Appendix M

Title	A Gardener's Dilemma
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Source:	2009 Office of Instruction Staff
Project Idea:	Communities set aside plots of land for local citizens to establish small gardens. Students will design a plan for a family garden plot.
Entry Event:	The "Community Director" will present the challenge to the third grade class. See attached: **Entry Event Description**, **Garden Association Letter**, **Garden Plot Requirements**, **Family Descriptions**, **Community Garden Map**.

Content Standards & Objectives:

Objectives Directly Taught or Learned Through Discovery	Identified Learning Target	Evidence of Success in Achieving Identified Learning Target
M.O.3.3.7 name the location of a point on a first-quadrant grid, represent using ordered pairs.	Use ordered pairs to identify the location of a point on a first-quadrant grid	The students will identify the location of vegetables in this activity using ordered pairs. **Where's My Vegetables? Activity** **Where's My Vegetables? Answer Sheet** Garden Design The students will use ordered pairs to identify the location of their garden plot in their garden design.
M.O. 3.4.2 estimate and find the perimeter and area of familiar geometric shapes, using manipulatives, grids, or appropriate measuring tools.	Find the perimeter of familiar geometric shapes using manipulatives, grids, and appropriate measuring tools. Find the area of familiar geometric shapes using manipulatives, grids, and appropriate measuring tools.	The attached mathematics quiz may be used to assess the students on the identified mathematics concepts. **Mathematics Quiz** Garden Design Students will identify the area and the perimeter of their garden plot in their presenation. They will also describe how they determined the perimeter and area of the garden plot.
M.O.3.4.3 determine the formula the area of a rectangle and explain reasoning through modeling.	Determine the formula for area of a rectangle. Explain reasoning for formula for area of a rectangle.	The attached mathematics quiz may be used to assess the students on the identified mathematics concepts. **Mathematics Quiz** **Project Presentation** Students will identify the area and the perimeter of their garden plot in their presenation. They will also describe how they determined the perimeter and area of the garden plot.

21st Century Skills	Learning Skills & Technology Tools	Teaching Strategies Culminating Activity	Evidence of Success

Information and Communication Skills:	21C.O.3-4.1.LS1 - Student identifies information needed to solve a problem or complete an assignment, conducts a search and prioritizes various sources based on credibility and relevance, retrieves relevant information from a variety of media sources, and uses this information to create an effective presentation.	Students will search identified websites to identify plants that will be included in their garden plan.	Students will research indentified websites and use the information to complete the of **Plant Information Sheet** Project presentation Students will share the information found in the websites to create their garden plan and planting guide.
Thinking and Reasoning Skills:	21C.O.3-4.2.LS3 - Student engages in a problem solving process that promotes questioning, planning investigations and finding answers and solutions. 21C.O.3-4.2.TT3 - Student uses technology tools (e.g., presentation software, word processing software, publishing software, group web page design, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create informative products for audiences inside and outside the classroom.	Students will work together to develop a plan to solve the problem identified in the project. Students will create a visual to be included in their project presentation.	Teacher will observe students as they work together to create a solution for the identified problem. Project presentation Students will create visuals to use in their presentation. These visuals may be made using various technology tools. Students may also use various presentation technologies assist in the project presentaton.
Personal and Workplace Skills:	21C.O.3-4.3.LS2 - Student is flexible in assuming various roles and responsibilities in the classroom and the school, and with minimal assistance, considers alternative methods, solutions and perspectives to solving a problem or completing a task.	Students will work together in small groups to solve the problem identified in the project.	**Collaboration Rubric** The collaboration rubric will be completed by students to self assess their collaboration skills each day they work on their project.

Performance Objectives:	**Know** Mathematics Vocabulary: length, width, perimeter, area, coordinate grid, ordered pairs, x-axis, y-axis **Do** Find the perimeter of geometric shapes Find the area of geometric shapes Determine the formula for a rectangle Use appropriate measuring tools Design a plan for a garden plot Locate points on a first quadrant coordinate grid

Driving Question:	How does mathematics help us create garden plans?

Assessment Plan:

Major Group Products	Presentation to the Local Garden Commission (including a plan for the garden plot)
Major Individual Projects	**Gardening by the Yard Project** **Gardening by the Yard Student Rubric**

Assessment and Reflection:

Rubric(s) I Will Use:	Collaboration Group Collaboration Rubric	x	Written Communication	
	Critical Thinking & Problem Solving		Content Knowledge	
	Oral Communication		Other Gardening by the Yard Project Rubric	x
Other Classroom Assessments For Learning:	Quizzes/Tests Math Quiz	x	Practice Presentations Rubric	x
	Self-Evaluation		Notes	
	Peer Evaluation		Checklists/Observations	
	Online Tests and Exams		Concept Maps	
Reflections:	Survey		Focus Group Focus Group Questions	x
	Discussion		Task Management Chart Task Checklist	x
	Journal Writing/Learning Log		Other	

Map The Product:

Knowledge and Skills Needed	Already Have Learned	Taught Before the Project	Taught During the Project
1. Determine perimeter of geometric shapes			X
2. Determine area of geometric shapes			X
3. Use grids to record design			X
4. Use of ordered pairs to identify location on a corrdinate grid			X
5. Group collaboration skills		X	

Resources:

School-based Individuals:
The librarian or media resource person may assist you in the collection of resources related to gardening or plants. Make sure the resources are appropriate for third grade students.

Technology:

Websites:
This site provides students with the growing requirements for common vegetables, herbs, and flowers. The sites may be bookmarked to assist students in the location of these sites.

http://www.chestnut-sw.com/seedhp.htm Weekend Gardener
http://www.gardenersnet.com/veggies.htm The Gardener's Network
http://www.heirloom-organics.com/guide/organicgrowingguides.html Heirloom Organics Growing Guides

The students must develop a visual to be included in their presentation. The teacher will need to determine if the

	students will use technology or use other visual materials. Depending on the skill level of the class, the time available and available technology the teacher may allow students to have a choice in how they will present their information. **Community:** The teachers may invite local gardeners or greenhouse specialists to provide expert information on plants. (This will help develop the context of the problem. The teacher must work to keep the primary focus on the mathematics of the project.) The teacher could decide to invite an architect who specializes in landscape design. If an expert is invited to the class the students should develop questions ahead of time in order to obtain the information necessary to complete their project. **Materials:** Selection of fiction and nonfiction books on plants, flowers, vegetables, assortment of seed packets, centimeter grid paper, colored pencils/markers, rulers, yard or meter sticks, caution tape, inch grid paper, large sheets of poster board (grids would be helpful) Fiction Books *City Green* by DyAnne DiSalvo-Ryan *Growing Vegetable Soup* by Lois Ehlert *Vegetable Garden* by Douglas Florian *The Carrot Seed by* Ruth Kraus *The Gardener by Farrar* by Straus & Giroux *Planting a Rainbow* by Lois Ehlert Flower Garden by Kathryn Hewitt Sunflower House by Kathryn Hewitt Too Many Zucchini for Zachary Beany with other by Tina Dozuer-Ray and Bonnie Lemaire Nonfiction Books *Kids First Gardening Book* by Jenny Hendy *A Harvest of Color* by Melanie Eclare Ready, Set, Grow! A Kid's guide to Gardening by Rebecca Spohn
Manage the Process:	**Determine Formula for Area of a Rectangle:** The teacher will need to decide if she wants to develop this concept within the project. This will depend on when he/she is choosing for his/her students to participate in this experience. If students develop the formula for the area of a rectangle they will need to have had experiences with multiplication. The students will need to have an understanding of multiplication. If students have not developed an understanding of multiplication, they may calculate the area by counting the number of squares needed to cover a surface. **Project Storyboard** **Where's the Math?** This document will provide the teacher with a summary of the mathematics in this PBL. **Student Groups:** The teacher should assign students to groups of 3 to 4 students. Lead a discussion identifying the roles necessary to complete this PBL. You will want to keep this simple. Possible roles: Project Manager, Materials Person, Time keeper, Recorder. These could vary based on the size of groups and roles identified by the group. The teacher should review appropriate group behavior. The teacher may have the groups role play appropriate and inappropriate behavior. It is important for the teacher set the expectations for group behavior. The teacher should review the group rubric with the groups at this time. The groups will self assess at the end of each time the group works on the PBL. **What I Know- What I Need to Know Discussion:** After you have launched the PBL with the entry event lead a class discussion around the following questions: What do I know that will help me complete this task? What do I need to know that will help me complete this task? Record the student responses on large chart paper with columns labeled "What I Know" "What I Need to Know" This chart should remain visible during the PBL. Additional items may be added as students work to complete this task. **Plant Information Record Sheet** Students may use the identified websites, seed packets, or other

	resources to identify the needed information on plants. This information is to be recorded on Plant Information Record Sheet. Students may get very involved in this process. Identify the time they will have to work on this section. Encourage them to make quick decisions. (This PBL is primarily about the mathematics.) Students may also use additional resources to find information on plants. If there is a range given for planting students will need to pick a distance. **Mini Lessons:** The teacher may use lessons he/she designs, from the adopted text or the following mini-lessons to develop these mathematical concepts: **Locating Plotting Points on a Coordinate Grid** **Where My Vegetables? Activity** **Where's My Vegetables? Answer Sheet** **How Big is My Garden? Activity** **How Big is My Garden Group Checklist** **Perimeter** **Area** **Formula for Area** These mathematical concepts are to be developed during the PBL as the need to know arises. It is important for students to develop an understanding of these mathematical concepts. It is not enough to learn only enough math to complete the project. It may be necessary for the teachers to plan additional lessons to develop the mathematical concepts. **Community Garden Map** Using an interactive white board and the community map, students should identify the shape and location of their garden plot. (The plots do not need to be rectangular.) Once they have placed their garden plot on the map, they should use ordered pairs to identify the location of the vertices. If a teacher does not have access to an interactive white board, they could enlarge the community map or make an overhead transparency of the map.
Project Evaluation:	**Focus Group Questions** have been included to guide the teacher as they reflect on this project. It is suggested that the teacher select a group of 5 to 7 students who have had varied levels of success with this project. The students' responses will help you refine the project in future years.
Resource Files Uploaded	**Resource Files** • UP3391WS2.doc (http://wveis.k12.wv.us/Teach21/CSO/Upload/UP3391WS2.doc) • UP3391WS3.doc (http://wveis.k12.wv.us/Teach21/CSO/Upload/UP3391WS3.doc) • UP3391WS4.doc (http://wveis.k12.wv.us/Teach21/CSO/Upload/UP3391WS4.doc) • UP3391WS5.doc (http://wveis.k12.wv.us/Teach21/CSO/Upload/UP3391WS5.doc) • UP3391WS6.doc (http://wveis.k12.wv.us/Teach21/CSO/Upload/UP3391WS6.doc) • UP3391WS7.doc (http://wveis.k12.wv.us/Teach21/CSO/Upload/UP3391WS7.doc) • UP3391WS8.doc (http://wveis.k12.wv.us/Teach21/CSO/Upload/UP3391WS8.doc) • UP3391WS9.doc (http://wveis.k12.wv.us/Teach21/CSO/Upload/UP3391WS9.doc) • UP3391WS10.doc

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