

Next Generation Science Standards Alignment

Performance Expectations



CHALLENGE

Legend

•	The standard is clearly addressed by program activities.
-	This standard potentially could be addressed as part of FIRST® LEGO® League Challenge either by actions that the coach or teacher takes when working with the students or by conditions established by the program.

Grade 4

Cluster	Indicator	Indicator Statement	Addressed
Energy	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 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.	-
Waves and Their Applications in Technologies for Information Transfer	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-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	
	4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.	
From Molecules to Organisms: Structures and Processes	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 of information through their senses, process the information in their brain, and respond to the information in different ways.	
Earth's Place in the Universe	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.	
Earth's Systems	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-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.	
Earth and Human Activity	4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	-
	4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	-

Grade 5

Cluster	Indicator	Indicator Statement	Addressed
Matter and Its Interactions	5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.	
	5-PS1-2	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.	

	5-PS1-3	Make observations and measurements to identify materials based on their properties.	
	5-PS1-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	
Motion and Stability: Forces and Interactions	5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.	-
Energy	5-PS3-1	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.	
From Molecules to Organisms: Structures and Processes	5-LS1-1	Support an argument that plants get the materials they need for growth chiefly from air and water.	
Ecosystems: Interactions, Energy, and Dynamics	5-LS2-1	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	
Earth's Place in the Universe	5-ESS1-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.	
Earth's Systems	5-ESS2-1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	
	5-ESS2-2	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.	
Earth and Human Activity	5-ESS3-1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	-

Grade 3-5

Cluster	Indicator	Indicator Statement	Addressed
Engineering Design	3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	•
	3-5 ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	•
	3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	-

Grade 6-8

Cluster	Indicator	Indicator Statement	Addressed
Motion and Stability: Forces and Interactions	MS-PS2-1	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	-
	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-PS2-3	Ask questions about data to determine the factors that affect the strength of 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.	
Energy	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.	-

	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-PS3-3	Apply scientific principles to design, construct, and test a device that either 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-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.	-
Engineering Design	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 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.	-
<i>Only Middle School science standards that could be addressed are listed in this table instead of the full standard listing.</i>			