Community Garden

Wareham Middle School
Wareham, Massachusetts

Subject Areas
Mathematics, History, Civics, Language Arts, Science and Health

Area of Service
Environmental

Grade Level
Middle School

Author of Project
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In Brief

The "Community Garden" is as an interactive school-wide project that addresses the societal need of feeding the hungry and enriches the math and science lessons of the middle school curriculum. Students research agricultural factors such as: crop rotation, water conservation, and organic gardening techniques (mulching and composting); design the garden and attend to all details necessary to reap a bountiful harvest. In addition to planting food, the students plant flowers, and the garden, peppered with benches, is now a pleasant spot for both school and community members.

Learner Outcomes

Students learn to:

Apply scientific method to design experiments for real world situations;

Utilize research skills to gather information;

Practice the writing process in completing a variety of assignments;

Recognize the application of geometric concepts in real world situations; and

Understand the issues that impact the individuals in need.

MASSACHUSETTS CURRICULUM FRAMEWORK CONNECTIONS

This unit is aligned with the Massachusetts Curriculum Frameworks. Listed are the subject areas and the learning strands addressed:

English/Language Arts
Language strand: 3
Composition strand: 20
History and Social Science
History strand: 4
Civics and Government strand: 19
Mathematics
Number sense
Patterns, Relations and Functions
Measurement
Statistics
Science and Technology
Inquiry
Life Science, Earth, and Space

OVERVIEW

The Need

Damien's Pantry, a community agency serving homeless and needy families in Wareham, is always in need of food donations. Middle school students involved in math and science classes and the Garden Club built a garden in which they plant vegetables such as kale, spinach, tomatoes, peas, scallions, and lettuce to address the needs of the Pantry.

A CSL Response

Seeking a means to connect the students' world of academics to their community, the members of the Wareham Middle School's Renaissance Program set the plans in motion to build a 60 by 90 foot community garden. The Renaissance Committee, a group of staff members and parents, envisioned the garden enriching students' academic experiences by providing an onsite learning lab for the life science curriculum, promoting school pride among the students as organizations held meetings in the garden, and harvesting crops from the Community Garden for the local food pantry.

The Community Garden also provides students an interactive learning opportunity to explore, discover, and understand how life science and technology connect to the agriculture industry of today. Students experience the basics, from preparing the garden for planting to harvesting the crops. Members of the science department at the middle school have created lesson plans for students to utilize the garden as a learning lab. Connecting the classroom instruction to the hands-on experiences in the garden, students learn to apply geometry concepts to planning the garden beds, discover the relationship between soil composition and crop growth, learn to test and prepare the soil, read and follow directions to plant tulip bulbs and vegetable crops, learn to compare and contrast fertilizers and improve their skills in data collecting and graphing.

Classroom instructors received community support for this initiative. A generous donation from the local bank was used to purchase soil testing kits and garden equipment. Teachers were given technical support by the local landscaper and nursery in the planning and planting of the community garden. Community members and teachers join hands to teach students in the middle school.

My name is Brian Backlund, I am a sophomore at Wareham High School. When I was in the middle school two years ago, I was Vice President of the Garden Club. The garden has opened a world of opportunities for me. Before I was in the Garden Club, I had gotten suspended for three weeks because I brought a knife to school. When I returned to school, Peter Hassenfuss welcomed me with open arms, thus changing my view of school and the people that run the Wareham Public School System. Right now I serve as a community service learning audio/visual representative for Wareham. Community service-learning helped me through school.

Brian Backlund,
former Wareham
Middle School Student

The math class will figure the amount of stones needed for building the raised beds, science students will do the soil testing, and students in the shop class will build it.

Wareham High School Principal

Service Component

The community garden created by the middle school students of Wareham Middle School addresses a community need that is universal. Through this project students become cognizant of the existence of hunger in their own community. The crops harvested in the school's community garden are donated to Damien's Pantry, for Wareham's needy families.

The community service component of this project has broadened over time. The students recognized the community's needy population was larger than the harvest from their garden could feed. Through additional creative problem solving the students researched the types of crops to plant that would harvest the greatest yield with the greatest nutritional value. In addition, the students began assisting community members in the creation of their own gardens by testing soil samples and providing steps to improve the condition of the soil, if necessary. Finally, the students initiated a can drive in November to supplement the needy families through the winter months.

Celebration

The community garden serves as the center stage for celebration. The students involved in the design of the beds, the planting and the harvesting of the crops formally receive recognition at Renaissance Night, an event that recognizes all students for their community service. However, there are several other occasions during the school year that the students, dedicated to the community garden project, receive recognition informally at the garden. For example, each spring the community is invited to participate in a planting day with the students, when the garden beds are planted. At this event students receive respect and appreciation from fellow community members. Finally, the school's Garden Club, which helps to maintain the garden over the summer, awards its participants community service points. Many students earn enough community service points to attend a free overnight camp in the spring.

OUTCOMES

Academic Gains

The community garden project, an interdisciplinary unit, is ongoing throughout the year. Beginning with researching raised beds, crop rotation, alternative methods of water conservation, and organic gardening techniques, the project integrates math and science in the students' activities. Students are introduced to the study of chemicals, minerals, and vitamins. In addition, when the students step up the activity at the garden site from research-based to action-based, they use measurement tools to lay out the garden beds, prepare the soil, purchase seeds, plant, and maintain the health of the garden by watering, cultivating, fertilizing, and harvesting. With timelines in place, the students can track the yearlong events ending with the delivery schedules of harvested crops to the food pantry in August.

Throughout this project, a variety of instructional methods are interwoven among the activities. The student instructional groupings may vary from an individual writing an entry in his/her reflection journal to a small group brainstorming their marketing strategies for the public awareness campaign to a guest speaker sharing technical information on the maintenance of the garden in a large group setting. As students complete activities designed to accomplish their tasks, whether it be researching and comparing fertilizers or purchasing seeds to plant, they complete cross-curriculum writing assignments.

Societal Gains

Identifying needs in the community is key to this project. Through the context of the community garden, students recognize that the needs of their community reflects to a lesser degree similar needs identified world wide. The garden project provides students the opportunity to participate in an activity to make a difference in their community, and to reflect on the impact their project has on the community's needs. Through community service-learning projects, students receive the necessary skills and knowledge to "be part of the solution" to a community need.

Community Partners

The Wareham Middle School Garden Project has attracted many partners. The parents of the middle school students volunteer their time and support the students in solving unpredictable problems that suddenly occur. The primary partner in this project is Damien's Pantry, a food distribution center. The technical support partners, including the Wareham Garden Club, local nurseries, lumberyard, and a masonry center, assist in the design, planting and maintenance of the garden. Finally, Sandwich Cooperative Bank and the Greater New Bedford United Way Building Mini Grant Program, a part of United Way, has provided both financial and promotional support for this project. Providing partners with updated communications regarding the status of the garden project has continued to foster collaboration throughout the community.

As a classroom teacher of both math and science, the attitude changes in the students I have witnessed are incredible. The students are no longer just students; they are community members making a difference. The students involved in the community garden project have not only gained academically through inquiry-based activities, but also have made a true connection to many different faces in the community. They have reached out, worked hard, and gained self-confidence. They now see themselves as people who can make a difference. This is a skill that they will carry for a lifetime in whatever they encounter.

Wareham Teacher

TIES TO THE MASSACHUSETTS CURRICULUM FRAMEWORKS

LEARNING STANDARDS/ OUTCOMES	ACTIVITY	ASSESSMENT
Science and Technology INQUIRY		
Standard: Design an investigation or problem specifying variables to be changed ,controlled, and measured.	Tulip planting activities. Students will design an experiment with a control and a variable to determine how to maximize the height of tulips.	Having designed an experiment to determine the variables affecting how high tulips grow, students complete a lab report with the observation, results , and conclusion of their experiment.
Use complex tools to make observations, and gather and represent quantitative data. Represent findings using tables, models, demonstrations and graphs.	Students will record observation of tulips' heights in charts or graphs to share with others.	
English/Language Arts LANGUAGE STRAND		
Standard 20: Students will select and use appropriate genres, modes of reasoning, and speaking styles when writing for different audiences and rhetorical purposes.	Tulip planting activities. Students will author an informational book entitled, "The Best Way To Plant Tulips."	The student's product, the book, will be assessed using a writing rubric for informational writing.
Mathematics		
Geometry and Measurement: Select appropriate units and tools to measure the degree of accuracy required in a particular situation.	Using a soil testing kit, each student will test the soil's pH, record the results on a chart and using a proportion determine the amount of lime to add, if needed. In addition, the student will till the lime and manure into the soil to a depth of 8 to 10 inches.	This project will be evaluated based on the physical observational data collected since the planting of the tulips. Soil samples will be extracted at a depth of 8 inches and tested for pH.

LESSON PLAN Soil Preparation

Objective

Students will test the quality of the soil in the community garden and make informed decisions about nutrients to be added to the soil in preparation for planting. Students will offer soil testing as a service to the community.

Learning Standards

Science and Technology

Apply personal experience and knowledge to make predictions.
Apply multiple lines of inquiry to address and analyze questions.

Inquiry Mathematics

Measurement: Select appropriate units and tools to measure to the degree of accuracy required in a particular situation.

English/ Language Arts

Students will make oral presentations that demonstrate appropriate consideration of audience, purpose, and the information to be conveyed.

Materials

- Soil testing kits
- Lime, manure, rye seeds
- Garden tools
- Research materials

Procedure

Pretest

Students will complete a journal prompt: What is in the soil that is required for plants to grow? The students are encouraged to write from their experience. The results could be shared in a "Think-Pair-Share" or in a whole class brainstorming session.

Activity

- Students will research soil composition and its role in the growth of plants.
- Students will evaluate the quality of the soil, using soil testing kits.
- Students will list the necessary steps to improve the quality of the soil for growing plants, (lime to correct acidity, sulfur to lower pH, manure, the planting of rye grass to replenish the nutrients).
- Students will record data collected on soil testing, quantity of nutrients added, and changes in soil quality in a journal.
- Students will create graphs from the data.
- Students will write a piece to put in the common journal in the school library to track data and compare over time.

LESSON PLAN continued

Assessment

Using the writing process, students will write at least a two-paragraph journal entry in response to the following prompts:

Write a brief review of the process you used during this project. Use specific data collected as you tested the soil and determined what needed to be added and in what proportions. If your group decided to plant rye grass, please also discuss this and explain why you chose this option.

Next, please speculate about the impact your choices will have on the garden in the spring? What are you hoping will happen as a result of your actions? How will your work help our school and community? What would you recommend happen next in our garden if we hope to make the garden attractive and productive?

TIMELINE

ONGOING CYCLE

September
Harvest crops, deliveries to food pantry

October
Harvest crops, deliveries to food pantry, clean garden

November
Finish cleaning garden, inventory supplies, create a needs assessment

December
Order garden supplies

March
Conduct soil tests, determine soil needs

April
Plant

LESSON PLAN Tulip Planting

Objective

Students will conduct an investigation using a variable and a control to determine the most effective method to plant tulips.

Learning Standards

Science Inquiry

Design an experiment specifying variables to be changed, controlled and measured.

Mathematics

Select appropriate units and tools to measure to the degree of accuracy required in a particular situation.

English/ Language Arts

Make oral presentations that demonstrate appropriate consideration of audience, purpose, and the information to be conveyed.

Materials

Soil testing kits

Lime, manure, rye seeds

Garden tools

Research materials

Procedure

- Working in small groups, students completed a K-W-L chart to create an experiment to test one variable.
- Assign the worksheet "Tulip Planting" to be completed as a Think-Pair-Share activity ending with a classroom discussion of the topics.
- Students list the possible variables they could study. Variables already studied in previous years are discussed. The journal from the library would be a source of information about the tulips.
- Students research and prepare to create a study with a control and a variable that will help to answer the questions about how to maximize the height of the tulips. Further, students research the standard method of planting tulips as is suggested in the gardening books (eg., How deep? When? How much sun?)
- Students select a reasonable number of variables to study.
- Students create the process using the vocabulary and method studied.
- Students list all required materials and assist in the analysis of the cost required to plant the tulips.
- Students plant the tulips according to their process.
- Students agree upon and implement a data collection method.
- Students collect data as the tulips break through the ground in the spring.

LESSON PLAN continued

Assessment

Students respond to the following prompt: How has this project helped our school community? Advise the reader how they would go about planting tulips that would grow as tall as possible. Use the following words in your letter:

control	graph
independent variable	variable
dependent variable	materials
hypothesis	experiment
conclusion	chart

Circle the words in your letter. Be sure to include in your letter information you learned from the other students' presentations.

COMMUNITY SERVICE LEARNING PROJECT
TULIP PLANTING

We are going to plant some tulips in the garden. What factors influence the height of the tulip plant? Any one of these factors could be a variable we might study as scientists.
List some possible variables that we could study. Circle the variable that you are most interested in investigating.

Write your hypothesis for the tulip experiment using the variable you suggested.

What would be the independent variable and the dependent variable in this experiment?

Explain the process you would use that investigates the variable and the use of a control.

Assessment

Designing, constructing, and maintaining a community garden is an authentic performance assessment. This project involves the completion of real-world tasks such as using measurement tools to layout the garden design. Students also demonstrate their understanding of working cooperatively among peers, designing an experiment with a variable and a control group, writing a friendly letter, and speaking in public through performance assessments. Finally, throughout this unit assessment data on the students' understanding of technical vocabulary is collected as students complete the traditional teacher-made tests. Throughout the student activities in the community garden project, students are actively engaged in a variety of assessments to determine their growth and understanding.

CONNECTING TO MCAS: OPEN RESPONSE QUESTION

Address one the following topics in a well-organized essay:

The Community Garden Project responds to the needs of families serviced by the Damien Pantry, by donating food grown and harvested in the school's community garden.

How have you responded to the needs of your community through your work on the community garden project? Give specific examples of your contributions toward a solution to the identified need in your community.

Challenges

Continuing to broaden the student base participating in the garden project, by expanding the participation of content area teachers.

The logistics involved in coordinating the volunteers' schedule to maintain the community garden.

Solutions

Conduct teacher and community seminars to promote the connections between the middle school curriculum and its real life application in the garden project. Supply sample units of study for garden project activities.

To address the scheduling logistics for garden maintenance, the School District's CSL office will investigate training parent leaders to assist in the task.

Extending the Vision

The garden project was designed to provide students a learning lab for math and science integrated activities while planting and harvesting crops to donate to the local food pantry for needy families. Initially this project appeared to be able to satisfy the needy population the students thought existed in their community. Once into the project, students realized this small garden could not feed the identified 1,700 needy families since the harvesting of crops only takes place in the late summer and early fall.

How do these families receive food at the other times of the year? Through creative problem solving sessions, the students extended the garden project to include sponsoring a can food drive in November. In addition, the students initiated a campaign to support community residents in planting their own gardens. Students will test the soil of community members and collaborate with a local nursery to provide advice on what needs to be added to their soil.

Finally, the committee that initiated the garden project has continued to support the garden project by having an irrigation system installed in order to help maintain the garden. Students are developing plans with a local mason to continue to enhance the aesthetics of the garden. A drive to raise money for brick walkways has begun. Within the design of the garden, benches provide a sitting area for teachers to conduct classes outside and for residents to visit. The garden, blooming with color, provides a pleasant area for our youth and residents to share a common interest in plants.

IN CONCLUSION: School's Role in the Community

The "Community Garden" has developed into a school-wide project that addresses two needs of the school and community—feeding the hungry and beautifying the school grounds. In the process, the project enriches the math and science lessons of the middle school curriculum. Students research agricultural concepts such as crop rotation, soil quality, water conservation, and organic gardening techniques (mulching and composting); design and build the garden; and attend to all the details necessary to reap a bountiful harvest. In addition to planting vegetables, students plant flowers, and the garden peppered with benches, is now a pleasant spot for both school and community members. The community garden has enhanced the school atmosphere, classroom instruction, and the community's relationship with the school.