

Madison Public Schools

Grade 2 STEAM Curriculum

Written by:
Joanne Walch

Reviewed by:
Daniel J. Ross, Esq.
Director of Curriculum and Instruction

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Members of the Board of Education:
Leslie Lajewski, President
Lisa Ellis, Vice President
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Thomas Piskula
Heather Reddy
Abi Singh
Pam Yousey

Madison Public Schools
359 Woodland Road
Madison, NJ 07940
www.madisonpublicschools.org

Course Overview

Description
<p>The goal of STEAM is to integrate science, technology, engineering, art, and math. This cross-curricular unit is designed to build on what students have learned or will learn in their science curriculum, math, language arts, and technology. Students are given a series of tasks to complete throughout the unit. Each task builds on the last until they have completed the challenges of planning for the beds in the school garden, implementing, and then harvesting.</p>
Goals
<p>This course aims to:</p> <ul style="list-style-type: none">• Develop and reinforce engineering and design principles• Develop and reinforce research skills and analyze information• Make observations and collection data• Develop a simple schematic to scale• Create a model• Develop their use of technology• Present information to an audience• Support the 2nd grade science, math, and language arts curriculum
Resources
<p>NJ Technology Standards https://www.state.nj.us/education/cccs/2014/tech/8.pdf NGSS http://ngss.nsta.org/AccessStandardsByTopic.aspx Madison Grade 2 Science Curriculum https://drive.google.com/drive/u/o/recent</p>
<p><u>Modifications and Adaptations for Special Needs Learners</u> (Gifted and Talented Students, English Language Learners, Special Education Students, At-Risk Students)</p>

Unit 1 Overview
Unit Title: Plants/CAS Garden
Unit Summary: This unit provides an opportunity for students to interact with the school garden in a real-life setting. Students will research, present, plan, and plant what can be grown in the garden. This unit reinforces plant and animal survival and the relationship between the two.
Suggested Pacing: About 17 Weeks
Learning Targets
Unit Essential Questions: <ul style="list-style-type: none"> • What are some ways we can contribute to our school garden? • What do plants need in order to survive? • How to animals help plants to survive? • What can we do to get the best growing results?
Unit Enduring Understandings: <ul style="list-style-type: none"> • Locally grown gardens help to sustain communities. • Gardens can be located almost anywhere. • Vegetables and herbs have nutritional value. • Gardens require research and planning. • Plants depend on animals and insects for pollination • Plants depend on water and light to grow. • Composting is a way to add nutrients to the soil thus reducing the amount in landfills.
Evidence of Learning
Unit Benchmark Assessment Information: There are a variety of ways students will demonstrate their learning: writing prompts from pictures, videos, discussions and or research, performance tasks, and design challenges. Students will also have an opportunity to contribute to the garden blog for that school.

Objectives <small>(Students will be able to...)</small>	Essential Content/Skills	Suggested Assessments	Standards	Pacing
<p>Observe where gardens can grow. https://greencitygrowers.com/fenway-farms/ Website for Green City Growers at Fenway Park https://greencitygrowers.com/projects/ Other businesses in urban areas with gardens https://greencitygrowers.com/urban-farming-products/creative-growing-systems/ Creative ways to grow in urban areas</p> <p>List the advantages of community gardens.</p> <p>Research vegetables and herbs that can grow in school garden.</p>	<p>List all the places one can create a garden or grow plants.</p> <p>List the advantages of locally grown foods.</p> <p>Break up into groups to begin research</p>	<p>Each group to share one alternative gardening area and or one reason why growing foods locally is beneficial.</p>	<p>Science Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)</p> <p>ELA/Literacy 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).</p> <p>W.2.8: Recall information from experiences or gather information from provided sources to answer a question.</p>	<p>Weeks 1-2</p>
<p>Research vegetables and herbs that can grow in the school garden.</p> <p>Work within a group</p>	<p>Note taking sheet</p> <p>Use Vegetable Doc informational sheet to help with research</p> <p>Use Herb Doc informational sheet to help with research</p> <p>https://www.fruitsandveggiemore.com/vegetable-nutrition-database</p> <p>Use websites to gather information about vegetables and herbs http://extension.illinois.edu/firstgarden/planning/index.cfm (Listing of vegetables and info for growing)</p> <p>https://www.almanac.com/gardening/growing-guides (Listing of vegetables and info for growing)</p> <p>https://www.thompson-morgan.com/top-10-easy-to-grow-vegetables (Listing of vegetables and info for growing)</p>	<p>Completed note taking sheet</p> <p>Each group decided on 3 vegetables and 1 herb to create slide show</p>	<p>Science Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1)</p> <p>ELA/Literacy 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).</p> <p>W.2.8: Recall information from experiences or gather information from provided sources to answer a question.</p>	<p>Week 3</p>

	http://www.johnnyseeds.com/growers-library/hardiness-zone-map.html (Hardiness zones map) Conduct a Google search to gather nutritional information			
Create a group slideshow	Use completed note taking sheet	Partially completed slideshow Each group to share one thing they learned to do in Google Slides.	Science Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1) ELA/Literacy 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). W.2.8: Recall information from experiences or gather information from provided sources to answer a question. Technology 8.1.2.A.3 Compare the common uses of at least two different digital applications and identify the advantages and disadvantages of using each. 8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resources. 8.1.2.C.1 Communicate information and ideas to multiple audiences using a variety of media and formats. 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.	Weeks 4-5
Present slideshows to garden committee	Each student to present their own slide speaking loud enough and making eye contact with audience.	(Possible blog article)		Weeks 6-7
Draw a labeled diagram of planting bed. Raised bed should be drawn to scale	Draw a schematic of the plant bed that shows where vegetables will be planted. Have students measure planting beds. Drawing must include bed measurements, seed labels, amount of space to give each plant. Use graph paper to show scale. Do the same for the herbs in pots.	Each student to complete a labeled drawing of planting beds.	Math MP.4 - Model with mathematics. (2-LS2-1), (2-LS2-2), (2-LS4-1) ETS1.B: Developing Possible Solutions 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. (secondary to 2-LS2-2)	Weeks 8-9

Define composting and how it helps plants grow and alleviates waste in landfills.	Using Google Docs, define compost and how it helps plants grow and alleviates waste in landfills. https://learn.eartheasy.com/guides/composting/ (Just the top section of website with benefits to composting)	Each student to complete paragraph and turn in (Possible blog article)	Technology 8.1.2.A.2 Create a document using a word processing application	Week 10
Explain importance of attracting birds and bees in a garden.	The links below can be used to help with research and writing. https://nestwatch.org/learn/all-about-birdhouses/features-of-a-good-birdhouse/ https://www.thespruce.com/benefits-of-attracting-birds-386399 https://birdfeedersetc.com/benefits-of-bird-feeders.aspx What are some pests that are found in a garden, how to control those pests without chemicals, how can birds help with pollination?	Students will complete a lab showing how pollination works. https://betterlesson.com/lesson/630819/pollinating-the-bees-have-it-# Each student to complete paragraph and turn in	Technology 8.1.2.A.2 Create a document using a word processing application Science 2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	Week 11-12
Sketch a bird feeder to place in the garden to help control pests and to encourage pollination. Decide on one design	https://youtu.be/BISAVPydFEI (video of different birdhouses) After watching video, discuss the birdhouses they liked, discuss materials used Label your sketch with measurements and possible recycled materials to use.	Each person in group to complete a sketch and then each group decides on one birdhouse design. Follow engineering design process (Ask, Imagine, Plan, Create, Improve)	Math MP.4 - Model with mathematics. (2-LS2-1), (2-LS2-2), (2-LS4-1) ETS1.B: Developing Possible Solutions 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. (<i>secondary to 2-LS2-2</i>)	Weeks 13
Construct a bird feeder using recycled materials.		Completed bird feeder (Possible blog article)	Science and Engineering Practices Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) Technology 8.2.2.A.2 Describe how designed products and systems are useful at school, home and work. 8.2.2.A.4 Choose a product to make and plan the tools and materials needed. 8.2.2.A.5 Collaborate to design a solution to a problem affecting the community. 8.2.2.B.2 Demonstrate how reusing a product affects the local and global environment. 8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product.	Weeks 14-15

			8.2.2.C.2 Create a drawing of a product or device that communicates its function to peers and discuss. 8.2.2.D.1 Collaborate and apply a design process to solve a simple problem from everyday experiences.	
Share completed bird feeder with class.	Each group shares their bird feeder and each student shares their role in construction.	Student reflections on how it can be improved or how they would have done something differently. (Possible blog article)	Science and Engineering Practices Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) Technology 8.2.2.C.2 Create a drawing of a product or device that communicates its function to peers and discuss.	Week 16
Create a spreadsheet and line graph.	Create a spreadsheet that is filled in with the height of plant growth each week and line graph that shows plant growth over time. Seeds can be started in the classroom	Sowing seeds can be done at the appropriate time- usually March/April and then measurements can be taken. (Possible blog article)	Math MP.4 - Model with mathematics. (2-LS2-1), (2-LS2-2), (2-LS4-1) MP.5 - Use appropriate tools strategically. (2-LS2-1) Technology 8.1.2.A.5 Enter information into a spreadsheet and sort the information.	Week 17 and then measure weekly if possible for data for line graph
Students will look at how widespread flooding can affect farming and the land.	Students will research different aspects of flooding including, factors leading to flooding, impacts on ecosystems, and impacts on communities. https://sustainability.uta.edu/wp-content/uploads/2016/05/Lesson-Plan-Floods-in-North-Texas-2016.pdf	Students will present their findings in a way that their group decides upon.	Technology 8.1.2.C.1 Communicate information and ideas to multiple audiences using a variety of media and formats. 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.	Week 18-19

****Continuous activities to be completed throughout unit**

Code	https://studio.code.org/s/coursed-2018	Can be done in between units and if some students are finished with their work early. Teacher to utilize dashboard to monitor student progress. Dashboard to assign courses as well.	Continuous
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Unit 2 Overview
Unit Title: Materials and Our Environment
Unit Summary: This unit provides an opportunity for students to learn the process of managing garbage and recyclables. Students will observe how different materials decompose and the impact that has on our environment. Students will research ways we can recycle, reuse and reduce in addition to newer, eco-friendly products.
Suggested Pacing: 15 Weeks
Learning Targets
Unit Essential Questions: <ul style="list-style-type: none"> ● Outline the steps garbage/recycling goes through. ● What is a landfill? ● What types of material take longer to break down? ● What is recycling? ● What are some ways we can reuse items? ● How can we do better to help our environment?
Unit Enduring Understandings: <ul style="list-style-type: none"> ● In the U.S., we produce the most trash/waste. ● Some items in landfills could take hundreds of years to decompose. ● We can make better choices in the materials we use.
Evidence of Learning
Unit Benchmark Assessment Information: There are a variety of ways students will demonstrate their learning: writing prompts from pictures, videos, discussions and or research, performance tasks, and design challenges.

Objectives (Students will be able to...)	Essential Content/Skills	Suggested Assessments	Standards	Pacing
Outline the steps garbage/recycling goes through once at waste facility.	What happens to a bag of garbage and how important it is to be recycling https://youtu.be/TOPYa5OKGgY	Class discussion after viewing videos. Students to work in pairs to create a flowchart or diagram that illustrates how garbage/recycling is handled at waste facilities.	Science Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1) ELA/Literacy W.2.8: Recall information from experiences or gather information from provided sources to answer a question. Technology 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue. 8.2.2.E.1 List and demonstrate the steps to an everyday task 8.2.2.D.3 Identify the strengths and weaknesses in a product or system. 8.2.2.B.1 Identify how technology impacts or improves life. 8.2.2.B.3 Identify products or systems that are designed to meet human needs.	Weeks 1-2
List items that can be recycled Become familiar with different recycling codes on packaging		Create a poster showing what the different symbols mean and what items can be recycled.	ELA/Literacy W.2.8: Recall information from experiences or gather information from provided sources to answer a question. Technology 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.	
Define landfill. List items found in landfills that should not be there. Explain the significance of recycling.	Landfill video that addresses items that shouldn't be in the landfill-is a longer video https://youtu.be/YIMwvPfgQLQ	Each student to create a Google Doc listing what they have learned so far about landfills. Add to that list, items that are found in landfills and some of the problems with landfills. Use a bulleted list.	Science Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1) ELA/Literacy W.2.8: Recall information from experiences or gather information from provided sources to answer a question. Technology Technology 8.1.2.A.2 Create a document using a word processing application 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue. 8.2.2.E.1 List and demonstrate the steps to an everyday task	Week 3

			8.2.2.B.3 Identify products or systems that are designed to meet human needs.	
Observe materials that decay more rapidly than others.	Groups will cut various items into equal pieces and place in bag with soil. Suggested items are: plastic bag, foil, cereal box, plastic cutlery, small chips bag, etc. Experiment can be taken further to include compostable packaging such as Bagasse	Record observations in spreadsheet. Column labels: Week 1, Week 2, Week 3, Week 4 Descriptors would include: appearance, size, texture, smell	Science Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1) Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)	Week 4-5, but will make observations weekly, perhaps with classroom teacher for one month
Define recycling. Identify which materials can be recycled and why is it so important to recycle these specific materials. Identify the steps in the recycling process.	https://jr.brainpop.com/science/conservation/educereuserecycle/ Recycling Video https://youtu.be/NYux4-KIY1o			Week 6
Identify alternative materials that is better for the environment. Identify better recycling practices we all can do so less ends up in a landfill.	Mushroom Packaging https://youtu.be/ACoA6vUD-h8 https://youtu.be/OpDXDoWBZuQ	Groups will research alternative materials that are compostable and or biodegradable and share using Google Slides.	Technology 8.1.2.A.3 Compare the common uses of at least two different digital applications and identify the advantages and disadvantages of using each. 8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resources. 8.1.2.C.1 Communicate information and ideas to multiple audiences using a variety of media and formats. 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue. ELA/Literacy 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).	Week 7-10
Identify ways to reuse materials.	Have students bring informational letter home so parents can help students be safe and bring in safe items. Have students bring in items that would have been thrown away for this project. Make sure items are thoroughly cleaned before bringing in. No sharp edges or packaging from raw meat.	Students will draw a model of a desk organizer that will sit on top of a desk to hold the items they have in their desks (pencils, post-its, crayons/colored pencils, erasers, etc.) Each student will sketch a design, with labels and measurements.	Math MP.4 - Model with mathematics. (2-LS2-1), (2-LS2-2), (2-LS4-1) ETS1.B: Developing Possible Solutions 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.(secondary to 2-LS2-2)	Week 11

<p>Identify ways to reuse materials.</p> <p>How are materials used for different purposes?</p>		<p>Groups will complete a mini lab in which they test different materials for different properties of matter to determine which items would work best for their desk organizers.</p> <p>Groups will decide on one design and begin construction.</p>	<p>Science and Engineering Practices Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)</p> <p>Science 2-PS1-2: Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.</p> <p>2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.</p> <p>Technology 8.2.2.C.2 Create a drawing of a product or device that communicates its function to peers and discuss.</p>	<p>Week 12-14</p>
<p>Share desk organizers with class</p>	<p>Each group shares their desk organizers and each student shares their role in construction.</p>	<p>Student reflections on how it can be improved or how they would have done something differently and or different materials..</p>		<p>Weeks 15-16</p>

****Continuous activities to be completed throughout unit**

Code	https://studio.code.org/s/course-2018	<p>Can be done in between units and if some students are finished with their work early. Teacher to utilize dashboard to monitor student progress. Dashboard to assign courses as well.</p>	Continuous
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