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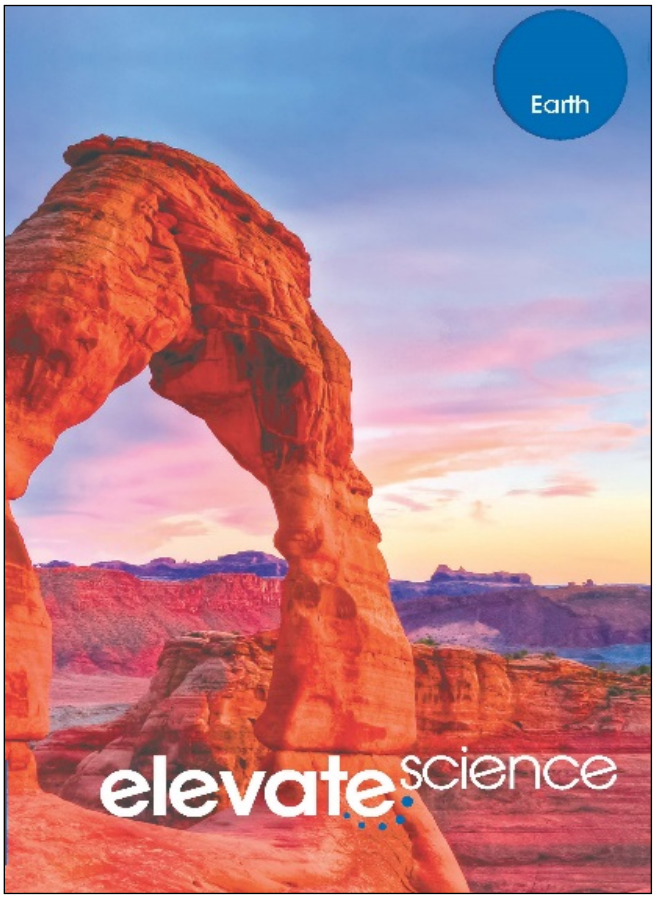

To the

Colorado
Academic Standards for Science 2020
Middle School Earth & Space Science

Prepared by Savvas Learning Company, formerly Pearson K12 Learning.

A Correlation of Elevate Science: Earth ©2019 to the Colorado Academic Standards for Science 2020 Middle School Earth & Space Science

Introduction

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

Elevate Science Middle Grades – where exploration is the heart of science! Designed to address the rigors of new science standards, students will experience science up close and personal, using real-world, relevant phenomena to solve project-based problems. Our newest program prepares students for the challenges of tomorrow, building strong reasoning skills and critical thinking strategies as they engage in explorations, formulate claims, and gather and analyze data that promote evidence-based arguments. The blended print and digital curriculum covers all Next Generation Science Standards at every grade level.

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

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

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

Innovate learning by focusing on 21st century skills.
Students are encouraged to think, collaborate, and innovate! With ***Elevate Science***, students explore STEM careers, experience engineering activities, and discover our scientific and technological world. The content, strategies, and resources of Elevate Science equip the science classroom for scientific inquiry and science and engineering practices.

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

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

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

Designed for today's classroom, preparing students for tomorrow's world. ***Elevate Science*** promises to:

- Elevate thinking.
- Elevate learning.
- Elevate teaching.

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Grade Level Expectations:

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** Earth's Movements in Space, 504-512 Phases and Eclipses, 514-522 Topic 11 Review and Assess Q7-19, 524-525 Topic 11 Review and Assess – Evidence-Based Assessment, 526-527 uDemonstrate Lab, 528-531
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:** Gravity and Orbits, 509-511 Solar System Formation, 546 Topic 12 Review and Assess – Evidence-Based Assessment, 582-583 **Engineering Design Notebook:** Mars or Bust (digital)
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:** Design It!, 442, Model It!, 519 Topic 11 Review and Assess Q19, 525 Topic 11 Review and Assess – Evidence-Based Assessment, 526-527
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Students can answer the question: What is the universe, and what goes on in stars?	**SE/TE:** Comparing the Sun and Planets, 539-540 Structure of the Sun, 541-542 Features of the Sun, 543 Stars, 560-569 The Universe, 574-575 Understanding the Universe, 576-577

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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:** Stars, 560-569 Movement in Space 492-501 Extraordinary Science, 579
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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:** Gravity and Orbits, 509-511 Solar System Formation, 546 Topic 12 Review and Assess – Evidence-Based Assessment, 582-583
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:** Math Toolbox, 538 The Solar System, Figure 7, 544-545
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:** Design It!, 506 The Seasons, 507-508 The Appearance of the Moon, 515-518 Model It!, 519 uDemonstrate Lab, 528-531

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** Design It!, 506 The Seasons, 507-508 The Appearance of the Moon, 515-518 Model It!, 519 uDemonstrate Lab, 528-531
Analyze and interpret data to determine similarities and differences in findings. (Analyze and Interpret Data) (Entrepreneurial: Inquiry/Analysis)	**SE/TE:** Math Toolbox, 538 The Solar System, Figure 7, 544-545 Topic 12 Review and Assess – Evidence-Based Assessment, 582-583
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:** Earth's Movement in Space, 504-512
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:** Earth's Movements in Space, 504-512 Phases and Eclipses, 514-522 Topic 11 Review and Assess Q7-19, 524-525 Topic 11 Review and Assess – Evidence-Based Assessment, 526-527 uDemonstrate Lab, 528-531 Understanding the Solar System, 537-540 The Solar System, Figure 7, 544-545 Case Study, 548-549
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Patterns: Patterns can be used to identify cause-and-effect relationships.	**SE/TE:** Lesson 2 Check Q2, 512 Topic 11 Review and Assess Q6&11, 524-525 Topic 11 Review and Assess – Evidence-Based Assessment, 526-527 uDemonstrate Lab, 528-529
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:** Math Toolbox, 538 The Solar System, Figure 7, 544-545 UDemonstrate Lab, 584-587

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Modeling: Models can be used to represent systems and their interactions.	**SE/TE:** Design It!, 506 The Seasons, 507-508 The Appearance of the Moon, 515-518 Model It!, 519 uDemonstrate Lab, 528-531
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Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.	**SE/TE:** Motions of the Moon, 516 Eclipses, 519 Math Toolbox, 520 Topic 9 Review and Assess, 524-525

Colorado Academic Standards for Science **Middle School Earth & Space Science**	**Elevate Science** **Earth, ©2019**
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.	
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:** The Essential Question, 363 Determining the Age of Rocks, 366-373 Case Study, 374-375 Geologic Time Scale, 376-382 Major Events in Earth's History, 384-392
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:** Determining the Age of Rocks, 366-373 Case Study, 374-375 Geologic Time Scale, 376-382 uDemonstrate Lab, 398-401

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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:** Determining the Age of Rocks, 366-373 Case Study, 374-375 Geologic Time Scale, 376-382 Major Events in Earth's History, 384-392 Topic 8 Review and Assess, 394-395
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:** The Essential Question, 363 Determining the Age of Rocks, 366-373 Case Study, 374-375 Geologic Time Scale, 376-382 Major Events in Earth's History, 384-392 Topic 8 Review and Assess, 394-395
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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 large or too small.	**SE/TE:** Model It!, 369 Math Toolbox, 372 The Geologic Time Scale, Figure 2, 378-379 How Scientists Organize Earth's History, Figure 5, 391
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:** The Essential Question, 1 Matter and Energy in Earth's System 4-10 The Earth System, 5-7 System Feedback, 8-9 Model It!, 8 Global to Local, 11 Topic 1 Review and Assessment, 36-37 The Cycling of Earth's Material, 137-140 Earth's Interior, 106–116 uEngineer It, 117 Rocks, 128-135 Cycling of Rocks, 136-141 Topic 3 Review and Access, 144-145

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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:** Plate Tectonics and Earth's Surface, 166–175 Case Study, 176-177 Earthquakes and Tsunami Hazards, 178–188 Volcanoes and Earth's Surface, 190–199 Topic 4 Review and Assess, 200-201 Topic 4 Review and Assess – Evidence-Based Assessment, 202-203 uDemonstrate Lab, 204-207 Weathering and Soil, 2220 Erosion and Deposition, 222-228 Water Erosion, 230-239 Glacial and Wave Erosion, 242-251 uDemonstrate Lab, 256-259
Academic Context and Connections	
Colorado Essential Skills and Science and Engineering Practices:	
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Elaboration on the GLE:	
Students can answer the question: How do Earth's major systems interact?	**SE/TE:** Earth's Spheres, 6-7 Earth's Spheres, Figure 2, 6-7
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:** The Earth System, 5-7 Earth's Interior, 106–116 Rocks, 128-135 Cycling of Rocks, 136-141 Plate Tectonics and Earth's Surface, 166–175 Case Study, 176-177 Earthquakes and Tsunami Hazards, 178–188 Volcanoes and Earth's Surface, 190–199 Weathering and Soil, 2220 Erosion and Deposition, 222-228 Water Erosion, 230-239 Glacial and Wave Erosion, 242-251

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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:** System Feedback, 8 Math Toolbox, 9 How Rocks Form, 131-134 The Cycling of Earth's Materials, 137-140
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:** Evidence of Plate Motion, 156-164 It's All Connected, 165 Plate Tectonics and Earth's Surface, 166–175 Case Study, 176-177 Earthquakes and Tsunami Hazards, 178–188 Volcanoes and Earth's Surface, 190–199
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:** Evidence of Plate Motion, 156-164 It's All Connected, 165 Plate Tectonics and Earth's Surface, 166–175
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:** Evidence of Plate Motion, 156-164
Elaboration on the GLE:	
Students can answer the question: Why do the continents move, and what causes earthquakes and volcanoes?	**SE/TE:** Plate Tectonics and Earth's Surface, 166–175 Case Study, 176-177 Earthquakes and Tsunami Hazards, 178–188 Volcanoes and Earth's Surface, 190–199

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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:** Plate Tectonics and Earth's Surface, 166–175 Case Study, 176-177 Earthquakes and Tsunami Hazards, 178–188 Volcanoes and Earth's Surface, 190–199
Cross Cutting Concepts:	
Patterns: Patterns in rates of change and other numerical relationships can provide information about natural systems.	**SE/TE:** Evidence of Plate Motion, 156-164 Connect It!, 156 It's All Connected, 165 Plate Tectonics and Earth's Surface, 166–175
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.	
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:** The Earth System, 5-7 Earth's Interior, 106–116 Rocks, 128-135 Cycling of Rocks, 136-141 Plate Tectonics and Earth's Surface, 166–175 Case Study, 176-177 Earthquakes and Tsunami Hazards, 178–188 Volcanoes and Earth's Surface, 190–199 Weathering and Soil, 2220 Erosion and Deposition, 222-228 Water Erosion, 230-239 Glacial and Wave Erosion, 242-251

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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:** Water and Rock Cycles, 5 The Hydrosphere, 24-33 Case Study, 34-35 Topic 1 Review and Assess, 37 Topic 1, Review and Assess, Evidence-Based Assessment, 38-39 uDemonstrate Lab, 40-43 Hands-On Lab, 44 Water in the Atmosphere, 56-64 Topic 2 Review and Assessment, 94 uDemonstrate Lab, 98-101
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:** Essential Question, 45 The Atmosphere Around You, 48-55 Air Masses, 66-73 Predicting Weather Change, 74-80 Career-Meteorologist, 81 Case Study, 92-93 Topic 2 Review and Assess, 94-95 Topic 2 Review and Assess – Evidence-Based Assessment, 96-97 **Digital Activities & Labs:** History of Hazardous, Tracking Weather
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:** The Essential Question, 45 The Atmosphere Around You, 48-55 Energy in the Atmosphere, 53-54 Lesson 1, Check, Q6, 55 Global Patterns and Local Weather, 77 Local and Global Winds, 419-421 Model It!, 420 Global Wind Patterns, 423 Patterns of Circulation in the Ocean, 426-433

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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:** Evidence of Plate Motions, 156-164 It's All Connected, 165 The Theory of Plate Tectonics, 167-170 Lesson 2 Check Q5, 175 Case Study, 176-177
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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:** Evidence of Plate Motions, 156-164 It's All Connected, 165 The Theory of Plate Tectonics, 167-170 Lesson 2 Check Q5, 175 Case Study, 176-177
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:** Weathering and Soil, 2220 Erosion and Deposition, 222-228 Water Erosion, 230-239 Glacial and Wave Erosion, 242-251

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** The Hydrosphere, 24-33 Case Study, 34-35 Water in the Atmosphere, 56-64 Severe Weather and Floods, 82-91 Water Erosion, 230-413 Glacial and Wave Erosion, 416-239 Local and Global Winds, 419-421 Model It!, 420 Global Wind Patterns, 423 Patterns of Circulation in the Ocean, 426-433

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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:** Math Toolbox, 172 Case Study, 176-177 Earthquake Potential, Figure 11, 186 Volcano Hazards, 196-197 Weathering Earth's Surface, 214-216 Math Toolbox, 216 Glaciers Change Earth's Surface, 243-247 Lesson 4 Check 4 Check Q3, 251
Energy and Matter: Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.	**SE/TE:** The Earth System, 5-7 Energy Flow, 7 The Water Cycle, 25-26 The Cycling of Earth's Materials, 138-140
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:** The Essential Question, 45 The Atmosphere Around You, 48-55 Energy in the Atmosphere, 53-54 Lesson 1, Check, Q6, 55 Air Masses, 66-73 Global Patterns and Local Weather, 77 Predicting Weather Change, 74-80 Career-Meteorologist, 81 Case Study, 92-93

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** Energy in the Atmosphere, 53-54 Global Winds, Figure 6, 54 Predicting Weather Changes, 74-80 Topic 2 Review and Assess, 94-97 Local and Global Winds, 419-421 Model It!, 420 Global Wind Patterns, 423 Patterns of Circulation in the Ocean, 426-433
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:** Model It!, 51 Model It! 63 Lesson 2 Check Q5, 64 Model It!, 71 Lesson 3 Check Q4, 73 Lesson 4 Check Q3, 80
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:** How to Predict Weather, 75-77 Math Toolbox, 78 Topic 2 Review and Assess – Evidence-Based Assessment, 96-97
Elaboration on the GLE:	
Students can answer the question: What regulates weather and climate?	**SE/TE:** Predicting Weather Changes, 74-81 Energy in Earth's Atmosphere, 406-414 Patterns of Circulation in the Atmosphere, 416-424 Patterns of Circulation in the Ocean, 426-433 Topic 9 Review and Assess, 436-439 Climate Factors, 448-456 Topic 10 Review and Assess, 480

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** The Hydrosphere, 24-33 Case Study, 34-35 Water in the Atmosphere, 56-64 Severe Weather and Floods, 82-91 Water Erosion, 230-239 Glacial and Wave Erosion, 242-251 Local and Global Winds, 419-421 Model It!, 420 Global Wind Patterns, 423 Patterns of Circulation in the Ocean, 426-433
Cross Cutting Concepts:	
Cause and Effect: Cause and effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** Lesson 1 Check Q5, 414 Lesson 3 Check Q1, 433 Topic 9 Review and Assess Q8, 436-437 Topic 9 Review and Assess Q5, 439 Connect It!, 470 Cascading Effects of Climate Change, Figure 3, 475 Lesson 3 Check Q3, 478
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:** Model It!, 51 Lesson 1 Check Q6, 55 Model It!, 420 Modeling the Coreolis Effect, Figure 5, 421 Lesson 2 Check Q4, 424 Surface Currents, Figure 2, 428-429 Global Conveyer Belt, Figure 5, 432 Lesson 3 Check Q4, 433 Case Study, 434-435 Topic 9 Review and Assess Q3 & 15, 436-437 Topic 9 Review and Assess – Evidence-Based Assessment Q3, 438-439

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
Prepared Graduates:	
11. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.	
Grade Level Expectation:	
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:** The Essential Question, 260 Nonrenewable Energy Resources, 264-273 Mineral Resources, 282-289 Case Study, 290-291 Water Resources, 292-298 Topic 6 Review and Assess, 300-303 uDemonstrate, 304-307
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:** The Essential Question, 260 Nonrenewable Energy Resources, 264-273 Mineral Resources, 282-289 Case Study, 290-291 Water Resources, 292-298 Topic 6 Review and Assess, 300-303 uDemonstrate, 304-307

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
Elaboration on the GLE:	
Students can answer the question: How do humans depend on Earth's resources?	**SE/TE:** Nonrenewable Energy Resources, 264-273 Renewable Energy Resources, 274-280 Mineral Resources, 282-289 Case Study, 290-291 Water Resources, 292-298 Topic 6 Review and Assess, 300-303 uDemonstrate, 304-307 Population Growth and Resource Consumption, 319 Air Pollution, 320-328 Impacts on Land, 330-341 Water Pollution, 344-352 Topic 7 Review and Assess, 354-357
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:** Nonrenewable Energy Resources, 264-273 Renewable Energy Resources, 274-280 Mineral Resources, 282-289 Case Study, 290-291 Water Resources, 292-298 Topic 6 Review and Assess, 300-303 uDemonstrate, 304-307 Population Growth and Resource Consumption, 3319 Air Pollution, 320-328 Impacts on Land, 330-341 Water Pollution, 344-352 Topic 7 Review and Assess, 354-357
Cross Cutting Concepts:	
Cause and effect: Cause - and - effect relationships may be used to predict phenomena in natural or designed systems.	**SE/TE:** Lesson 2 Check Q4, 328 Connect It!, 330 Plan It!, 333 Lesson 3 Check Q5, 341 Lesson 4 Check Q2, 352 Topic 7 Review and Assess, Q4, 354-355 Topic 7 Review And Assess – Evidence-Based Assessment Q2, 356-357

Colorado Academic Standards for Science **Middle School Earth & Space Science**	**Elevate Science** **Earth, ©2019**
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:** Topic 2 Quest: Preparing a Plan, 46-47, 64, 73, 80, 91, 97 Severe Weather and Floods, 82-91 Earthquake and Tsunami Hazards, 178-188 uEngineer It!, 189 Volcano Hazards, 196-198 Question It!, 198 Topic 4 Review and Assess – Evidence-Based Assessment, 202-203 Math Toolbox, 225 Career, 229 uDemonstrate Lab, 256-259
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:** Hands-On Lab, 87 Case Study, 92-93 Topic 2 Review and Assess, 96-97 Hands-On Lab, 183 Math Toolbox, 185 Math Toolbox, 197 Lesson 4 Check Q4, 199 Math Toolbox, 224-225 Lesson 2 Check Q5, 228

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
Elaboration on the GLE:	
Students can answer the question: How do natural hazards affect individuals and societies?	**SE/TE:** Topic 2 Quest: Preparing a Plan, 46-47, 64, 73, 80, 91, 97 Severe Weather and Floods, 82-91 Earthquake and Tsunami Hazards, 178-188 uEngineer It!, 189 Volcano Hazards, 196-198 Question It!, 198 Topic 4 Review and Assess – Evidence-Based Assessment, 202-203 Math Toolbox, 225 Career, 229 uDemonstrate Lab, 256-433
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:** Topic 2 Quest: Preparing a Plan, 46-47, 64, 73, 80, 91, 97 Storm Safety, Figure 8, 90 Case Study, 92-93 Earthquake Potential, Figure 11, 186 Predicting Volcano Hazards, 198 Question It!, 198 Topic 4 Review and Assess – Evidence-Based Assessment, 202-203 Math Toolbox, 225 uDemonstrate Lab, 256-259
Cross Cutting Concepts:	
Patterns: Graphs, charts, and images can be used to identify patterns in data.	**SE/TE:** Math Toolbox, 50 Model It!, 51 Model It!, 71 Math Toolbox, 78 Topic 2 Review and Assess, 96-97
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:** Measuring Air Pressure, 51 P & S Waves, Figure 7, 183 Seismogram, Figure 8, 184 Volcano Hazards, 196-198 uEngineer It!, 221

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** Lesson 1 Check Q3, 319 Lesson 2 Check Q5, 328 Lesson 3 Check Q3, 341 Case Study, 342-343 Plan It!, 351 Lesson 4 Check Q5, 352 Topic 7 Review and Assess Q16 & 18, 354-355
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:** Topic 6 Review and Assess Q5 & 17, 300-301 Lesson 1 Check Q3, 319 Lesson 2 Check Q5, 328 Lesson 3 Check Q3, 341 Case Study, 342-343 Plan It!, 351 Lesson 4 Check Q5, 352 Topic 7 Review and Assess Q16 & 18, 354-355
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:** Topic 7 Review and Assess Q16 & 18, 354-355

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** Topic 6 Review and Assess Q5 & 17, 300-301 Lesson 1 Check Q3, 319 Lesson 2 Check Q5, 328 Lesson 3 Check Q3, 341 Case Study, 342-343 Plan It!, 351 Lesson 4 Check Q5, 352 Topic 7 Review and Assess Q16 & 18, 354-355
Elaboration on the GLE:	
Students can answer the question: How do humans change the planet?	**SE/TE:** Essential Question, 309 Population Growth and Resource Consumption, 3319 Air Pollution, 320-328 Impacts on Land, 330-341 Water Pollution, 344-352
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:** The Essential Question, 309 Topic 7 Quest: Trash Backlash, 319, 328, 341, 352, 357 Hands-On Lab, 313 Hands-On Lab, 316 Question It!, 316 Math Toolbox, 326 uDemonstrate Lab, 358-361
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:** Lesson 2 Check Q4, 328 Lesson 3 Check Q5, 341 Lesson 4 Check Q2, 352 Topic 7 Review and Assess Q4, 354-355 Topic 7 Review and Assess – Evidence-Based Assessment Q2, 356-357

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** uDemonstrate, 304-307 Harvesting Timber, Figure 4, 318 Quest Connection, 330 Land as a Resource, 331-332 Land Use, Figure 2, 332 Topic 7 Review and Assess, 354-355 uDemonstrate Lab, 38-41
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:** Nonrenewable Energy Resources, 264-273 Renewable Energy Resources, 274-280 Mineral Resources, 282-289 Water Resources, 290-298
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:** Lesson 2 Check Q5, 467 Topic 10 Review and Assess – Evidence-Based Assessment Q2, 482-483

Colorado Academic Standards for Science Middle School Earth & Space Science	Elevate Science Earth, ©2019
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:** Lesson 3 Check Q6, 478 Topic 10 Review and Assess – Evidence-Based 10-Assessment Q4, 482-483 uDemonstrate Lab, 484-487
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:** Math Toolbox, 462 Global Temperature Change, Figure 4, 463 Human Activities, 464-466 Carbon Dioxide Concentrations, Figure 6, 466 Topic 10 Review and Assess – Evidence-Based Assessment, 482-483
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:** Climate Factors, 448-456 Math Toolbox, 462 Climate Change, 458-467 Global Temperature Change, Figure 4, 463 Human Activities, 464-466 Carbon Dioxide Concentrations, Figure 6, 466 Effects of Climate Change, 470-478 Topic 10 Review and Assess – Evidence-Based Assessment, 482-483
Cross Cutting Concepts:	
Stability and Change: Stability might be disturbed either by sudden events or gradual changes that accumulate over time.	**SE/TE:** World Climates, 454 Extraordinary Science, 457 Model It!, 460 Math Toolbox, 462 Global Temperature Change, Figure 4, 463 Carbon Dioxide Concentrations, Figure 6, 466 Rising Sea Levels, 472 Math Toolbox, 473 Extreme Weather Change, 474 Cascading Effects of Climate Change, Figure 3, 475