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	Unit 1 **Units alternate w/Social Studies throughout the year and will vary in timing based on availability of materials.**	**Unit 2** **Units alternate w/Social Studies throughout the year and will vary in timing based on availability of materials.**	**Unit 3** **Units alternate w/Social Studies throughout the year and will vary in timing based on availability of materials.**
Grade K	**Independent Relationships in Ecosystems: Animals, Plants and Their Environments** This unit provides young students with close and personal interaction with some common land and water animals. Students observe differences in structure and behavior and learn about basic needs of animals.	**Weather and Climate** Students will conduct investigations of trees and leaves over the seasons to bring students to a better understanding of trees' place at school and in the community. Students observe day-to-day changes in weather over the year, as well as the impact weather has on living things.	**Forces and Interactions: Pushes and Pulls** Students will be provided experiences that heighten their awareness, curiosity, and understanding of the physical world as they observe and compare the properties of various wood, paper, and fabric by performing a number of tests and interactions. Students explore the concept of force and motion by observing and comparing a variety of pushes and pulls, the speed and motion of moving objects, and collisions.
Standards	K-LS1- 1. Use observations to describe patterns of what plants and animals (including humans) need to survive. KESS2- 2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. KESS3- 1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. KESS3- 3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	K-PS3- 1. Make observations to determine the effect of sunlight on Earth's surface. K-PS3- 2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area K-ESS2- 1. Use and share observations of local weather conditions to describe patterns over time. K-ESS3- 2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	KPS2- 1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. KPS2- 2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull

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Grade 1	**Space Systems: Patterns and Cycles** Students turn their focus to the sky to make observations that will heighten their awareness, curiosity, and understanding of Earth's dynamic atmosphere and the observable patterns of objects in the sky. Students explore the natural world by using simple instruments to observe and monitor change.	**Structure, Functioning, and Information Processing** This unit provides students with experiences that heighten their awareness of the way that plants and animals meet their basic needs. They observe plant structures and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). Students design terrariums and provide for the needs of both plants and animals living together in the classroom.	**Waves: Lights and Sound** Students will be provided experiences to develop an understanding of how to observe and manipulate sound and light. Students learn that sound comes from vibrating objects. They explore how to change sound volume and pitch, and develop simple models for how sound travels from the source to the receiver. With light, students also work with sources and receivers. They find out what happens when materials with different properties are placed in a beam of light, and explore how to create and change shadows and reflections.
Standards	1-ESS1- 1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. 1- ESS1- 2. Make observations at different times of year to relate the amount of daylight to the time of year.	1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. 1-LS1-2. Read text and use media to determine patterns in behavior of parents and offspring that help offspring survive.	1- PS4- 1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. 1- PS4- 2. Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. 1- PS4- 3. Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. 1- PS4- 4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

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Grade 2	**Earth's Systems: Processes That Shape the Earth** This unit provides students with experiences with earth science core ideas. They will investigate the observable structures and properties of earth materials (rocks, soil, and water), weathering and erosion of Earth's surface, and natural sources of water. They will also learn how to represent the shapes and kinds of land and bodies of water on Earth.	**Interdependent Relationships in Ecosystems** This unit provides students with experiences with the life science core ideas dealing with structure and function of living things. They will investigate growth and development of plants and animals, interactions of organisms with their environment, and biodiversity of organisms on land and in water.	**Structures and Properties of Matter** This unit provides students with physical science core ideas dealing with matter and its interactions and engineering design. The experiences help students develop an understanding about how materials are similar and different from one another and how the properties of materials relate to their use.
Standards	2- ESS1- 1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly. 2- ESS2- 1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. 2- ESS2- 2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. 2- ESS2- 3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.	2- LS2- 1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. 2- LS2- 2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.* 2- LS4- 1. Make observations of plants and animals to compare the diversity of life in different habitats	2- PS1- 1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. 2- PS1- 2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. 2- PS1- 3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. 2- PS1- 4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

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Grade 3	**Forces and Interactions** This unit provides students with physical science core ideas. Students explore the forces of magnetism and gravity using magnets. They will use a variety of systems to explore patterns of motion. They will also tackle an engineering design challenge.	**Weather and Climate** This unit provides students with experiences to explore the properties of water, the water cycle and weather, interactions between water and other earth materials, and how humans use water as a natural resource. Students investigate the properties of water. They will compare weather data that they observe and collect forecasts and historical weather data. They will also compare what happens when water is poured through different earth materials and test soil drainage rates.	**Inheritance and Variation of Traits: Life Cycles and Traits** In this unit of study, students will investigate two main questions: How do organisms vary in their traits? and How are plants, animals, and environments of the past similar and different from current plants, animals, and environments? Students will learn about how traits are inherited from parents and how many characteristics involve a combination of inheritance and environmental factors. They will also learn that differences between individuals of the same species can provide advantages in surviving, finding mates, and in reproducing.	**Interdependent Relationships in Ecosystems** Students will explore what happens to organisms when their environment changes. They will see that when an environment changes it can affect physical characteristics and availability of resources. Some organisms will survive and reproduce while others will more, transform, or will not survive. We can look at fossils to provide evidence about organisms that lived long ago and explore the nature of their environments.
Standards	3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. 3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be	3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. 3-ESS2-2. Obtain and combine information to describe climates in different regions of the world. 3-ESS3-1. Make a claim about	3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a	3-LS2-1. Construct an argument that some animals form groups that help members survive. 3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. 3-LS4-3. Construct an argument with evidence that in a particular

	used to predict future motion. 3-PS2-3 Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. 3-PS2-4 Define a simple design problem that can be solved by applying scientific ideas about magnets.	the merit of a design solution that reduces the impacts of a weather-related hazard.	group of similar organisms. 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. 3-LS4-2. 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.	habitat some organisms can survive well, some survive less well, and some cannot survive at all. 3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

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	Unit 1 13 Weeks	Unit 2 13 Weeks	Unit 3 13 Weeks	Unit 4 13 Weeks
Grade 4	**Earth's Systems: Processes That Shape the Earth** Geology is the study of our planet's earth materials and natural resources. In this unit, students will gain firsthand experiences with soils, rocks, and minerals. They will model experiences to study changes to rocks and landforms at Earth's surface.Students investigate properties of soil and use stream-table models to observe that water moves earth materials from one location to another. They will study how fossils are created. Students are also introduced to topography.	**Energy** In this unit, students will explore the concepts of energy. They will investigate electricity and magnetism as related effects and learn useful applications of electromagnetism in everyday life. They also consider energy transfer, force, and motion in different systems. Students observe energy transfer that results in heat, light, sound, and motion and they are introduced to sources of energy and components that store energy.	**Waves: Waves and Information** Students will continue exploring the concept of energy. They will investigate energy in the form of both sound and light. Students experience waves through firsthand experiences using ropes, demonstrations with waves in water, spring toys, and a sound generator. They use mirrors to experience reflecting light and build a conceptual model about how light travels. Students design series and parallel solar cell circuits and observe the effect on the speed of a motor.	**Structure, Function, and Information Processing** Through the study of different ecosystems, students build an understanding of the relationships between organisms and their environments. They will focus on the concepts that organisms need energy and matter to live and grow, and that living organisms depend on one another and on their environment for their survival and the survival of populations.
Standards	4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. 4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object. 4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. 4-PS3-3. Ask questions and predict outcomes about the	4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. 4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.	4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. 4-LS1-2. Use a model to describe that animals receive different types

	4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features. 4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	changes in energy that occur when objects collide. 4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.* 4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.		of information through their senses, process the information in their brain, and respond to the information in different ways.

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	Unit 1 4 Weeks	Unit 2 4 Weeks	Unit 3 7 Weeks	Unit 4 8 weeks	Unit 5 7 Weeks	Unit 6 6 Weeks
Grade 5	**Properties of Matter** In this unit of study, students describe that matter is made of particles too small to be seen by developing a model. Students demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, and use these practices to demonstrate understanding of the core ideas.	**Changes to Matter** In this unit of study, students develop an understanding of the idea that regardless 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. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations and using mathematics and computational thinking.	**Energy and Matter in Ecosystems** 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. Students are expected to demonstrate grade-appropriate proficiency in developing and using models and engaging in argument from evidence. Students are also expected to use these practices to demonstrate understanding of the core ideas.	**Water on the Earth** In this unit of study, students describe and graph data to provide evidence about the distribution of water on Earth. Students are expected to demonstrate grade-appropriate proficiency in using mathematics and computational thinking and in obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.	**Earth Systems** In this unit of study, students are able to describe ways in which the geosphere, biosphere, hydrosphere, and atmosphere interact. The crosscutting concept of systems and system models is called out as an organizing concept for this disciplinary core idea. Students are expected to demonstrate grade-appropriate proficiency in developing and using models, obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.	**Interactions Within the Earth, Sun, and Moon System** 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. Students are expected to demonstrate grade-appropriate proficiency in analyzing and interpreting data and engaging in argument from evidence. Students are also expected to use these practices to demonstrate an understanding of the core ideas.
Standards	Make observations and measurements to identify materials based on their properties. (5-PS1-3) Develop a model to describe that matter is made of particles too	Conduct an investigation to determine whether the mixing of two or more substances results in new substances. (5-PS1-4) Measure and graph quantities to provide evidence that regardless of the type of change	Support an argument that plants get the materials they need for growth chiefly from air and water. (5-LS1-1) Develop a model to describe the movement of matter among plants,	Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. (5-ESS2-2) Obtain and combine information about ways	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (5-ESS2-1) Obtain and combine information about ways individual communities use science ideas to protect the	Support an argument that the gravitational force exerted by Earth on objects is directed down. (5-PS2-1) Support an argument that the apparent brightness of the sun and stars is due to their relative

	small to be seen. (5-PS1-1)	that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. (5-PS1-2)	animals, decomposers, and the environment. (5-LS2-1) Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. (5-PS3-1)	individual communities use science ideas to protect the Earth's resources and environment. (5-ESS3-1)	Earth's resources and environment. (5-ESS3-1)	distances from the Earth. (5-ESS1-1) Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. 5-ESS1-2)

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Grade 6	**Structure & Function** Students plan and carry out investigations to develop evidence that living organisms are made of cells. Students gather information to support explanations of the relationship between structure and function in cells. They are able to understand that all organisms are made of cells. Students understand that special structures are responsible for particular functions in organisms. They then are able to use their understanding of cell theory to develop and use physical and conceptual models of cells.	**Body Systems** 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-interactio n subsystems that form a hierarchy, from cells to the body. Students construct explanations for the interactions of systems in cells	**Organization for Matter and Energy Flow** 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	**Matter and Energy in Organisms and Ecosystems** Students demonstrate a deeper understanding of the cycling of matter, the flow of energy, and resources in ecosystems. They 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.	**Interdependent Relationships in Ecosystems** Students build on their understanding of the transfer of matter and energy as they 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 a population. They construct explanations for the interactions in ecosystems and the scientific, economic, political, and social justifications used in making decisions about maintaining biodiversity in ecosystems. Part B: This unit includes a two-stage engineering design process. Students first evaluate different engineering ideas	**Growth, development and Reproduction of Organisms** 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.	**Inheritance and Variation of Traits** Students develop and use models to describe how gene mutations andsexual reproduction contribute to genetic variation. 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.	**Selection and Adaptation** 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.

		and organisms and for how organisms gather and use information from the environment.	structure and functions of organisms contribute to the capture, transformation, transport, release, and elimination of matter and energy.		that have been proposed. They then test different solutions, and combine the best ideas into a new solution that may be better than any of the preliminary ideas.			
Standards	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 arguments supported by evidence for how the body is a system of interacting subsystems of interacting 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.	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-LS2-1. 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	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. 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	MS-LS1-4. Use arguments 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	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	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-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

				flow of energy among living and nonliving parts of an ecosystem.	and potential impacts on people and the natural environment that may limit possible solutions. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	growth of organisms.	with genetic variation.	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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Grade 7	**Evidence of Common Ancestry** In this unit of study, students develop an understanding of how fossil records and anatomical similarities of the relationships among organisms and species describe biological evolution. Students search for patterns in the evidence to support their understanding of the fossil record and how those patterns show relationships between modern organisms and their common ancestors.	**Stability and Change on Earth** 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.	**Earth Systems** Students examine geoscience data in order to understand processes and events in Earth's history. 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. Students investigate the controlling properties of important materials and construct explanations based on the analysis of real geoscience data.	**Astronomy** 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. There is also a strong connection to engineering through the instruments and technologies that have allowed us to explore the objects in our solar system and obtain the data that support the theories explaining the formation and evolution of the universe. Students examine geosciences data in order to understand the processes and events in Earth's history.	**Weather and Climate** 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. A systems approach is also important here, examining the feedback between systems as energy from the Sun is transferred between systems and circulates through the ocean and atmosphere.	**Human Impacts** In this unit of study, students analyze and interpret data and design solutions to build on their understanding of the ways that human activities affect Earth's systems. The emphasis of this unit is the significant and complex issues surrounding human uses of land, energy, mineral, and water resources and the resulting impacts of these uses.Students define a problem by precisely specifying criteria and constraints for solutions as well as potential impacts on society and the natural environment; systematically evaluate alternative solutions; analyze data from tests of different solutions; combining the best ideas into an improved solution; and develop and iteratively test and improve their model to reach an optimal solution. In this unit of study students are expected to	**Electromagnetic Spectrum** In this unit of study, students develop and use models, use mathematical thinking, and obtain, evaluate, and communicate information 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.

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						demonstrate proficiency in analyzing and interpreting data and designing solutions.	
Standards	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	(MS-ESS3-1) Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. (MS-ESS3-2) Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-4) Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. (MS-ESS3-5)	(MS-ESS1-4) Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. (MS-ESS2-1) Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (MS-ESS2-2) Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-3) Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	(ESS1.B) Generate and analyze evidence (through simulations or long term investigations) to explain why the Sun's apparent motion across the sky changes over the course of a year. (MS-ESS1-1) Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. (ESS1.A; ESS1.B) Develop and use a model that shows how gravity causes smaller objects to orbit around larger objects at increasing scales, including the gravitational force of the sun causes the planets and other bodies to orbit around it holding together the solar system. (MS-ESS1-3) Analyze and interpret	(MS-ESS2-4) Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (MS-ESS2-5) Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. (ESS2.C) Explain how variations in density result from variations in temperature and salinity drive a global pattern of interconnected ocean currents. (ESS2.C; ESS2.D) Use a model to explain the mechanisms that cause varying daily temperature ranges in a coastal community and in a community located in the interior of the country.	(MS-ESS3-3) Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (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. (MS-ETS1-3) Analyze data from tests to determine similarities and differences among several design	(MS-PS4-1) Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. (MS-PS4-2) Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials (MS-PS4-3) Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

	multiple species to identify relationships not evident in the fully formed anatomy	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.		data to determine scale properties of objects in the solar system. (MS-ESS1-2) Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.	(MS-ESS2-6) Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	

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	Unit 1 5 Weeks	Unit 2 5 Weeks	Unit 3 5 Weeks	Unit 4 4 weeks	Unit 5 5 Weeks	Unit 6 7 Weeks	Unit 7 5 Weeks
Grade 8	**Structure and Properties of Matter** 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 molecular level accounts to explain states of matter and changes between states.	**Interactions of Matter** Students will build on their understanding of atoms and molecules to explain how the addition or removal of thermal energy can cause something to change state. Students will also trace synthetic materials back to their original chemical makeup.	**Chemical Interactions** 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.	**Relationships Among Forms of Energy** In this unit, students make sense of the relationship between energy and forces. Students develop their understanding 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.	**Thermal Energy** Students make sense of the difference between energy and temperature. 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.	**Forces and Motion** Students system models to understand 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.	**Types of Interactions** Students understand ideas that explain why some materials are attracted to each other while others are not. 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. In particular, students develop understandings that gravitational interactions are always attractive but that electrical and magnetic forces can be both attractive and negative. Students also develop ideas that objects can exert forces on each other even though the objects are not in contact, through fields.
Standards	MS-PS1-1 Develop models to describe the atomic composition of simple molecules	MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural	MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical	MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of	MS-PS3-3. Apply scientific principles to design, construct, and test a device that either	MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	MS-PS2-3. Ask questions about data to determine the factors that affect the strength of

	and extended structures. MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	resources and impact society. MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	reaction and thus mass is conserved. MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	an object and to the speed of an object. MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. MS-PS3-5. Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.	minimizes or maximizes thermal energy transfer. MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. 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	MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. 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. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best	electric and magnetic forces. MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

					constraints of the problem. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. 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.	characteristics of each that can be combined into a new solution to better meet the criteria for success. 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.	