: Initiative/Self-direction)	**SE/TE:** **Elevate Science Course 1:** Topic 5 Review and Assess Q17, 210-211 Model It!, 237 Lesson 2 Check Q5, 238
Nature of Science: Influence of Science, Engineering, and Technology on Society and the Natural World. Science findings are frequently revised and/or reinterpreted based on new evidence.	**SE/TE:** **Elevate Science Course 1:** Evidence of Plate Motions, 330-338 It's All Connected, 339 The Theory of Plate Tectonics, 341-344 Lesson 2 Check Q5, 349 Case Study, 350-351
Elaboration on the GLE:	
Students can answer the question: How do the properties and movements of water shape Earth's surface and affect its systems?	**SE/TE:** **Elevate Science Course 1:** Weathering and Soil, 386-394 Erosion and Deposition, 396-402 Water Erosion, 404-413 Glacial and Wave Erosion, 416-425

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ESS2:C The Roles of Water in Earth's Surface Processes: The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. Water's movements — both on the land and underground — cause weathering and erosion, which change the land's surface features and create underground formations. Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. Global movements of water and its changes in form are propelled by sunlight and gravity. The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. Because these patterns are so complex, weather can only be predicted probabilistically. The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents.	**SE/TE:** **Elevate Science Course 1:** The Hydrosphere, 198-207 Case Study, 208-209 Water in the Atmosphere, 230-238 Severe Weather and Floods, 256-265 Water Erosion, 404-413 Glacial and Wave Erosion, 416-425 **Elevate Science Course 3:** Local and Global Winds, 355-357 Model It!,, 356 Global Wind Patterns, 359 Patterns of Circulation in the Ocean, 362-369

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Cross Cutting Concepts:	
Scale Proportion and Quantity: Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	**SE/TE:** **Elevate Science Course 1:** Math Toolbox, 346 Case Study, 350-351 Earthquake Potential, Figure 11, 360 Volcano Hazards, 370-371 Weathering Earth's Surface, 388-390 Math Toolbox, 390 Glaciers Change Earth's Surface, 417-421Leson 4 Check 4 Check Q3, 425
Energy and Matter: Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.	**SE/TE:** **Elevate Science Course 1:** The Earth System, 179-181 Energy Flow, 181 The Water Cycle, 199-200 The Cycling of Earth's Materials, 312-314

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Grade Level Expectation:	
7. Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	
Evidence Outcomes:	
Students Can:	
Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. (MS-ESS2-5) (Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather [defined by temperature, pressure, humidity, precipitation, and wind] at a fixed location to change over time and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students [such as weather maps, diagrams, and visualizations] or obtained through laboratory experiments [such as with condensation].) (Boundary Statement: Does not include recalling the names of cloud types or weather symbols used on weather maps of the reported diagrams from weather stations.)	**SE/TE:** **Elevate Science Course 1:** The Essential Question, 219 The Atmosphere Around You, 222-229 Energy in the Atmosphere, 227-228 Lesson 1, Check, Q6, 229 Air Masses, 240-247 Global Patterns and Local Weather, 251 Predicting Weather Change, 248-254 Career-Meteorologist, 255 Case Study, 266-267

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Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (MS-ESS2-6) (Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps, and globes, or digital representations.) (Boundary Statement: Does not include the dynamics of the Coriolis effect.)	**SE/TE:** **Elevate Science Course 1:** Energy in the Atmosphere, 227-228 Global Winds, Figure 6, 228 Predicting Weather Changes, 248-254 Topic 6 Review and Assess, 268-271 **Elevate Science Course 3:** Local and Global Winds, 355-357 Model It!,, 356 Global Wind Patterns, 359 Patterns of Circulation in the Ocean, 362-369
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Develop and use a model to describe phenomena. (Developing and Using Models) (Entrepreneurial: Creativity/Innovation)	**SE/TE:** **Elevate Science Course 1:** Model It!, 225 Model It!237 Lesson 2 Check Q5, 238 Model It!, 245 Lesson 3 Check Q4, 247 Lesson 4 Check Q3, 254
Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.	**SE/TE:** **Elevate Science Course 1:** How to Predict Weather, 249-251 Math Toolbox, 252 Topic 6 Review and Assess – Evidence-Based Assessment, 270-271

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Elaboration on the GLE:	
Students can answer the question: What regulates weather and climate?	**SE/TE:** **Elevate Science Course 1:** Predicting Weather Changes, 248-255 **Elevate Science Course 3:** Energy in Earth's Atmosphere, 342-350 Patterns of Circulation in the Atmosphere, 352-360 Patterns of Circulation in the Ocean, 262-369 Topic 7 Review and Assess, 372-375 Climate Factors, 384-392 Topic 8 Review and Assess, 416
ESS2:D Weather and Climate: The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. Because these patterns are so complex, weather can only be predicted probabilistically. The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents.	**SE/TE:** **Elevate Science Course 1:** The Hydrosphere, 198-207 Case Study, 208-209 Water in the Atmosphere, 230-238 Severe Weather and Floods, 256-265 Water Erosion, 404-413 Glacial and Wave Erosion, 416-425 **Elevate Science Course 3:** Local and Global Winds, 355-357 Model It!,, 356 Global Wind Patterns, 359 Patterns of Circulation in the Ocean, 362-369

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Cross Cutting Concepts:	
Cause and Effect: Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** **Elevate Science Course 1:** Lesson 1 Check Q4, 229 **Elevate Science Course 3:** Lesson 1 Check Q5, 350 Lesson 3 Check Q1, 369 Topic 7 Review and Assess Q8, 372-373 Topic 7 Review and Assess Q5, 375 Connect It!, 406 Cascading Effects of Climate Change, Figure 3, 411 Lesson 3 Check Q3, 414
Systems and System Models: Models can be used to represent systems and their interactions — such as inputs, processes and outputs — and energy, matter, and information flows within systems.	**SE/TE:** **Elevate Science Course 1:** Model It!, 225 Lesson 1 Check Q6, 229 **Elevate Science Course 3:** Model It!, 356 Modeling the Coreolis Effect, Figure 5, 357 Lesson 2 Check Q4, 360 Surface Currents, Figure 2, 364-365 Global Conveyer Belt, Figure 5, 368 Lesson 3 Check Q4, 369 Case Study, 370-371 Topic 7 Review and Assess Q3 & 15, 372-373 Topic 7 Review and Assess – Evidence-Based Assessment Q3, 374-375
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.	

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Grade Level Expectation:	
8. Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	
Evidence Outcomes:	
Students Can:	
Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. (MS-ESS3-1) (Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum [locations of the burial of organic marine sediments and subsequent geologic traps], metal ores [locations of past volcanic and hydrothermal activity associated with subduction zones], and soil locations of active weathering and/or deposition of rock.)	**SE/TE:** **Elevate Science Course 2:** The Essential Question, 286 Nonrenewable Energy Resources, 290-299 Mineral Resources, 308-315 Case Study, 316-317 Water Resources, 318-324 Topic 6 Review and Assess, 326-329 uDemonstrate, 330-333
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: Creativity/Innovation)	**SE/TE:** **Elevate Science Course 2:** The Essential Question, 286 Nonrenewable Energy Resources, 290-299 Mineral Resources, 308-315 Case Study, 316-317 Water Resources, 318-324 Topic 6 Review and Assess, 326-329 uDemonstrate, 330-333

Colorado 2020 Academic Standards for Science, Grades 6-8	Elevate Science 6-8 Integrated ©2019
Elaboration on the GLE:	
Students can answer the question: How do humans depend on Earth's resources?	**SE/TE:** **Elevate Science Course 2:** Nonrenewable Energy Resources, 290-299 Renewable Energy Resources, 300-306 Mineral Resources, 308-315 Case Study, 316-317 Water Resources, 318-324 Topic 6 Review and Assess, 326-329 uDemonstrate, 330-333 Population Growth and Resource Consumption, 338-345 Air Pollution, 346-354 Impacts on Land, 356-367 Water Pollution, 370-378 Topic 7 Review and Assess, 380-383
ESS3:A Natural Resources: Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes.	**SE/TE:** **Elevate Science Course 2:** Nonrenewable Energy Resources, 290-299 Renewable Energy Resources, 300-306 Mineral Resources, 308-315 Case Study, 316-317 Water Resources, 318-324 Topic 6 Review and Assess, 326-329 uDemonstrate, 330-333 Population Growth and Resource Consumption, 338-345 Air Pollution, 346-354 Impacts on Land, 356-367 Water Pollution, 370-378 Topic 7 Review and Assess, 380-383

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Cross Cutting Concepts:	
Cause and effect: Cause - and - effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** **Elevate Science Course 2:** Lesson 2 Check Q4, 354 Connect It!, 356 Plan It!, 359 Lesson 3 Check Q5, 367 Lesson 4 Check Q2, 378 Topic 7 Review and Assess, Q4, 380-381 Topic 7 Review And Assess – Evidence-Based Assessment Q2, 382-383
Grade Level Expectation:	
9. Mapping the history of natural hazards in a region and understanding related geological forces.	
Evidence Outcomes:	
Students Can:	
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-2) (Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes, such as earthquakes and volcanic eruptions, surface processes, such as mass wasting and tsunamis, or severe weather events, such as hurricanes, tornadoes, and floods. Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global, such as satellite systems to monitor hurricanes or forest fires, or local, such as building basements in tornado-prone regions or reservoirs to mitigate droughts.)	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-Ins, and Quest Findings, 220-221,238, 247, 254, 265, 271 Severe Weather and Floods, 256-265 Earthquake and Tsunami Hazards, 352-362 uEngineer It!, 363 Volcano Hazards, 370-372 Question It!, 372 Topic 8 Review and Assess – Evidence-Based Assessment, 376-377 Math Toolbox, 399 Career, 403 uDemonstrate Lab, 430-433

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Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Analyze and interpret data to determine similarities and differences in findings. (Analyzing and Interpreting Data) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 1:** Hands-On Lab, 261 Case Study, 266-267 Topic 6 Review and Assess, 270-271 Hands-On Lab, 357 Math Toolbox, 359 Math Toolbox, 371 Lesson 4 Check Q4, 373 Math Toolbox, 398-399 Lesson 2 Check Q5, 402
Elaboration on the GLE:	
Students can answer the question: How do natural hazards affect individuals and societies?	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-Ins, and Quest Findings, 220-221,238, 247, 254, 265, 271 Severe Weather and Floods, 256-265 Earthquake and Tsunami Hazards, 352-362 uEngineer It!, 363 Volcano Hazards, 370-372 Question It!, 372 Topic 8 Review and Assess – Evidence-Based Assessment, 376-377 Math Toolbox, 399 Career, 403 uDemonstrate Lab, 430-433

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ESS3:B Natural Hazards: Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events.	**SE/TE:** **Elevate Science Course 1:** Quest Kickoff and Quest Check-Ins, and Quest Findings, 220-221,238, 247, 254, 265, 271 Storm Safety, Figure 8, 264 Case Study, 266-267 Earthquake Potential, Figure 11, 360 Predicting Volcano Hazards, 372 Question It!, 372 Topic 8 Review and Assess – Evidence-Based Assessment, 376-377 Math Toolbox, 399 uDemonstrate Lab, 430-433
Cross Cutting Concepts:	
Patterns: Graphs, charts, and images can be used to identify patterns in data.	**SE/TE:** **Elevate Science Course 1:** Math Toolbox, 224 Model It!, 225 Model It!, 245 Math Toolbox, 252 Topic 6 Review and Assess, 270-271
Influence of Science, Engineering, and Technology on Society and the Natural World: The uses 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:** **Elevate Science Course 1:** Measuring Air Pressure, 225 P & S Waves, Figure 7, 357 Seismogram, Figure 8, 358 Volcano Hazards, 370-372 uEngineer It!, 395

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Grade Level Expectation:	
10. Human activities have altered the biosphere, sometimes damaging it, although changes to environments can have different impacts for different living things.	
Evidence Outcomes:	
Students Can:	
Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (MS-ESS3-3) (Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage, such as the withdrawal of water from streams and aquifers or the construction of dams and levees; land usage, such as urban development, agriculture, or the removal of wetlands; and pollution, such as of the air, water, or land.)	**SE/TE:** **Elevate Science Course 2:** Quest Kick-Off, Quest Check-Ins, and Quest Findings, 138-139, 158, 168, 179, 185 uEngineer It!, 277 uEngineer It!, 307 Interactivity, 345 Global to Local, 355
Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. (MS-ESS3-4) (Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources [such as freshwater, mineral, and energy]. Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.)	**SE/TE:** **Elevate Science Course 2:** Topic 6 Review and Assess Q5 & 17, 326-327 Lesson 1 Check Q3, 345 Lesson 2 Check Q5, 354 Lesson 3 Check Q3, 367 Case Study, 368-369 Plan It!, 377 Lesson 4 Check Q5, 378 Topic 7 Review and Assess Q16 & 18, 380-381

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Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Apply scientific principles to design an object, tool, process or system. (Constructing Explanations and Designing Solutions) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 2:** Quest Kick-Off, Quest Check-Ins, and Quest Findings, 138-139, 158, 168, 179, 185 uEngineer It!, 277 uEngineer It!, 307 Interactivity, 345 Global to Local, 355
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. (Engaging in Argument from Evidence) (Entrepreneurial: Critical thinking/Problem solving)	**SE/TE:** **Elevate Science Course 2:** Topic 6 Review and Assess Q5 & 17, 326-327 Lesson 1 Check Q3, 345 Lesson 2 Check Q5, 354 Lesson 3 Check Q3, 367 Case Study, 368-369 Plan It!, 377 Lesson 4 Check Q5, 378 Topic 7 Review and Assess Q16 & 18, 380-381
Elaboration on the GLE:	
Students can answer the question: How do humans change the planet?	**SE/TE:** **Elevate Science Course 2:** Essential Question, 335 Population Growth and Resource Consumption, 338-345 Air Pollution, 346-354 Impacts on Land, 356-367 Water Pollution, 370-378

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ESS3.C Human Impacts on Earth Systems: Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.	**SE/TE:** **Elevate Science Course 2:** The Essential Question, 335 Quest Kickoff, Quest Check-Ins and Quest Findings, 336-337, 345,354, 367, 378, 383 Hands-On Lab, 339 Hands-On Lab, 342 Question It!, 342 Math Toolbox, 352 uDemonstrate Lab, 384-387
Cross Cutting Concepts:	
Cause and Effect: Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** **Elevate Science Course 2:** Lesson 2 Check Q4, 354 Lesson 3 Check Q5, 367 Lesson 4 Check Q2, 378 Topic 7 Review and Assess Q4, 380-381 Topic 7 Review and Assess – Evidence-Based Assessment Q2, 382-383
Influence of Science, Engineering, and Technology on Society and the Natural World:-All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.-The uses 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:** **Elevate Science Course 2:** uDemonstrate, 330-333 Harvesting Timber, Figure 4, 344 Quest Connection, 356 Land as a Resource, 357-358 Land Use, Figure 2, 358 Topic 7 Review and Assess, 380-381 **Elevate Science Course 1:** uDemonstrate Lab, 38-41 **Elevate Science Course 3:** Quest Kickoff, 118-119, 127, 137, 148, 158, 163 Quest Kickoff, 382-383, 392, 403, 414, 419

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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:** **Elevate Science Course 2:** Nonrenewable Energy Resources, 290-299 Renewable Energy Resources300-306 Mineral Resources, 308-315 Water Resources, 316-324
Grade Level Expectation:	
11. Human activities affect global warming. Decisions to reduce the impact of global warming depend on understanding climate science, engineering capabilities, and social dynamics.	
Evidence Outcomes:	
Students Can:	
Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. (MS-ESS3-5) (Clarification Statement: Examples of factors include human activities [such as fossil fuel combustion, cement production, and agricultural activity] and natural processes [such as changes in incoming solar radiation or volcanic activity]. Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities play in causing the rise in global temperatures.)	**SE/TE:** **Elevate Science Course 3:** Lesson 2 Check Q5, 403 Topic 8 Review and Assess – Evidence-Based Assessment Q2, 418-419
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
Ask questions to identify and clarify evidence of an argument (Asking Questions and Defining Problems) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** **Elevate Science Course 3:** Lesson 3 Check Q6, 414 Topic 8 Review and Assess – Evidence-Based Assessment Q4, 418-419 uDemonstrate Lab, 420-423

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Elaboration on the GLE:	
Students can answer the question: How do people model and predict the effects of human activities on Earth's climate?	**SE/TE:** **Elevate Science Course 3:** Math Toolbox, 398 Global Temperature Change, Figure 4, 399 Human Activities, 400-402 Carbon Dioxide Concentrations, Figure 6, 402 Topic 8 Review and Assess – Evidence-Based Assessment, 418-419
ESS3:D Global Climate Change: Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.	**SE/TE:** **Elevate Science Course 3:** Climate Factors, 384-392 Math Toolbox, 398 Climate Change, 394-403 Global Temperature Change, Figure 4, 399 Human Activities, 400-402 Carbon Dioxide Concentrations, Figure 6, 402 Effects of Climate Change, 406-414 Topic 8 Review and Assess – Evidence-Based Assessment, 418-419
Cross Cutting Concepts:	
Stability and Change: Stability might be disturbed either by sudden events or gradual changes that accumulate over time.	**SE/TE:** **Elevate Science Course 3:** World Climates, 390 Extraordinary Science, 393 Model It!, 396 Math Toolbox, 398 Global Temperature Change, Figure 4, 399 Carbon Dioxide Concentrations, Figure 6, 402 Rising Sea Levels, 408 Math Toolbox, 409 Extreme Weather Change, 410 Cascading Effects of Climate Change, Figure 3, 411