

Activity: Plan It, Map It

Grades: K-7

Overview: Using the information provided, students work with their teacher and resources available to plan their garden and employ math skills to do so.

Time:

Groundwork: 40 minutes

Exploration: 30 minute setup; time for student to consider various options and develop plans

Making connections: ongoing

Materials:

- Seed catalogs or Internet access to seed catalogs
- Rulers, yardsticks, measuring tapes
- Paper, Graph paper or notebook (or purchase garden planning software to use computers)
- Copies of the *Plant Dimensions* handout
- Writing Instruments
- Optional: Calculators

Background

Living things compete with one another to survive and reproduce. Plants have differing characteristics unique to their species, variety. Even within species there are differences between two varieties or among a host of varieties. Consider the number of squashes there are or variety of tomato plants. Much of the information provided in this guide sets standard parameters that plants need. But this can vary. This activity will give students the opportunity to experience first hand that math has a purpose with real-life applications, research various plant information and make decisions about the garden they will plan and plant.

Groundwork: Their Own Garden

Objective: To identify a plant they would like to plant in the school garden, specify a variety, and detail its growth requirements.

1. Have students select vegetable plants that they could plant in their own garden. Make a list of those plants.
2. Using hard copy seed catalogs or on-line seed suppliers have students identify the number of varieties of one of these vegetables. List the names of the varieties available on the student handout *Plant Dimensions*.

<p>NOTE: For plants with more than 10 varieties, the students should select a specific type of that vegetable. i.e. tomatoes select full-sized, slicing tomatoes or heirloom, slicing tomatoes; squash select winter squash or summer squash, peppers select sweet bell peppers or hot peppers.</p>

3. Have students identify for each variety, its growing requirements and note it in the chart provided. Then select one or two varieties of the rest of the vegetables and document the requirements for these varieties.
4. Select the varieties to plant in their own garden and the number of plants they would like to have for each variety.
5. Then have students calculate the number of square feet their garden will require to grow the number of vegetables they have selected and create a map of their garden drawn to scale. Make sure they allow space for humans to weed, water and harvest the garden. For youngest students plants needs can be depicted graphically by making a paper pattern of the space needed by that plant and using these patterns to map out the garden in real-life size.

Exploration: The School Garden

Objective:

1. Indicate the limitations of the school garden space and the number of students that need to utilize that space. Share what space will be available to this class. (Teachers may need to limit the type and number of plants.)
2. Have students determine what and how many of each plant students will incorporate into the garden. Decisions to be made:
 - a. Will each student have their own plant or plants (number)?
 - b. Will each student have the same type of plant? If so, what will it be?
 - c. If not, how many total types of vegetables will be grown?
 - d. Will more than one variety of each vegetable be grown?
3. As a group, plan the school garden making sure that adequate space is provided for all students to have access.
4. Make sure they take plant height into account in relation to the sun – prevent tall plants from shading short plants as much as possible.

Extensions for Middle and High School

1. Have students create algebraic equations for planning the garden.
2. Have students create gardens that incorporate circles, triangles, rectangles, octagons, and create a garden diagram drawn to scale that provides adequate plant space and human working space.
3. Have students create three-dimensional gardens that use fencing, wire cages, climbing poles etc. to make use of space vertically as well as horizontally.
4. Have students research and develop a plan for a commercial hydroponic operation that would be profitable.

Additional Materials:

1. The *Keeping Florida Green* Curriculum developed by Florida Ag in the Classroom, Inc. has lessons about the classification of Florida's plants that can be used in concert with the garden. It can be obtained by attending a workshop.
2. Use the lesson "What will the land support?" from Project Food, Land & People's *Resources for Learning*. It can be obtained by attending a workshop.

Next Generation Sunshine Standards Met:

MA.K.G.2.4	Interpret the physical world with geometric shapes, and describe it with corresponding vocabulary
MA.K.G.2.5	Use basic shapes, spatial reasoning, and manipulatives to model objects in the environment and to construct more complex shapes.
MA.K.G.3.1	Compare and order objects indirectly or directly using measurable attributes such as length, height, and weight
SC.1.L.17.1	Through observation recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.
MA.1.A.6.2	Solve routine and non-routine problems by acting them out, using manipulatives, and drawing diagrams.
MA.1.G.5.1	Measure by using iterations of a unit, and count the unit measures by grouping units.
MA.1.G.5.2	Compare and order objects according to descriptors of length, weight, and capacity
SC.2.L.17.1	Compare and contrast the basic needs that all living things, including humans, have for survival.
MA.2.A.2.4	Solve addition and subtraction problems that involve measurement and geometry
MA.2.G.3.1	Estimate and use standard units, including inches and centimeters, to partition and measure lengths of objects.
MA.2.G.3.2	Describe the inverse relationship between the size of a unit and number of units needed to measure a given object
SC.3.L.14.1	Describe structures in plants and their roles in food production, support, water and nutrient transport, and reproduction.
SC.3.L.17.2	Recognize that plants use energy from the Sun, air and water to make their own food.
MA.3.A.4.1	Create, analyze, and represent patterns and relationships using words, variables, tables, and graphs.
MA.3.G.5.1	Select appropriate units, strategies, and tools to solve problems involving perimeter.
MA.4.G.3.1	Describe and determine area as the number of same-sized units that cover a region in the plane, recognizing that a unit square is the standard unit for measuring area.
MA.4.G.3.2	Justify the formula for the area of the rectangle "area = base x height."
MA.4.G.3.3	Select and use appropriate units, both customary and metric, strategies, and measuring tools to estimate and solve real-world area problems.
MA.5.G.5.3	Solve problems requiring attention to approximation, selection of appropriate measuring tools, and precision of measurement.
MA.6.A.1.3	Solve real-world problems involving multiplication and division of fractions and decimals.
MA.6.A.5.1	Use equivalent forms of fractions, decimals, and percents to solve problems
MA.6.G.4.2	Find the perimeters and areas of composite two-dimensional figures, including non-rectangular figures (such as semicircles) using various strategies.
MA.7.G.4.1	Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures, and apply these relationships to solve problems.

Vegetable Selected:			
Variety	Row Width	Space Between Plants	Height
Vegetable Selected:			
Vegetable Selected:			
Vegetable Selected:			
Vegetable Selected:			

