Essential Standards and Prerequisite Skills

GRADE 6

**Time frames/pacing for each essential standard are suggested, but flexible depending on the individual needs of each teacher and group of students.*

Science

Month	Grade Level Essential Standards	Prerequisite Skills to Consider	5E Lessons
2 Weeks* UNIT 1	MS-ESS1-1 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. **Clarification Statement:** Examples of models can be physical, graphical, or conceptual. **Assessment Boundary:** none	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Developing and using models	Lesson Overview MS-ESS1-1: Sun-Earth-Moon System *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule..
Sept 2 Weeks* UNIT 1	MS-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. **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). **Assessment Boundary:** Assessment does not include Kepler's Laws of orbital motion or the	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Developing and using models	Lesson Overview MS-ESS1-2: Sun-Earth-Moon System- Gravitational Pull *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule.

	apparent retrograde motion of the planets as viewed from Earth.		
Sept 3 Weeks* UNIT 1	MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system. **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. **Assessment Boundary:** Assessment does not include recalling facts about properties of the planets and other solar system bodies.	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Analyzing and Interpreting data	Lesson Overview MS-ESS1-3: Scale of the Solar System *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule.
Oct. 2 Weeks* UNIT 2	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.	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Developing and Using Models	Lesson Overview MS-ESS2-1: The Rock Cycle *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule.
Oct. 19 - 30 **2 Weeks*** UNIT 2	MS-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Developing and Using Models	Lesson Overview MS-ESS2-4: The Water Cycle *Note-The lesson needs to be reviewed prior to implementation to

	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. **Assessment Boundary:** A quantitative understanding of the latent heats of vaporization and fusion is not assessed		determine teacher office hours and full virtual vs. hybrid schedule.
Nov. 2 - 13 2 Weeks* **Nov. 6 - End of 1st Trimester** UNIT 2	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) **Assessment Boundary**: none	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Constructing Explanations and Designing Solutions	Lesson Overview MS-ESS3-1: Earth & Human Impact Uneven Distribution of Resources *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule.
Nov. 16 - Dec. 4 2 Weeks* UNIT 3	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 formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Constructing Explanations and Designing Solutions • Analyzing & Interpreting Data	Lesson Overview MS-ESS1-4 & MS-ESS2-3: Geologic Time *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule.

	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-ESS2-3 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.		
Dec. 7 - 18 **2 weeks*** UNIT 3	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)	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Constructing Explanations and Designing Solutions	Lesson Overview MS-ESS2-2: Geologic Processes *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule.

	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. **Assessment Boundary:** none		
Jan 4 - 15 2 Weeks* UNIT 3	MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. **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. **Assessment Boundary:** none MS-ESS2-6 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. **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	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Asking Questions and Defining Problems • Developing and using Models	Lesson Overview MS-ESS3-5 & MS-ESS3-6: Heat Transfer & Climate *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule.

	Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations **Assessment Boundary:** Assessment does not include the dynamics of the Coriolis effect.		
Jan 18 - 29* 2 Weeks UNIT 4 Mar. 5 End of 3rd Grading Period	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. **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). **Assessment Boundary:** none 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	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Analyzing & Interpreting Data • Constructing Explanations and Designing Solutions	Lesson Overview MS-ESS3-2 & MS-ESS3-3: Natural Disasters & Human Impact *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule.

	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). **Assessment Boundary:** none		
Feb 1 - 15 2 weeks UNIT 4 Feb 19 - End of 2nd Trimester	MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. **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. **Assessment Boundary:** none	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Engaging in Argument from Evidence	Lesson Overview MS-ESS3-4: Consumption of Natural Resources *Note-The lesson needs to be reviewed prior to implementation to determine teacher office hours and full virtual vs. hybrid schedule
Feb - 5 Weeks*	MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. **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,	Students should be able to engage in the following NGSS Science & Engineering Practices (SEPs): • Asking Questions and Defining Problems • Engaging in Argument from Evidence	

	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. **Assessment Boundary:** none		