

What's a Square Foot Anyway? Laying out the Design Plan

Activity Overview

Teams of students lay out a rain garden design plan on the school ground using a scale drawing and square foot templates.

Objectives

Students will:

- Transfer points on graph paper to physical points on the ground
- Apply mathematical concepts (e.g., geometry, graphing, measurement, perimeter, area, etc.) to a real-life design project
- Demonstrate techniques of measurement using scale drawings
- Generate a model for a real-world project

Subjects Covered

Math

Grades

3 through 12

Activity Time

1 hour

Season

Any

Materials

A rain garden design plan drawn on graph paper, 2 “square foot” cardboard pieces and string per student (see illustration at the end of activity), surveyor flags, one 100 foot measuring tape, spray paint

State Standards

Math: A.4.2, A.4.3, A.8.4, A.12.3, B.4.1, B.8.1, B.12.5, C.4.3, C.4.4, C.12.1, C.12.2, D.4.1, D.4.2, D.4.3, D.4.5, D.8.1, D.8.2, D.8.4, D.12.2

Source

David Schultz, Central Middle School, Hartford, WI

Background

After students design their rain garden, they need to transfer the plan from paper to the school landscape. In this activity, students are able to make that transition from a concept on paper to an actual location on the school ground. This step not only lays out the restoration plot but also offers students a chance to see how a concept can materialize into a reality.

The following list of warm-up activities may help students not familiar with these mapping concepts:

- In the classroom, draw out sample designs or have students draw a design on graph paper. Have the students determine the area in square feet. One square on the graph represents one square foot.
- Practice using the cardboard square foot templates to create different shapes and visualize various square foot areas.
- Measure spaces such as a classroom or library using the square foot templates.

Activity Description

In this activity, you will lay out your restoration design plan on the school ground. Follow each step and when you are finished, your schematic drawing will be physically marked on the ground ready for site preparation and planting.

First, measure, and cut out two, one square foot cardboard pieces. Attach a string to each cardboard piece to tie the cardboard to your feet. You will wear the cardboard-like shoes to layout the restoration plot.

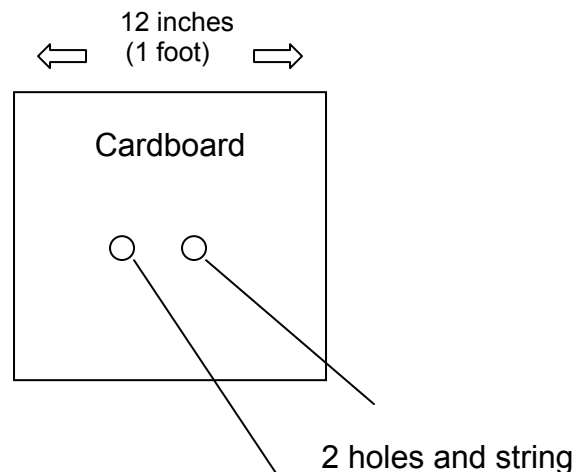
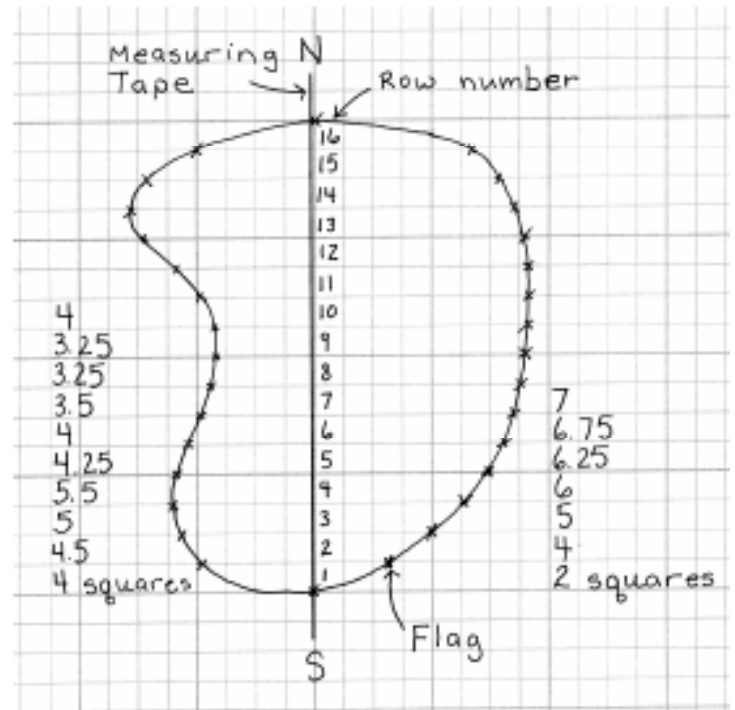


Illustration showing one “square foot.”

What's a Square Foot Anyway? (cont.)

Option 1:

1. Assign roles. You need 2 students to call out the design (“callers”) and two students to place flags (“flaggers”). The remaining students will wear the square foot cardboard pieces on their feet and step out the design (“line people”).
2. Divide into two teams. Each team will have one “caller”, one “flagger”, and several “line people.”
3. Draw a line through the middle of your design in a north/south or east/ west direction, (using cardinal points is preferable).
Number each row. Count the number of squares to the right of the line. Record this number on the row. Count the number of squares to the left of the line. Record this number on the row. (See illustration.)
4. Go outside and lay out the measuring tape in a north/ south or east/west direction at the site of the restoration. The measuring tape represents the line on the design plan.
5. Divide into your two teams.
Begin at one end of the garden. One team will lay out the design to the left of the line and the other team will lay out the design to the right of the line.
6. To begin the mapping process, the “callers” call out the number of squares in the first row. The “line people” then line up shoulder to shoulder wearing the cardboard templates on their feet. For instance on the example below, in the first row, there are 2 squares (or 2 square feet) to the right of the line and 4 squares (or 4 square feet) to the left of the line. One student with cardboard squares tied to his/her feet stands to the right of the line to measure out two square feet. To the left of the line, two students will stand side-by-side to measure out 4 square feet.
7. Once the “line people” are standing in position the “flaggers” place a flag at either end of the row.
8. Repeat this process for each row in the design.
9. After each flag is placed on the ground you will see the perimeter of your design laid out with flags. Walk the perimeter of the rain garden.
10. Use landscape spray paint to mark the perimeter of the garden.



Extensions

- Practice different layouts using a set number of square feet, e.g. 4, 6, 10, etc. Measure the

What's a Square Foot Anyway? (cont.)

perimeters of the different layouts. Which layouts create the largest perimeters? What effect would perimeter have on a garden plot?

- Measure the square feet of different existing features on the school ground. Compare and rank the areas in terms of size. What is the ratio of built areas to natural areas?
- Create a map of an area using cardboard pieces.

Additional Resources

- Wyzga, Marilyn C. (1995). *Homes for wildlife*. United States Fish and Wildlife Service, Office of Extension Publications, through the University of New Hampshire Cooperative Extension.
- (1995) *Project Wet curriculum & activity guide*. Bozeman, MT: The Watercourse and the Council for Environmental Education.

Assessment

- Calculate square footage of shapes and designs drawn on graph paper.
- Draw a rain garden design and calculate square footage.
- Explain the relationship between perimeter and shape.



EPS Institute participants using their square feet to lay out a rain garden. Photo: Libby McCann.