

**Readington Township Schools
Science Curriculum Map**

UNIT 1									
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
<p>Unit Title and Description: NJ Model Curriculum</p>	<p style="text-align: center;"><u>Pushes and Pulls</u></p> <p>During this unit of study, students apply an understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object to analyze a design solution. The crosscutting concept of cause and effect is called out as the organizing concept for this disciplinary core idea.</p>	<p style="text-align: center;"><u>Waves: Light and Sound</u></p> <p>In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials.</p>	<p style="text-align: center;"><u>Structure and Properties of Matter</u></p> <p>In this unit of study, students demonstrate an understanding of observable properties of materials through analysis and classification of different materials. Students continue to develop an understanding of observable properties of materials through analysis and classification of different materials.</p>	<p style="text-align: center;"><u>Forces and Interactions</u></p> <p>In this unit of study, students determine the effects of balanced and unbalanced forces on the motion of an object and the cause-and-effect relationships of electrical or magnetic interactions to define a simple design problem that can be solved with magnets.</p>	<p style="text-align: center;"><u>Energy</u></p> <p>In this unit of study, fourth-grade students develop an understanding that energy can be transferred from place to place by sound, light, heat, and electrical currents. Students also obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment. In this unit of study, students are able to use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object, and are expected to develop an understanding that energy can be transferred from object to object through collisions.</p>	<p style="text-align: center;"><u>Structure and Properties of Matter</u></p> <p>In this unit of study, students describe that matter is made of particles too small to be seen by developing a model. In this unit of study, students develop an understanding of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances.</p>	<p style="text-align: center;"><u>Space Systems</u></p> <p>This unit is broken down into three sub-ideas: the universe and its stars, Earth and the solar system, and the history of planet Earth. Students examine the Earth's place in relation to the solar system, the Milky Way galaxy, and the universe. There is a strong emphasis on a systems approach and using models of the solar system to explain the cyclical patterns of eclipses, tides, and seasons.</p>	<p style="text-align: center;"><u>Growth, Development, and Reproduction of Organisms</u></p> <p>Students use data and conceptual models to understand how the environment and genetic factors determine the growth of an individual organism. They connect this idea to the role of animal behaviors in animal reproduction and to the dependence of some plants on animal behaviors for their reproduction. Students provide evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms. Students understand how genetic factors determine the growth of an individual organism. They also demonstrate understanding of the genetic implications of sexual and asexual reproduction.</p>	<p style="text-align: center;"><u>Earth's Systems</u></p> <p>Students construct an understanding of the ways that human activities affect Earth's systems. Students use practices to understand the significant and complex issues surrounding human uses of land, energy, mineral, and water resources and the resulting impacts on the development of these resources. Students also understand that the distribution of these resources is uneven due to past and current geosciences processes or removal by humans.</p>
<p>Performance Expectations: Next Gen Science</p>	<p><u>K-PS2</u></p>	<p><u>1-PS4-1.</u> <u>1-PS4-2.</u> <u>1-PS4-4.</u></p>	<p><u>2-PS1-1.</u> <u>2-PS1-2.</u> <u>2-PS1-3.</u> <u>2-PS1-4.</u></p>	<p><u>3-PS2-1.</u> <u>3-PS2-2.</u> <u>3-PS2-3.</u> <u>3-PS2-4.</u></p>	<p><u>4-PS3-1.</u> <u>4-PS3-2.</u> <u>4-PS3-3.</u> <u>4-PS3-4.</u> <u>4-ESS3-1.</u></p>	<p><u>5-PS1-1</u> <u>5-PS1-2.</u> <u>5-PS1-3</u> <u>5-PS1-4</u></p>	<p><u>MS-ESS1-1.</u> <u>MS-ESS1-2.</u> <u>MS-ESS1-3.</u></p>	<p><u>MS-LS1-4.</u> <u>MS-LS1-5.</u> <u>MS-LS3-1.</u> <u>MS-LS3-2.</u></p>	<p><u>MS-ESS2-1.</u> <u>MS-ESS2-4.</u> <u>MS-ESS3-1.</u></p>

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Content NJ Model Curriculum	<p>Pushes and pulls can have different strengths and directions.</p> <p>Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.</p> <p>When objects touch or collide, the object's motion can be changed.</p> <p>The force of the push or pull will make things speed up or slow down more quickly.</p>	<p>Objects can be seen if light is available to illuminate them or if they give off their own light.</p> <p>Some materials allow light to pass through them, others allow only some light through, and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach.</p> <p>Mirrors can be used to redirect a light beam.</p> <p>Sound can make matter vibrate, and vibrating matter can make sound.</p>	<p>Patterns in the natural and human-designed world can be observed.</p> <p>Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature.</p> <p>Matter can be described and classified by its observable properties.</p> <p>Different properties are suited to different purposes.</p>	<p>Objects in contact exert forces on each other.</p> <p>Each force that acts on a particular object has both strength and a direction.</p> <p>An object at rest typically has multiple forces acting on it, but they add to zero net force on the object.</p> <p>Forces that do not sum to zero can cause changes in the object's speed or direction of motion.</p> <p>Science findings are based on recognizing patterns.</p> <p>Patterns of change can be used to make predictions.</p> <p>The patterns of an object's motion in various situations can be observed and measured.</p> <p>When past motion exhibits a regular pattern, future motion can be predicted from it.</p>	<p>Energy can be transferred in various ways and between objects.</p> <p>Energy can be moved from place to place through sound, light, or electric currents.</p> <p>Energy is present whenever there are moving objects, sound, light, or heat.</p> <p>Light also transfers energy from place to place.</p> <p>Energy can also be transferred from place to place by electric currents; the currents may have been produced to begin with by transforming the energy of motion into electrical energy.</p> <p>Energy can be transferred in various ways and between objects.</p> <p>The faster a given object is moving, the more energy it possesses.</p>	<p>Cause-and-effect relationships are routinely identified, tested, and used to explain change.</p> <ul style="list-style-type: none"> • When two or more different substances are mixed, a new substance with different properties may be formed. <p>The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.</p> <p>No matter what reaction or change in properties occurs, the total weight of the substances does not change.</p>	<p>Patterns in the apparent motion of the sun, moon, and stars in the sky can be observed, described, predicted, and explained with models.</p> <p>Earth's spin axis is fixed in direction over the short term but tilted relative to its orbit around the sun.</p> <p>The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year.</p> <p>Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.</p> <p>The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids, that are held in orbit around the sun by its gravitational pull on them.</p> <p>The solar system appears to have formed from a disk of dust and gas, drawn together by gravity.</p>	<p>There are a variety of ways that plants reproduce.</p> <p>Specialized structures for plants affect their probability of successful reproduction.</p> <p>Animals engage in characteristic behaviors that affect the probability of successful reproduction.</p> <p>There are a variety of animal behaviors that attract a mate.</p> <p>Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes.</p> <p>Genetic factors affect the growth of organisms (plant and animal)</p> <p>Each distinct gene chiefly controls the production of specific proteins, which in turn affect the traits of the individual.</p>	<p>Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources.</p> <p>All human activities draw on Earth's land, ocean, atmosphere, and biosphere resources and have both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.</p> <p>Minerals, fresh water, and biosphere resources are distributed unevenly around the planet as a result of past geologic processes.</p> <p>Mineral, fresh water, ocean, biosphere, and atmosphere resources are limited, and many are not renewable or replaceable over human lifetimes.</p> <p>The distribution of some of Earth's land, ocean, atmosphere, and biosphere resources are changing significantly due to removal by humans.</p>

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	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Disciplinary Core Ideas: Next Gen Science	PS2.A: Forces and Motion PS2.B: Types of Interactions PS3.C: Relationship Between Energy and Forces ETS1.A: Defining Engineering Problems	PS4.A: Wave Properties PS4.B: Electromagnetic Radiation PS4.C: Information Technologies and Instrumentation	PS1.A: Structure and Properties of Matter PS1.B: Chemical Reactions	PS2.A: Forces and Motion PS2.B: Types of Interactions	PS3.A: Definitions of Energy PS3.B: Conservation of Energy and Energy Transfer PS3.C: Relationship Between Energy and Forces ESS3.A: Natural Resources	PS1.A: Structure and Properties of Matter PS1.B: Chemical Reactions	ESS1.A: The Universe and Its Stars ESS1.B: Earth and the Solar System	LS1.B: Growth and Development of Organisms LS3.A: Inheritance of Traits LS3.B: Variation of Traits LS4.B: Natural Selection	ESS2.A: Earth's Materials and Systems ESS2.C: The Roles of Water in Earth's Surface Processes ESS3.A: Natural Resources
Education For Sustainability Standards The Cloud Institute	C: The Dynamics of Systems & Change	C: The Dynamics of Systems & Change	C: The Dynamics of Systems & Change F: Natural Laws and Ecological Principles	C: The Dynamics of Systems & Change G: Inventing and Affecting the Future	A: Cultural Preservation and Transformation B: Responsible Local/Global Citizenship F: Natural Laws and Ecological Principles G: Inventing and Affecting the Future	C: The Dynamics of Systems & Change	F: Natural Laws and Ecological Principles	B: Responsible Local/Global Citizenship E: Healthy Commons H: Multiple Perspectives	C: The Dynamics of Systems & Change F: Natural Laws and Ecological Principles
Materials	FOSS Materials and Motion Module	FOSS Light and Sound Module	FOSS Solids and Liquids Module	FOSS Motion and Matter Module	FOSS Energy Module	FOSS Mixtures and Solutions	iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science
Timeframe:	37 days	28 days	35 days	38 days	45 days	50 days	30 days	30 days	22 days

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UNIT 2									
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Unit Title and Description:	<p style="text-align: center;"><u>Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment</u></p> <p>In this unit of study, students develop an understanding of what plants and animals need to survive and the relationship between their needs and where they live. Students compare and contrast what plants and animals need to survive and the relationship between the needs of living things and where they live. Students develop an understanding of what humans need to survive and the relationship between their needs and where they live.</p>	<p style="text-align: center;"><u>Structure, Function, and Information Processing</u></p> <p>In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. Students develop an understanding of how plants and animals use their parts to help them survive, grow, and meet their needs.</p>	<p style="text-align: center;"><u>Interdependent Relationships in Ecosystems</u></p> <p>In this unit of study, students develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students also compare the diversity of life in different habitats.</p>	<p style="text-align: center;"><u>Interdependent Relationships in Ecosystems: Environmental Impacts on Organisms</u></p> <p>In this unit of study, students develop an understanding of the idea that when the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. Students develop an understanding of the types of organisms that lived long ago and also about the nature of their environments. Students develop an understanding of the idea that when the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.</p>	<p style="text-align: center;"><u>Waves</u></p> <p>In this unit of study, students use a model of waves to describe patterns of waves in terms of amplitude and wavelength and to show that waves can cause objects to move.</p>	<p style="text-align: center;"><u>Matter and Energy in Organisms and Ecosystem</u></p> <p>In this unit of study, students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment, and they can explain that energy in animals' food was once energy from the sun.</p>	<p style="text-align: center;"><u>Forces and Interactions</u></p> <p>Students use <i>system and system models and stability and change</i> to understanding ideas related to why some objects will keep moving and why objects fall to the ground. Students apply Newton's third law of motion to related forces to explain the motion of objects. Students also apply an engineering practice and concept to solve a problem caused when objects collide. Students apply ideas about gravitational, electrical, and magnetic forces to explain a variety of phenomena including beginning ideas about why some materials attract each other while others repel.</p>	<p style="text-align: center;"><u>Interdependent Relationships in Ecosystems</u></p> <p>Students are able to study patterns of interactions among organisms within an ecosystem. They consider biotic and abiotic factors in an ecosystem and the effects these factors have on populations. They also understand that the limits of resources influence the growth of organisms and populations, which may result in competition for those limited resources.</p>	<p style="text-align: center;"><u>History of Earth</u></p> <p>Students examine geoscience data in order to understand processes and events in Earth's history. Important crosscutting concepts in this unit are <i>scale, proportion, and quantity, stability and change, and patterns</i> in relation to the different ways geologic processes operate over geologic time. An important aspect of the history of Earth is that geologic events and conditions have affected the evolution of life, but different life forms have also played important roles in altering Earth's systems. Students understand how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems</p>
Performance Expectations:	<p>K-LS1-1 K-ESS2-2 K-ESS3-1 K-ESS3-3</p>	<p>1-LS1-1. 1-LS1-2. 1-LS3-1.</p>	<p>2-LS2-1. 2-LS2-2. 2-LS4-1.</p>	<p>3-LS2-1. 3-LS4-1. 3-LS4-3. 3-LS4-4.</p>	<p>4-PS4-1 4-PS4-3</p>	<p>5-PS3-1 5-LS1-1 5-LS2-1</p>	<p>MS-PS2-1. MS-PS2-2. MS-PS2-3. MS-PS2-4. MS-PS2-5.</p>	<p>MS-LS2-2. MS-LS2-5.</p>	<p>MS-ESS1-4. MS-ESS2-2. MS-ESS2-3.</p>

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UNIT 2									
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Content	<p>Plants do not need to take in food, but do need water and light to live and grow.</p> <p>All animals need food in order to live and grow, that they obtain their food from plants or from other animals, that different kinds of food are needed by different kinds of animals, and that all animals need water.</p>	<p>Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.</p> <p>Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents.</p> <p>The shape and stability of structures of natural and designed objects are related to their function(s).</p> <p>All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.</p> <p>Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. • Animals have body parts that capture and convey different kinds of information needed for growth and survival.</p>	<p>The shape and stability of structures of natural and designed objects are related to their function.</p> <p>Plants depend on animals for pollination or to move their seeds around.</p> <p>Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.</p> <p>Develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination.</p>	<p>For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</p> <p>Organisms and their habitat make up a system in which the parts depend on each other.</p> <p>Observable phenomena exist from very short to very long periods of time.</p> <p>Science assumes consistent patterns in natural systems.</p> <p>Some kinds of plants and animals that once lived on Earth are no longer found anywhere.</p> <p>Fossils provide evidence about the types of organisms that lived long ago, and also about the nature of their environments.</p>	<p>Waves, which are regular patterns of motion, can be made in water by disturbing the surface.</p> <p>When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach.</p> <p>Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks)</p>	<p>Matter is transported into, out of, and within systems.</p> <p>Plants acquire their material for growth chiefly from air and water.</p> <p>Science explanations describe the mechanisms for natural events.</p> <p>A system can be described in terms of its components and their interactions. .</p> <p>Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants.</p> <p>Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as decomposers.</p> <p>Decomposition eventually restores (recycles) some materials back to the soil.</p> <p>Organisms can survive only in environments in which their particular needs are met.</p>	<p>Students apply ideas about gravitational, electrical, and magnetic forces to explain a variety of phenomena including beginning ideas about why some materials attract each other while others repel.</p> <p>The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change.</p> <p>The greater the mass of the object, the greater the force needed to achieve the same change in motion.</p> <p>For any given object, a larger force causes a larger change in motion.</p> <p>Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales.</p>	<p>Organisms and populations of organisms are dependent on their environmental interactions with other living things.</p> <p>Organisms and populations of organisms are dependent on their environmental interactions with nonliving factors.</p> <p>In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with others for limited resources.</p> <p>Access to food, water, oxygen, or other resources constrain organisms' growth and reproduction.</p> <p>Predatory interactions may reduce the number of organisms or eliminate whole populations of organisms.</p> <p>Mutually beneficial interactions may become so interdependent that each organism requires the other for survival.</p>	<p>The geologic time scale is used to organize Earth's 4.6-billion-year-old history.</p> <p>Rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history.</p> <p>The geologic time scale interpreted from rock strata provides a way to organize Earth's history.</p> <p>Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.</p> <p>Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.</p>

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	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Disciplinary Core Ideas:	LS1.C: Organization for Matter and Energy Flow in Organisms ESS2.E: Biogeology ESS3.A: Natural Resources ESS3.C: Human Impacts on Earth Systems ETS1.B: Developing Possible Solutions	LS1.A: Structure and Function LS1.B: Growth and Development of Organisms LS1.D: Information Processing LS3.A: Inheritance of Traits LS3.B: Variation of Traits	LS2.A: Interdependent Relationships in Ecosystems LS4.D: Biodiversity and Humans ETS1.B: Developing Possible Solutions	LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS2.D: Social Interactions and Group Behavior LS4.A: Evidence of Common Ancestry and Diversity LS4.C: Adaptation	PS4.A: Wave Properties PS4.C: Information Technologies and Instrumentation ETS1.C: Optimizing The Design Solution	PS3.D: Energy in Chemical Processes and Everyday Life LS1.C: Organization for Matter and Energy Flow in Organisms LS2.A: Interdependent Relationships in Ecosystems LS2.B: Cycles of Matter and Energy Transfer in Ecosystems	PS2.A: Forces and Motion PS2.B: Types of Interactions	LS2.A: Interdependent Relationships in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.D: Biodiversity and Humans ETS1.B: Developing Possible Solutions	ESS1.C: The History of Planet Earth ESS2.A: Earth's Materials and Systems ESS2.B: Plate Tectonics and Large-Scale System Interactions ESS2.C: The Roles of Water in Earth's Surface Processes
Education For Sustainability Standards	B: Responsible Local/Global Citizenship E: Healthy Commons F: Natural Laws and Ecological Principles	H: Multiple Perspectives C: The Dynamics of Systems & Change	B: Responsible Local/Global Citizenship C: The Dynamics of Systems & Change F: Natural Laws and Ecological Principles I: Strong Sense of Place	B: Responsible Local/Global Citizenship C: The Dynamics of Systems & Change F: Natural Laws and Ecological Principles I: Strong Sense of Place	C: The Dynamics of Systems & Change	B: Responsible Local/Global Citizenship E: Healthy Commons F: Natural Laws and Ecological Principles	C: The Dynamics of Systems & Change G: Inventing and Affecting the Future	B: Responsible Local/Global Citizenship E: Healthy Commons F: Natural Laws and Ecological Principles I: Strong Sense of Place	C: The Dynamics of Systems & Change E: Healthy Commons F: Natural Laws and Ecological Principles I: Strong Sense of Place
Materials	FOSS Animals Two by Two Kit	FOSS Plants and Animals Module	FOSS Insects and Plants Module	FOSS Structures of Life Module	FOSS Energy Module	FOSS Living Systems	iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science
Timeframe:	40 days	39 days	35 days	10 days	11 days	47 days	40 days	24 days	18 days

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UNIT 3									
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Unit Title and Description:	<p style="text-align: center;"><u>Weather and Climate</u></p> <p>In this unit of study, students develop an understanding of patterns and variations in local weather and the use of weather forecasting to prepare for and respond to severe weather. During this unit of study, students apply an understanding of the effects of the sun on the Earth's surface.</p>	<p style="text-align: center;"><u>Space Systems: Patterns and Cycles</u></p> <p>In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky.</p>	<p style="text-align: center;"><u>Earth's Systems: Processes that Shape the Earth</u></p> <p>In this unit of study, students apply their understanding of the idea that wind and water can change the shape of land to compare design solutions to slow or prevent such change. Students use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth.</p>	<p style="text-align: center;"><u>Inheritance and Variation of Traits: Life Cycles and Traits</u></p> <p>In this unit of study, students acquire an understanding that organisms have different inherited traits and that the environment can also affect the traits that an organism develops. Students develop an understanding of the similarities and differences in organisms' life cycles. In addition, students use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</p>	<p style="text-align: center;"><u>Structure, Function, and Information Processing</u></p> <p>In this unit of study, students develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Students are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p>	<p style="text-align: center;"><u>Earth's Systems</u></p> <p>In this unit of study, students are able to describe ways in which the geosphere, biosphere, hydrosphere, and atmosphere interact. In this unit of study, students describe and graph data to provide evidence about the distribution of water on Earth.</p>	<p style="text-align: center;"><u>Structure and Properties of Matter</u></p> <p>Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They also provide a molecular level accounts to explain states of matter and changes between states.</p>	<p style="text-align: center;"><u>Matter and Energy in Organisms and Ecosystems</u></p> <p>Students provide a mechanistic account for how cells provide a structure for the plant process of photosynthesis in the movement of matter and energy needed for the cell. Students use conceptual and physical models to explain the transfer of energy and cycling of matter as they construct explanations for the role of photosynthesis in cycling matter in ecosystems. They construct scientific explanations for the cycling of matter in organisms and the interactions of organisms to obtain matter and energy from an ecosystem to survive and grow. They understand that sustaining life requires substantial energy and matter inputs, and that the structure and functions of organisms contribute to the capture, transformation, transport, release, and elimination of matter and energy.</p>	<p style="text-align: center;"><u>Natural Selection and Adaptations</u></p> <p>Students construct explanations based on evidence to support fundamental understandings of natural selection and evolution. They will use ideas of genetic variation in a population to make sense of how organisms survive and reproduce, thus passing on the traits of the species. In this unit of study, students analyze graphical displays and gather evidence from multiple sources in order to develop an understanding of how fossil records and anatomical similarities of the relationships among organisms and species describe biological evolution.</p>

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UNIT 3									
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Performance Expectations:	K-PS3-1 K-PS3-2 K-ESS2-1 K-ESS3-2	1-ESS1-1 1-ESS1-2	2-ESS1-1 2-ESS2-1 2-ESS2-2 2-ESS2-3	3-LS1-1 3-LS3-1 3-LS3-2 3-LS4-2	4-PS4-2 4-LS1-1 4-LS1-2	5-ESS2-1 5-ESS2-2 5-ESS3-1	MS-PS1-1. MS-PS1-3. MS-PS1-4.	MS-LS1-6. MS-LS1-7. MS-LS2-1. MS-LS2-3. MS-LS2-4.	MS-LS4-1. MS-LS4-2. MS-LS4-3. MS-LS4-4. MS-LS4-6.
Content	<p>Weather is the combination of sunlight, wind, snow, or rain and temperature in a particular region at a particular time.</p> <p>People measure these conditions to describe and record the weather and to notice patterns over time.</p> <p>People look for patterns in the weather data when they organize and order when making observations about the world.</p> <p>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.</p>	<p>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.</p> <p>Seasonal patterns of sunrise and sunset can be observed, described, and predicted.</p> <p>The sun and moon appear to rise in one part of the sky, move across the sky, and set.</p> <p>The shape of the moon appears to change over a period of time in a predictable pattern.</p> <p>Stars, other than our sun, are visible at night but not during the day.</p>	<p>Scientists study the natural and material world.</p> <p>The shape and stability of structures of natural and designed objects are related to their function(s).</p> <p>Wind and water can change the shape of the land.</p> <p>Things may change slowly or rapidly.</p> <p>Patterns in the natural world can be observed.</p> <p>Water is found in the ocean, rivers, lakes, and ponds.</p> <p>Water exists as solid ice and in liquid form.</p> <p>Maps show where things are located. One can map the shapes and kinds of land and water in any area.</p>	<p>Similarities and differences in patterns can be used to sort and classify natural phenomena (e.g., inherited traits that occur naturally).</p> <p>Many characteristics of organisms are inherited from their parents.</p> <p>Different organisms vary in how they look and function because they have different inherited information.</p> <p>Cause-and-effect relationships are routinely identified and used to explain change.</p> <p>Other characteristics, which can range from diet to learning, result from individuals' interaction with the environment.</p> <p>Many characteristics involve both inheritance and environment.</p> <p>The environment also affects the traits that an organism develops. Reproduction is essential to the continued existence of</p>	<p>A system can be described in terms of its components and their interactions.</p> <p>Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.</p> <p>A system can be described in terms of its components and its interactions.</p> <p>Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain.</p> <p>Animals are able to use their perceptions and memories to guide their actions.</p>	<p>A system can be described in terms of its components and their interactions.</p> <p>Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans).</p> <p>The Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.</p> <p>The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate.</p> <p>Winds and clouds in the atmosphere interact with landforms to determine patterns of weather.</p> <p>Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space.</p>	<p>Substances are made from different types of atoms. Atoms are the basic units of matter.</p> <p>Substances combine with one another in various ways. Molecules are two or more atoms joined together.</p> <p>Atoms form molecules that range in size from two to thousands of atoms. Molecules can be simple or very complex.</p> <p>Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).</p> <p>Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.</p> <p>Substances react chemically in characteristic ways.</p> <p>In a chemical process, the atoms that make up the original substances are regrouped into different</p>	<p>Photosynthesis has a role in the cycling of matter and flow of energy into and out of organisms.</p> <p>The flow of energy and cycling of matter can be traced.</p> <p>The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon based organic molecules and release oxygen.</p> <p>Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen.</p> <p>Sugars produced by plants can be used immediately or stored for growth or later use.</p>	<p>Genetic variations of traits in a population increase or decrease some individuals' probability of surviving and reproducing in a specific environment.</p> <p>Natural selection leads to the predominance of certain traits in a population and the suppression of others.</p> <p>Natural selection may have more than one cause, and some cause-and effect relationships within natural selection can only be described using probability.</p> <p>Natural selection, which over generations leads to adaptations, is one important process through which species change over time in response to changes in environmental conditions.</p> <p>Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common.</p> <p>Natural selection may</p>

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				<p>every kind of organism.</p> <p>Plants and animals have unique and diverse life cycles.</p> <p>Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.</p>			<p>molecules; these new substances have different properties from those of the reactants.</p>	<p>Within a natural system, the transfer of energy drives the motion and/or cycling of matter.</p> <p>Molecules are broken apart and put back together to form new substances, and in this process, energy is released.</p> <p>Cellular respiration in plants and animals involves chemical reactions with oxygen that release stored energy.</p>	<p>have more than one cause, and some cause-and effect relationships in natural selection can only be described using probability.</p> <p>The collection of fossils and their placement in chronological order as identified through the location of sedimentary layers in which they are found or through radioactive dating is known as the fossil record.</p> <p>Relative fossil dating is achieved by examining the fossil's relative position in sedimentary rock layers.</p>
Disciplinary Core Ideas:	<p>PS3.B: Conservation of Energy and Energy Transfer</p> <p>ESS2.D: Weather and Climate</p> <p>ESS3.B: Natural Hazards</p> <p>ETS1.A: Defining and Delimiting an Engineering Problem</p>	<p>ESS1.A: The Universe and its Stars</p> <p>ESS1.B: Earth and the Solar System</p>	<p>ESS1.C: The History of Planet Earth</p> <p>ESS2.A: Earth Materials and Systems</p> <p>ESS2.B: Plate Tectonics and Large-Scale System Interactions</p> <p>ESS2.C: The Roles of Water in Earth's Surface Processes</p> <p>ETS1.C: Optimizing the Design Solution</p>	<p>LS1.B: Growth and Development of Organisms</p> <p>LS3.A: Inheritance of Traits</p> <p>LS3.B: Variation of Traits</p> <p>LS4.B: Natural Selection</p>	<p>PS4.B: Electromagnetic Radiation</p> <p>LS1.A: Structure and Function</p> <p>LS1.D: Information Processing</p>	<p>ESS2.A: Earth Materials and Systems</p> <p>ESS2.C: The Roles of Water in Earth's Surface Processes</p> <p>ESS3.C: Human Impacts on Earth Systems</p>	<p>PS1.A: Structure and Properties of Matter</p> <p>PS1.B: Chemical Reactions</p> <p>PS3.A: Definitions of Energy</p>	<p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <p>LS2.A: Interdependent Relationships in Ecosystems</p> <p>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems</p> <p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</p> <p>PS3.D: Energy in Chemical Processes and Everyday Life</p>	<p>LS4.A: Evidence of Common Ancestry and Diversity</p> <p>LS4.B: Natural Selection</p> <p>LS4.C: Adaptation</p>

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UNIT 3									
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Education For Sustainability Standards	E: Healthy Commons F: Natural Laws and Ecological Principles	F: Natural Laws and Ecological Principles I: Strong Sense of Place H: Multiple Perspectives	I: Strong Sense of Place E: Healthy Commons C: The Dynamics of Systems & Change	F: Natural Laws and Ecological Principles	E: Healthy Commons	C: The Dynamics of Systems & Change E: Healthy Commons I: Strong Sense of Place	C: The Dynamics of Systems & Change F: Natural Laws and Ecological Principles	B: Responsible Local/Global Citizenship C: The Dynamics of Systems & Change F: Natural Laws and Ecological Principles I: Strong Sense of Place	F: Natural Laws and Ecological Principles
Materials	FOSS Trees and Weather Kit	FOSS Air and Weather Kit	FOSS Pebbles, Sand, and Silt Kit	FOSS Structures of Life	FOSS Environments	FOSS Earth and Sun	iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science
Timeframe:	56 days	38 days	35 days	46 days	45 days	30 days	30 days	24 days	12 days

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UNIT 4									
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Unit Title and Description:				<p><u>Weather and Climate</u></p> <p>In this unit of study, students organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards, students are able to make a claim about the merit of a design solution that reduces the impacts of such hazards.</p>	<p><u>Earth's Systems: Processes that Shape the Earth</u></p> <p>In this unit of study, students develop understandings of the effects of weathering and the rate of erosion by water, ice, wind, or vegetation. In this unit of study, students apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from map.</p>	<p><u>Space Systems: Stars and the Solar System</u></p> <p>In this unit of study, students develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.</p>	<p><u>Chemical Reactions</u></p> <p>Students provide molecular-level accounts of states of matters and changes between states, of how chemical reactions involve regrouping of atoms to form new substances, and of how atoms rearrange during chemical reactions. Students also apply their understanding of optimization design and process in engineering to chemical reaction systems.</p>	<p><u>Structure, Function, and Information Processing</u></p> <p>Students develop a basic understanding of the role of cells in body systems and how those systems work to support the life functions of the organism. Students will construct explanations for the interactions of systems in cells and organisms. Students understand that special structures are responsible for particular functions in organisms, and that for many organisms, the body is a system of multiple -interaction subsystems that form a hierarchy, from cells to the body.</p>	<p><u>Weather and Climate</u></p> <p>This unit is broken down into three sub-ideas: Earth's large-scale systems interactions, the roles of water in Earth's surface processes, and weather and climate. Students make sense of how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems.</p>
Content				<p>Patterns of change can be used to make predictions.</p> <p>People record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.</p> <p>Climate describes the range of an area's typical weather conditions and the extent to which those conditions vary over years.</p> <p>A variety of natural</p>	<p>Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.</p> <p>Rainfall helps to shape the land and affects the types of living things found in a region.</p> <p>Living things affect the physical characteristics of their regions.</p> <p>Local, regional, and global patterns of rock formations reveal</p>	<p>The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.</p> <p>Natural objects exist from the very small to the immensely large.</p> <p>The sun is a star that appears larger and brighter than other stars because it is closer.</p> <p>Stars range greatly in their distance from</p>	<p>Substances react chemically in characteristic ways.</p> <p>In a chemical process, the atoms that make up the original substances are regrouped into different molecules.</p> <p>New substances created in a chemical process have different properties from those of the reactants.</p> <p>Some chemical reactions release energy, while others store energy.</p>	<p>In multicellular organisms, the body is a system of multiple, interacting subsystems.</p> <p>Subsystems are groups of cells that work together to form tissues.</p> <p>Organs are groups of tissues that work together to perform a particular body function.</p> <p>Tissues and organs are specialized for particular body functions.</p> <p>Systems may interact</p>	<p>Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.</p> <p>Global movements of water and its changes in form are propelled by sunlight and gravity.</p> <p>The cycling of water through Earth's systems is driven by energy from the sun and the force of gravity.</p>

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				<p>hazards result from natural processes (e.g., flooding, fast wind, or lightning).</p> <p>Humans cannot eliminate natural hazards but can take steps to reduce their impacts.</p>	<p>changes over time due to earth forces, such as earthquakes.</p> <p>The presence and location of certain fossil types indicate the order in which rock layers were formed. Maps can help locate the different land and water features of Earth.</p> <p>The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns.</p> <p>Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans.</p> <p>A variety of hazards result from natural processes (e.g., earthquakes, floods, tsunamis, volcanic eruptions).</p> <p>Humans cannot eliminate the hazards, but they can take steps to reduce their impacts.</p>	<p>Earth.</p> <p>The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its north and south poles, cause observable patterns.</p>	<p>The total number of each type of atom in a chemical process is conserved, and thus the mass does not change (the law of conservation of matter).</p> <p>Matter is conserved because atoms are conserved in physical and chemical processes.</p> <p>The law of conservation of mass is a mathematical description of natural phenomena.</p>	<p>with other systems.</p> <p>Systems may have subsystems and be part of larger complex systems.</p> <p>Interactions are limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.</p> <p>Sense receptors transmit responses as signals that travel along nerve cells to the brain.</p>	<p>Within Earth's systems, the transfer of energy drives the motion and/or cycling of water.</p> <p>The complex patterns of the changes in and movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns.</p>
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UNIT 4

	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Disciplinary Core Ideas:				<p>ESS2.D: Weather and Climate</p> <p>ESS3.B: Natural Hazards</p>	<p>ESS1.C: The History of Planet Earth</p> <p>ESS2.A: Earth Materials and Systems</p> <p>ESS2.B: Plate Tectonics and Large-Scale System Interactions</p>	<p>PS2.B: Types of Interactions</p> <p>ESS1.A: The Universe and its Stars</p> <p>ESS1.B: Earth and the Solar System</p>	<p>PS1.A: Structure and Properties of Matter</p> <p>PS1.B: Chemical Reactions</p> <p>ETS1.B: Developing Possible Solutions</p>	<p>LS1.A: Structure and Function</p> <p>LS1.D: Information Processing</p>	<p>ESS2.C: The Roles of Water in Earth's Surface Processes</p> <p>ESS2.D: Weather and Climate</p> <p>ESS3.D: Global Climate Change</p>

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					ESS2.E: Biogeology ESS3.B: Natural Hazards ETS1.B: Designing Solutions to Engineering Problems		ETS1.C: Optimizing the Design Solution		
Education For Sustainability Standards				E: Healthy Commons F: Natural Laws and Ecological Principles	C: The Dynamics of Systems & Change F: Natural Laws and Ecological Principles	C: The Dynamics of Systems & Change H: Multiple Perspectives F: Natural Laws and Ecological Principles	C: The Dynamics of Systems & Change	C: The Dynamics of Systems & Change H: Multiple Perspectives	B: Responsible Local/Global Citizenship H: Multiple Perspectives I: Strong Sense of Place
Materials				FOSS Water and Climate	FOSS Soils, Rocks, and Landforms	FOSS Earth and Sun	iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science
Timeframe:				58 days	45 days	23 days	35 days	35 days	20 days

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UNIT 5									
	Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade	7th Grade	8th Grade
Unit Title and Description:							<p style="text-align: center;"><u>Energy</u></p> <p>Students develop their understanding of important qualitative ideas about the conservation of energy. Students understand that objects that are moving have kinetic energy and that objects may also contain stored (potential) energy, depending on their relative positions. Students also understand the difference between energy and temperature, and the relationship between forces and energy. They use the practices to make sense of how the total change of energy in any system is always equal to the total energy transferred into or out of the system.</p>	<p style="text-align: center;"><u>Waves and Electromagnetic Radiation</u></p> <p>In this unit of study, students <i>develop and use models, use mathematical thinking, and obtain, evaluate, and communicate information</i> in order to describe and predict characteristic properties and behaviors of waves. Students also apply their understanding of waves as a means of sending digital information.</p>	
Performance Expectations:							MS-PS3-1. MS-PS3-2. MS-PS3-3. MS-PS3-4. MS-PS3-5.	MS-PS4-1. MS-PS4-2. MS-PS4-3.	
Content							<p>Kinetic energy is related to the mass of an object and to the speed of an object.</p> <p>Kinetic energy has a relationship to mass separate from its relationship to speed.</p> <p>Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of the object's speed.</p> <p>Proportional relationships among different types of quantities provide information about the</p>	<p>A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude.</p> <p>When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light.</p> <p>The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where</p>	

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							<p>magnitude of properties and processes.</p> <p>When the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.</p> <p>A system of objects may contain stored (potential) energy, depending on the objects' relative positions.</p> <p>When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the objects.</p>	<p>the light path bends.</p> <p>Waves are reflected, absorbed, or transmitted through various materials.</p> <p>A sound wave needs a medium through which it is transmitted.</p> <p>Because light can travel through space, it cannot be a matter wave, like sound or water waves.</p> <p>The structure of a wave can be modified to serve particular functions by taking into account properties of different materials and how materials can be shaped and used.</p> <p>Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information than are analog signals.</p>	
Disciplinary Core Ideas:							<p>PS3.A: Definitions of Energy</p> <p>PS3.B: Conservation of Energy and Energy Transfer</p> <p>PS3.C: Relationship Between Energy and Forces</p>	<p>PS4.A: Wave Properties</p> <p>PS4.B: Electromagnetic Radiation</p> <p>PS4.C: Information Technologies and Instrumentation</p>	
Education For Sustainability Standards							<p>F: Natural Laws and Ecological Principles</p> <p>C: The Dynamics of Systems & Change</p>	<p>F: Natural Laws and Ecological Principles</p>	
Materials							iScience McGraw Hill Knowing Science	iScience McGraw Hill Knowing Science	
Timeframe:							30 days	20 days	

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Resources:

- NJSLS-Science
- New Jersey Model Curriculums
- Next Generation Science Standards
- The Cloud Institute for Sustainability Educaiton