

## 6<sup>th</sup> Grade NGSS Scope & Sequence

<b>Unit Title:</b>	Segment 1			
<b>Guiding Concept:</b>	Systems within organisms and between them are adapted to Earth's climate systems.			
<b>Guiding Questions:</b>	1. How are living systems and Earth systems similar and different? 2. What is the value of creating a systems model?			
<b>Unit Concepts:</b> <ul style="list-style-type: none"> <li>Describe water cycle</li> <li>Unequal heating and rotation of the earth cause atmospheric and oceanic patterns</li> <li>All living things are made of cells</li> <li>Viruses have features in common in cellular life</li> <li>Parts of a cell and how they function</li> <li>Cells form tissues, then organs</li> </ul>		<b>Vocab:</b> <ul style="list-style-type: none"> <li>Six kingdoms (i.e. Animals, plants, fungus)</li> <li>Multicellular functions</li> <li>Structures</li> <li>Subsystems</li> <li>Reproductions</li> <li>Osmosis</li> <li>Cell</li> <li>gravity</li> </ul>		
<b>NGSS Performance Expectations (PE)</b>	<b>Essential Questions</b> (What do students need to know about the standard that leads them to answering the guiding questions of the segment?):	<b>Science and Engineering Practices</b> addressed in NGSS PEs	<b>Crosscutting Concepts</b> addressed in NGSS PEs	<b>Disciplinary Core Ideas (DCI)</b> addressed in NGSS PEs
MS-LS1-1:	<ul style="list-style-type: none"> <li>What are the smallest functional units of living organisms?</li> <li>How are the structures of living and non-living things similar and different?</li> </ul>	<ul style="list-style-type: none"> <li>Investigate, produce data</li> </ul>	<ul style="list-style-type: none"> <li>Scale, proportion, quantity</li> </ul>	<ul style="list-style-type: none"> <li>All living things are made up of cells, which is the smallest unit that can be said to be alive.</li> </ul>
MS-LS1-2:	<ul style="list-style-type: none"> <li>How do the structures of cell parts contribute to their functions?</li> <li>What is the effect of osmosis on a cell?</li> </ul>	<ul style="list-style-type: none"> <li>Structure and function</li> </ul>	<ul style="list-style-type: none"> <li>System and system models</li> </ul>	<ul style="list-style-type: none"> <li>Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.</li> </ul>
MS-LS1-3:	<ul style="list-style-type: none"> <li>How can one explain the ways cells contribute to the function of living organisms?</li> </ul>	<ul style="list-style-type: none"> <li>Use argument supported by evidence</li> </ul>	<ul style="list-style-type: none"> <li>Cause and effect</li> </ul>	<ul style="list-style-type: none"> <li>Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.</li> </ul>
MS-LS1-8:	<ul style="list-style-type: none"> <li>How does your brain use patterns to process stimuli from the outside world?</li> </ul>	<ul style="list-style-type: none"> <li>Obtaining, evaluating and communicating information</li> </ul>	<ul style="list-style-type: none"> <li>Cause and effect</li> </ul>	<ul style="list-style-type: none"> <li><u>Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.</u></li> </ul>

MS-ESS2-4:	<ul style="list-style-type: none"> <li>How do the sun and earth's gravity affect the hydrologic cycle?</li> </ul>	<ul style="list-style-type: none"> <li>Develop and use a model</li> </ul>	<ul style="list-style-type: none"> <li>Energy and matter</li> </ul>	<ul style="list-style-type: none"> <li><u>Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.</u></li> <li><u>Global movements of water and its changes in form are propelled by sunlight and gravity.</u></li> </ul>
MS-ESS2-6:	<ul style="list-style-type: none"> <li>What patterns in the atmosphere and ocean affect regional climate?</li> <li>How does the unequal heating of earth's surface cause atmospheric patterns?</li> </ul>	<ul style="list-style-type: none"> <li>Develop and use a model</li> </ul>	<ul style="list-style-type: none"> <li>System and system models</li> </ul>	<ul style="list-style-type: none"> <li><u>Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.</u></li> <li><u>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.</u></li> <li><u>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.</u></li> </ul>

<b>Unit Title:</b>	Segment 2			
<b>Guiding Concept:</b>	Earth System Interactions Cause Weather			
<b>Guiding Questions:</b>	1. Why is the weather so different in different parts of the world? 2. How is weather related to the transfer of energy? 3. How do models help us understand the different kinds of weather in California?			
<b>Unit Concepts:</b> <ul style="list-style-type: none"> <li>Water cycle (hydrologic)</li> <li>Earth's rotation and gravity affect climate *</li> <li>Thermal energy transfer</li> <li>Temperature, mass, and energy are inter-related *</li> <li>Oceans affect weather</li> <li>Unequal heating and rotation of earth affect climate *</li> </ul>		<b>Vocab:</b> <ul style="list-style-type: none"> <li>Hydrologic cycle</li> <li>Latitude</li> <li>Altitude</li> <li>Earth's Rotation</li> <li>Convection cycle</li> <li>Coriolis effect</li> <li>Thermal Energy</li> <li>Matter</li> <li>Mass</li> <li>Kinetic Energy</li> <li>Transfer of Energy</li> </ul>		
<b>NGSS Performance Expectations (PE)</b>	<b>Essential Questions</b> (What do students need to know about the standard that leads them to answering the guiding questions of the segment?):	<b>Science and Engineering Practices</b> addressed in NGSS PEs	<b>Crosscutting Concepts</b> addressed in NGSS PEs	<b>Disciplinary Core Ideas (DCI)</b> addressed in NGSS PEs
MS-ESS2-4:	<ul style="list-style-type: none"> <li>How does transfer of energy change water in the hydrologic cycle?</li> </ul>	<ul style="list-style-type: none"> <li>Develop a model for the water cycle.</li> </ul>	<ul style="list-style-type: none"> <li>Energy and Matter</li> </ul>	<ul style="list-style-type: none"> <li>Water continually cycles among land, ocean, and atmosphere. <u>Global movements of water and its changes in form are propelled by sunlight and gravity.</u></li> </ul>
MS-ESS2-6:	<ul style="list-style-type: none"> <li>What atmospheric patterns and oceanic patterns affect California's climate?</li> </ul>	<ul style="list-style-type: none"> <li>Develop and use model</li> </ul>	<ul style="list-style-type: none"> <li>System Models</li> </ul>	<ul style="list-style-type: none"> <li><u>Changes in density due to variations in temperature and salinity</u> effect global patterns of ocean current. / The ocean exerts a major influence on weather and climate</li> </ul>
MS-PS3-3:	<ul style="list-style-type: none"> <li>How would you construct a device that either minimizes or maximizes thermal energy transfer?</li> <li>How is thermal energy transferred?</li> </ul>	<ul style="list-style-type: none"> <li>Construct an explanation and design a solution.</li> </ul>	<ul style="list-style-type: none"> <li>Energy and Matter</li> </ul>	<ul style="list-style-type: none"> <li><u>Temperature is a measure of the average kinetic energy of particles of matter. Energy is spontaneously transferred out of hotter regions or objects and into colder ones.</u></li> </ul>
MS-PS3-4:	<ul style="list-style-type: none"> <li>What is the relationship between the temperature and matter with different properties?</li> </ul>	<ul style="list-style-type: none"> <li>Plan an investigation and determine relationships</li> </ul>	<ul style="list-style-type: none"> <li>Scale, Proportion, and Quantity</li> </ul>	<ul style="list-style-type: none"> <li><u>The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment./ The</u></li> </ul>

MS-PS3-5:	<ul style="list-style-type: none"> <li>How is energy transferred from one object to another?</li> </ul>	<ul style="list-style-type: none"> <li>Construct, use, and present an argument</li> </ul>	<ul style="list-style-type: none"> <li>Energy and Matter</li> </ul>	<p><u>relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.</u></p> <ul style="list-style-type: none"> <li><u>When the motion energy of an object changes, there is inevitably some other change in energy at the same time.</u></li> </ul>
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<b>Unit Title:</b>	Segment 3			
<b>Guiding Concept:</b>	Causes and Effects of Regional Climates			
<b>Guiding Questions:</b>	<ol style="list-style-type: none"> <li>1. Why is the climate so different in different regions of the planet?</li> <li>2. Why are organisms so different in different regions of the planet?</li> <li>3. What makes organisms so similar to, but also different from their parents?</li> <li>4. What makes animals behave the way they do and how does their behavior affect their survival and reproduction?</li> </ol>			
<b>Unit Concepts:</b> <ul style="list-style-type: none"> <li>• Temperature, mass, and energy are inter-related *</li> <li>• Behavioral adaptations in animals and their effect on reproduction *</li> <li>• Physical adaptations of plants and animals in reproduction *</li> <li>• Relationship between plants and animals in reproduction *</li> <li>• Environmental factors on organism growth</li> <li>• The brain's response to stimuli and its effect on behavior</li> <li>• Compare and contrast sexual and asexual reproduction and its relation to genetic variation</li> </ul>		<b>Vocab:</b> <ul style="list-style-type: none"> <li>• Organism</li> <li>• Stimuli</li> <li>• Climate</li> <li>• Weather</li> <li>• Kinetic energy</li> <li>• Nectar</li> <li>• Offspring</li> <li>• </li> </ul> <div>conservation of energy</div> <div>transfer of energy</div>		
<b>NGSS Performance Expectations (PE)</b>	<b>Essential Questions</b> (What do students need to know about the standard that leads them to answering the guiding questions of the segment?):	<b>Science and Engineering Practices</b> addressed in NGSS PEs	<b>Crosscutting Concepts</b> addressed in NGSS PEs	<b>Disciplinary Core Ideas (DCI)</b> addressed in NGSS PEs
MS-LS1-4:	<ul style="list-style-type: none"> <li>• How do animal behavioral adaptations increase the odds of reproduction?</li> </ul>	<ul style="list-style-type: none"> <li>• Engage in Argument from Evidence</li> </ul>	<ul style="list-style-type: none"> <li>• Cause and Effect</li> </ul>	Animals and Plants reproduce in ways to maximize odds
MS-LS 1-5:	<ul style="list-style-type: none"> <li>• How do plant features affect the probability of reproduction?</li> </ul>			
MS-LS 1-8:	<ul style="list-style-type: none"> <li>• How does climate influence the growth of organisms?</li> <li>• What genetic factors influence the growth of organisms?</li> </ul>	<ul style="list-style-type: none"> <li>• Construct explanations and design solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Cause and Effect</li> </ul>	Genetic Factors and Local Conditions affect plant growth
MS-LS 3-2:	<ul style="list-style-type: none"> <li>• How does climate affect behavior in organisms?</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Obtaining, Evaluating, and Communicating Information</u></li> </ul>	<ul style="list-style-type: none"> <li>• Cause and Effect</li> </ul>	How sensory receptors are used to process information
MS-ESS 2-5	<ul style="list-style-type: none"> <li>• What causes genetic variations in offspring?</li> <li>• What causes identical genetic characteristics in offspring?</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and use Models</li> </ul>	<div>Cause and Effect</div> <div>Cause and Effect</div>	Growth and Development of Organisms Inheritance and Variation of Traits

MS-ESS 2-6	<ul style="list-style-type: none"> <li>• What variables are influence and determine local weather patterns?</li> <li>• What causes weather not to be predicted with 100% accuracy?</li> </ul>	<ul style="list-style-type: none"> <li>• Plan and carry out investigations</li> </ul>		<u>The Roles of Water in Earth's Surface Processes</u>
MS-PS 3-4	<ul style="list-style-type: none"> <li>• How does temperature and the amount of salt affect ocean currents?</li> <li>• How does the redistribution of the sun's energy change weather systems?</li> <li>• What conditions interact to alter weather and climate?</li> <li>• How does quantity of kinetic energy determine temperature?</li> <li>• How does the conservation and transfer of energy affect temperature?</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and Use Models</li> </ul> <p>Plan and Carry out Investigations</p>	<p>System and System Models</p> <p>Scale, Proportion and Quantity</p>	<p>Pattern of Weather and Climate</p> <p>Role of water in earth's processes</p> <p>Definition, transfer and conservation of energy</p>

<b>Unit Title:</b>	Segment 4			
<b>Guiding Concept:</b>	Effects of Global Warming on Living Systems			
<b>Guiding Questions:</b>	1. How do human activities affect earth's systems? 2. How do we know our global climate is changing?			
<b>Unit Concepts:</b> <ul style="list-style-type: none"> <li>Behavioral adaptations effect on reproduction *</li> <li>Physical adaptations of plants effect on reproduction *</li> <li>Genetic factors influence organism growth *</li> <li>Evidence of human impact on the environment; water, land, and pollution</li> <li>The rise in global temperature is due to human activity</li> </ul>		<b>Vocab:</b> <ul style="list-style-type: none"> <li>Thermal energy</li> <li>Kinetic energy</li> <li>Atmosphere</li> <li>Biosphere</li> <li>Extinction</li> </ul> <div>environment</div> <div>genetic factors</div> <div>fossil fuels</div> <div>asexual</div>		
<b>NGSS Performance Expectations (PE)</b>	<b>Essential Questions</b> (What do students need to know about the standard that leads them to answering the guiding questions of the segment?):	<b>Science and Engineering Practices</b> addressed in NGSS PEs	<b>Crosscutting Concepts</b> addressed in NGSS PEs	<b>Disciplinary Core Ideas (DCI)</b> addressed in NGSS PEs
MS-LS 1-4	<ul style="list-style-type: none"> <li>How do environmental factors affect organisms reproductive adaptations?</li> </ul>	<ul style="list-style-type: none"> <li>Engage in argument from evidence</li> </ul>	<ul style="list-style-type: none"> <li>Cause and Effect</li> </ul>	Organisms adapt to increase reproduction odds
MS-LS 1-5	<ul style="list-style-type: none"> <li>How does variations in climate change growth of organisms?</li> </ul>	<ul style="list-style-type: none"> <li><u>Constructing Explanations and Designing Solutions</u></li> </ul>	<ul style="list-style-type: none"> <li>Cause and Effect</li> </ul>	Genetic Factors affect growth
MS-ESS 3-3	<ul style="list-style-type: none"> <li>How does the growth in human population negatively impact earth's environments?</li> </ul>	<ul style="list-style-type: none"> <li><u>Constructing Explanations and Designing Solutions</u></li> </ul>	<ul style="list-style-type: none"> <li>Causes and Effect</li> </ul>	Humans affect the biosphere and ecosystems
MS-ESS 3-5	<ul style="list-style-type: none"> <li>How have human activities caused a rise in global temperatures over the past century?</li> </ul>	Ask Questions and Define Problems	<ul style="list-style-type: none"> <li>Stability and Change</li> </ul>	Human behavior impacts the earth's temperature.