



Grade 5
Unit 1: The Nature of Science

NYS Science Standard	FOSS Alignment
Major Understandings <i>Quoted from New York State Performance Indicators (S 1.1 a-c; 1.2a; 1.32.1b-d; 2.2b-e 2.3 b, c; 3.1a, b; 3.2a-e)</i>	
S1.1a. Formulate questions about natural phenomena.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 3: Parts 1-3
S1.1b. Identify appropriate references to investigate a question.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3
S1.1c. Refine and clarify questions so that they are subject to scientific investigation.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3
S1.2a. Independently formulate a hypothesis.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 4: Parts 1-3
S1.3. Represent, present, and defend their proposed explanations of everyday observations so that they can be understood and assessed by other.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3
S2.1b. Conduct an experiment designed by others.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-2 Investigation 4: Parts 1-3
S2.1c. Design and conduct an experiment to test a hypothesis.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 3: Part 3 Investigation 4: Part 3
S2.1d. Use appropriate tools and conventional techniques to solve problems about the natural world, including: measuring, observing, describing, classifying and sequencing.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigations 1-4 FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigations 1-4 FOSS Next Generation Living Systems Investigations Guide Investigations 1-4 FOSS Next Generation Environments Investigations Guide Investigations 1-4
S2.2b. Design scientific investigations (e.g., observing, describing, and comparing; collecting samples, seeking more information, conducting a controlled experiment, discovering new objects or phenomena; making models).	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3



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S2.2c. Design a simple controlled experiment.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 3: Parts 2-3 Investigation 4: Part 3
S2.2d. Identify independent variables (manipulated), dependent variables (responding), and constant in a simple controlled experiment.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3
S2.2e. Choose appropriate sample size and number of trials.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Part 3
S2.3b. Conduct a scientific investigation.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-2
S2.3c. Collect quantitative and qualitative data.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3
S3.1a. Organize results, using appropriate graphs, diagrams, data tables, and other models to show relationships.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3
S3.1b. Generate and use scales, create legends, and appropriately label axes.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3
S3.2a. Accurately describe the procedures used and the data gathered.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3
S3.2b. Identify sources of error and the limitations of data collected.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Part 2 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3
S3.2c. Evaluate the original hypothesis in light of the data.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Part 3 Investigation 4: Parts 1-2



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S3.2d. Formulate and defend explanations and conclusions as they relate to scientific phenomena.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3
S3.2e. Form and defend a logical argument about cause and effect relationships in an investigation.	FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-2 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-2



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MST Standard	FOSS Alignment
Standard 2: Information Systems	
<p>Key Idea 1: Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.</p>	<p>FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1, 3 Investigation 2: Parts 3-4 Investigation 3: Part 1 Investigation 4: Parts 1-2</p>
Standard 6: Interconnectedness: Common Themes	
<p>Key Idea 1: Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.</p>	<p>FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 3: Parts 1-3</p>
<p>Key Idea 2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.</p>	<p>FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 4: Parts 1-3</p>
<p>Key Idea 5: Identifying patterns of change is necessary for making predictions about future behavior and conditions.</p>	<p>FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3</p>
Standard 7: Interdisciplinary Problem Solving	
<p>Key Idea 1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.</p>	<p>FOSS Third Edition Motion, Force and Models Investigations Guide Investigation 1: Part 3 Investigation 2: Parts 3-4 Investigation 3: Parts 2-3 Investigation 4: Parts 1-3</p>



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NGSS Cross-Cutting Concepts	FOSS Alignment
<p>Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.</p> <ul style="list-style-type: none"> - Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products. - Patterns of change can be used to make predictions. - Patterns can be used as evidence to support an explanation. 	<p>FOSS Third Edition Motion, Force and Models Investigations Guide</p> <p>Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3</p>
<p>Cause and Effect: Mechanism and Prediction: 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.</p> <ul style="list-style-type: none"> - Cause and effect relationships are routinely identified, tested, and used to explain change. - Events that occur together with regularity might or might not be a cause and effect relationship. 	<p>FOSS Third Edition Motion, Force and Models Investigations Guide</p> <p>Investigation 1: Parts 1-3 Investigation 2: Parts 1-4 Investigation 3: Parts 1-3</p>
<p>Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.</p> <ul style="list-style-type: none"> - Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. - Models can be used to represent systems and their interactions—such as inputs, processes and outputs— and energy, matter, and information flows within systems. - Models are limited in that they only represent certain aspects of the system under study. 	<p>FOSS Third Edition Motion, Force and Models Investigations Guide</p> <p>Investigation 1: Parts 1-3 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3</p>



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Unit 2: Changes in the Surface of the Planet

NYS Science Standard	FOSS Alignment
Major Understandings <i>Quoted from New York State Performance Indicators (PS. 2.1e, g-i; 2.2a, c, f-h)</i>	
<p>PS 2.1e. Rocks are composed of minerals. Only a few rock-forming minerals make up most of the rock on Earth. Minerals are identified on the basis of physical properties such as streak, hardness, and reaction to acid.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Part 3 Investigation 3: Parts 1-4</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Part 3</p>
<p>PS 2.2g. Rocks are classified according to their method of formation. The three classes of rocks are sedimentary, metamorphic, and igneous. Most rocks show characteristics that give clues to their formation conditions.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 3: Parts 1-4</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 4: Parts 1-3</p>
<p>PS 2.2h. The rock cycle model shows how types of rock or rock material may be transformed from one type of rock to another.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 3: Part 1</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 4: Part 3</p>
<p>PS 2.1g. The dynamic processes that wear away Earth's surface include weathering and erosion.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 2-3 Investigation 2: Parts 1-4</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 1-4 Investigation 2: Parts 1-4 Investigation 3: Part 4</p>
<p>PS 2.1h. The process of weathering breaks down rocks to form sediment. Soil consists of sediment, organic material, water, and air.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 1-4</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 1-4</p>
<p>PS 2.1i. Erosion is the transport of sediment. Gravity is the driving force behind erosion. Gravity can act directly or through agents such as moving water, wind, and glaciers.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 2: Parts 1-4</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 2: Parts 1-3 Investigation 3: Part 4</p>



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Unit 2: Changes in the Surface of the Planet

NYS Science Standard	FOSS Alignment
Major Understandings <i>Quoted from New York State Performance Indicators (PS. 2.1e, g-i; 2.2a, c, f-h)</i>	
<p>PS 2.2a. The interior of Earth is hot. Heat flow and movement of material within Earth cause sections of Earth's crust to move. This may result in earthquakes, volcanic eruption, and the creation of mountains and ocean basins.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 2: Part 4 Investigation 3: Part 1</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 3: Part 4 Investigation 4: Part 3</p>
<p>PS 2.2c. Folded, tilted, faulted, and displaced rock layers suggest past crustal movement.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 2: Part 2</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 2: Part 2</p>
<p>PS 2.2f. Plates may collide, move apart, or slide past one another. Most volcanic activity and mountain building occur at the boundaries of these plates, often resulting in earthquakes.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 2: Part 4</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 3: Parts 1-4</p>



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Unit 2: Changes in the Surface of the Planet

MST Standard	FOSS Alignment
Standard 2: Information Systems	
<p>Key Idea 1: Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 3-4 Investigation 2: Parts 2-3 Investigation 3: Parts 2, 4 Investigation 4: Part 1</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 3-4 Investigation 2: Parts 2-4 Investigation 3: Parts 2-3 Investigation 4: Part 1</p>
<p>Key Idea 2: Knowledge of the impacts and limitations of information systems is essential to its effectiveness and ethical use.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 1, 3 Investigation 2: Parts 1-2 Investigation 3: Parts 2-4 Investigation 4: Parts 1-3</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 1, 3 Investigation 2: Parts 1-2, 4 Investigation 3: Parts 1-3 Investigation 4: Parts 1-3</p>
Standard 6: Interconnectedness: Common Themes	
<p>Key Idea 1: Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Part 1 Investigation 2: Part 1</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Part 1 Investigation 2: Part 1</p>
<p>Key Idea 2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 2-3 Investigation 2: Parts 1-2</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 2-3 Investigation 2: Parts 1-2, 4 Investigation 3: Parts 1-3</p>



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Unit 2: Changes in the Surface of the Planet

MST Standard	FOSS Alignment
Standard 2: Information Systems	
<p>Key Idea 4: Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 2: Parts 1, 3</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 2: Parts 1, 3-4 Investigation 3: Part 3</p>
Standard 7: Interdisciplinary Problem Solving	
<p>Key Idea 2: Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.</p>	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 1-4 Investigation 2: Parts 1-4 Investigation 3: Parts 1-4 Investigation 4: Parts 1-3</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 1-4 Investigation 2: Parts 1-4 Investigation 3: Parts 2-4 Investigation 4: Parts 1-3</p>



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Unit 2: Changes in the Surface of the Planet

NGSS Cross-Cutting Concepts	FOSS Alignment
<p>Cause and Effect: Mechanism and Prediction: 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.</p> <ul style="list-style-type: none"> - Cause and effect relationships are routinely identified, tested, and used to explain change. - Events that occur together with regularity might or might not be a cause and effect relationship. 	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 2-3 Investigation 2: Parts 1-4</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 2-3 Investigation 2: Parts 1-4 Investigation 3: Part 4</p>
<p>Energy and Matter: Flows, Cycles, and Conservation: Tracking energy and matter flows into, out of, and within systems helps one understand their system's behavior.</p> <ul style="list-style-type: none"> - Matter is made of particles. - Matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems. - Energy can be transferred in various ways and between objects. 	<p><i>Foundational experiences and connections to this Cross-Cutting Concept are found in FOSS Third Edition Soils, Rocks and Landforms and FOSS Next Generation Soils, Rocks and Landforms. However, the conceptual design of the investigations does not include direct correlations to this CCC.</i></p>
<p>Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.</p> <ul style="list-style-type: none"> - Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. - Models can be used to represent systems and their interactions—such as inputs, processes and outputs— and energy, matter, and information flows within systems. - Models are limited in that they only represent certain aspects of the system under study. 	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 1: Parts 1 Investigation 2: Parts 1</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 1: Part 1 Investigation 2: Part 1</p>
<p>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.</p> <ul style="list-style-type: none"> - Change is measured in terms of differences over time and may occur at different rates. - Some systems appear stable, but over long periods of time will eventually change. 	<p>FOSS Third Edition Soils, Rocks and Landforms Investigations Guide Investigation 2: Parts 1, 3-4 Investigation 3: Parts 1</p> <p>FOSS Next Generation Soils, Rocks and Landforms Investigations Guide Investigation 2: Parts 1, 3-4 Investigation 3: Part 3</p>



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Unit 3: Food and Nutrition

NYS Science Standard	FOSS Alignment
Major Understandings <i>Quoted from New York State Performance Indicators (LE. 4.2a,b) (Elementary LE. 5.2e, g; 5.3a, b)</i>	
LE 5.3a. Humans need a variety of healthy foods, exercise, and rest in order to grow and maintain good health.	FOSS Next Generation Living Systems Investigations Guide Investigation 2: Parts 1-3
LE 5.3b. Good health habits include hand washing and personal cleanliness; avoiding harmful substances (including alcohol, tobacco, illicit drugs); eating a balanced diet; engaging in regular exercise.	<i>Foundational experiences and connections to this NYS Standard are found in FOSS Next Generation Living Systems. However the conceptual design of the investigations does not include direct correlations to this standard.</i>
LE 5.2g. The health, growth, and development of organisms are affected by environmental conditions such as the availability of food, air, water, space, shelter, heat, and sunlight.	FOSS Next Generation Living Systems Investigations Guide Investigation 3: Parts 1-3
LE 5.2e. Particular animal characteristics are influenced by changing environmental conditions including; fat storage in winter, coat thickness in winter, camouflage, shedding of fur.	See Grade 3: FOSS Next Generation Structures of Life Investigations Guide <i>Investigation 2: Part 2</i>
LE 4.2a. Growth is the process by which plants and animals increase in size.	FOSS Next Generation Living Systems Investigations Guide Investigation 2: Parts 1-3
LE 4.2b. Food supplies the energy and materials necessary for growth and repair.	FOSS Next Generation Living Systems Investigations Guide Investigation 2: Parts 1-3 Investigation 3: Parts 1-3



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Unit 3: Food and Nutrition

MST Standard	FOSS Alignment
Standard 2: Information Systems	
<p>Key Idea 1: Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.</p>	<p>FOSS Next Generation Living Systems Investigations Guide Investigation 1: Parts 2-4 Investigation 2: Part 3 Investigation 3: Parts 1-3 Investigation 4: Parts 1, 3-4</p>
Standard 6: Interconnectedness: Common Themes	
<p>Key Idea 1: Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.</p>	<p>FOSS Next Generation Living Systems Investigations Guide Investigation 1: Parts 1-4 Investigation 2: Parts 1-3 Investigation 3: Parts 1-3 Investigation 4: Parts 1-2, 4</p>
Standard 7: Interdisciplinary Problem Solving	
<p>Key Idea 2: Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.</p>	<p>FOSS Next Generation Living Systems Investigations Guide Investigation 1: Part 4 Investigation 2: Part 2 Investigation 3: Parts 1-2 Investigation 4: Part 4</p>



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Unit 3: Food and Nutrition

NGSS Cross-Cutting Concepts	FOSS Alignment
<p>Cause and Effect: Mechanism and Prediction: 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.</p> <ul style="list-style-type: none"> - Cause and effect relationships are routinely identified, tested, and used to explain change. - Events that occur together with regularity might or might not be a cause and effect relationship. 	<p><i>Multiple investigations in FOSS Next Generation Living Systems provide experiences where students analyze cause and effect relationships. However, the conceptual design of this module does not include focus on this Cross-Cutting Concept. The investigations re-direct the experiences to consider Stability and Change in complex plant and animal systems.</i></p>
<p>Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.</p> <ul style="list-style-type: none"> - Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. - Models can be used to represent systems and their interactions—such as inputs, processes and outputs— and energy, matter, and information flows within systems. - Models are limited in that they only represent certain aspects of the system under study. 	<p>FOSS Next Generation Living Systems Investigations Guide</p> <ul style="list-style-type: none"> Investigation 1: Parts 1, 4 Investigation 2: Parts 1-3 Investigation 3: Parts 1-3 Investigation 4: Parts 1-2, 4



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Unit 4: Exploring Ecosystems

NYS Science Standard	FOSS Alignment
Major Understandings <i>Quoted from New York State Performance Indicators (3.2a, 5.1c-e; 5.2a, 6.1a,b, 6.2a, 7.1a 7.2b-d)</i>	
<p>LE 7.1a. A population consists of all individuals of a species that are found together at a given place and time. Populations in one place form a community. The community and the physical factors with which it interacts compose an ecosystem.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Part 3</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 1: Part 3 Investigation 2: Parts 1-3</p>
<p>LE 5.1c. All organisms require energy to survive. The amount of energy needed and the method for obtaining this energy vary among cells. Some cells use oxygen to release the energy stored in food.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Part 2 Investigation 3: Part 2</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 5: Part 2</p>
<p>LE 5.1d. The methods for obtaining nutrients vary among organisms. Producers, such as green plants, use light energy to make their food. Consumers, such as animals, take in energy rich foods.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Part 2</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 5: Parts 1-2 Investigation 6: Parts 1-3</p>
<p>LE 6.2a. Photosynthesis is carried on by green plants and other organisms containing chlorophyll. In this process, the Sun's energy is converted into and stored as chemical energy in the form of sugar. The quantity of sugar molecules increases in green plants during photosynthesis in the presence of sunlight.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Part 2</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 5: Parts 1-2</p>
<p>LE 5.1e. Herbivores obtain energy from plants. Carnivores obtain energy from animals. Omnivores obtain energy from both plants and animals. Decomposers such as bacteria and fungi, obtain energy by consuming wastes and/or dead organisms.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Part 2</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 3: Part 2</p>
<p>LE 5.2a. Food provides molecules that serve as fuel and building material for all organisms. All living things, including plants, must release energy from their food, using it to carry on their life processes.</p>	<p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 3: Part 2 Investigation 5: Parts 1-4</p> <p><i>Foundational experiences and connections to this NYS Standard are found in FOSS Next Generation Environments. However the conceptual design of the investigations does not include direct correlations to this standard.</i></p>



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Unit 4: Exploring Ecosystems

NYS Science Standard	FOSS Alignment
Major Understandings <i>Quoted from New York State Performance Indicators (3.2a, 5.1c-e; 5.2a, 6.1a,b, 6.2a, 7.1a 7.2b-d)</i>	
<p>LE 6.1a. Energy flows through ecosystems in one direction, usually from the Sun, through producers to consumers and then to decomposers. This process may be visualized with food chains or energy pyramids.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Part 2</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 3: Parts 2-3 Investigation 6: Parts 1-4</p>
<p>LE 6.1b. Food webs identify the feeding relationships among producers, consumers and decomposers in an ecosystem.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Parts 1-4</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 3: Parts 2-3</p>
<p>LE 3.2a. In all environments, organisms with similar needs may compete with one another for resources.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Parts 2-3 Investigation 3: Parts 2-4</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 7: Parts 1-3</p>
<p>LE 7.2b. The environment may be altered through the activities of organisms. Alterations are sometimes abrupt. Some species may replace others over time, resulting in long-term gradual changes (ecological succession).</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Part 4 Investigation 3: Parts 2-3</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 8: Parts 1-3</p>
<p>LE 7.2c. Overpopulation by any species impacts the environment due to the increased use of resources. Human activities can bring about environmental degradation through resource acquisition, urban growth, land-use decisions, waste disposal, etc.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Parts 2-3 Investigation 3: Parts 2-3</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 7: Parts 1-3 Investigation 9: Parts 1-3</p>
<p>LE 7.2d. Since the Industrial Revolution, human activities have resulted in major pollution of air, water, and soil. Pollution has cumulative ecological effects such as acid rain, global warming, or ozone depletion. The survival of living things on our planet depends on the conservation and protection of Earth's resources.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Parts 1-4</p> <p>FOSS MS Populations and Ecosystems Investigation Guide Investigation 8: Parts 1-3 Investigation 9: Parts 1-3</p>



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Unit 4: Exploring Ecosystems

MST Standard	FOSS Alignment (to module/investigation/part as needed)
Standard 6: Interconnectedness: Common Themes	
<p>Key Idea 1: Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 1: Parts 1, 3 Investigation 2: Parts 1, 3 Investigation 3: Parts 2-3</p>
<p>Key Idea 2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 1: Part 2 Investigation 2: Part 3 Investigation 3: Parts 1-2</p>
<p>Key Idea 3: The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 3: Part 1</p>
<p>Key Idea 4: Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Part 3</p>
Standard 7: Interdisciplinary Problem Solving	
<p>Key Idea 1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.</p>	<p>FOSS Next Generation Environments Investigations Guide Investigation 3: Parts 1-2</p>



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Unit 4: Exploring Ecosystems

NGSS Cross-Cutting Concepts	FOSS Alignment
<p>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.</p> <ul style="list-style-type: none"> - Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. 	<p>FOSS Next Generation Environments Investigations Guide Investigation 3: Parts 1</p>
<p>Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.</p> <ul style="list-style-type: none"> - A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. - A system can be described in terms of its components and their interactions. 	<p>FOSS Next Generation Environments Investigations Guide Investigation 1: Parts 1, 3 Investigation 2: Parts 1, 3 Investigation 3: Parts 1, 4</p>
<p>Energy and Matter: Flows, Cycles, and Conservation: Tracking energy and matter flows into, out of, and within systems helps one understand the system's behavior.</p> <ul style="list-style-type: none"> - Matter is made of particles. - Matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems. - Energy can be transferred in various ways and between objects. 	<p>FOSS Next Generation Environments Investigations Guide Investigation 2: Parts 2-3</p>