



# **Next Generation Science Standards (NGSS) Correlation with Project Learning Tree's *GreenSchools* Investigations**

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## **Correlation of Next Generation Science Standards with Project Learning Tree's *GreenSchools* Investigations**

This document correlates PLT's *GreenSchools* Investigations with the Performance Expectations of the *Next Generation Science Standards* (NGSS). The tables on the following pages are organized by grade levels. Suggestions for using the *GreenSchools* Investigations to meet specific Performance Expectations are provided.

Comments and recommendations for improving the correlation are encouraged; please submit comments to [information@plt.org](mailto:information@plt.org).

This correlation was developed in collaboration with Project Learning Tree staff and Sheri Soyka of Soyka Consulting.

## KINDERGARTEN

### NGSS Performance Expectations Supported by PLT's *GreenSchools* Energy Investigation

Performance Expectations	Suggestions for using the Energy Investigation to support the Performance Expectations
<b>K-PS3 Energy</b>	
K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.	In the Energy Investigation, students look at the location of outdoor air conditioning units to determine if they are in the shade to increase their efficiency. They are also asked if there are trees on the south side of the school to provide shade in hotter months. Students could place their hand on a surface in the sun and a similar one in the shade to feel the difference in temperature and determine which one is warmer and which one is cooler. Be sure the surface in the sun is not too hot to touch.
K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	Students come up with a list of action projects that will reduce energy use at their school. Shading air conditioning units and the sunny side of the school are typical action projects. This can be accomplished by building a structure or by planting shrubs and trees to reduce the warming effect of sunlight and thus reduce energy demands.

## NGSS Performance Expectations Supported by PLT's *GreenSchools* School Site Investigation

Performance Expectations	Suggestions for using the School Site Investigation to support the Performance Expectations
<b>K-LS1 From Molecules to Organisms: Structures and Processes</b>	
K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.	In the School Site Investigation, students record information on the types of plants and animals found on their school grounds. Daily and monthly plant and wildlife observation charts are provided so they can record their sightings; this can be done using words or pictures. Students also brainstorm ideas to make the school site better for wildlife and to support a diversity of plants and animals. Their observations and ideas can be used to discuss what plants and animals need to survive.
<b>K-ESS2 Earth's Systems</b>	
K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	Students observe the types of plants and animals that live in different parts of the school grounds. They also look at how humans have changed the environment by determining the amount of pervious (i.e. lawns, gardens) and impervious (i.e. asphalt, concrete) surfaces on their school grounds. If available, students can look at photos of the site before and after the school was built to see how the area has changed over time. Students also observe the types and number of trees on the school site. Their observations can be used to construct an argument for how plants and animals (including humans) can change the environment to meet their needs.
<b>K-ESS3 Earth and Human Activity</b>	
K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.	In the School Site Investigation, student map their school grounds. This map can be posted on a bulletin board and students can place pictures of where different plants and animals are found; for example, butterflies in the flower garden, squirrels in a tree, lizards in a rock garden, birds in a bird nest, or students eating lunch in the cafeteria.

## NGSS Performance Expectation Supported by all PLT's *GreenSchools* Investigations

Performance Expectation	Suggestions for using the Energy, School Site, Water, Waste & Recycling, and Environmental Quality Investigations to support the Performance Expectation
<b>K-ESS3 Earth and Human Activity</b>	
K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	<p>All of the <i>GreenSchools</i> Investigations help students discover that although human activities have had major effects on the land, water, air, vegetation, and animals, there are numerous ways that communities, schools, and individuals can communicate solutions and help protect Earth's resources and environment.</p> <p>For example, in the School Site Investigation, students develop an action plan for how they can improve their school grounds. The Investigation includes several action project ideas to help students brainstorm and prioritize their ideas, such as planting trees, installing rain barrels, improving wildlife habitat, and establishing a vegetable garden.</p> <p>Another example is in the Waste and Recycling Investigation, where students develop an action plan for how they can reduce waste and increase recycling efforts at their school. The Investigation includes several action project ideas to help students come up with solutions, such as starting up or increasing recycling efforts, setting up a compost program, and reducing cafeteria waste by using reusable trays, plates, and utensils.</p> <p>In all the Investigations, students are encouraged to share their ideas and communicate solutions with their families through a "Home Connection" and with their community by posting information on their school website, in local newspapers, and so forth.</p>
End of kindergarten correlation	

## FIRST GRADE

### No Correlations for NGSS Performance Expectations with GreenSchools Investigations

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## SECOND GRADE

### NGSS Performance Expectations Supported by PLT's *GreenSchools* School Site Investigation

Performance Expectations	Suggestions for using the School Site Investigation to support the Performance Expectations
<b>2-PS1 Matter and its Interactions</b>	
2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	In the School Site Investigation, students classify the grounds around their school as either pervious or impervious. They also classify the types of surfaces found on the school grounds, for example: woodchips, gravel, blacktop, mulch, concrete, rubber.
<b>2-LS4 Biological Evolution: Unity and Diversity</b>	
2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.	On daily and monthly plant and wildlife observation charts, students record data on wildlife sightings, buds changing, flowers and leaves emerging, birds nesting, and so forth. They include information on the date, weather, and location so they can easily compare observations. For example, they can determine which habitats on the school grounds support a greater diversity of plants and animals. They can also determine if the diversity of plants and animals changes after they make improvements to the school grounds.
<b>2-ESS2 Earth's Systems</b>	
2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	Students determine the percentage of pervious and impervious areas on their school grounds and brainstorm ways to increase the amount of pervious land. They are encouraged to take action to increase the pervious area through such activities as building a rain garden, rooftop garden, or container garden. They discover how pervious land helps to improve water quality by slowing down the flow of water and reducing storm runoff.

<b>Grades K-2: K-2 ETS1 Engineering Design</b>	<b>For all PLT <i>Greenschools</i> Investigations</b>
<p><b>K-2-ETS1-1.</b></p> <p>Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p>	<p>In each of the <i>GreenSchools</i> Investigations, students make observations, gather information, analyze results, ask questions, and brainstorm solutions regarding a situation that they want to improve. They compare design solutions to determine the best action to take.</p>
<p>End of K-2 correlation</p>	

## THIRD GRADE

### NGSS Performance Expectations Supported by PLT's *GreenSchools* School Site Investigation

Performance Expectations	Suggestions for using the School Site Investigation to support the Performance Expectations
<b>3-LS4 Biological Evolution: Unity and Diversity</b>	
3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	In the School Site Investigation, students record information on the types of plants and animals found in different locations on their school grounds. They brainstorm ways to improve wildlife habitat, prioritize their list, and decide on a few action projects that can be accomplished. This information can be used by students to construct an argument that certain organisms survive better in some habitats than other.
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.	Students brainstorm and prioritize ideas on how they can solve an environmental problem on their school site. They discuss the merits of various solutions and select one or more to accomplish. For example, if invasive plants are taking over native plants on the school grounds, students can determine the merits of various plans to eradicate the invasive species, such as manual removal of the invasive plants versus the use of herbicides.



## FOURTH GRADE

### NGSS Performance Expectation Supported by PLT's *GreenSchools* Energy Investigation

Performance Expectation	Suggestions for using the School Site Investigation to support the Performance Expectations
<b>4-ESS3 Earth and Human Activity</b>	
4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	In the Energy Investigation, students find out the sources of energy used by their school, for example: coal, natural gas, oil, hydroelectric, solar, nuclear, wind, wood, or geothermal. They determine if any of the sources are from renewable resources. They brainstorm ways to reduce energy use at school in order to lessen the impact on the environment.

## FIFTH GRADE

### NGSS Performance Expectation Supported by all PLT's *GreenSchools* Investigations

Performance Expectation	Suggestions for using the Energy, School Site, Water, Waste & Recycling, and Environmental Quality Investigations to support the Performance Expectation
<b>5-ESS3 Earth and Human Activity</b>	
5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	All of the <i>GreenSchools</i> Investigations help students discover that although human activities have had major effects on the land, water, air, vegetation, and animals, there are numerous ways that communities, schools, and individuals can help protect Earth's resources and environment.

## GRADES 3-5

<b>Grades 3-5: 3-5-ETS1 Engineering Design</b>	<b>For all PLT <i>Greenschools</i> Investigations</b>
<p>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.</p>	<p>For each <i>GreenSchools</i> Investigation, students brainstorm a list of things they can do to help solve an environmental problem at their school. They prioritize the list based on need, outcome, and constraints on materials, time, and cost.</p>
<p>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.</p>	<p>For each <i>GreenSchools</i> Investigation, students generate and compare multiple possible solutions to an environmental problem at their school based on how well each is likely to meet the criteria and constraints of the problem.</p>
End of Grades 3-5 correlation	

## MIDDLE SCHOOL

### NGSS Performance Expectation Supported by PLT's *GreenSchools* Energy Investigation

Performance Expectation	Suggestions for using the Energy Investigation to support the Performance Expectation
<b>MS-PS3 Energy</b>	
MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	In the Energy Investigation, students are encouraged to figure out ways to save energy in the classroom by doing things such as insulating windows to minimize heat loss.

### NGSS Performance Expectations Supported by PLT's *GreenSchools* School Site Investigation

Performance Expectations	Suggestions for using the School Site Investigation to support the Performance Expectations
<b>MS-LS2 Ecosystems: Interactions, Energy, and Dynamics</b>	
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.	In the School Site Investigation, students collect data on the animals living in different areas of the school grounds. They analyze this data to determine why more species may live in some areas than others. As they improve the habitat of their school site, they keep records to find out if there are increases in populations and species diversity after improvements are made.
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	Students brainstorm ways to improve the biodiversity of their school grounds. They evaluate competing design solutions to determine the best action to take.

## MIDDLE SCHOOL, *continued*

NGSS Performance Expectation Supported by all PLT's <i>GreenSchools</i> Investigations	
Performance Expectation	Suggestions for using the Energy, School Site, Water, Waste & Recycling, and Environmental Quality Investigations to support the Performance Expectation
<b>MS-ESS3 Earth and Human Activity</b>	
MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	All of the <i>GreenSchools</i> Investigations help students discover that although human activities have had major effects on the land, water, air, vegetation, and animals, there are numerous ways that communities, schools, and individuals can help protect Earth's resources and environment. At the end of each Investigation, students are encouraged to design and carry out a plan to minimize a human impact on the environment.
<b>Middle School: MS-ETS1 Engineering Design</b>	<b>For all PLT <i>Greenschools</i> Investigations</b>
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.	For each <i>GreenSchools</i> Investigation, students brainstorm a list of things they can do to help solve an environmental problem at their school. They prioritize the list based on need, outcome, and constraints on materials, time, and cost. They select one or more projects to implement based on what they predict will be successful.
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	For each <i>GreenSchools</i> Investigation, students generate and compare multiple possible solutions to an environmental problem at their school based on how well each is likely to meet the criteria and constraints of the problem.
End of middle school correlation	

## HIGH SCHOOL

### NGSS Performance Expectation Supported by PLT's *GreenSchools* School Site Investigation

Performance Expectation	Suggestions for using the School Site Investigation to support the Performance Expectation
<b>HS-LS2 Ecosystems: Interactions, Energy, and Dynamics</b>	
HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and Biodiversity.	In the School Site Investigation, students brainstorm ways to reduce the impacts of human activities on the environment and Biodiversity. They evaluate competing design solutions to determine the best action to take. As they improve the habitat of their school site, they keep records to find out if the Biodiversity is increasing after improvements are made.

### NGSS Performance Expectation Supported by all PLT's *GreenSchools* Investigations

Performance Expectation	Suggestions for using the Energy, School Site, Water, Waste & Recycling, and Environmental Quality Investigations to support the Performance Expectation
<b>HS-ESS3 Earth and Human Activity</b>	
HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.	In all of the <i>GreenSchools</i> Investigations, students brainstorm and then evaluate technological solutions that reduce the impacts of human activities on natural systems. For example, starting or increasing recycling and composting efforts at the school, installing a rooftop garden to capture rain and reduce runoff, or building a rain garden to improve the health of a local watershed.

## HIGH SCHOOL, *continued*

<b>High School: HS-ETS1 Engineering Design</b>	<b>For all PLT <i>Greenschools</i> Investigations</b>
<p>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.</p>	<p>For each <i>GreenSchools</i> Investigation, students brainstorm a list of things they can do to help solve an environmental problem at their school. They are encouraged to develop a detailed plan that they can present to school officials for approval.</p>
<p>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.</p>	<p>For each <i>GreenSchools</i> Investigation, students generate and compare multiple possible solutions to an environmental problem at their school based on how well each is likely to meet the criteria and constraints of the problem. They prioritize the list based on such things as materials, time, cost, safety, reliability, and aesthetics. As approval, time, and funding permit, students work with school personnel to implement one or more of their environmental improvement plans.</p>
End of high school correlation	