Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 6-8.LS1.B.1

Learning Goal	Proficiency Scale
Construct an explanation for how characteristic animal behaviors as well as specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	4: Student demonstrates innovation, in depth inference(s), and/or advanced application(s) with the learning goal. 3: Student demonstrates mastery with the learning goal as evidenced by: ● Explaining with evidence how characteristic behaviors of animals increase the odds of reproduction. ● Explaining with evidence the ways that plants reproduce including those that depend on animal behavior and specialized features. 2: Student demonstrates he/she is nearing proficiency by: ● Identifying how characteristic behaviors of animals increase the odds of reproduction. ● Identifying the ways that plants reproduce including those that depend on animal behavior and specialized features. 1: Student demonstrates a limited understanding of reproduction in plants and animals.

Learning Targets - Growth, Development, and Reproduction

Science and Engineering Practices
Use oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

Disciplinary Core Ideas
● Animals engage in characteristic behaviors that increase the odds of reproduction.
● Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features of reproduction.

Cross Cutting Concept
Phenomena may have more than one cause, and some cause and effect relationships in systems can be described only by using probability.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 6-8.LS1.B.2

Learning Goal	Proficiency Scale
Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	4: Student demonstrates innovation, in depth inference(s), and/or advanced application(s) with the learning goal. 3: Student demonstrates mastery with the learning goal as evidenced by: ● Explaining with evidence genetic factors as well as environmental factors that affect the growth of the adult plant. ● Explaining with evidence that organism growth is influenced by multiple environmental and genetic factors. 2: Student demonstrates he/she is nearing proficiency by: ● Identifying genetic factors as well as environmental factors that affect the growth of the adult plant. ● Identifying that organism growth is influenced by multiple environmental and genetic factors. 1: Student demonstrates a limited understanding of environmental and genetic factors that influence growth of organisms.

Learning Targets - Growth, Development, and Reproduction

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.
Disciplinary Core Ideas
Genetic factors as well as local conditions affect the growth of the adult plant.
Cross Cutting Concept
Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described only by using probability.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)	
Missouri Learning Goal 6-8.ESS1.B.1	

Learning Goal	**Proficiency Scale**
Analyze and interpret data to determine scale properties of objects in the solar system.	4: Student demonstrates advanced application and understanding of comparing and contrasting objects in the universe. 3: Student demonstrates mastery with the learning goal as evidenced by: ● analyzing and interpreting data to both compare and contrast objects (celestial bodies) in the universe by describing patterns of features of those objects at different scales including 　○ Distance from the sun 　○ Diameter 　○ Surface features (eg. size of volcanoes) 　○ Structure 　○ Composition (eg. ice versus rock versus gas) ● Using patterns in data as evidence to describe that two objects may be similar when viewed at one scale but may appear to be quite different when viewed at a different scale. 2: Student demonstrates he/she is nearing proficiency by: ● Organizing given data on solar system objects (e.g. surface features, object layers, orbital radii) from various Earth-and space-based instruments to allow for analysis and interpretation. ● recognizing similarities and/or differences between objects (celestial bodies) in the universe. 1: Student demonstrates limited understanding of similarities and differences between objects in the universe.

Curriculum - Grade

Learning Targets - Space Systems

Science and Engineering Practices

Analyze and interpret data to determine similarities and differences in findings to determine the relationship between scale, proportion, and quantity and their effects on certain properties.

Disciplinary Core Ideas

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.

Cross Cutting Concept

Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small to be directly observed. The solar system is a large system that must be reduced in order to study it in a classroom setting.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 6-8.ESS1.A.3

Learning Goal	Proficiency Scale
Develop and use models to describe the role of gravity in the motions within galaxies and the solar system.	4: Student demonstrates advanced application and understanding of the role of gravity. 3: Student demonstrates mastery with the learning goal as evidenced by: - Developing a model in which they identify the relevant components of the system including: - The solar system as a collection bodies, including the sun, planets, moons, and asteroids - The Milky Way galaxy as a collection of stars and their associated systems of objects - Other galaxies in the universe - Describe the role gravity plays in the interactions and relationships between components of the solar and galaxy systems. 2: Student demonstrates he/she is nearing proficiency by: - Using a given model to describe that gravity causes a pattern of smaller/less massive objects orbiting around larger/more massive objects at all system scales in the universe. 1: Student demonstrates limited understanding of the role of gravity.

Learning Targets - Space Systems

Science and Engineering Practices
Develop and use a model based on the analysis and interpretation of data to describe the role of gravity in the motions within galaxies and the solar system.

Disciplinary Core Ideas
- Earth and its solar system are part of the Milky Way galaxy, which is one of the many galaxies in the universe.
- 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.
- The solar system appears to have formed from a disk of dust and gas, drawn together by gravity.

Cross Cutting Concept
Models can be used to represent systems and their interactions such as how gravity affects the motions within galaxies and the solar system.

Curriculum - Grade

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)	
Missouri Learning Goal 6-8.ESS1.A.1	

Learning Goal	**Proficiency Scale**
Develop and use a model of the Earth-sun-moon system to explain the cyclic patterns of lunar phases and eclipses of the sun and moon.	4: Student demonstrates advanced application and understanding of cyclic patterns of lunar phases. 3: Student demonstrates mastery with the learning goal as evidenced by: ● Developing a model of the Earth-moon-sun systems and identify the relevant components and describe the relationship between them including: 　○ Earth, including the tilt of its axis of rotations 　○ Sun 　○ Moon 　○ Solar Energy (light source) ● Using patterns from their model to provide causal accounts for moon phases and eclipses 2: Student demonstrates he/she is nearing proficiency by: ● Identifying the relationships between the Earth and the moon as it relates to moon phases and eclipses. 1: Student demonstrates limited understanding of the cyclic patterns of lunar phases.

Learning Targets - Space Systems

Science and Engineering Practices
Develop and use a model to explain the cyclic patterns of lunar phases and eclipses of the sun and moon.
Disciplinary Core Ideas
  ● This model of the solar system can explain eclipses of the sun and the moon. Earth's 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 throughout the year.
  ● Patterns of the apparent motion of the Sun, moon, and stars in the sky can be observed, described, predicted, and explained with models.
Cross Cutting Concept
Use patterns to identify cause and effect relationships between the relative positions of Earth, the moon, and the Sun and the cyclic patterns of lunar phases and eclipses of the sun and moon.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)
Missouri Learning Goal 6-8.ESS1.A.2

Learning Goal	**Proficiency Scale**

Develop and use a model of the Earth-sun system to explain the cyclical pattern of seasons, which includes the Earth's tilt and directional angle of sunlight on different areas of Earth across the year.	4: Student demonstrates advanced application and understanding of cyclic patterns of Earth's season.
	
	 3: Student demonstrates mastery with the learning goal as evidenced by:
	
	    ● Developing a model of the Earth-moon-sun systems and identify the relevant components and describe the relationship between them including:
	       ○ Earth, including the tilt of its axis of rotations
	       ○ Sun
	       ○ Solar Energy (direct and indirect light)
	    ● Using patterns from their model to provide causal accounts for seasons
	 2: Student demonstrates he/she is nearing proficiency by:
	
	    ● Using a given model to identify the season on Earth, given the relative positions of Earth and the sun (including the orientation of the Earth's axis) and position on Earth.
	 1: Student demonstrates limited understanding of the cyclic patterns of Earth's seasons.

Learning Targets - Space Systems

Science and Engineering Practices
Develop and use a model to describe the predictability and patterns of seasons on different areas of Earth over the period of a year.
Disciplinary Core Ideas
- This model of the solar system can explain eclipses of the sun and the moon. Earth's 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 throughout the year.
- Patterns of the apparent motion of the Sun, moon, and stars in the sky can be observed, described, predicted, and explained with models.

Cross Cutting Concept
Use patterns to identify cause and effect relationships between the relative positions of Earth, the moon, and the Sun and the predictability of seasons on different areas of Earth throughout the period of a year.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)	
Missouri Learning Goal 6-8.PS2.B.2	

Learning Goal	**Proficiency Scale**

Create and analyze a graph to use evidence to support the claim that gravitational interactions depend on the mass of interacting objects.	4: Student demonstrates advanced application and understanding of gravitational interactions.
	
	3: Student demonstrates mastery with the learning goal as evidenced by:
	
	● Creating a graph that shows the relationship between gravitational interactions and the mass of interacting objects
	● Using their graph to connect the appropriate evidence about the forces on objects and support the claim that gravitational forces are attractive and mass dependent.
	
	2: Student demonstrates he/she is nearing proficiency by:
	● Describing that:
	   ○ Systems of objects can be modeled as a set of masses interacting via gravitational forces
	   ○ In systems of objects, larger masses experience and exert proportionally larger gravitational forces.
	   ○ In every case for which evidence exists, gravitational force is attractive.
	
	1: Student demonstrates limited understanding of gravitational interactions.

Learning Targets - Space Systems

Science and Engineering Practices
Analyze and interpret data to provide evidence for phenomena.
Disciplinary Core Ideas
Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have a large mass (e.g., Earth, the sun).
Cross Cutting Concept
Models can be used to represent systems and their interactions, such as inputs, processes and outputs, and energy and matter flows within systems.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)	
Missouri Learning Goal 6-8.LS1.A.1	

Learning Goal	Proficiency Scale
Provide evidence that organisms (unicellular and multicellular) are made of cells and that a single cell must carry out all the basic functions of life.	4: Student demonstrates advanced application and understanding of concepts relating to the interacting subsystems of organisms and cells. 3: Student demonstrates mastery with the learning goal as evidenced by: ● Providing evidence of the presence or absence of cells in living things (unicellular & multicellular), and non-living things. ● Describing that a single cell must carry out the 6 basic functions of life. 2: Student demonstrates he/she is nearing proficiency by: ● Identifying and describing that all living things are made of cells(either one cell or many different numbers and types of cells) and that the cell is the smallest unit that can be said to be alive. 1: Student demonstrates limited understanding of the subsystems in organisms and cells.

Learning Targets - Structure, Function, and Information Processing

Science and Engineering Practices
Conduct an investigation to produce data to serve as the basis for evidence that meets the goals of an investigation.
Disciplinary Core Ideas
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).
Cross Cutting Concept
Phenomena that can be observed at one scale may not be observable at another scale.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)
Missouri Learning Goal 6-8.LS1.A.2

Learning Goal	Proficiency Scale
Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	4: Student demonstrates advanced application and understanding of concepts relating to the function of a cell and how it's parts allow it to function. 3: Student demonstrates mastery with the learning goal as evidenced by: ● Developing a model in which they identify the parts of cells 　○ Nucleus 　○ Chloroplasts 　○ Cell wall 　○ Mitochondria 　○ Cell membrane ● Using the model to describe how different parts of a cell contribute to cell function. 2: Student demonstrates he/she is nearing proficiency by: ● Identifying and describing the function of some, but not all, of the parts of a cell. 1: Student demonstrates limited understanding relating the function of a cell and how it's parts allow it to function.

Learning Targets - Structure, Function, and Information Processing

Science and Engineering Practices
Develop and use a model to describe phenomena.
Disciplinary Core Ideas
Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.
Cross Cutting Concept
Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine function.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 6-8.LS1.A.3

Learning Goal	Proficiency Scale

Develop an argument supported by evidence for how multicellular organisms are organized by varying levels of complexity; cells, tissue, organs, organ systems.	4: Student demonstrates advanced application and understanding of multicellular organisms.
	
	3: Student demonstrates mastery with the learning goal as evidenced by:
	
	● Making a claim that the body is a system of interacting subsystems composed of groups of cells.
	● identifying and describing the given evidence that supports the claim that:
	  ○ Specialized groups of cells work together to form tissues
	  ○ Specialized tissues comprise each organ, enabling the specific organ functions to be carried out
	  ○ Different organs can work together as subsystems to form organ systems that carry out complex functions
	  ○ The body contains organs and organ systems that interact with each other to carry out all necessary functions for survival and growth of the organism.
	2: Student demonstrates he/she is nearing proficiency by:
	● Identifying and describing some but not all of the interacting subsystems of a multicellular organism.
	1: Student demonstrates limited understanding of multicellular organisms.

Learning Targets - Structure, Function, and Information Processing

Science and Engineering Practices
Use oral and written arguments supported by evidence to support or refute an explanation or a model for a phenomenon.

Disciplinary Core Ideas
In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

Cross Cutting Concept
Systems may interact with other systems; they may have subsystems and be a part of larger complex systems.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)	
Missouri Learning Goal 6-8.LS1.A.4	

Learning Goal	Proficiency Scale
Present evidence that body systems interact to carry out key body functions, including providing nutrients and oxygen to cells, removing carbon dioxide and waste from cells and the body, controlling body motion/activity and coordination, and protecting the body.	4: Student demonstrates advanced application and understanding of concepts relating to the interaction of human body systems. 3: Student demonstrates mastery with the learning goal as evidenced by: ● Presenting evidence that the following human body systems interact to support healthy human body functions: ○ respiratory, digestive, circulatory, excretory, muscular, skeletal, and nervous. 2: Student demonstrates he/she is nearing proficiency by: ● Identifying body systems and their functions in the human body. 1: Student demonstrates limited understanding of the interaction of human body systems.

Learning Targets - Structure, Function, and Information Processing

Science and Engineering Practices
Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon.
Disciplinary Core Ideas
 In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.
Cross Cutting Concept
Systems may interact with other systems; they may have subsystems and be a part of larger complex systems.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)	
Missouri Learning Goal 6-8.ESS2.C.3	
Learning Goal	**Proficiency Scale**

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.	4: Student demonstrates advanced application and understanding of concepts relating to regional climate.
	
	3: Student demonstrates mastery with the learning goal as evidenced by:
	
	● Developing a model and identify and describing the relationship between the components of the system including:
	  ○ Differences in the distribution of solar energy and temperature changes
	  ○ Motion of ocean water and air masses (matter)
	  ○ Factors affecting the motion of wind and currents
	  ○ Thermal energy transfer
	● Using the model to describe patterns in latitude, altitude, geographic land distribution, atmospheric circulation, ocean circulation that determine climates
	2: Student demonstrates he/she is nearing proficiency by:
	● Identifying and describing some but not all of the factors that affect regional climate.
	1: Student demonstrates limited understanding of regional climate.

Learning Targets - Weather and Climate

Science and Engineering Practices
Develop and use a model to describe the interaction of uneven heating and the rotation of Earth to produce systems of oceanic and atmospheric currents that determine regional climates.

Disciplinary Core Ideas
● Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.
● 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.
● 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.

Cross Cutting Concept
Models are based on systems. The model describes the interaction of uneven heating and the rotation of Earth to produce systems of oceanic and atmospheric currents that determine regional climates.

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)	
Missouri Learning Goal 6-8.ESS2.C.2	

Learning Goal	Proficiency Scale

Research, collect, and analyze data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	**4:** Student demonstrates advanced application and understanding of weather conditions.
	
	3: Student demonstrates mastery with the learning goal as evidenced by:
	
	● Researching, collecting, and analyzing (predicting) data that would indicate relationships between air mass movement and changes in the weather including
	    ○ Patterns in weather conditions in a specific area over time
	    ○ The relationship between the distribution and movement of air masses and landforms, ocean temperatures and currents.
	    ○ The relationship between observed, large-scale weather patterns and the location or movement of air masses, including patterns that develop between air masses.
	2: Student demonstrates he/she is nearing proficiency by:
	● identifying the cause/effect relationship between changes in weather (temperature, pressure, humidity, precipitation, wind) in terms of air mass movement result in changes in weather conditions.
	● interpreting data from weather maps, diagrams, visualizations, and experiments to identify possible weather.
	1: Student demonstrates limited understanding of weather conditions.

Learning Targets - Weather and Climate

Science and Engineering Practices
- 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.
- Research, collect, and analyze data to provide evidence for cause and effect relationships between air masses and changing weather conditions.

Disciplinary Core Ideas
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

Cross Cutting Concept
- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

- Cause and effect relationships show the relationship between air masses and changing weather conditions.

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)	
Missouri Learning Goal 6-8.ESS3.D.1	

Learning Goal	Proficiency Scale
Analyze evidence of the factors that have caused the change in global temperatures over the past century.	4: Student demonstrates advanced application and understanding of global climate change. 3: Student demonstrates mastery with the learning goal as evidenced by: ● Analyzing evidence for patterns in data that connect natural processes and human activities to changes in global temperatures over the past century. ● Analyzing evidence for patterns in data that connect the changes in natural processes and/or human activities related to greenhouse gas production to changes in the concentrations of carbon dioxide and other greenhouse gases in the atmosphere. 2: Student demonstrates he/she is nearing proficiency by: ● Identifying the influence of natural processes and/or human activities on a gradual or sudden change in global temperatures in natural systems AND/OR on changes in the concentration of carbon dioxide and other greenhouse gases in the atmosphere over the past century. 1: Student demonstrates limited understanding of global climate change.

Learning Targets - Weather and Climate

Science and Engineering Practices
Analyze evidence to identify factors that have caused changes in global temperatures over the past century.
Disciplinary Core Ideas
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 human behavior, and on applying that knowledge wisely in decisions and activities.
Cross Cutting Concept
Stability might be disturbed either by sudden events or gradual changes that accumulate over time.

Curriculum - Grade

Curriculum - Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 6-8.ESS2.C.1

Learning Goal	Proficiency Scale
Design and develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	4: Student demonstrates advanced application and understanding of global climate change. 3: Student demonstrates mastery with the learning goal as evidenced by: ● Developing a model with components listed below 　○ Water (liquid, solid, and in the atmosphere 　○ Energy in the form of sunlight 　○ Gravity 　○ Atmosphere 　○ Landforms 　○ Plants and other living things ● Using the model to describe that the transfer of energy between water and its environment drives the phase changes that drive water cycling through evaporation, transpitation, condensation, crystallization, and precipitation. ● Using the model to describe how gravity interacts with water in different phases and locations to drive water cycling between the Earth's surface and the atmosphere. 2: Student demonstrates he/she is nearing proficiency by: ● Demonstrating some, but not all, parts of the cycling of water. ● Describing the transfer of energy between water and its environment AND/OR how gravity interacts with water in different phases. 1: Student demonstrates limited understanding of the cycling of water.

Learning Targets - Weather and Climate

Science and Engineering Practices
● Develop a model to describe unobservable mechanisms.
● Design and develop a model to describe the absorption or release of energy as water changes its state and moves through the hydrologic cycle.
Disciplinary Core Ideas

Curriculum - Grade

Water continually cycles between land, ocean, and atmosphere via transpiration, evaporation, condensation, crystallization, and precipitation, as well as downhill flows on land.

- o Global movements of water and its changes in form are propelled by sunlight and gravity.

Cross Cutting Concept

Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.

- o Design and develop a model to describe the absorption or release of energy as water changes its state and moves through the hydrologic cycle.