



Science Grades K-2nd

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- 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.

- K-LS1-1: use observations to describe patterns of what plants and animals (including humans) need to survive.

Farm Animal Life Cycles- Students investigate six major livestock species, discover that animals need air, space, food, water, and shelter to survive, explore the life cycle of a farm animal, and identify the products each farm animal produces.

Lesson Plan: Grades K-2

- Sunlight warms Earth's surface.

- K-PS3-1: Make observations to determine the effect of sunlight on Earth's surface.
- K-PS3-2: Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Installing Native Shade Trees to Absorb Excess Water- Use this resource to have students plant a native shade tree at your school facilities.

Lesson Plan: Grades K-12

- Plants and animals can change their environment.
- 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.

- K-ESS2-2: Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

Worm Anatomy- In this lesson, students learn about worm anatomy and explore the role that worms play in developing healthy soil.

Lesson Plan: Grades Pre-K-2



Science Grades K-2nd

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- 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.
- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.

K-ESS3-3: Communicate solutions that will reduce the impact of climate change and humans on the land, water, air, and/or other living things in the local environment.

Project Plant It! Planting and Caring for a Pollinator Garden- Students will gain hands-on experience at how to plant and care for a garden that attracts bees and other pollinators.

Lesson Plan: Grades K-5

- Plants depend on water and light to grow.

- 2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Photosynthesis and You- Students identify the process used by plants make their own food and discover how photosynthesis provides the food they eat.

Lesson Plan: Grades K-2



Social Studies Grades K-2nd

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- A situation that people want to change or create can be approached as a problem to be solved through engineering.
- Asking questions, making observations, and gathering information are helpful in thinking about problems.
- Before beginning to design a solution, it is important to clearly understand the problem.

- 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.

Build a Rain Barrel- Examine student's relationship with water and our community's need to conserve water. Best paired with pollinator/rain indoor/outdoor garden. PBS How-to video on rain barrels.
Resource for Educators:
Grades K-2

- Environmental characteristics influence the how and where people live.

- 6.1.2.Geo.HE.1: Explain how seasonal weather changes, climate, and other environmental characteristics affect people's lives in a place or region.

Four Seasons on a Farm- Students identify the characteristics of the four seasons of the year, investigate what causes seasons, and observe the effects changing seasons have on farms.
Lesson Plan: Grades K-2

- Environmental characteristics influence the how and where people live.

- 6.1.2.Geo.HE.4: Investigate the relationship between the physical environment of a place and the economic activities found there.

Farm Field Trip Toolkit for Educators- Complete a garden or farm visit!
Resource for Educators:
Grades K-12

Programming Sun & Rain - On the cramped urban campus of Boston Latin School, students grow an acre's worth of vegetables.
Resource for Educators:
Grades K-12



Computer Science & Design Thinking Grades K-2nd

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved.

- 8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device.

Fish in a Bottle- Part 2- Document findings from "Science" section in an electronic data collection software.

Lesson Plan: Grade K-3
Nation Center for Education Statistics- Kids' Zone: Create A Graph.

Resource for Educators: Grades K-3

- Data can be used to make predictions about the world.

- 8.1.2.DA.3: Identify and describe patterns in data visualizations.
- 8.1.2.DA.4: Make predictions based on data using charts or graphs.

Fish in a Bottle- Part 1- Students will build fish ecosystems, observe and write about changes they observe. See "Science" section.

Lesson Plan: Grades K-3



Career Readiness, Life Literacies, & Key Skills **Grades K-2nd**

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Data can be used to make predictions about the world.

- 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).

FoodCorps- Agents of Change: Growing & Accessing Health Food- In this lesson, students hear about an activist who created change in the food system. They then brainstorm issues around food and health in their school community and work in teams to generate solutions and action steps they could take to be agents of change.
Lesson Plan: Grade 4

- Young people can have a positive impact on the natural world in the fight against climate change.

- 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1).

Hold a Cool Climate Food Taste Test- Decide with students which "Cool Climate Food" tasting they would like to complete in the class room.
Food and Climate Change: Healthy diets for a healthier planet
Resources for Educators: K-12

- Digital tools and media resources provide access to vast stores of information that can be searched.

- 9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource

Kiddle- Safe visual search engine for kids. Children should search key agricultural terms and complete research on the key term.
Resource for Educators: Grades K-2

Visual and Performing Arts Grades 3-5



Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- People develop ideas and understandings of society, culture and history through their interactions with and analysis of art.

- 1.5.5.Cn11b: Communicate how art is used to inform others about global issues, including climate change.

The Team Mural Project-
Design a school garden mural. Students learn about the meaning and purpose of art in public places, and how young people contribute to our civic life.

Lesson Plan: Grades K-5



Comprehensive Health & Physical Education Grades 3-5

Farm to School Connections to Climate Change Standards

Core Ideas

- Community professionals and school personnel are available to assist and address health emergencies as well as provide reliable information.

Performance Expectations

- 2.1.5.CHSS.2: Describe how business, non-profit organizations and individuals can work cooperatively to address health problems that are affected by global issues, including climate change.

In Action

Bring Home the Blue, Not the Flu!- Students investigate how diseases are spread and discover how to prevent transmission between humans and animals.
Lesson Plan: Grades 3-5
World Health Organization - Climate Change and Health
Resource for Educators: all grades



Science Grades 3-5

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Populations live in a variety of habitats and change in those habitats affects the organisms living there.
- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.

- 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.

What's Bugging You?- Students examine how pests affect other living organisms and the environment and identify how pests are managed in agricultural settings.

Lesson Plan: Grades 3-5

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

- 4-ESS3-2: Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.

How Rain Gardens Fight Pollution and Flooding - In this lesson, students will make mini rain gardens and discover how these can filter out pollution and soak up excess rainwater.

Lesson Plan: Grade 3



Science Grades 3-5

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- 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.

- 5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Vermicomposting- Students create a worm bin which will serve as a basis for investigations about ecosystems, life and nutrient cycles, and decomposition.
Lesson Plan: Grades 3-5



Science Grades 3-5

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.
- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.

- 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.

Eating in Season Lesson Plan- Guide students in using scientific inquiry to design a seasonal taste test and investigate what produce is grown nearby seasonally, if locally grown foods tastes better, and what other factors might play a role in flavor. Groups will graph and summarize results and the class has the opportunity to discuss benefits of seasonal meal planning and eating locally grown products. **Lesson Plan: Grades 3-5**



Social Studies Grades 3-5

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Human activities affect environmental characteristics of places or regions resulting in positive and negative impacts.

- 6.1.5.GeoHE.1: Use a variety of sources from multiple perspectives, including aerial photographs or satellite images to describe how human activity has impacted the physical environment during different periods of time in New Jersey and the United States.
- 6.1.5.GeoHE.2: Cite examples of how technological advances have changed New Jersey and the United States (e.g., energy, transportation, communications).
- 6.1.5.GeoHE.3: Analyze the effects of catastrophic environmental and technological events on human settlements and migration.

Local History: Mapping My Spot- Students often think of history as tattered documents, worn photographs, and musty books, all of which have little or no relevance to their lives. Maps provide an often-overlooked source of information and a new and compelling perspective on the past.

Lesson Plan: Grades 5-12

High-Tech Farming - Students discover technologies that are used on farms to increase efficiency and yields and decrease costs and environmental impact.

Lesson Plan: Grades 3-5

Hurricane Impacts on Agriculture - ERS and USDA resources covering recent hurricane impacts, as well as historical and background information.

Resource for Educators



Social Studies Grades 3-5

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Regions form and change as a result of unique physical characteristics conditions, economies, and cultures.

- 6.1.5.GeoPP.2: Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States.

Growing Our State History-
Students investigate what makes a community livable and explore the influence of agriculture on the history of their state.

Lesson Plan: Grades 3-5

- Through participation in the decision-making process (e.g., voting, petitions, contacting elected officials, serving in their community) people can initiate change.

- 6.3.5.CivicsPD.1: Develop an action plan that addresses issues related to climate change and share with school and/or community members.

Starting a School Garden-
Establishing and maintaining a school garden can provide a valuable, hands-on learning environment that encourages students to apply what they learn in the classroom. Work with your students to create a proposal to start your own school garden.

Resource for Educators: Grades 3-5

Computer Science & Design Thinking Grades 3-5



Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- The technology developed for the human designed world can have unintended consequences for the environment.

- 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.

Wheat Germ DNA - Using wheat as an example, students explore how DNA determines the genetic traits of a plant and how plant breeders change the DNA of a plant to produce desired characteristics. How did this agricultural advancement impact the environment?

Lesson Plan: Grades 3-5

Drones in High-Tech Farming- Students discover the science behind how a drone works, explore how drones are used in agriculture, and program and operate a drone for the purpose of surveying a field.

Lesson Plan: Grades 3-5

Technology must be continually developed and made more efficient to reduce the need for non-renewable resources.

- 6.3.5.CivicsPD.1: Develop an action plan that addresses issues related to climate change and share with school and/or community members.

Farming for Energy Lesson Plan- Students identify renewable and nonrenewable energy sources and investigate how farms can produce renewable energy.

Lesson Plan: Grades 3-5

Computer Science & Design Thinking

Grades 3-5



Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Engineering design requirements include desired features and limitations that need to be considered.

- 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
- 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process.
- 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process.

Farming for Energy- Students identify renewable and nonrenewable energy sources and investigate how farms can produce renewable energy.

Lesson Plan: Grades 3-5
Wind Power Kit available to order.

Optional Educator Resource: Grades 3-5



Comprehensive Health & Physical Education **Grades 6-8**

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Advocacy for personal, family, community, and global health can influence and change the interaction of people and their health.

- 2.1.8.CHSS.7: Collaborate with other students to develop a strategy to address health issues related to climate change.

Exploring Our Food System - This lesson lays the groundwork for understanding food through an integrated, systems-thinking lens.

Lesson Plan: Grade 6-8

Food Citizen Action Project- Students will identify a food system problem and design an intervention to address it. This culminating project has students apply what they have learned from prior lessons, and empowers them to create change.

Project Based Learning: Grades 6-8



Science Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- 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.

- MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Photosynthesis: Energy's Journey From Farm to You- Explore photosynthesis to discover how plants obtain energy from the sun and then continue following energy's path to see how energy can flow through ecosystems to ultimately provide food for humans.

Lesson Plan: Grades 6-8

- Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.

- MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Land and Soil in the Ecosystem- Students use an apple to represent the Earth and discover how our land resources are used. Through critical thinking, students discover why topsoil is a nonrenewable resource, the importance of soil to our food supply, and factors that impact topsoil distribution in different regions.

Lesson Plan: Grades 6-8



Science Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health.
- Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.

- MS-LS2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Biodiversity and Agriculture- An educational module on biodiversity and agriculture. It comprises an online educational web portal for primary school students and five accompanying lesson plans for educators.
Resource for Educators and Lesson Plans: Grades 6-12

- Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization and precipitation, as well as downhill flows on land.

- 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.

Journey 2050 Lesson 3: Water- Students will discuss the limited amount of fresh water on earth, identify how best management practices can reduce water consumption, discuss the need for water conservation and protection, and compare and contrast methods of irrigation for water conservation. **Lesson Plan: Grades 6-8**



Science Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

<ul style="list-style-type: none"> Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. 	<ul style="list-style-type: none"> MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. 	<p><u>The Edible Schoolyard Project Lesson Series for School Gardens</u>- This is the first of a 12-lesson series in which students will explore the basic ecological principle of interdependence through the lens of common organic farming practices.</p> <p>Lesson Plan: Grades 6-8</p>
<ul style="list-style-type: none"> The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. 	<ul style="list-style-type: none"> 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. 	<p><u>Overfishing and Aquaculture</u>- Students discover the sources of various fish and seafood, compare wild-caught and farm-raised aquaculture systems, and use a simulation to learn how overfishing can damage the ocean ecosystem.</p> <p>Lesson Plan: Grades 6-8</p>



Science Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.

- MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused climate change over the past century.

Climate Change Phenomena: Bananas in Our Breadbasket?- Students will explore the carbon cycle and evaluate associated phenomena of climate as they discover the impact climate change could have on the farms that produce our food.
Lesson Plan: Grades 6-8



Science Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a 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.

Journey 2050 Lesson 3: Water- Students will discuss the limited amount of fresh water on earth, identify how best management practices can reduce water consumption, discuss the need for water conservation and protection, and compare and contrast methods of irrigation for water conservation.

Lesson Plan: Grades 6-8

- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.

- 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.

Journey 2050 Lesson 2: Plant Health- Students will identify nitrogen, potassium and phosphorus as primary soil nutrients necessary in the production of abundant and healthy foods, describe various methods of replenishing soil nutrients that have been depleted by plant growth, discover how overall plant health impacts a plant's ability to resist disease and pests and describe what best management practices are in agriculture to improve overall sustainability.

Lesson Plan: Grades 6-8



Science Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.
- Models of all kinds are important for testing solutions.
- The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution

Performance Expectations

- 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.

In Action

Journey 2050 Lesson 1: Introduction to Sustainable Agriculture- Students will explore the core question, “How will we sustainably feed nearly 10 billion people by the year 2050?” as they discover what sustainable agriculture is and how it is critical to securing a stable food supply and future for a growing population.
Lesson Plan: Grades 6-8



Social Studies Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- The physical and human characteristics of places and regions are connected to human identities and cultures.

- 6.2.8.GeoHE.4.b: Use geographic models to determine the impact of environmental modifications made by earlier civilizations on the current day environmental challenges.

The Indigenous Origins of Regenerative Agriculture- In this lesson, students will learn about the origins of regenerative agriculture, and how many modern-day sustainable farming practices, including regenerative agriculture, originated within Indigenous communities
Grades 6-12

- In a democratic government, there are multiple processes by which individuals can influence the creation of rules, laws, and public policy.

- 6.3.8.CivicsPR.4: Use evidence and quantitative data to propose or defend a public policy related to climate change.

EPA's Agriculture and Air Quality- Review EPA Standards for Agriculture. Use evidence and quantitative data to propose or defend EPA Air Quality Standards for Agriculture.
Resource for Educators: Grades 6-8



Social Studies Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Economic decision involves setting goals, weighing costs and benefits and identifying the resources available to achieve those goals.

- 6.3.8.EconET.2: Assess the impact of government incentives and disincentives on the economy (e.g., patents, protection of private property, taxes).

Federal Lands: Ranching & Recreating on Common Grounds- Using various forms of maps, students will analyze public lands in the western United States, describe how ranchers raise food and fiber on federally owned land, and discuss different points of view concerning public lands use and public lands grazing. This lesson covers a socioscientific issue and aims to provide students with tools to evaluate science within the context of social and economic points of view.
Lesson Plan: Grades 9-12; Can be modified for **Grades 7-8**



World Languages Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Learning a language involves interpreting meaning from listening, viewing, and reading culturally authentic materials in the target language.

- 7.1.NM.IPRET.5: Demonstrate comprehension of brief oral and written messages found in short culturally authentic materials on global issues, including climate change.

Spanish Module: Basic Agricultural Science- At the end of this lesson, the student will be able to say “I can . . .” • I can name various plants and animals in Spanish • I can talk about farming and crops in Georgia • I can talk about farming stereotypes and what real farms are like. **Lesson Plan: Grades 6-8**

- Interpersonal communication between and among people is the exchange of information and the negotiation of meaning.

- 7.1.NM.PRSNT.6: Name and label tangible cultural products associated with climate change in the target language regions of the world.

Ag Mags a Great Teaching Resource for Spanish Class!- These nonfiction text readers are perfect for Spanish teachers who want to have their students practice reading in Spanish (and learning about agriculture)! **Resource for Educators: Grades 3-8**

- Presentational communication involves presenting information, concepts, and ideas to an audience of listeners or readers on a variety of topics.

- 7.1.NM.PRSNT.6: Name and label tangible cultural products associated with climate change in the target language regions of the world.

Agriculture in France Lesson Plan- Agricultural production in France – similarly to other areas – depends on natural conditions to great extent. What are these conditions and what types of agricultural activity have developed in France? Incorporate French vocabulary words for student development language skills. **Lesson Plan: Grades 6-8**

Computer Science & Design Thinking Grades 6-8



Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Resources need to be utilized wisely to have positive effects on the environment and society.
- Some technological decisions involve trade-offs between environmental and economic needs, while others have positive effects for both the economy and environment.

- 8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best.

GPS and GIS Technology in Agriculture- Students will explore technical careers in agriculture and learn how GPS and GIS technologies are used to improve agricultural production.

Lesson Plan: Grades 6-8

Career Readiness, Life Literacies, & Key Skills **Grades 6-8**



Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Multiple solutions often exist to solve a problem.

- 9.4.8.CT.1: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change and use critical thinking skills to predict which one(s) are likely to be effective.
- 9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).

Innovation in Agriculture- This lesson encourages students to investigate and share an agricultural invention that they research.

Lesson Plan: Grades 7-10

Comprehensive Health & Physical Education **Grades 9-12**



Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Local, state, and global advocacy organizations provide accurate and reliable resources and strategies designed to address common health and social issues.

- 2.1.12.CHSS.8: Investigate how local, state and global agencies are addressing health issues caused by climate change and share this information in an appropriate setting.

National Institute of Environmental Health Science
- An overview of the human health impacts of climate change.

**Resource for Educators:
Grades 9-12**

The Impacts of Climate Change on Human Health: A Scientific Assessment - A report by the U.S. Global Change Research Program that outlines seven different types of health issues caused by climate change including food safety, nutrition, and distribution.

**Resource for Educators:
Grades 9-12**



Science Grades 9-12

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Resource availability has guided the development of human society.

- 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.

Farming The Desert: The Science Behind Desertification- The purpose of these activities is to introduce students to the factors that contribute to desertification and solutions that have been implemented in the Sahel region of West Africa. The lessons correspond with a PBS LearningMedia video called "Farming the Desert" from the EARTH A New Wild series.
Lesson Plan: Grades 6-10

- All forms of energy production and other resource extraction have associated economic, social, environmental and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors.
- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics and to consider social, cultural and environmental impacts.

- HS-ESS3-2: Evaluate competing design solutions for developing, managing and utilizing energy and mineral resources based on cost-benefit ratios.

Journey 2050 Lesson 7: Technology and Innovations- Students will explore new technologies that will impact the future of farming, understand the role of developing countries in food security, and explain how consumers influence the production of food.
Lesson Plan: Grades 9-12



Science Grades 9-12

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation.
- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics and to consider social, cultural and environmental impacts.

- HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems.

Pig Power: Creating Biogas and Renewable Energy- After exploring the science of energy and energy conversion, students will evaluate some environmental impacts of hog farming and explore technologies that minimize negative human impact by creating biogas energy from animal waste.
Lesson Plan: Grades 9-12

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them.
- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities.

- 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.

Journey 2050 Lesson 3: Water - Students will discuss the limited amount of fresh water on earth, identify how best management practices can reduce water consumption, discuss the need for water conservation and protection, and compare and contrast methods of irrigation for water conservation.
Lesson Plan: Grades 9-12



Social Studies Grades 9-12

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Human settlement activities impact the environmental and cultural characteristics of specific places and regions.

- 6.1.12.GeoHE.5.a: Generate/make an evidence-based argument regarding the impact of rapid urbanization on the environment and on the quality of life in cities.
- 6.1.12.GeoHE.8.a: Determine the impact of the expansion of agricultural production into marginal farmlands and other ineffective agricultural practices on people and the environment.

Environmental Effects of Agricultural Land-Use Change: Role of Economics & Policy- This report examines evidence on the relationship between agricultural land-use changes, soil productivity, and indicators of environmental sensitivity
Resource for Educators: Grades 9-12

- Economic globalization affects economic growth, labor markets, human rights guarantees, the environment, resource allocation, income distribution and culture.

- 6.1.12.EconGE.3.a: Analyze how technological developments transformed the economy, created international markets and affected the environment in New Jersey and the nation.

Our Food's Journey - Food often travels thousands of miles from where it is produced to where it is sold and eaten. Students will learn why food is transported long distances and consider the advantages and disadvantages. Students will critically examine and debate different scales of food distribution (local, regional, national, and global).
Lesson Plan: Grades 9-12



Social Studies Grades 9-12

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Political and economic decisions throughout time have influenced cultural and environmental characteristics of various places and regions.

- 6.1.12.GeoHE.6.a: Compare and contrast issues involved in the struggle between the unregulated development of natural resources and efforts to conserve and protect natural resources during the period of industrial expansion.

Lessons Learned from the Three Gorges Dam- This module provides students with a case study of a major human modification to the environment, the Three Gorges Dam on the Yangtze River in China. Environmental modifications have economic, cultural, and political implications for most of the world's people... **Grades 9-12**

- Political and economic decisions throughout time have influenced cultural and environmental characteristics.

- 6.1.12.GeoHE.13.a: Construct an argument on the effectiveness of environmental movements, their influence on public attitudes and the efficacy of the government's environmental protection agencies and laws.
- 6.1.12.GeoHE.14.a: Evaluate the impact of individual, business and government decisions and actions on the environment and climate change and assess the efficacy of government policies and agencies in New Jersey and the United States in addressing these decisions.

The 1970s and the Environment- Bob Bostock, a head speechwriter for George W. Bush administration EPA Administrator Christine Todd Whitman, talked about views of environmental regulation at the onset of the 1970s. The U.S. Capitol Historical Society hosted this virtual event. **Lesson Plan: Grades 9-12**



Social Studies Grades 9-12

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Long-term climate variability has influenced human migration and settlement patterns, resource use and land use at local-to-global scales.

- 6.1.12.GeoHE16.a: Explain why natural resources (i.e., fossil fuels, food, and water) continue to be a source of conflict and analyze how the United States and other nations have addressed issues concerning the distribution and sustainability of natural resources and climate change.

"Sí, se puede!": Chávez, Huerta, and the UFW- This lesson highlights the historical context which promoted human migration for the purpose of cultivating food as a natural resource.
Lesson Plan: Grades 6-12

- Resources impact what is produced and employment opportunities.

- 6.2.12.EconET.3.a: Determine how, and the extent to which, scientific and technological changes, transportation and new forms of energy brought about social, economic and cultural changes in the world.

Technology in Agriculture: How Technology has Changed Farming in the late Twentieth Century- This lesson plan focuses on the changes in technology used in agriculture between 1950 and 1980 on North Carolina farms and a look at what technological advances affect agriculture today.
Resource for Educators: Grades 8-9



Social Studies Grades 9-12

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Understanding the interrelated patterns of change by examining multiple events allows for a clearer understanding of the significance of individuals and groups.

- 6.2.12.HistoryCC.3.b: Explain how industrialization and urbanization affected class structure, family life, the daily lives of men, women, and children and the environment.

Growing a Nation Era 1a: Seeds of Change- Students will engage with the *Growing a Nation* timeline to explore the significant historical and agricultural events and inventions from American history during the years 1600-1929. Students will recognize the importance of labor in agriculture, discover how the implementation of technology increased agricultural production, and explore the role wool played during this era.

Lesson Plan: Grades 9-12

- Demographic shifts and migration patterns both influence and are impacted by social, economic and political systems.

- 6.2.12.GeoPP.6.a: Make evidence-based inferences to determine the global impact of increased population growth, migration and changes in urban-rural populations on natural resources and land use.

"Development at the Urban Fringe and Beyond: Impacts on Agriculture"- 2001 USDA Report on changes in urban-rural populations and its effects on agriculture.

Resource for Educators: Grades 9-12



Social Studies Grades 9-12

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Human and civil rights support the worth and dignity of the individual.

- 6.2.12.CivicsHR.6.b: Make an evidence-based argument on the tensions between national sovereignty and global priorities regarding economic development and environmental sustainability and its impact on human rights.

Case Study of Brazil's Global Ag. Trade and Human Right. 1) [Brazil's Momentum as a Global Agricultural Supplier Faces Headwinds](#). 2) [Bolsonaro government is denounced at the UN for threatening the global climate and violating human rights in Brazil](#). Students should be encouraged to research additional reports.
Resource for Educators: Grade 9-12

- Constitutions, laws, treaties and international agreements seek to maintain order at the national, regional and international levels of governance.

- 6.2.12.CivicsPI.6.a: Use historic case studies or a current event to assess the effectiveness of multinational organizations in attempting to solve global issues.

[Evaluating Perspectives About GMOs](#)- This lesson provides students with a brief overview of the technology, equipping them with the ability to evaluate the social, environmental, and economic arguments for and against bioengineered crops (GMOs).
Lesson Plan: Grades 9-12

- Global economic activities involve decisions based on national interests, the exchange of different units of exchange, decisions of public and private institutions and the ability to distribute goods and services safely.

- 6.2.12.EconGE.6.a: Evaluate efforts of governmental, non-governmental, and international organizations to address economic imbalances, social inequalities, climate change, health and/or illiteracy.

[The Transition from NAFTA to USMCA](#)- Economics centered lesson plan examining the role of international trade agreements of agricultural and other goods.
Lesson Plan: Grades 11-12



World Languages Grades 6-8

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Learning a language involves interpreting meaning from listening, viewing, and reading culturally authentic materials in the target language.

- 7.1.NH.IPRET.8: Demonstrate comprehension of brief oral and written messages using contextualized culturally authentic materials on global issues, including climate change.
- 7.1.IL.IPRET.6: Using contextual authentic cultural resources, identify reasons for climate change in the target culture and in students' own community.
- 7.1.IM.IPRET.9: Use information gathered from culturally authentic resources to identify possible solutions to the effects of climate change.
- 7.1.IH.IPRET.8: Collect, share and analyze data related to global issues including climate change.
- 7.1.AL.IPRET.10: Collect, share and analyze data related to global issues including climate change.

Review the Sustainable Development Goals with emphasis on Goals 2, 11, 12, 13, & 15. Translations offered in the following: [French](#), [Spanish](#), [Russian](#), [Arabic](#), [中文](#).

Resource for Educators: Grades 9-12



Computer Science & Design Thinking Grades 9-12

Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

- Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.

- 8.2.12.ED.5: Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
- 8.2.12.ED.6: Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).

Esri GIS for Agriculture- This website from the creators of ArcGIS mapping software provides articles, interactive demos, and videos illustrating how GIS technology can be applied to agriculture.

**Resource for Educators:
Grade 9-12**

Aeroponic Engineering and Vertical Farming - Students will use the Engineering Design Process to develop and construct an aeroponic garden to grow a food crop. Students will develop and apply an understanding of plant anatomy and physiology related to plant growth and ultimately discuss the possibilities and limitations of using vertical farming to produce our food.

Lesson Plan: 9-12

Career Readiness, Life Literacies, & Key Skills **Grades 9-12**



Farm to School Connections to Climate Change Standards

Core Ideas

Performance Expectations

In Action

<ul style="list-style-type: none"> • Network connectivity and computing capability extended to objects, sensors and everyday items not normally considered computers allows these devices to generate, exchange and consume data with minimal human intervention. • Technologies such as Artificial Intelligence (AI) and blockchain can help minimize the effect of climate change. 	<ul style="list-style-type: none"> • 9.4.12.DC.8: Explain how increased network connectivity and computing capabilities of everyday objects allow for innovative technological approaches to climate protection. 	<p><u>Growing a Nation Era 5a: Growing Technology</u> Students will be introduced to technologies currently used on farms by engaging in an AppQuest to discover how farmers use mobile apps to manage farm production systems, marketing options, and make timely decisions. Lesson Plan: Grades 9-12</p>
<ul style="list-style-type: none"> • Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences. 	<ul style="list-style-type: none"> • 9.4.12.GCA.1: Collaborate with individuals analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political, economic, cultural). 	<p><u>Climate Hub-</u> The mission of the Climate Hubs is to develop and deliver science-based, region-specific information and technologies, with USDA agencies and partners, to agricultural and natural resource managers that enable climate-informed decision-making, and to provide access to assistance to implement those decisions. Resource for Educators: Grades 9-12</p>