Science 7

Curriculum/Content Area: Science	**Course Length:** 1 year
Course Title: Science 7	**Date last reviewed:** September 2017
Prerequisites: None	**Board approval date:** December 5, 2017
Primary Resource: TCI	

Desired Results

Course description and purpose:
The emphasis of the seventh grade science program is the presentation of scientific skills and content as they relate to the students' experiences. The units of study are divided into earth science, physics, cells, and energy flow while incorporating the engineering and design process and inquiry throughout each unit.

Enduring Understandings:	**Essential Questions**:
1. **Patterns:** Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. (P)	1. How do patterns in nature guide organization and affect relationships?
2. **Cause and Effect:** Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. (C&E)	2. To what extent can understanding cause and effect help us solve problems and make decisions?
3. **Scale, Proportion, and Quantity:** In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. (SP&Q)	3. How do proportional relationships between quantities and scales affect how we analyze the phenomena?
4. **Systems and System Models:** A system is an organized group of related objects or components; models can be used for understanding and predicting	4. How do models and systems communicate and predict behavior of phenomena?

the behavior of systems. (S&SM) 5. **Energy and Matter:** Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior. (E&M)	5. How does the flow of energy and matter help explain a system's behavior?
6. **Structure and Function:** The way an object is shaped or structured determines many of its properties and functions. (S&F)	6. How does structure impact function and/or properties in living and nonliving in things?
7. **Stability and Change:** For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand. (S&C)	7. How do conditions affect stability and factors that control rate of change determine the functioning of a system?

Priority Standards (Science and Engineering Practices)
1 Asking Question and Defining Problems - A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works and which can be empirically tested. **2 Developing and Using Models -** A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations **3 Planning and Carrying Out Investigations -** Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. **4 Analyzing and Interpreting Data -** Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis. **5 Using Mathematical and Computational Thinking -** In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; statistically analyzing data; and recognizing, expressing, and applying quantitative relationships.

6 Constructing Explanations and Designing Solutions - The products of science are explanations and the products of engineering are solutions.
7 Engage in Argument from Evidence - Argumentation is the process by which explanations and solutions are reached.
8 Obtaining, Evaluating and Communicating, Information - Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity.

Cells

Essential Questions:

1. How does structure impact function and/or properties in living and nonliving in things?
2. How do proportional relationships between quantities and scales affect how we analyze the phenomena?

Standards:

Cross-Cutting Concepts:
1. **Scale, Proportion, and Quantity** - Phenomena that can be observed at one scale may not be observable at another scale.
2. **Structure and Function** - The way an object is shaped or structured determines many of its properties and functions.

Science and Engineering Practices:
1. **S&EP #1A Asking Questions**
2. **S&EP #2 Developing and Using Models**
3. **S&EP #3 Planning and Carrying Out Investigations**

Disciplinary Core Ideas:
1. **LS1.A.1: 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).
2. **LS1.A.3: Structure and Function** - Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.

WI Standards for Literacy in All Subjects:
1. **WHST.6-8.1** Write arguments focused on discipline content. (MS-LS1-3)
2. **WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-LS1-1)

Learning Targets:
1. I 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. (DCI - LS1A.1; S&EP - #1 & #3; CCC - S, P&Q, S&F) 2. I can develop and use a model to describe the function of a cell as a whole. (DCI - LS1A.3; S&EP - #2; CCC - S&F) 3. I can describe ways parts (nucleus, chloroplasts, mitochondria, cell membrane, cell wall) of cells contribute to the function of the whole cell. (DCI - LS1A.3; S&EP - #1 & #3; CCC - S&F)

Assessment Evidence:	
Performance Assessment Options *May include, but are not limited to the following:* 1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (LS1A.1, Planning and Carrying out Investigations, Scale, Proportion, & Quantity, Structure & Function) [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.] 2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (LS1A.3, Models, Structure Function) [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.] [*Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.*]	**Other assessment options** *May include, but are not limited to the following:*

Digital Tools & Supplementary Resources:
DCI Progressions Documents **Science and Engineering Practices Progressions Documents** **CCC Matrix** Phenomenon

[Example Phenomenon]

Energy Flow
Essential Questions: 1. To what extent can understanding cause and effect help us solve problems and make decisions? 2. How does the flow of energy and matter help explain a system's behavior?
Standards:
<u>Cross-Cutting Concepts:</u> 1. **Cause and Effect:** Phenomena may have more than one cause and some cause and effect relationships in systems can only be described using probability. Cause and Effect Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. 2. **Energy and Matter:** Within a natural system, the transfer of energy drives the motion and/or cycling of matter. **<u>Science and Engineering Practices:</u>** **1. S&EP #1A** Asking Questions **2. S&EP #1B** Defining Problems **3. S&EP #6A-** Constructing Explanations **4. S&EP #6B -** Designing Solutions **<u>Disciplinary Core Ideas:</u>** **1. LS1.B Growth and Development of Organisms** a. Genetic factors as well as local conditions affect the growth of the adult plant. **2. LS1.C Organization for Matter and Energy Flow in Organisms** a. 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. **3. PS3.D Energy in Chemical Processes and Everyday Life** a. 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 oxygen. **4. ESS3.C Human Impacts on Earth Systems** a. 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. b. Typically as human populations and per-capita consumption of natural resources, so do the negative impacts on Earth unless the activities and

technologies involved are engineered otherwise.

5. **ETS1.A: Defining and Delimiting Engineering Problems**
    a. The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.
6. **ETS1.B: Developing Possible Solutions**
    a. A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.
    b. There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
    c. Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.
    d. Models of all kinds are important for testing solution.

WI Standards for Literacy in All Subjects:

1. **RST.6-8.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. (MS-LS3-1),(MS-LS3-2)
2. **RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS3-1),(MS-LS3-2)

Learning Targets:

1. I can explain the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. (DCI LS1-6; S&EP #6; CCC- M&E)
2. I can develop a model to describe how atoms are rearranged through chemical reactions in living organisms forming new molecules that support growth and/or release energy as this matter moves through an organism. (DCI LS1.C & PS3.D; S&EP #2; CCC -E&M)
3. I can use the engineering design process to create a method for monitoring and minimizing human impact on the environment. (DCI ESS3.C; ETS1.A; ETS1.B; S&EP 1A, 1B, #3 & #6B; CCC- C&E)

Assessment Evidence:

Performance Assessment Options	Other assessment options
May include, but are not limited to the following: 1. MS-LS1-6.Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy Energy and Matter Within a natural system, the transfer of energy drives the motion and/or cycling of matter. into and out of organisms. [Clarification Statement: Emphasis is on	*May include, but are not limited to the following:*

tracing movement of matter and flow of energy.] [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.] 2. Develop a model to describe how atoms are rearranged through chemical reactions in living organisms forming new molecules that support growth and/or release energy as this matter moves through an organism. [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.] [Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.] 3. MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* [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).]	
Digital Tools & Supplementary Resources:	
DCI Progressions Documents **Science and Engineering Practices Progressions Documents** **CCC Matrix** Phenomenon Example Phenomenon	

Physics: Forces, Motion, & Energy and Interactions
Essential Questions: 1. How do models and systems communicate and predict behavior of phenomena? 2. How do conditions that affect stability and factors that control rate of change determine the functioning of a system? 3. How does the flow of energy and matter help explain a system's behavior?
Standards:
Cross-Cutting Concepts: 1. **System 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.

2. **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.
3. **Energy and Matter-** Energy may take different forms (e.g. energy in fields, thermal energy,energy of motion).
4. **Scale, Proportion, and Quantity -** Phenomena that can be observed at one scale may not be observable at another scale.

Science and Engineering Practices:

1. **S&EP #1A** Asking Questions
2. **S&EP #1B** Defining Problems
3. **S&EP #2** Developing and using models
4. **S&EP #3** Planning & carrying out investigations
5. **S&EP #4** Analyzing & Interpreting Data
6. **S&EP #6B** Designing Solutions
7. **S&EP #7** Engage in an Argument from Evidence

Disciplinary Core Ideas:

1. **PS2.A Forces and Motion**
    a. For any pair of interacting objects the force exerted by the first object on the second object is equal in the strength to the force that the second object exerts on the first, but in the opposite direction (Newton's 3rd Law)
    b. 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.
    c. 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.
2. **PS3.A Definition of Energy**
    a. 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
    b. A system of objects may also contain stored (potential) energy, depending on their relative positions.
3. **PS3.C Relationships between energy and forces**
    a. When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.
4. **PS3.B Conservation of Energy and Energy Transfer**
    a. When the motion energy of an object changes, there is inevitably some other change in energy at the same time.
5. **ETS1.A: Defining and Delimiting Engineering Problems**
    a. The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant

knowledge that are likely to limit possible solutions.

6. ETS1.B: Developing Possible Solutions

a. A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.
b. There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
c. Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.
d. Models of all kinds are important for testing solution.

7. ETS1.C: Optimizing the Design Solution

a. Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process - that is, some of those characteristics may be incorporated into the new design.
b. The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.

WI Standards for Literacy in All Subjects:

1. **RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS2-1),(MS-PS2-2),(MS-PS2-5)
2. **WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions, that allow for multiple avenues of exploration. (MS-PS2-1) (MS-PS2-2) (MS-PS2-5)

Learning Targets:

1. I can apply Newton's Laws to design a solution to a problem involving the motion of two colliding objects. (DCI PS2.A; ETS1.A; ETS1.B; ETS1.C; S&EP #1A, 1B & #6B; CCC - S&SM, S&C)
2. I can construct and interpret a graph of data to describe the relationships between the following: kinetic energy, mass, and speed of an object. (DCI PS3.A; S&EP #4; CCC S,P&Q)
3. I can develop a model to show that transfer of energy, kinetic energy and potential energy, can be impacted by both the mass and distance of an object. (DCI PS3.A, PS3.C, PS3.B; S&EP #2, #7; CCC S&SM, E&M)

Assessment Evidence:

Performance Assessment Options *May include, but are not limited to the following:*	**Other assessment options** *May include, but are not limited to the following:*
● MS-PS2-1 Apply Newton's Third Law to design a solution	

to a problem involving the motion of two colliding objects.* [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.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.] ● MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. [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.] [Assessment Boundary: Assessment is 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.] ● MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. 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. [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.] ● MS-PS3-2 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. [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 cart 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.] [Assessment Boundary: Assessment is limited to two objects and electric, magnetic, and gravitational interactions.] ● MS-PS3-5. 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. [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.] [Assessment Boundary: Assessment does not include calculations of energy.]	

Digital Tools & Supplementary Resources:
DCI Progressions Documents **Science and Engineering Practices Progressions Documents** **CCC Matrix** Phenomenon Example Phenomenon

Earth Science
Essential Questions: 1. How do patterns in nature guide organization and affect relationships? 2. To what extent can understanding cause and effect help us solve problems and make decisions? 3. How do proportional relationships between quantities and scales affect how we analyze the phenomena?
Standards:
<u>Cross-Cutting Concepts:</u> 1. **Patterns:** Patterns in rates of change and other numerical relationships can provide information about natural systems. Graphs, charts, and images can be used to identify patterns in data. 2. **Cause and Effect:** Cause and effect relationships may be used to predict phenomena in natural or designed systems. 3. **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. 4. **Stability and Change:** For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand. **<u>Science and Engineering Practices:</u>** 1. **S&EP #1A** Asking Questions 2. **S&EP #4** Analyze and interpret data 3. **S&EP #6A** Construction Explanations 4. **S&EP #2** Developing and Using Models 5. **S&EP #7** Engage in an Argument from Evidence **<u>Disciplinary Core Ideas:</u>** 1. **ESS1.C The History of Planet Earth**

   a. Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.
   b. 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.
2. **ESS2.B Plate Tectonics and Large-Scale System Interactions**
   a. 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.
3. **ESS2.A Earth's Materials and Systems**
   a. 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 it's future.
   b. 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.
4. **ESS2.C The Roles of Water in Earth's Surface Processes**
   a. Water's movements - both on the land and underground - cause weathering and erosion, which change the land's surface features and create underground formations.
5. **ESS3.B Natural Hazards**
   a. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events.
6. **ESS3.A Natural Resources**
   a. 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 geological process.
7. **ESS3.C Human Impacts on Earth Systems**
   a. 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.

WI Standards for Literacy in All Subjects:

1. **WHST.6-8.8** Gather relevant information from multiple print and digital sources, using search terms effectively. (MS-ESS3-3)
2. **WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions, that allow for multiple avenues of exploration. (MS-ESS3-3)

Learning Targets:

1. I can analyze and interpret data on the distribution of fossils, rocks, continents, and seafloor structures to provide evidence of the past plate motions and use this information to predict future catastrophic events and solutions or technologies. (DCI ESS1.C, ESS2.B, ESS3.B; S&EP 1A & #4; CCC - P)
2. I can explain using evidence how the Earth's surface and resources have changed at different rates over time. (DCI - ESS2.A, ESS2.C, ESS3.A; S&EP #6A; CCC S,P&Q, C&E)
3. I can construct an argument supported by evidence for how our changes in human population impact the natural resources on Earth's surface. (DCI ESS3.C; S&EP #7; CCC - C&E)
4. I can develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (DCI ESS2.A; S&EP #2; CCC - S&C)
5. I can construct a scientific explanation based on evidence from rock layers for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. (DCI ESS1.C; S&EP 1A &#6A; CCC - S,P&Q)

Assessment Evidence:

Performance Assessment Options	Other assessment options
Performance Assessment Options *May include, but are not limited to the following:* ● MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. [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.] [Assessment Boundary: Assessment does not include the identification and naming of minerals.] ● MS-ESS3-1. 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. [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).] ● MS-ESS1-4. 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. [Clarification Statement: Emphasis is on how analyses of rock	**Other assessment options** *May include, but are not limited to the following:*

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.] [Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.] ● MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. [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.] ● MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. [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).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.] ● MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. 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. [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).] ● MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources [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.]	

Digital Tools & Supplementary Resources: *Tools and resources that can augment the learning experience for students*
DCI Progressions Documents **Science and Engineering Practices Progressions Documents** **CCC Matrix** Phenomenon Example Phenomenon