Next Generation Science Standards Correlations (1 of 6)

The Next Generation Science Standards (NGSS) were completed and published online (http://www.nextgenscience.org) in April 2013. The standards are based on the *Framework for K–12 Science Education* developed by the National Research Council and integrate three dimensions: disciplinary core ideas (content), scientific and engineering practices, and crosscutting concepts. The activities in this module have been correlated to the NGSS performance expectations for middle school and high school. Only those performance expectations that are addressed by at least one of the module activities are included in the tables.

Key to Level of Activity Correlation

The following key can be used to interpret the level of activity correlation presented in the tables.

- A "**1**" indicates that the activity presents or reinforces the concept and idea, often by connecting it to a climate change issue.

- A "**2**" indicates that the activity includes some teaching of the concept and idea, and that the concept and idea are part of the focus of the activity.

- A "**3**" indicates that the activity teaches both the concept and idea and requires demonstration of the practice; therefore, upon successful completion of the activity, students will have met the performance expectation.

The "*****" symbol presented frequently for Activity 14 denotes that the correlation level of that activity will change based on the type of environmental action project that is developed and implemented.

Middle School NGSS Correlations (2 of 6)

PERFORMANCE EXPECTATION	ACTIVITY													
MS-PS1 Matter and Its Interactions	1	2	3	4	5	6	7	8	9	10	11	12	13	14
MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	0	0	0	0	0	0	0	0	2	3	2	1	1	*
MS-LS1 From Molecules to Organisms: Structures and Processes	1	2	3	4	5	6	7	8	9	10	11	12	13	14
MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	0	0	3	1	3	3	1	0	0	0	0	0	1	*
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.	0	0	0	0	0	0	1	1	0	0	0	0	1	*
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.	0	0	0	0	0	0	1	0	0	0	0	0	1	*
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	2	3	4	5	6	7	8	9	10	11	12	13	14
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.	0	0	3	1	1	3	0	0	0	0	0	0	1	*
MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	0	0	2	0	0	1	0	0	0	0	0	0	1	*
MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	0	0	0	0	0	0	1	0	0	0	0	1	1	*
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	1	3	3	1	2	3	1	1	0	0	0	0	1	*
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	0	2	1	1	3	1	1	1	3	2	2	3	1	*
MS-LS4 Biological Evolution: Unity and Diversity	1	2	3	4	5	6	7	8	9	10	11	12	13	14
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.	0	0	0	0	0	3	0	0	0	0	0	0	1	*
MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	0	0	0	0	1	3	0	0	0	0	0	0	1	*
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.	0	0	0	0	0	2	0	0	0	0	0	0	1	*

Middle School NGSS Correlations (3 of 6)

PERFORMANCE EXPECTATION	ACTIVITY													
MS-ESS2 Earth's Systems	1	2	3	4	5	6	7	8	9	10	11	12	13	14
MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	0	0	0	0	0	0	1	0	0	1	0	0	1	*
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.	0	1	0	0	0	0	0	0	0	0	0	0	1	*
MS-ESS3 Earth and Human Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14
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.	1	1	0	0	0	0	1	0	0	0	0	0	1	*
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.	1	1	1	0	1	0	0	0	0	0	0	0	1	*
MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	1	3	2	1	3	1	1	2	1	2	2	2	1	*
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.	1	2	1	1	0	0	0	2	2	2	2	2	2	*
MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	3	3	0	0	0	0	1	1	0	0	0	0	1	*
MS-ETS1 Engineering Design	1	2	3	4	5	6	7	8	9	10	11	12	13	14
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.	0	2	0	0	2	1	0	0	1	3	1	1	0	3
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	0	2	0	0	1	0	0	0	1	3	1	1	1	3
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.	0	0	1	0	0	0	0	0	0	2	0	0	0	0

High School NGSS Correlations (4 of 6)

PERFORMANCE EXPECTATION	ACTIVITY													
HS-PS4 Waves and Their Applications in Technologies for Information Transfer	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HS-PS4-2. Evaluate questions about the advantages of using a digital transmission and storage of information.	0	0	0	0	0	0	0	0	0	0	1	0	0	*
HS-LS1 From Molecules to Organisms: Structures and Processes	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	0	0	0	0	0	0	1	1	0	0	0	1	0	*
HS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	0	1	3	0	1	2	0	0	0	0	0	0	0	*
HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	0	1	3	1	2	2	0	0	0	0	0	0	1	*
HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	0	0	0	0	0	0	2	2	0	0	0	2	1	*
HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	0	0	0	0	0	0	3	2	0	0	0	3	1	*
HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	0	0	3	2	1	2	0	1	0	0	0	0	1	*
HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.	0	3	0	0	0	0	1	3	2	3	3	3	1	*
HS-LS3 Heredity: Inheritance and Variation of Traits	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	0	0	0	0	0	1	0	0	0	0	0	0	1	*
HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	0	0	0	0	0	3	0	0	0	0	0	0	1	*

High School NGSS Correlations (5 of 6)

PERFORMANCE EXPECTATION	ACTIVITY													
HS-LS4 Biological Evolution: Unity and Diversity	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HS-LS4-2. Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	0	0	2	0	1	2	0	0	0	0	0	0	1	*
HS-LS4-3. Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	0	0	2	0	0	3	0	0	0	0	0	0	1	*
HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	0	0	1	1	1	3	0	0	0	0	0	0	1	*
HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	0	1	3	1	1	2	0	0	0	0	0	0	1	*
HS-ESS2 Earth's Systems	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth's systems.	1	2	3	1	1	2	1	1	0	0	0	0	1	*
HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.	1	2	1	0	0	0	0	0	0	0	0	0	1	*
HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	0	1	0	0	0	0	2	2	0	1	3	1	1	*

High School NGSS Correlations (6 of 6)

PERFORMANCE EXPECTATION	ACTIVITY													
HS-ESS3 Earth and Human Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	1	2	2	1	2	1	0	2	0	1	0	0	3	*
HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	0	2	0	0	1	0	0	0	1	1	1	1	1	*
HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.	0	1	2	1	2	2	0	1	0	2	1	2	1	*
HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.	2	3	0	1	0	0	0	1	1	3	3	2	2	*
HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.	2	2	3	1	0	0	0	0	0	0	0	0	1	*
HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.	2	2	3	1	2	0	1	1	1	1	1	1	1	*
HS-ETS1 Engineering Design	1	2	3	4	5	6	7	8	9	10	11	12	13	14
HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	2	3	0	0	1	1	0	0	1	2	1	2	2	2
HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	0	2	0	0	1	2	0	1	1	3	1	3	1	2
HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	1	3	0	0	1	0	0	1	2	3	3	1	2	3
HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	0	0	2	0	0	0	0	0	0	1	0	1	0	0