Main Criteria: Next Generation Science Standards (NGSS)
Secondary Criteria: California Content Standards, Pennsylvania Core and Academic Standards
Subject: Science
Grade: 6

Correlation Options: Show All

Main Criteria Standards	California Content Standards	Pennsylvania Core and Academic Standards
Science		
Grade 6		
PERFORMANCE EXPECTATION: **MS-PS1-1.** - Develop models to describe the atomic composition of simple molecules and extended structures.	**RST.6-8.4.** - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.	**CC.3.5.6-8.D.** - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
PERFORMANCE EXPECTATION: **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.		**3.2.6.A4.** - Differentiate between physical changes and chemical changes.
PERFORMANCE EXPECTATION: **MS-PS1-3.** - Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.		
PERFORMANCE EXPECTATION: **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.		**3.2.6.B3b.** - Explain the effect of heat on particle motion by describing what happens to particles during a phase change.
PERFORMANCE EXPECTATION: **MS-PS1-5.** - Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.		

PERFORMANCE EXPECTATION: **MS-PS1-6.** - Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.		
PERFORMANCE EXPECTATION: **MS-PS2-1.** - Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.		
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-PS2-3.** - Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.		**3.4.6.E3.** - Investigate that power is the rate at which energy is converted from one form to another or transferred from one place to another.
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-PS3-1.** - Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.		

PERFORMANCE EXPECTATION: **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.		**3.2.6.B2b.** - Differentiate between potential and kinetic energy.
PERFORMANCE EXPECTATION: **MS-PS3-3.** - Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	**MS-PS3-3.** - Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	
PERFORMANCE EXPECTATION: **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-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.	
PERFORMANCE EXPECTATION: **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.	**MS-PS3-5.** - Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	**3.2.6.B2b.** - Differentiate between potential and kinetic energy.
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-PS4-2.** - Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.		
PERFORMANCE EXPECTATION: **MS-PS4-3.** - Integrate qualitative scientific and technical information to support the claim that digitized		**3.4.6.A3.** - Explain how knowledge from other fields of study (STEM) integrate to create new technologies.

signals (sent as wave pulses) are a more reliable way to encode and transmit information.		**3.4.6.B2.** - Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. **3.4.6.D3.** - Design and use instruments to evaluate data. **3.4.6.E4.** - Illustrate how communication systems are made up of a source, encoder, transmitter, receiver, decoder, and destination. Examine how communications information technologies are used to help humans make decisions and solve problems. **3.4.6.E7.** - Explain how the type of structure determines the way the parts are put together.
PERFORMANCE EXPECTATION: **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	**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.	**3.1.6.A4.** - Recognize that all organisms are composed of cells and that many organisms are **3.1.6.A6.** - Identify examples of unicellular and multicellular organisms.
PERFORMANCE EXPECTATION: **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-LS1-2.** - Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	**3.1.6.A8.** - (SCALE) Explain why the details of most cells are visible only through a microscope.
PERFORMANCE EXPECTATION: **MS-LS1-3.** - Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	**MS-LS1-3.** - Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	
PERFORMANCE EXPECTATION: **MS-LS1-4.** - Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	**MS-LS1-4.** - Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	

	MS-LS3-2. - Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	
PERFORMANCE EXPECTATION: **MS-LS1-5.** - Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	**MS-LS1-5.** - Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	
PERFORMANCE EXPECTATION: **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.		**3.1.6.A2.** - Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers.
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **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-LS1-8.** - Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-LS2-2.** - Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.		

PERFORMANCE EXPECTATION: **MS-LS2-3.** - Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.		**3.1.6.A2.** - Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers.
PERFORMANCE EXPECTATION: **MS-LS2-4.** - Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.		**4.1.6.D.** - Identify reasons why organisms become threatened, endangered, and extinct.
PERFORMANCE EXPECTATION: **MS-LS2-5.** - Evaluate competing design solutions for maintaining biodiversity and ecosystem services.		
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-LS3-2.** - Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	**MS-LS1-4.** - Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS3-2.** - Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	

PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-LS4-3.** - Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.		**3.4.6.A3.** - Explain how knowledge from other fields of study (STEM) integrate to create new technologies. **3.4.6.B2.** - Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. **3.4.6.D3.** - Design and use instruments to evaluate data. **3.4.6.E7.** - Explain how the type of structure determines the way the parts are put together.
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-LS4-5.** - Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.		

PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **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.		**3.3.6.B1e.** - Explain how the tilt of the earth and its revolution around the sun cause an uneven heating of the earth which in turn causes the seasons and weather patterns. **3.3.6.B2a.** - (MODELS) Use models to demonstrate that earth has different seasons and weather patterns. **3.3.6.B2b.** - (MODELS) Use models to demonstrate that the phases of the moon are a result of its orbit around Earth.
PERFORMANCE EXPECTATION: **MS-ESS1-2.** - Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.		**3.3.6.B1b.** - Recognize the role of gravity as a force that pulls all things on or near the earth toward the center of the earth and in the formation of the solar system and the motions of objects in the solar system. **3.3.6.B1c.** - Explain why the planets orbit the sun in nearly circular paths.
PERFORMANCE EXPECTATION: **MS-ESS1-3.** - Analyze and interpret data to determine scale properties of objects in the solar system.		**3.3.6.B1c.** - Explain why the planets orbit the sun in nearly circular paths.
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-ESS2-1.** - Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	**MS-ESS2-4.** - Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	**3.3.6.A4.** - Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere.

PERFORMANCE EXPECTATION: **MS-ESS2-2.** - Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.		
PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **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-ESS2-4.** - Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	**3.3.6.A4.** - Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere.
PERFORMANCE EXPECTATION: **MS-ESS2-5.** - Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	**MS-ESS2-5.** - Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	**3.3.6.B2a.** - (MODELS) Use models to demonstrate that earth has different seasons and weather patterns.
PERFORMANCE EXPECTATION: **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.	**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.	**3.3.6.A5c.** - Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.
PERFORMANCE EXPECTATION: **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.		

PERFORMANCE EXPECTATION: **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.		
PERFORMANCE EXPECTATION: **MS-ESS3-3.** - Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	**MS-ESS3-3.** - Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	**4.5.6.D.** - Explain the costs and benefits of recycling in controlling resource use.
PERFORMANCE EXPECTATION: **MS-ESS3-4.** - Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact		**4.2.6.C.** - Identify natural and human-made **4.5.6.A.** - Examine how historical events have shaped the sustainable use of natural resources.
PERFORMANCE EXPECTATION: **MS-ESS3-5.** - Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	**MS-ESS3-5.** - Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	
PERFORMANCE EXPECTATION: **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-ETS1-1.** - 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-ETS1-4.** - 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.	**3.4.6.A2.** - Describe how systems thinking involves considering how every part relates to others. **3.4.6.C1.** - Recognize that requirements for a design include such factors as the desired elements and features of a product or system or the limits that are placed on the design. **3.4.6.C2.** - Show how models are used to communicate and test design ideas and processes. **3.4.6.D1.** - Apply a design process to solve problems beyond the laboratory classroom.

PERFORMANCE EXPECTATION: **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-ETS1-2.** - 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 characteristics of each that can be combined into a new solution to better meet the criteria for success.	
PERFORMANCE EXPECTATION: **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-ETS1-2.** - 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 characteristics of each that can be combined into a new solution to better meet the criteria for success.	**3.4.6.A3.** - Explain how knowledge from other fields of study (STEM) integrate to create new technologies. **3.4.6.B2.** - Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. **3.4.6.D3.** - Design and use instruments to evaluate data. **3.4.6.E7.** - Explain how the type of structure determines the way the parts are put together.
PERFORMANCE EXPECTATION: **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.	**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-ETS1-4.** - 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.	**3.4.6.C2.** - Show how models are used to communicate and test design ideas and processes.