SAVVAS
LEARNING COMPANY

A Teacher Planning Guide for

Elevate Science
Life ©2019

To the

Wisconsin Standards for Science
Life Science, Grades 6-8

Prepared by Savvas Learning Company, formerly Pearson K12 Learning

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Introduction

The following document demonstrates how the ***Elevate Science ©2019*** program supports the Wisconsin Standards for Science.

Savvas Learning Company is proud to introduce ***Elevate Science: Life, Earth, and Physical*** for Middle Grades – where exploration is the heart of science! Designed to address the rigors of new science standards, students will experience science up close and personal, using real-world, relevant phenomena to solve project-based problems. Our newest program prepares students for the challenges of tomorrow, building strong reasoning skills and critical thinking strategies as they engage in explorations, formulate claims, and gather and analyze data that promote evidence-based arguments. The blended print and digital curriculum covers all Next Generation Science Standards at every grade level.

Elevate Science helps teachers transform learning, promote innovation, and manage their classroom.

Transform science classrooms by immersing students in active, three-dimensional learning.
Elevate Science engages students with real-world phenomena, open-ended Quests, uDemonstrate performance-based tasks, and in the engineering/design process with uEngineer It! investigations.

- A new 3-D learning model enhances best practices.
- Engineering-focused features infuse STEM learning.
- Phenomena-based activities put students at the heart of a Quest for knowledge.

Innovate learning by focusing on 21st century skills.
Students are encouraged to think, collaborate, and innovate! With ***Elevate Science***, students explore STEM careers, experience engineering activities, and discover our scientific and technological world. The content, strategies, and resources of Elevate Science equip the science classroom for scientific inquiry and science and engineering practices.

- Problem-based learning Quests put students on a journey of discovery.
- STEM connections help integrate curriculum.
- Coding and innovation engage students and build 21st century skills.

Manage the classroom with confidence.
Teachers will lead their class in asking questions and engaging in argumentation. Evidence-based assessments provide new options for monitoring student understanding.

- Professional development offers practical point-of-use support.
- Embedded standards in the program allow for easy integration.
- ELL and differentiated instruction strategies help instructors reach every learner.
- Interdisciplinary connections relate science to other subjects.

Designed for today's classroom, preparing students for tomorrow's world. ***Elevate Science*** promises to:

- Elevate thinking.
- Elevate learning.
- Elevate teaching.

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Performance Indicators	**MS-LS4-2** Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
Science and Engineering Practices	**SCI.SEP7.A.m.2** Respectfully provide and receive critiques about one's explanations, procedures, models, and questions by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
Engineering, Technology, and the Application of Science	**SCI.ETS3.B.m.i** Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence.
uConnect Lab: Is It an Animal, pp. 3A-3B	
Performance Indicators	**MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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.

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Elevate Science: Life ©2019	**Wisconsin Standards for Science Life Science, Grades 6-8**
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS3.B.m.i** Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence.
Lesson 1: Living Things, pp. 4-13	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **SCI.LS2.B.m** The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. Food webs model how matter and energy are transferred among producers, consumers, and decomposers as the three groups interact within an ecosystem.
Science and Engineering Practices	**SCI.SEP3.A.m.1** Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. **SCI.SEP3.A.m.2** Conduct an investigation. Evaluate and revise the experimental design to produce data that serve as the basis for evidence to meet the goals of the investigation. **SCI.SEP8.A.m.3** Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used.

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Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**SCI.ETS3.A.m.i** Individuals and teams from many nations, cultures and backgrounds have contributed to advances in science and engineering. **SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas. **SCI.ETS3.A.m.iii** Science and engineering are influenced by what is valued in society.
Case Study: The Tough and Tiny Tardigarde, pp. 14-15	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared.
Science and Engineering Practices	**SCI.SEP4.A.m.1** Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).

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Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. **SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Lesson 2: Classification Systems, pp. 16-25	
Performance Indicators	**SCI.LS4.C.m** Species can change over time in response to changes in environmental conditions through adaptation by natural selection acting over generations. Traits that support successful survival and reproduction in the new environment become more common. **MS-LS4-2** Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
Science and Engineering Practices	**SCI.SEP1.A.m.6** Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. **SCI.SEP2.A.m.1** Evaluate limitations of a model for a proposed object or tool. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.

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Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
Engineering, Technology, and the Application of Science	**SCI.ETS3.A.m.i** Individuals and teams from many nations, cultures and backgrounds have contributed to advances in science and engineering. **SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas. **SCI.ETS3.A.m.iii** Science and engineering are influenced by what is valued in society. **SCI.ETS3.C.m.i** A theory is an explanation of some aspect of the natural world. Scientists develop theories by using multiple approaches. Validity of these theories and explanations is increased through a peer review process that tests and evaluates the evidence supporting scientific claims.
Lesson 3: Viruses, Bacteria, Protists, and Fungi, pp. 26-36	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions.
Science and Engineering Practices	**SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP6.A.m.5** Apply scientific reasoning to show why the data or evidence is adequate for the explanation.

Elevate Science: Life ©2019	Wisconsin Standards for Science Life Science, Grades 6-8
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. **SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. **SCI.ETS3.B.m.ii** Engineering seeks solutions to human problems, including issues that arise due to human interaction with the environment. It uses some of the same practices as science and often applies scientific principles to solutions.
uEngineer it!: A Disease Becomes a Cure, p. 37	
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena. **SCI.SEP6.B.m.1** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system.

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Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
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Lesson 4: Plants and Animals, pp. 38-49	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
Science and Engineering Practices	**SCI.SEP3.A.m.2** Conduct an investigation. Evaluate and revise the experimental design to produce data that serve as the basis for evidence to meet the goals of the investigation. **SCI.SEP6.A.m.5** Apply scientific reasoning to show why the data or evidence is adequate for the explanation. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).

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Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Evidence-Based Assessment, pp. 52-53	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions.
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP4.A.m.6** Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials). **SCI.SEP6.A.m.5** Apply scientific reasoning to show why the data or evidence is adequate for the explanation. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

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Engineering, Technology, and the Application of Science	**SCI.ETS1.A.m** The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. **MS-ETS1-1** Define 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.
uDemonstrate Lab: It's Alive!, pp. 54-57	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-1** Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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.
Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations.

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Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.
Topic 2: The Cell System	
Quest Kickoff: Cells on Display, pp. 60-61	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-1** Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells. **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Science and Engineering Practices	**SCI.SEP2.A.m.1** Evaluate limitations of a model for a proposed object or tool.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas.

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uConnect Lab: What Can You See, pp. 61A-61B	
Science and Engineering Practices	**SCI.SEP3.A.m.3** Evaluate the accuracy of various methods for collecting data.
Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations.
Engineering, Technology, and the Application of Science	**SCI.ETS2.A.m.ii** Science and technology drive each other forward.
Lesson 1: Structure and Function of Cells, pp. 62-71	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
Science and Engineering Practices	**SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP6.A.m.5** Apply scientific reasoning to show why the data or evidence is adequate for the explanation. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.

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Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. **SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.A.m.ii** Science and technology drive each other forward. **SCI.ETS2.B.m.iii** Technology use varies over time and from region to region. **SCI.ETS3.A.m.i** Individuals and teams from many nations, cultures and backgrounds have contributed to advances in science and engineering. **SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas. **SCI.ETS3.A.m.iii** Science and engineering are influenced by what is valued in society. **SCI.ETS3.C.m.i** A theory is an explanation of some aspect of the natural world. Scientists develop theories by using multiple approaches. Validity of these theories and explanations is increased through a peer review process that tests and evaluates the evidence supporting scientific claims.

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Lesson 2: Cell Structures, pp. 72-81	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
Science and Engineering Practices	**SCI.SEP2.A.m.1** Evaluate limitations of a model for a proposed object or tool. **SCI.SEP4.A.m.6** Consider limitations of data analysis (e.g., measurement error), and seek to improve precision and accuracy of data with better technological tools and methods (e.g., multiple trials).
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Lesson 3: Obtaining and Removing Materials, pp. 82-89	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
Science and Engineering Practices	**SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.

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Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. **SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system. **SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Lesson 4: Cell Division pp. 90-97	
Performance Indicators	**MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
Science and Engineering Practices	**SCI.SEP1.A.m.4** Ask questions to clarify or refine a model, an explanation, or an engineering problem. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.

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Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS3.C.m.i** A theory is an explanation of some aspect of the natural world. Scientists develop theories by using multiple approaches. Validity of these theories and explanations is increased through a peer review process that tests and evaluates the evidence supporting scientific claims.
Lesson 5: Photosynthesis, pp. 98-106	
Performance Indicators	**SCI.LS1.C.m** Plants use the energy from light to make sugars through photosynthesis. Within individual organisms, food is broken down through a series of chemical reactions that rearrange molecules and release energy. **MS-LS1-6** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. **MS-LS1-7** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).

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Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. **SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.
uEngineer it!: An Artificial Leaf, p. 107	
Performance Indicators	**MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP6.B.m.1** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints. **SCI.SEP6.B.m.3** Optimize performance of a design by prioritizing criteria, making trade-offs, testing, revising, and retesting. **SCI.SEP8.A.m.5** Communicate scientific and technical information (e.g., about a proposed object, tool, process, or system) in writing and through oral presentations.

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Crosscutting Concepts	**SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.
Engineering, Technology, and the Application of Science	**SCI.ETS1.A.m** The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. **SCI.ETS1.B.m.i** A solution needs to be tested and then modified on the basis of the test results in order to improve it. **SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.
Lesson 6: Cellular Respiration, pp. 108-115	
Performance Indicators	**SCI.LS1.C.m** Plants use the energy from light to make sugars through photosynthesis. Within individual organisms, food is broken down through a series of chemical reactions that rearrange molecules and release energy. **MS-LS1-7** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

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Science and Engineering Practices	**SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts. **SCI.SEP8.A.m.5** Communicate scientific and technical information (e.g., about a proposed object, tool, process, or system) in writing and through oral presentations.
Crosscutting Concepts	**SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.
Engineering, Technology, and the Application of Science	**MS-ETS1-1** Define 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.
Case Study: The Mighty Role Rat, pp. 116-117	
Performance Indicators	**MS-LS1-7** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
Science and Engineering Practices	**SCI.SEP3.A.m.1** Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).

Elevate Science: Life ©2019	Wisconsin Standards for Science Life Science, Grades 6-8
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. **SCI.ETS3.B.m.ii** Engineering seeks solutions to human problems, including issues that arise due to human interaction with the environment. It uses some of the same practices as science and often applies scientific principles to solutions.
Evidence-Based Assessment, pp. 120-121	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena. **SCI.SEP6.A.m.2** Construct an explanation using models or representations.

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Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. **SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
uDemonstrate Lab: Design and Build a Microscope, pp. 122-125	
Science and Engineering Practices	**SCI.SEP2.A.m.7** Develop and use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales. **SCI.SEP6.B.m.1** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.

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Engineering, Technology, and the Application of Science	**MS-ETS1-4** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. **SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.
Topic 3: Human Body Systems	
Quest Kickoff: Peak Performance Plan, pp. 128-129	
Performance Indicators	**MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **MS-LS1-8** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
Science and Engineering Practices	**SCI.SEP7.A.m.4** Make an oral or written argument that supports or refutes the advertised performance of a device, process, or system. Based the argument on empirical evidence concerning whether or not the technology meets relevant criteria and constraints. **SCI.SEP8.A.m.5** Communicate scientific and technical information (e.g., about a proposed object, tool, process, or system) in writing and through oral presentations.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.

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Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. **SCI.ETS3.B.m.i** Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence. **SCI.ETS3.B.m.ii** Engineering seeks solutions to human problems, including issues that arise due to human interaction with the environment. It uses some of the same practices as science and often applies scientific principles to solutions.
uConnect Lab: How is Your Body Organized?, pp. 129A-129B	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Science and Engineering Practices	**SCI.SEP2.A.m.2** Develop or modify a model—based on evidence—to match what happens if a variable or component of a system is changed. **SCI.SEP6.A.m.2** Construct an explanation using models or representations. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.

Elevate Science: Life ©2019	Wisconsin Standards for Science Life Science, Grades 6-8
Lesson 1: Body Organization, pp. 130-138	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **SCI.LS1.D.m** Each sense receptor responds to different inputs, transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain resulting in immediate behavior or memories. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Science and Engineering Practices	**SCI.SEP2.A.m.3** Use and develop a model of simple systems with uncertain and less predictable factors. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP7.A.m.3** Construct, use, and present 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.
Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. **SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.

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Continued:	**Continued:** **SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
uEngineer it!: Artificial Skin, pp. 139	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena. **SCI.SEP6.B.m.1** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints. **SCI.SEP8.A.m.5** Communicate scientific and technical information (e.g., about a proposed object, tool, process, or system) in writing and through oral presentations.

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Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. **SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.A.m.ii** Science and technology drive each other forward. **SCI.ETS2.B.m.iii** Technology use varies over time and from region to region.
Lesson 2: Systems Interacting, pp. 140-149	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Science and Engineering Practices	**SCI.SEP3.A.m.1** Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.

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Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. **SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. **SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Case Study: Agents of Infection, pp. 150-151	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Science and Engineering Practices	**SCI.SEP7.A.m.3** Construct, use, and present 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. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).

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Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. **SCI.ETS3.B.m.ii** Engineering seeks solutions to human problems, including issues that arise due to human interaction with the environment. It uses some of the same practices as science and often applies scientific principles to solutions.
Lesson 3: Supply Energy, pp. 152-163	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **SCI.LS1.D.m** Each sense receptor responds to different inputs, transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain resulting in immediate behavior or memories. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Science and Engineering Practices	**SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP7.A.m.3** Construct, use, and present 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.

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Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations. **SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. **SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Lesson 4: Managing Materials, pp. 164-175	
Performance Indicators	**SCI.LS1.A.m** All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions. **SCI.LS1.D.m** Each sense receptor responds to different inputs, transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain resulting in immediate behavior or memories. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

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Science and Engineering Practices	**SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP8.A.m.5** Communicate scientific and technical information (e.g., about a proposed object, tool, process, or system) in writing and through oral presentations.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
Lesson 5: Controlling Processes, pp. 176-185	
Performance Indicators	**SCI.LS1.D.m** Each sense receptor responds to different inputs, transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain resulting in immediate behavior or memories. **MS-LS1-8** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability. **SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.

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Evidence-Based Assessment, pp. 188-189	
Performance Indicators	**SCI.LS1.D.m** Each sense receptor responds to different inputs, transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain resulting in immediate behavior or memories. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
Science and Engineering Practices	**SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
uDemonstrate: Reaction Research, pp. 190-193	
Performance Indicators	**MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **MS-LS1-8** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
Science and Engineering Practices	**SCI.SEP3.A.m.1** Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. **SCI.SEP3.A.m.5** Collect data about the performance of a proposed object, tool, process, or system under a range of conditions. **SCI.SEP8.A.m.5** Communicate scientific and technical information (e.g., about a proposed object, tool, process, or system) in writing and through oral presentations.

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Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability. **SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
Engineering, Technology, and the Application of Science	**MS-ETS1-4** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
Topic 4: Reproduction and Growth	
Quest Kickoff: Construction Without Destruction, pp. 196-197	
Performance Indicators	**SCI.LS1.B.m** Animals engage in behaviors that increase the odds of reproduction. An organism's growth is affected by both genetic and environmental factors. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. **SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

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Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.
Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.
Engineering, Technology, and the Application of Science	**MS-ETS1-1** Define 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. **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
uConnect Lab: To Care or Not to Care?, 197A-197B	
Performance Indicators	**MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
Science and Engineering Practices	**SCI.SEP2.A.m.2** Develop or modify a model—based on evidence—to match what happens if a variable or component of a system is changed.
Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.

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To the
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Lesson 1: Patterns of Reproduction, pp. 198-207	
Performance Indicators	**SCI.LS3.B.m** In sexual reproduction, each parent contributes half of the genes acquired by the offspring resulting in variation between parent and offspring. Genetic information can be altered because of mutations, which may result in beneficial, negative, or no change to proteins in or traits of an organism. **MS-LS3-2** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information, and sexual reproduction results in offspring with genetic variation.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena. **SCI.SEP4.A.m.5** Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.
Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.
Lesson 2: Plant Structures for Reproduction, pp. 208-216	
Performance Indicators	**MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

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Science and Engineering Practices	**SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
uEngineer it!: Gardening in Space, p. 217	
Performance Indicators	**SCI.LS1.C.m** Plants use the energy from light to make sugars through photosynthesis. Within individual organisms, food is broken down through a series of chemical reactions that rearrange molecules and release energy. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. **MS-LS1-6** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP6.B.m.1** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints.

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Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS1.A.m** The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. **SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.A.m.ii** Science and technology drive each other forward. **SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. **SCI.ETS3.B.m.ii** Engineering seeks solutions to human problems, including issues that arise due to human interaction with the environment. It uses some of the same practices as science and often applies scientific principles to solutions.

Elevate Science: Life ©2019	Wisconsin Standards for Science Life Science, Grades 6-8
Lesson 3: Animal Behaviors for Reproduction, pp. 218-227	
Performance Indicators	**SCI.LS1.B.m** Animals engage in behaviors that increase the odds of reproduction. An organism's growth is affected by both genetic and environmental factors. **MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
Science and Engineering Practices	**SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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.
Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.
Lesson 4: Factors Influencing Growth, pp. 228-237	
Performance Indicators	**SCI.LS1.B.m** Animals engage in behaviors that increase the odds of reproduction. An organism's growth is affected by both genetic and environmental factors. **MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

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Science and Engineering Practices	**SCI.SEP3.A.m.1** Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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.
Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.
Engineering, Technology, and the Application of Science	**MS-ETS1-1** Define 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.
Case Study: Warmer Waters, Fewer Fish, pp. 238-239	
Performance Indicators	**MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
Science and Engineering Practices	S**CI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).

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Crosscutting Concepts	**SCI.CC3.m** Students observe time, space, and energy phenomena at various scales using models to study systems that are too large or too small. They understand phenomena observed at one scale may not be observable at another scale, and the function of natural and designed systems may change with scale. They use proportional relationships (e.g., speed as the ratio of distance traveled to time taken) to gather information about the magnitude of properties and processes. They represent scientific relationships through the use of algebraic expressions and equations.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.i** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.
Evidence-Based Assessment, pp. 242-243	
Performance Indicators	**SCI.LS1.B.m** Animals engage in behaviors that increase the odds of reproduction. An organism's growth is affected by both genetic and environmental factors. **MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
Science and Engineering Practices	**SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.

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Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.i** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.
uDemonstrate Lab: Clean and Green, pp. 244-247	
Performance Indicators	**SCI.LS1.B.m** Animals engage in behaviors that increase the odds of reproduction. An organism's growth is affected by both genetic and environmental factors. **MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
Science and Engineering Practices	**SCI.SEP3.A.m.1** Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. **SCI.SEP4.A.m.5** Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible. **SCI.SEP5.A.m.1** Decide when to use qualitative vs. quantitative data. **SCI.SEP6.A.m.1** Construct an explanation that includes qualitative or quantitative relationships between variables that predict and describe phenomena.

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Continued:	**Continued:** **SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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. **SCI.SEP8.A.m.2** Clarify claims and findings by integrating text-based qualitative and quantitative scientific information with information contained in media and visual displays.
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data. **SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.i** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. **SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.

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Topic 5: Ecosystems	
Quest Kickoff: Mystery at Pleasant Pond, pp. 250-251	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP3.A.m.3** Evaluate the accuracy of various methods for collecting data. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena.
Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **SCI.ETS3.B.m.i** Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence.

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uConnect Lab: Every Breath You Take, pp. 251A-251B	
Performance Indicators	**MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP2.A.m.2** Develop or modify a model—based on evidence—to match what happens if a variable or component of a system is changed. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP6.A.m.2** Construct an explanation using models or representations.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. **SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.

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Lesson 1: Living Things and the Environment, pp. 252-259	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data. **SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.

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Case Study: The Case of the Disappearing Cerulean Warbler, pp. 260-261	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.i** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.

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Lesson 2: Energy Flow in Ecosystems, pp. 262-270	
Performance Indicators	**SCI.LS1.C.m** Plants use the energy from light to make sugars through photosynthesis. Within individual organisms, food is broken down through a series of chemical reactions that rearrange molecules and release energy. **SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **SCI.LS2.B.m** The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. Food webs model how matter and energy are transferred among producers, consumers, and decomposers as the three groups interact within an ecosystem. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP2.A.m.1** Evaluate limitations of a model for a proposed object or tool. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.

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Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. **SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.i** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.
uEngineer it!: Eating Oil, p. 271	
Performance Indicators	**SCI.LS2.B.m** The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. Food webs model how matter and energy are transferred among producers, consumers, and decomposers as the three groups interact within an ecosystem. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP6.B.m.1** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system.

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Crosscutting Concepts	**SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.
Engineering, Technology, and the Application of Science	**SCI.ETS1.A.m** The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. **SCI.ETS1.B.m.iv** Models of all kinds are important for testing solutions. **MS-ETS1-1** Define 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. **SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.B.m.i** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. **SCI.ETS3.B.m.ii** Engineering seeks solutions to human problems, including issues that arise due to human interaction with the environment. It uses some of the same practices as science and often applies scientific principles to solutions.

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Lesson 3: Cycles of Matter, pp. 272-281	
Performance Indicators	**MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. **SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared.
Science and Engineering Practices	**SCI.SEP1.A.m.3** Ask questions to determine relationships between independent and dependent variables and relationships in models. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
Engineering, Technology, and the Application of Science	**SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas.

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Evidence-Based Assessment, pp. 284-285	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **SCI.LS2.B.m** The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. Food webs model how matter and energy are transferred among producers, consumers, and decomposers as the three groups interact within an ecosystem. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena. **SCI.SEP7.A.m.3** Construct, use, and present 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.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. **SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.

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Continued:	Continued: **SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
uDemonstrate Lab: Last Remains, pp. 286-289	
Performance Indicators	**SCI.LS2.B.m** The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. Food webs model how matter and energy are transferred among producers, consumers, and decomposers as the three groups interact within an ecosystem. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study. **SCI.CC5.m** Students understand matter is conserved because atoms are conserved in physical and chemical processes. They also understand that within a natural or designed system the transfer of energy drives the motion and cycling of matter. Energy may take different forms (e.g., energy in fields, thermal energy, and energy of motion). The transfer of energy can be tracked as energy flows through a designed or natural system.

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Topic 6: Populations, Communities, and Ecosystems	
Quest Kickoff: To Cross or Not to Cross, pp. 292-293	
Performance Indicators	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP2.A.m.7** Develop and use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints. **SCI.SEP7.A.m.2** Respectfully provide and receive critiques about one's explanations, procedures, models, and questions by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail. **SCI.SEP7.A.m.5** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.

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Engineering, Technology, and the Application of Science	**SCI.ETS1.B.m.ii** There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. **MS-ETS1-1** Define 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. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
uConnect Lab: How Communities Change, pp. 293A-293B	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **SCI.LS2.C.m** Ecosystem characteristics vary over time. Disruptions to any part of an ecosystem can lead to shifts in all of its populations. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-4** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena.

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Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Lesson 1: Interactions in Ecosystems, pp. 294-303	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **SCI.LS2.C.m** Ecosystem characteristics vary over time. Disruptions to any part of an ecosystem can lead to shifts in all of its populations. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.

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Continued:	**Continued:** **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints. **SCI.SEP7.A.m.5** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Lesson 2: Dynamic and Resilient Ecosystems, pp. 304-311	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **SCI.LS2.C.m** Ecosystem characteristics vary over time. Disruptions to any part of an ecosystem can lead to shifts in all of its populations. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. **MS-LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **MS-LS2-4** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

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Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts. **SCI.SEP7.A.m.5** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.
Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability. **SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

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Lesson 3: Biodiversity, pp. 312-323	
Performance Indicators	**SCI.LS2.C.m** Ecosystem characteristics vary over time. Disruptions to any part of an ecosystem can lead to shifts in all of its populations. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. **SCI.LS2.D.m** Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on -- for example, water purification and recycling. **MS-LS2-4** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **SCI.LS4.D.m** Changes in biodiversity can influence humans' resources and ecosystem services they rely on.
Science and Engineering Practices	**SCI.SEP1.A.m.2** Ask questions to identify and clarify evidence and the premise(s) of an argument. **SCI.SEP1.A.m.4** Ask questions to clarify or refine a model, an explanation, or an engineering problem. **SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP3.A.m.5** Collect data about the performance of a proposed object, tool, process, or system under a range of conditions. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints.

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Continued:	Continued: **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts. **SCI.SEP7.A.m.3** Construct, use, and present 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. **SCI.SEP7.A.m.5** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.
Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
Case Study: The Dependable Elephant, pp. 324-325	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **MS-LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **SCI.LS4.D.m** Changes in biodiversity can influence humans' resources and ecosystem services they rely on.

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Science and Engineering Practices	**SCI.SEP4.A.m.1** Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP6.A.m.4** Apply scientific ideas, principles, and evidence to construct, revise, or use an explanation for real world phenomena, examples, or events. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data. **SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.i** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

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Lesson 4: Ecosystem Services, pp. 326-334	
Performance Indicators	**SCI.LS2.D.m** Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on -- for example, water purification and recycling. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **SCI.LS4.D.m** Changes in biodiversity can influence humans' resources and ecosystem services they rely on.
Science and Engineering Practices	**SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP7.A.m.5** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.
Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

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uEngineer it!: From Bulldozers to Biomes, p. 335	
Performance Indicators	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Science and Engineering Practices	**SCI.SEP7.A.m.5** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Evidence-Based Assessment, pp. 338-339	
Performance Indicators	**SCI.LS2.C.m** Ecosystem characteristics vary over time. Disruptions to any part of an ecosystem can lead to shifts in all of its populations. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints. **SCI.SEP7.A.m.5** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

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uDemonstrate Lab: Changes in an Ecosystem, pp. 340-343	
Performance Indicators	**SCI.LS2.A.m** Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared. **SCI.LS2.C.m** Ecosystem characteristics vary over time. Disruptions to any part of an ecosystem can lead to shifts in all of its populations. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-4** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
Science and Engineering Practices	**SCI.SEP2.A.m.2** Develop or modify a model—based on evidence—to match what happens if a variable or component of a system is changed. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.
Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

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Topic 7: Genes and Heredity	
Quest Kickoff: Funky Fruits, pp. 346-347	
Performance Indicators	**MS-LS3-1** Develop and use 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** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information, and sexual reproduction results in offspring with genetic variation. **MS-LS4-5** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
Science and Engineering Practices	**SCI.SEP8.A.m.5** Communicate scientific and technical information (e.g., about a proposed object, tool, process, or system) in writing and through oral presentations.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. **MS-LS4-5** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

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uConnect Lab: Making More, p. 347A-347B	
Performance Indicators	**MS-LS3-2** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information, and sexual reproduction results in offspring with genetic variation.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
Lesson 1: Patterns of Inheritance, pp. 348-357	
Performance Indicators	**SCI.LS3.B.m** In sexual reproduction, each parent contributes half of the genes acquired by the offspring resulting in variation between parent and offspring. Genetic information can be altered because of mutations, which may result in beneficial, negative, or no change to proteins in or traits of an organism. **MS-LS3-2** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information, and sexual reproduction results in offspring with genetic variation.
Science and Engineering Practices	**SCI.SEP2.A.m.4** Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. **SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena. **SCI.SEP3.A.m.4** Collect data under a range of conditions that serve as the basis for evidence to answer scientific questions or test design solutions. **SCI.SEP4.A.m.5** Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible.

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Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.
Engineering, Technology, and the Application of Science	**SCI.ETS3.A.m.i** Individuals and teams from many nations, cultures and backgrounds have contributed to advances in science and engineering. **SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas.
Case Study: Cephalopods Special Edition, pp. 358-359	
Performance Indicators	**SCI.LS3.A.m** Genes chiefly regulate a specific protein, which affect an individual's traits. **SCI.LS3.B.m** In sexual reproduction, each parent contributes half of the genes acquired by the offspring resulting in variation between parent and offspring. Genetic information can be altered because of mutations, which may result in beneficial, negative, or no change to proteins in or traits of an organism.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).

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Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Lesson 2: Chromosomes and Inheritance, pp. 360-368	
Performance Indicators	**SCI.LS3.B.m** In sexual reproduction, each parent contributes half of the genes acquired by the offspring resulting in variation between parent and offspring. Genetic information can be altered because of mutations, which may result in beneficial, negative, or no change to proteins in or traits of an organism. **MS-LS3-2** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information, and sexual reproduction results in offspring with genetic variation.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena. **SCI.SEP4.A.m.2** Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.
Crosscutting Concepts	**SCI.CC2.m** Students classify relationships as causal or correlational, and recognize correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be explained using probability.

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Lesson 3: Genetic Coding and Protein Synthesis, pp. 370-378	
Performance Indicators	**SCI.LS3.A.m** Genes chiefly regulate a specific protein, which affect an individual's traits. **MS-LS3-1** Develop and use 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.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
uEngineer it!: Reinventing DNA as Data Storage, p. 379	
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints.
Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.

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Engineering, Technology, and the Application of Science	**SCI.ETS1.A.m** The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. **MS-ETS1-1** Define 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. **SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.B.m.ii** The uses of technologies are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.
Lesson 4: Trait Variations, p. 380-391	
Performance Indicators	**SCI.LS3.A.m** Genes chiefly regulate a specific protein, which affect an individual's traits. **SCI.LS3.B.m** In sexual reproduction, each parent contributes half of the genes acquired by the offspring resulting in variation between parent and offspring. Genetic information can be altered because of mutations, which may result in beneficial, negative, or no change to proteins in or traits of an organism. **MS-LS3-1** Develop and use 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.
Science and Engineering Practices	**SCI.SEP2.A.m.4** Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. **SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena.

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Continued:	**Continued:** **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Lesson 5: Genetic Technologies, pp. 392-401	
Performance Indicators	**SCI.LS3.B.m** In sexual reproduction, each parent contributes half of the genes acquired by the offspring resulting in variation between parent and offspring. Genetic information can be altered because of mutations, which may result in beneficial, negative, or no change to proteins in or traits of an organism. **MS-LS4-5** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
Science and Engineering Practices	**SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

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Engineering, Technology, and the Application of Science	**SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.A.m.ii** Science and technology drive each other forward. **SCI.ETS2.B.m.iii** Technology use varies over time and from region to region. **MS-LS4-5** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. **SCI.ETS3.A.m.i** Individuals and teams from many nations, cultures and backgrounds have contributed to advances in science and engineering. **SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas. **SCI.ETS3.A.m.iii** Science and engineering are influenced by what is valued in society. **SCI.ETS3.B.m.iii** Science and engineering have direct impacts on the quality of life for all people. Therefore, scientists and engineers need to pursue their work in an ethical manner that requires honesty, fairness and dedication to public health, safety and welfare. **MS-ETS3-2** Evaluate information and evidence about issues related to genetically modifying organisms and identify questions that can, and cannot, be answered by science (LS3.B.m).

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Evidence-Based Assessment, pp. 404-405	
Performance Indicators	**MS-LS3-1** Develop and use 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** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information, and sexual reproduction results in offspring with genetic variation. **MS-LS4-5** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena.
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.
Engineering, Technology, and the Application of Science	**MS-LS4-5** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
uDemonstrate: Make the Right Call!, pp. 406-409	
Performance Indicators	**MS-LS3-2** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information, and sexual reproduction results in offspring with genetic variation.
Science and Engineering Practices	**SCI.SEP2.A.m.5** Develop and use a model to predict and describe phenomena. **SCI.SEP4.A.m.8** Analyze data to define an optimal operational range for a proposed object, tool, process, or system that best meets criteria for success.

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Crosscutting Concepts	**SCI.CC4.m** Students understand systems may interact with other systems: they may have sub-systems and be a part of larger complex systems. They use models to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. They also learn that models are limited in that they only represent certain aspects of the system under study.
Topic 8: Natural Selection and Change Over Time	
Quest Kickoff: A Migration Puzzle, pp. 412-413	
Performance Indicators	**MS-LS4-1** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. **MS-LS4-2** Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. **MS-LS4-3** Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. **MS-LS4-4** Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena.
Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.

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Engineering, Technology, and the Application of Science	**SCI.ETS3.B.m.i** Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence.
uConnect Lab: Fins and Limbs, p. 413A-413B	
Performance Indicators	**MS-LS4-1** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. **MS-LS4-2** Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP4.A.m.7** Analyze and interpret data to determine similarities and differences in findings.
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.
Lesson 1: Early Study of Evolution, p. 414-423	
Performance Indicators	**SCI.LS4.B.m** Both natural and artificial selection result from certain traits giving some individuals an advantage in surviving and reproducing, leading to predominance of certain traits in a population. **MS-LS4-1** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

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Continued:	**Continued:** **MS-LS4-3** Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. **MS-LS4-4** Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
Science and Engineering Practices	**SCI.SEP1.A.m.6** Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena.
Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**SCI.ETS3.A.m.i** Individuals and teams from many nations, cultures and backgrounds have contributed to advances in science and engineering. **SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas. **SCI.ETS3.A.m.iii** Science and engineering are influenced by what is valued in society. **SCI.ETS3.C.m.i** A theory is an explanation of some aspect of the natural world. Scientists develop theories by using multiple approaches. Validity of these theories and explanations is increased through a peer review process that tests and evaluates the evidence supporting scientific claims.

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Lesson 2: Natural Selection, pp. 424-432	
Performance Indicators	**SCI.LS4.B.m** Both natural and artificial selection result from certain traits giving some individuals an advantage in surviving and reproducing, leading to predominance of certain traits in a population. **MS-LS4-4** Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. **MS-LS4-6** Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
Science and Engineering Practices	**SCI.SEP5.A.m.3** Use mathematical representations to describe and support scientific conclusions and design solutions. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems.
Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**SCI.ETS3.A.m.i** Individuals and teams from many nations, cultures and backgrounds have contributed to advances in science and engineering. **SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas. **SCI.ETS3.A.m.iii** Science and engineering are influenced by what is valued in society.

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uEngineer it! Fossils and Bedrock, p. 433	
Performance Indicators	**SCI.LS4.A.m** The fossil record documents the existence, diversity, extinction, and change of many life forms and their environments through Earth's history. The fossil record and comparisons of anatomical similarities between organisms enables the inference of lines of evolutionary descent.
Science and Engineering Practices	**SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP6.B.m.2** Undertake a design project, engaging in the design cycle, to construct and implement a solution that meets specific design criteria and constraints.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
Lesson 3: The Process of Evolution, pp. 434-441	
Performance Indicators	**SCI.LS4.B.m** Both natural and artificial selection result from certain traits giving some individuals an advantage in surviving and reproducing, leading to predominance of certain traits in a population. **MS-LS4-4** Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. **MS-LS4-6** Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

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Science and Engineering Practices	**SCI.SEP5.A.m.3** Use mathematical representations to describe and support scientific conclusions and design solutions.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Engineering, Technology, and the Application of Science	**SCI.ETS3.C.m.i** A theory is an explanation of some aspect of the natural world. Scientists develop theories by using multiple approaches. Validity of these theories and explanations is increased through a peer review process that tests and evaluates the evidence supporting scientific claims.
Lesson 4: Evidence in the Fossil Record, pp. 442-453	
Performance Indicators	**SCI.LS4.A.m** The fossil record documents the existence, diversity, extinction, and change of many life forms and their environments through Earth's history. The fossil record and comparisons of anatomical similarities between organisms enables the inference of lines of evolutionary descent. **MS-LS4-1** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. **MS-LS4-2** Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. **MS-LS4-3** Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. **MS-LS4-6** Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

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Science and Engineering Practices	**SCI.SEP4.A.m.1** Construct, analyze, or interpret graphical displays of data and large data sets to identify linear and nonlinear relationships. **SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP4.A.m.7** Analyze and interpret data to determine similarities and differences in findings. **SCI.SEP5.A.m.3** Use mathematical representations to describe and support scientific conclusions and design solutions. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP6.A.m.5** Apply scientific reasoning to show why the data or evidence is adequate for the explanation. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts. **SCI.SEP8.A.m.3** Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used. **SCI.SEP8.A.m.4** Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts. **SCI.SEP8.A.m.5** Communicate scientific and technical information (e.g., about a proposed object, tool, process, or system) in writing and through oral presentations.

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Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.
Engineering, Technology, and the Application of Science	**SCI.ETS2.B.m.i** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.
Case Study: Could Dinosaurs Roars?, pp. 454-455	
Performance Indicators	**SCI.LS4.A.m** The fossil record documents the existence, diversity, extinction, and change of many life forms and their environments through Earth's history. The fossil record and comparisons of anatomical similarities between organisms enables the inference of lines of evolutionary descent. **MS-LS4-2** Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
Science and Engineering Practices	**SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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. **SCI.SEP8.A.m.1** Critically read scientific texts adapted for classroom use to determine the central ideas, to obtain scientific and technical information, and to describe patterns in and evidence about the natural and designed world(s).
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.

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Lesson 5: Other Evidence of Evolution, pp. 456-465	
Performance Indicators	**SCI.LS4.A.m** The fossil record documents the existence, diversity, extinction, and change of many life forms and their environments through Earth's history. The fossil record and comparisons of anatomical similarities between organisms enables the inference of lines of evolutionary descent. **MS-LS4-1** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. **MS-LS4-6** Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP5.A.m.2** Use digital tools (e.g., computers) to analyze very large data sets for patterns and trends. **SCI.SEP5.A.m.3** Use mathematical representations to describe and support scientific conclusions and design solutions. **SCI.SEP5.A.m.5** Apply mathematical concepts and processes (such as ratio, rate, percent, basic operations, and simple algebra) to scientific and engineering questions and problems. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts.
Crosscutting Concepts	**SCI.CC6.m** Students model complex and microscopic structures and systems and visualize how their function depends on the shapes, composition, and relationships among their parts. They analyze many complex natural and designed structures and systems to determine how they function. They design structures to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

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Engineering, Technology, and the Application of Science	**SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. **SCI.ETS2.A.m.ii** Science and technology drive each other forward. **SCI.ETS2.B.m.iii** Technology use varies over time and from region to region. **SCI.ETS3.A.m.ii** Scientists and engineers are persistent, use creativity, reasoning, and skepticism, and remain open to new ideas.
Evidence-Based Assessment, pp. 468-469	
Performance Indicators	**MS-LS4-1** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. **MS-LS4-4** Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP5.A.m.3** Use mathematical representations to describe and support scientific conclusions and design solutions.
Crosscutting Concepts	**SCI.CC7.m** Students explain stability and change in natural or designed systems by examining changes over time, and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
Engineering, Technology, and the Application of Science	**SCI.ETS2.A.m.i** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.

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uDemonstrate Lab: A Bony Puzzle, pp. 470-473	
Performance Indicators	**MS-LS4-2** Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. **MS-LS4-4** Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
Science and Engineering Practices	**SCI.SEP4.A.m.4** Analyze and interpret data to provide evidence for explanations of phenomena. **SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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.
Crosscutting Concepts	**SCI.CC1.m** Students recognize macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human-designed systems. They use patterns to identify cause and effect relationships and use graphs and charts to identify patterns in data.

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Science and Engineering Practices Handbook, pp. 474-485	
Science and Engineering Practices	**SCI.SEP1.A.m.2** Ask questions to identify and clarify evidence and the premise(s) of an argument. **SCI.SEP1.A.m.4** Ask questions to clarify or refine a model, an explanation, or an engineering problem. **SCI.SEP1.A.m.7** Ask questions that challenge the premise(s) of an argument or the interpretation of a data set. **SCI.SEP1.B.m** Students define a design problem that can be solved through the development of an object, tool, process, or system, and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **SCI.SEP2.A.m.1** Evaluate limitations of a model for a proposed object or tool. **SCI.SEP2.A.m.4** Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. **SCI.SEP2.A.m.7** Develop and use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales. **SCI.SEP3.A.m.1** Individually and collaboratively plan an investigation, identifying: independent and dependent variables and controls, tools needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. **SCI.SEP3.A.m.3** Evaluate the accuracy of various methods for collecting data. **SCI.SEP3.A.m.4** Collect data under a range of conditions that serve as the basis for evidence to answer scientific questions or test design solutions. **SCI.SEP3.A.m.5** Collect data about the performance of a proposed object, tool, process, or system under a range of conditions. **SCI.SEP4.A.m.2** Use graphical displays (e.g., maps, charts, graphs, and tables) of large data sets to identify temporal and spatial relationships.

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Continued:	**Continued:** **SCI.SEP6.A.m.3** Construct a scientific explanation based on valid and reliable evidence obtained from sources, including the students' own experiments. Solutions should build on the following assumption: 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. **SCI.SEP6.A.m.5** Apply scientific reasoning to show why the data or evidence is adequate for the explanation. **SCI.SEP6.B.m.1** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. **SCI.SEP6.B.m.3** Optimize performance of a design by prioritizing criteria, making trade-offs, testing, revising, and retesting. **SCI.SEP7.A.m.1** Compare and critique two arguments on the same topic. Analyze whether they emphasize similar or different evidence and interpretations of facts. **SCI.SEP7.A.m.2** Respectfully provide and receive critiques about one's explanations, procedures, models, and questions by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail. **SCI.SEP7.A.m.5** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. **SCI.SEP8.A.m.3** Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication. Describe how they are supported or not supported by evidence and evaluate methods used. **SCI.SEP8.A.m.4** Evaluate data, hypotheses, and conclusions in scientific and technical texts in light of competing information or accounts.

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Engineering, Technology, and the Application of Science	**SCI.ETS1.A.m** The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. **SCI.ETS1.B.m.i** A solution needs to be tested and then modified on the basis of the test results in order to improve it. **SCI.ETS1.B.m.ii** There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. **SCI.ETS1.B.m.iii** Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. **SCI.ETS1.B.m.iv** Models of all kinds are important for testing solutions. **MS-ETS1-1** Define 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. **MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **SCI.ETS3.B.m.i** Science asks questions to understand the natural world and assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. Science carefully considers and evaluates anomalies in data and evidence. **SCI.ETS3.C.m.i** A theory is an explanation of some aspect of the natural world. Scientists develop theories by using multiple approaches. Validity of these theories and explanations is increased through a peer review process that tests and evaluates the evidence supporting scientific claims.