| High Priority Standards (CCSS, State, National, TILS, CREDE, etc.) |
|---|
| NGSS<br>CCC Patterns. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them. |

| Learning Goal | Proficiency Scale |
|---|---|
| Students will understand how patterns guide organization and classification. | 4: Student demonstrates an in-depth inference, advanced application or innovates with the learning goal.<br><br>3: Student demonstrates mastery with the learning goal as evidenced by:<br>• making observations using both qualitative and quantitative data.<br>• assessing the validity of the data from the process by which it was collected.<br>• forming conclusions based on evidence and patterns from data.<br>• organizing data in multiple ways to uncover patterns.<br><br>2: Student demonstrates he/she is nearing proficiency by:<br>• recognizing and recalling specific vocabulary, such as: audience, influence, conclusion, relevant, validity.<br>• performing processes such as:<br>o organizing data to best meet the needs of the audience.<br>o Identifying relevant and meaningful data to influence a conclusion.<br>o identifying bias in interpretations of data.<br><br>1: Student demonstrates limited understanding or skill with the learning goal. |

Learning Targets - Universe

**Universe - Goal 1:** Student will analyze and interpret data to compare and contrast objects in the universe.
**Universe - Goal 3:** Student will develop and use models to describe cyclic patterns of lunar phases.
**Universe - Goal 4:** Student will develop and use models to describe cyclic patterns of Earth's seasons.
**Universe - Goal 5:** Student will develop and use models to describe cyclic patterns of eclipses.
**Scientific Method - Goal 2:** Student will be able to make qualitative and quantitative observations and distinguish between the two.
**Scientific Method - Goal 3:** Student clearly communicates data using tables and graphs.

Learning Targets - Human Impact

- MS-ESS3-2. Identifying patterns in data on natural hazards to forecast future catastrophic events.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: volcano, earthquake, interior, exterior, mass wasting, tsunami, hurricane, typhoon, tornado, flood, magnitude, hazard, technology, mitigate, catastrophic, solution, monitoring, design, impact, aquifer, levee, development, wetland, pollution, population, per capita, consumption, resources, society, deforestation, overpopulation, water and air pollution, global warming, restoration of natural environments, river bank/coastal stabilization, recycling, channelization, reintroduction of species, depletion of resources, technology, mitigate, catastrophic, solution, monitoring, design, impact, aquifer, levee, development.

Learning Targets - Space Systems

- MS-ESS1-1. Describing the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: eclipse, ellipse, season, axial tilt, rotation, revolution, latitude, equator, lunar, phase, scale, proportionality, crust, atmosphere, orbital radius, telescopes, satellites, solar system, galaxy, universe, gravity, satellites, orbit, ellipse

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

NGSS

CCC Cause and effect: Mechanism and explanation. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

| Learning Goal | Proficiency Scale |
| --- | --- |
| Students will be able to investigate and explain causal relationships. | 4: Student demonstrates an in-depth inference, advanced application or innovates with the learning goal.<br><br>3: Student demonstrates mastery with the learning goal as evidenced by:<br>• identifying how various factors contribute to a cause and/or different results.<br>• explaining why events have simple and multifaceted causes.<br>• using relationships to predict phenomena in natural or designed systems.<br>• proving that phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.<br>• classifying relationships as causal or correlational, and recognizing that correlation does not necessarily imply causation.<br><br>2: Student demonstrates he/she is nearing proficiency by:<br>• recognizing and recalling specific vocabulary, such as: probability, correlation, causation, multifaceted.<br>• performing processes such as:<br>o explaining causes and the results of events in familiar contexts.<br>o demonstrating that events that occur together with regularity might or might not signify a cause and effect relationship.<br>o explaining effects that are seen as a result of causes that are unseen.<br><br>1: Student demonstrates limited understanding or skill with the learning goal. |

Learning Targets - Universe

- **Universe - Goal 2:** Student will develop and use models to describe the role of gravity.
- **Universe - Goal 3:** Student will develop and use models to describe cyclic patterns of lunar phases.
- **Universe - Goal 4:** Student will develop and use models to describe cyclic patterns of Earth's seasons.
- **Universe - Goal 5:** Student will develop and use models to describe cyclic patterns of eclipses.

Learning Targets - Engineering Design

- MS-ETS1-1. Defining the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: science, engineering, technology, research, climate, natural resource, economics, renewable, non-renewable.

Learning Targets - Growth Development and Reproduction of Organisms

- MS-LS3-2. Describing why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- MS-LS1-5. Explaining how environmental and genetic factors influence the growth of organisms.
- MS-LS4-5. Interpreting the way humans influence (or have influenced) the inheritance of desired traits in organisms.
- **Growth, Development, & Reproduction - Goal 2:** Student describes how environmental and genetic factors affect growth and development of organisms.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: characteristics, behaviors, asexual, sexual, hereditary, Punnett square, chromosome, gene, predators, prey, trait, genetic modification, chromosome, gene, gene therapy, trait, sexual, asexual.

Learning Targets - Human Impact

- MS-ESS3-3. Determining how human activities impact the environment.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: volcano, earthquake, interior, exterior, mass wasting, tsunami, hurricane, typhoon, tornado, flood, magnitude, hazard, technology, mitigate, catastrophic, solution, monitoring, design, impact, aquifer, levee, development, wetland, pollution, population, per capita, consumption, resources, society, deforestation, overpopulation, water and air pollution, global warming,

restoration of natural environments, river bank/coastal stabilization, recycling, channelization, reintroduction of species, depletion of resources, technology, mitigate, catastrophic, solution, monitoring, design, impact, aquifer, levee, development.

Learning Targets - Structure, Function, and Information Processing

- MS-LS1-8. Explaining how sensory receptors cause a response to stimuli and how they are stored.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: brain, sensory, input, stimuli, response, nerve, receptor, memory, cell, organelle, multicellular, unicellular, nucleus, chloroplasts, mitochondria, cell membrane, cell wall, tissue, organs, cytoplasm, system, organism, biology, biomedical, nanotechnology, centrifuge, botany, veterinarian, circulatory, excretory, digestive, respiratory, muscular.
- **Structure, Function, & Information Processing - Goal 3:** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]

Learning Targets -Weather and Climate

- MS-ESS2-5. Demonstrating that the motions and complex interactions of air masses results in changes in weather conditions.
- MS-ESS2-5. Collecting data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
- **Weather - MS-ESS2-5. Goal 1:** Student can analyze data, including maps, and construct and use models to develop understanding of the factors that control weather.
- **Weather - MS-ESS2-6. Goal 2:** Student can analyze data, including maps, and construct and use models to develop understanding of the factors that control climate.
- **Weather - Goal 3:** Student can analyze evidence, including tables, graphs, maps to develop understanding of the natural factors and human activities that influence change in global temperature.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: weather, temperature, pressure, humidity, precipitation, wind, latitude, altitude, geographic land distribution, atmospheric circulation, oceanic circulation, climate, global temperature, natural factors, human activities

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

NGSS

CCC Scale, proportion, and quantity. In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

| Learning Goal | Proficiency Scale |
|---|---|
| Students will understand how changes in scale, proportion, or quantity affect a system's structure and/or performance | 4: Student demonstrates an in-depth inference, advanced application or innovates with the learning goal.<br><br>3: Student demonstrates mastery with the learning goal as evidenced by:<br>• Relate objects or organisms using ratios and/or scales.<br>• determining ratio or scale from data.<br>• comparing quantities of objects or organisms using data.<br><br>2: Student demonstrates he/she is nearing proficiency by:<br>• recognizing and recalling specific vocabulary, such as: ratio, magnitude, equation, model.<br>• performing processes such as:<br>o using estimation to make determinations of scale, proportion and quantity.<br>o comparing a scale model to a natural or designed system.<br>o creating a visual representation of data to communicate scale, proportion and/or quantity.<br><br>1: Student demonstrates limited understanding or skill with the learning goal. |

Learning Targets - Energy

- MS-PS3-4. Describing the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: kinetic energy, speed, velocity, mass, force, conservation of energy, potential energy, thermal energy, heat, temperature, conductor, insulator, calorie, joule.

Learning Targets - Structure, Function, and Information Processing

- MS-LS1-1. Providing evidence that living things are made of cells, either one cell or many different numbers and types of cells.
- **Structure, Function and Information Processing - Goal 1:** Student will understand that living organisms are systems of interacting subsystems composed, on the most basic level, of cells.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: brain, sensory, input, stimuli, response, nerve, receptor, memory, cell, organelle, multicellular, unicellular, nucleus, chloroplasts, mitochondria, cell membrane, cell wall, tissue, organs, cytoplasm, system, organism, biology, biomedical, nanotechnology, centrifuge, botany, veterinarian, circulatory, excretory, digestive, respiratory, muscular.

Learning Targets - Space Systems

- MS-ESS1-3. Determining scale properties of objects in the solar system.
- MS-ESS1-3. Analyzing and interpreting data to determine scale properties of objects in the solar system.
- **Universe - MS-LS1-1. Goal 1:** Student will analyze and interpret data to compare and contrast objects in the universe.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: eclipse, ellipse, season, axial tilt, rotation, revolution, latitude, equator, lunar, phase, scale, proportionality, crust, atmosphere, orbital radius, telescopes, satellites, solar system, galaxy, universe, gravity, satellites, orbit, ellipse

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

NGSS

CCC Systems and system models. Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

| Learning Goal | Proficiency Scale |
| --- | --- |
| Students will be able to relate parts of a system to the whole. | 4: Student demonstrates an in-depth inference, advanced application or innovates with the learning goal.<br><br>3: Student demonstrates mastery with the learning goal as evidenced by:<br>• use models and simulations to illustrate a system.<br>• critiquing how systems interact with other systems<br>• provinging how systems may have sub-systems and may be a part of larger complex systems.<br><br>2: Student demonstrates he/she is nearing proficiency by:<br>• recognizing and recalling specific vocabulary, such as: component, interaction, simulation, complex.<br>• performing processes such as:<br>○ making observations of a system created to do a task.<br>○ identifying patterns of the inputs and outputs of a system.<br>○ analyzing models used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.<br><br>1: Student demonstrates limited understanding or skill with the learning goal. |

Learning Targets - Engineering Design

- MS-ETS1-1. Defining the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: science, engineering, technology, research, climate, natural resource, economics, renewable, non-renewable.

Learning Targets - Forces and Interactions

- MS-PS2-4. Developing or using a system to demonstrate gravitational interactions on interacting objects.

Learning Targets - Structure, Function, and Information Processing

- MS-LS1-3. Proving the body is a system of interacting subsystems composed of groups of cells.
- MS-LS1-2. Developing and using a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
- **Growth, Development, & Reproduction - Goal 1:** Student describes factors that impact reproduction.
- **Growth, Development, & Reproduction - Goal 2:** Student describes how environmental and genetic factors affect growth and development of organisms.
- **Structure, Function and Information Processing - MS-LS1-1. Goal 1:** Student will understand that living organisms are systems of interacting subsystems composed, on the most basic level, of cells.
- **Structure, Function, & Information Processing - Goal 3:** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: brain, sensory, input, stimuli, response, nerve, receptor, memory, cell, organelle, multicellular, unicellular, nucleus, chloroplasts, mitochondria, cell membrane, cell wall, tissue, organs, cytoplasm, system, organism, biology, biomedical, nanotechnology, centrifuge, botany, veterinarian, circulatory, excretory, digestive, respiratory, muscular.

Learning Targets - Space Systems

- MS-ESS1-1. Developing and using 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-ESS1-2. Developing and using a model to describe the role of gravity in the motions within galaxies and the solar system.
- **Universe - Goal 2:** Student will develop and use models to describe the role of gravity.
- **Universe - Goal 3:** Student will develop and use models to describe cyclic patterns of lunar phases.
- **Universe - Goal 4:** Student will develop and use models to describe cyclic patterns of Earth's seasons.
- **Universe - Goal 5:** Student will develop and use models to describe cyclic patterns of eclipses.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: eclipse, ellipse, season, axial tilt, rotation, revolution, latitude, equator, lunar, phase, scale, proportionality, crust, atmosphere, orbital radius, telescopes, satellites, solar system, galaxy, universe, gravity, satellites, orbit, ellipse

Learning Targets -Weather and Climate

- MS-ESS2-6. Using models to describe atmospheric and oceanic circulation and their impacts.
- **Weather - Goal 1:** Student can analyze data, including maps, and construct and use models to develop understanding of the factors that control weather.
- **Weather - Goal 2:** Student can analyze data, including maps, and construct and use models to develop understanding of the factors that control climate.
- **Weather - Goal 4: 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 will be able to use/know and understand/recognize and recall domain specific vocabulary such as: weather, temperature, pressure, humidity, precipitation, wind, latitude, altitude, geographic land distribution, atmospheric circulation, oceanic circulation, climate, global temperature, natural factors, human activities

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

NGSS

CCC *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

| Learning Goal | Proficiency Scale |
| --- | --- |
| Students will understand how changes in energy and matter help them define a system's limitations and possibilities. | 4: Student demonstrates an in-depth inference, advanced application or innovates with the learning goal.<br><br>3: Student demonstrates mastery with the learning goal as evidenced by:<br>• demonstrating the energy or matter as it flows in a system or process.<br>• comparing different forms of energy or matter in a system.<br><br>2: Student demonstrates he/she is nearing proficiency by:<br>• recognizing and recalling specific vocabulary, such as: potential energy, kinetic energy.<br>• performing processes such as:<br>o applying the law of conservation of matter as it is displayed in a natural or designed system.<br>o illustrating the matter and energy in a system.<br><br>1: Student demonstrates limited understanding or skill with the learning goal. |

Learning Targets - Weather and Climate

- **Weather - MS-ESS2-5. Goal 1:** Student can analyze data, including maps, and construct and use models to develop understanding of the factors that control weather.
- **Weather - MS-ESS2-6 Goal 2:** Student can analyze data, including maps, and construct and use models to develop understanding of the factors that control climate.
- **Weather - Goal 4: 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.

Learning Targets - Energy

- MS-PS3-3. Applying scientific principles of thermal energy transfer.
- MS-PS3-5. Proving that when the kinetic energy of an object changes, energy is transferred to or from the object.
- **Energy - Goal 1: MS-PS2-2.** Student describes, demonstrates, or models thermal energy transfer factors.
  **Energy - Goal 2: MS-PS3-4.** Students will describe, demonstrate, or model energy transfer among materials and is able to explain the relationship between temperature and average kinetic energy of the particles.
- **Energy - Goal 3: MS-PS3-5.** Students are able to provide evidence to support their conclusion regarding energy transfer between objects.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: kinetic energy, speed, velocity, mass, force, conservation of energy, potential energy, thermal energy, heat, temperature, conductor, insulator, calorie, joule.

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

NGSS

CCC *Structure and function*. The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

| Learning Goal | Proficiency Scale |
|---|---|
| Students will understand the structures of an object or organism determines its properties and functions. | 4: Student demonstrates an in-depth inference, advanced application or innovates with the learning goal.<br><br>3: Student demonstrates mastery with the learning goal as evidenced by:<br>• analyzing structures and system to determine how they function.<br>• analyzing the function of the structure to the whole object or organism.<br>• critiquing a structure's design and construction in relation to how it serves particular function.<br>• critiquing a living thing's adaptations and how it serves particular functions.<br>• categorizing substructures based on their shapes and the parts that serve functions.<br><br>2: Student demonstrates he/she is nearing proficiency by:<br>• recognizing and recalling specific vocabulary, such as structure, function, shape, composition, substructure, relationship.<br>• performing processes such as:<br>o making observations about the shape, composition, and relationship among the parts in a system.<br>o investigating the different substructures of different materials.<br>o defining components that make up a system.<br>o identifying the functions of various structures.<br><br>1: Student demonstrates limited understanding or skill with the learning goal. |

Learning Targets - Growth Development and Reproduction of Organisms

- MS-LS3-1. Developing and using a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
- MS-LS3-2. Developing and using a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- **Growth, Development, & Reproduction - Goal 1:** Student describes factors that impact reproduction.
- **Growth, Development, & Reproduction - Goal 2:** Student describes how environmental and genetic factors affect growth and development of organisms.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: characteristics, behaviors, asexual, sexual, hereditary, Punnett square, chromosome, gene, predators, prey, trait, genetic modification, chromosome, gene, gene therapy, trait, sexual, asexual.

Learning Targets - Structure, Function, and Information Processing

- MS-LS1-2. Describing how the function of a cell as a whole and ways parts of cells contribute to the function.
- MS-LS1-1. Conducting an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells.
- ·MS-LS1-8. Gathering and synthesizing information to prove/demonstrate/refute that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
- **Structure, Function and Information Processing - MS-LS1-1. Goal 1:** Student will understand that living organisms are systems of interacting subsystems composed, on the most basic level, of cells.
- **Structure, Function and Information Processing - MS-LS1-2. MS-LS1-3. Goal 2:** Student will develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
- **Structure, Function, & Information Processing - Goal 3:** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: brain, sensory, input, stimuli, response, nerve, receptor, memory, cell, organelle, multicellular, unicellular, nucleus, chloroplasts, mitochondria, cell membrane, cell wall, tissue, organs, cytoplasm, system, organism, biology, biomedical, nanotechnology, centrifuge, botany, veterinarian, circulatory, excretory, digestive, respiratory, muscular.

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

NGSS

CCC *Stability and change*. For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

| Learning Goal | Proficiency Scale |
|---|---|
| Students will understand conditions of stability and rates of change. | 4: Student demonstrates an in-depth inference, advanced application or innovates with the learning goal.<br><br>3: Student demonstrates mastery with the learning goal as evidenced by:<br>• evaluating factors that contribute to the stability or rate of change.<br>• comparing stability and change relative to time.<br>• proving how cyclic change patterns can be stable.<br>• assessing the role of equilibrium in maintaining stability.<br><br>2: Student demonstrates he/she is nearing proficiency by:<br>• recognizing and recalling specific vocabulary, such as: relative, maintain.<br>• performing processes such as:<br>o identifying factors that influence stability and change.<br>o measuring change (in systems, objects or organisms) in terms of differences over time.<br>o observing that change may occur at different rates.<br>o identifying examples of systems that appear stable, but over long periods of time they will eventually change.<br><br>1: Student demonstrates limited understanding or skill with the learning goal. |

Learning Targets - Weather and Climate

- MS-ESS3-5. Assessing and citing evidence factors that have caused the rise in global temperatures over the past century.
- **Weather - MS-ESS3-5. MS-ESS3-2. MS-ESS3-3. Goal 3:** Student can analyze evidence, including tables, graphs, maps to develop understanding of the natural factors and human activities that influence change in global temperature.
- Students will be able to use/know and understand/recognize and recall domain specific vocabulary such as: weather, temperature, pressure, humidity, precipitation, wind, latitude, altitude, geographic land distribution, atmospheric circulation, oceanic circulation, climate, global temperature, natural factors, human activities.