Outdoor Learning Garden K-8/ Climate Change Connections

Content Area: **Science**
Course(s):
Time Period: **September**
Length: **all year**
Status: **Published**

Unit Overview

The learning garden is an outside garden that provides immediate access to the world beyond the classroom. It fosters and interest in how the world works, and how making responsible choices for the environment is our responsibility. This garden can be used in multiple ways, through multiple disciplines to engage students in environmental ownership, scientific understanding and civic responsibilities.

Enduring Understandings

There is much to be learned about the world through the study of plants, environmental responsibilities, and the beauty of outdoor spaces for human enjoyment.

We are stewards of our world, community and school environments.

We have the power to make the world a better place.

Instructional Strategies and Learning Activities

Teachers can choose and/or develop tie-ins to their curriculum and grade specific learning standards and develop age appropropriate learning activities built around the NJSLS standards for their grade level. Additionally, the Learning Garden Manual available in the school in the library features some suggested activities suitable for use in the garden.

There is a google classroom everyone can join to view lessons that are already developed in the gardens. It is also available in the library in binder form. https://classroom.google.com/c/Mzk2NTcyOTAwMTM4

Contact Laura Ferrante for an invitation.

https://padlet.com/lizhermoso/Green

From the presentation by Liz Hernoso on Feb. 18, 2022.

Career Readiness, Life Literacies and Key Skills

Standards broken into bands K-2, 3-5, 6-8

9.1.2.CAP	Career Awareness and Planning
9.1.2.CR	Civic Responsibility
	There are actions an individual can take to help make this world a better place.
	You can give back in areas that matter to you.
	Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.
	Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
	Different types of jobs require different knowledge and skills.
	An individual's passions, aptitude and skills can affect his/her employment and earning potential.
	An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
9.1.2.CR.1	Recognize ways to volunteer in the classroom, school and community.
9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.
9.1.5.CR.1	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
9.4.8.CI.1	Assess data gathered on varying perspectives on causes of climate change (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4).
9.1.8.CR.1	Compare and contrast the role of philanthropy, volunteer service, and charities in community development and the quality of life in a variety of cultures.
9.2.5.CAP.1	Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
9.4.5.CI.2	Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
9.1.2.CR.2	List ways to give back, including making donations, volunteering, and starting a business.
	Individuals can use their talents, resources, and abilities to give back.
9.2.8.CAP.3	Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
9.4.2.CT	Critical Thinking and Problem-solving
9.1.8.CR.2	Compare various ways to give back through strengths, passions, goals, and other personal factors.
9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.
	Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).

9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
9.4.5.CT.2	Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).

Interdiciplinary Connections

Standards Broken into bands, K-2, 3-5, 6-8

Articles concerning connections with Mindfulness and Climate change

American Psychological Association - Mindfulness and climate change: How being present can help our future

Mindfulness and Sustainability

Mindfulness and Sustainability: How to practice for the planet

LA.RI.5.1	Quote accurately from a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
LA.RI.8.1	Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
LA.RI.5.2	Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
LA.RI.8.2	Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.
LA.RI.8.3	Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).
LA.RI.5.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
MA.2.MD	Measurement and Data
MA.2.MD.A	Measure and estimate lengths in standard units.
MA.2.MD.A.3	Estimate lengths using units of inches, feet, centimeters, and meters.
LA.W.8.1	Write arguments to support claims with clear reasons and relevant evidence.
LA.W.8.2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

LA.W.5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
LA.W.2.1	Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a conclusion.
LA.W.8.3	Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
LA.W.2.2	Write informative/explanatory texts in which they introduce a topic, use evidence-based facts and definitions to develop points, and provide a conclusion.
LA.W.5.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
LA.W.2.3	Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.
MA.5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
MA.5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.
LA.W.5.3	Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
LA.W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
LA.W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
LA.SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
LA.W.5.7	Conduct short research projects that use several sources to build knowledge through investigation of different perspectives of a topic.
LA.W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
LA.W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.

Standards

Learning Garden Curriculum Alignment

Learning Garden Manual "Mini-Activities" Standards Alignment		
Activity Name	**Objective/Topic**	**Standard Alignment**
Sink or Float?	Density, buoyancy Conducting an investigation, formulating a hypothesis, making	

	observations.	
Seeing Stars	Constellations	1-ESS1-1 Earth's Place in the Universe Use observations of the sun, moon, and stars to describe pat that can be predicted.
The Way of the Wind	Wind, weather vanes, compasses	Science and Engineering Practices Possibly: K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.
Around the Clock	Sundials	1-ESS1-1 Earth's Place in the Universe Use observations of the sun, moon, and stars to describe pat that can be predicted.
Let it Snow	Snow crystals, making observations, asking questions	Cross-Cutting-Concept: Patterns
Map It Out	Map making	
Breathing Tree	Photosynthesis	MS-LS1-6 Construct a scientific explanation based on evi for the role of photosynthesis in the cycling of matter and fl of energy into and out of organisms.
Toad Home AND For The Birds	Animals, biodiversity	K-LS1-1 Use observations to describe patterns of what p and animals (including humans) need to survive. 2-LS4-1 Make observations of plants and animals to comp the diversity of life in different habitats. MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamic Evaluate competing design solutions for maintaining biodiversity and ecosystem services
Magnifying Glass (of water)		1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in th path of a beam of light. 4-PS4-2 Develop a model to describe that light reflecting objects and entering the eye allows objects to be seen. MS-PS4-2 Develop and use a model to describe that wave reflected, absorbed, or transmitted through various material
Washed Away		4-ESS2-1 Make observations and/or measurements to pro evidence of the effects of weathering or the rate of erosion b water, ice, wind, or vegetation.
Bake Your Own Fossils		3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which th lived long ago.

		4-ESS1-1 Identify evidence from patterns in rock formatic and fossils in rock layers to support an explanation for chan in a landscape over time. MS-LS4-1 Analyze and interpret data for patterns in the fo record that document the existence, diversity, extinction, an change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in t past.
Break It Down		5-LS2-1 Develop a model to describe the movement of mat among plants, animals, decomposers, and the environment.

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2020 Climate Change Standards

That Can Be Addressed

with Activities in the Learning Garden

This document is not all of the possible ideas for addressing the new climate change standards using the Learning Garden, and this list should be viewed simply as a jumping-off point for brainstorming ideas. Also, these standards mentioned below can be addressed in a variety of ways that do not necessarily employ the Learning Garden. Additional factors, including teacher autonomy, the needs of the students and the season when these standards fall into the curriculum, must also be taken into consideration when planning lessons.

Health and Physical Education		
PE Code	**Performance Expectation**	Sample Activity Idea
2.1.2.CHSS.4	Describe how climate change affects the health of individuals, plants, and animals.	Observations can be made of plants (and p animals) and a discussion conducted of ho similar these needs are to human health.
2.1.8.CHSS.7	Collaborate with other students to develop a strategy to address health issues related to climate change.	Discussions can take place in the Learning
Visual and Performing Arts		
PE Code	**Performance Expectation**	Sample Activity Idea
1.1.2.Cn10b	Using an inquiry-based set of questions, to examine global issues, including climate change and consider how these ideas could be expressed in a dance.	Dances could be performed in the stump c
Social Studies		
PE Code	**Performance Expectation**	Sample Activity Idea

6.3.5.CivicsPD.1	Develop an action plan that addresses issues related to climate change and share with school and/or community members.	Posters or Signs displayed near LG
6.3.5.GeoHE.1	Plan and participate in an advocacy project to inform others about the impact of climate change at the local or state level and propose possible solutions.	Brainstorming and planning can take place outside
Insert Other Discipline Here		
PE Code	**Performance Expectation**	Sample Activity Idea
Science		
PE Code	**Performance Expectation**	Sample Activity Idea
K-LS1-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.	Conduct observations of the plants in the I Garden
K-ESS2-1	Use and share observations of local weather conditions to describe patterns over time.	Discussing changes in weather or tempera over time
K-PS3-1	Make observations to determine the effect of sunlight on Earth's surface.	Examine LG for signs of fading or other e sunlight. Feel the ground in the shade vers sun, and record data.
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-ESS2-2	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	Make observations and look for evidence changes to the environment. (roots pushin surfaces, ants moving soil and building tu etc)
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.	Observations can be conducted outside.
2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.	Class garden can be housed in one of the g beds - preferably the greenhouse if plants edible to rabbits, etc.
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.	Brainstorming can take place outside. Observations can be made of "green" obj tools (rain barrel, compost pile or bins, etc
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	Sketches and drawings can be made outsi
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.	
5-LS2-1	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	Make observations of matter moving betw plants, animals, decomposers (look at com pile!), and the environment. Rich discussi be had.
MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	
MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	Brainstorming can take place outside. Observations can be made of local physic biological components of an ecosystem an populations.
MS-LS2-5	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	Brainstorming can take place outside.
MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	Brainstorming can take place outside. Observations can be made of energy cycli taking place in the garden.
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.	Brainstorming can take place outside. Observations can be made of sun, gravity, water cycling in the garden.
MS-ESS3-3	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	Brainstorming can take place outside.

Additional Resources:
https://www.teachengineering.org/standards/ngss

	Analyze data from tests of an object or tool to determine if it works as intended.
	Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
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.
2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.
LS1.A	Structure and Function
	Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
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.
	All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

	Changes organisms go through during their life form a pattern.
	Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.
K-LS1-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.
	Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.
	Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
	Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.
	All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.
	Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
	Patterns in the natural and human designed world can be observed and used as evidence.
2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.
	Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.
	Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.
LS3.B	Variation of Traits
	Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.
	There are many different kinds of living things in any area, and they exist in different places on land and in water.
	Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.
K-ESS2-2	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
	Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.
3-LS3-2	Use evidence to support the explanation that traits can be influenced by the environment.
5-LS2-1	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
ESS3.C	Human Impacts on Earth Systems
	Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.
	Things that people do to live comfortably can affect the world around them. But they can

	make choices that reduce their impacts on the land, water, air, and other living things. Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.
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.
1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year. Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight, so they often grow in meadows. Plants, animals, and their surroundings make up a system.
LS2.A	Interdependent Relationships in Ecosystems
4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin. Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. Wind and water can change the shape of the land. Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. Maps show where things are located. One can map the shapes and kinds of land and water in any area. Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring. Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.
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. Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information. Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to

	critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
	Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.
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.
	Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
	Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.
	Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.
	Living things affect the physical characteristics of their regions.
3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
ESS3.C	Human Impacts on Earth Systems
	Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.
	Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.
3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.
	Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.
3-ESS3-1	Make a claim about the merit of a design solution that reduces the impacts of climate change and/or a weather-related hazard.
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.
	Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.
	In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.
MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
	Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
	Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.
	Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific,

	economic, and social considerations.
LS4.B	Natural Selection
	In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed onto offspring.