

MNLA Curriculum Unit B, Lesson 2

UNIT TITLE: Using Math to Create Functional Landscapes:

LESSON 2: Designing Shrub and Flower Beds; 30-40 minutes

MINNESOTA ACADEMIC STANDARDS IN SCIENCE:

- 3.1.3.2.2 -- Recognize that the practice of science and/or engineering involves many different kinds of work and engages men and women of all ages and backgrounds.
- 4.1.2.2.1 -- Identify and investigate a design solution and describe how it was used to solve an everyday problem.

MINNESOTA ACADEMIC STANDARDS IN MATH:

- 3.3.2.2 -- Find the perimeter of a polygon by adding the lengths of the sides.
- 4.1.1.5 -- Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of technology, and the context of the problem to assess the reasonableness of results.
- 4.3.2.3 -- Understand that the area of a two-dimensional figure can be found by counting the total number of same size square units that cover a shape without gaps or overlaps. Justify why length and width are multiplied to find the area of a rectangle by breaking the rectangle into one unit by one unit squares and viewing these as grouped into rows and columns. *For example:* How many copies of a square sheet of paper are needed to cover the classroom door? Measure the length and width of the door to the nearest inch and compute the area of the door.
- 4.3.2.4 -- Find the areas of geometric figures and real-world objects that can be divided into rectangular shapes. Use square units to label area measurements

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GRADE LEVEL/SUBJECT: 3 -4 Science ; 3-4 Math

OVERVIEW: In third and fourth grade math, students learn how to calculate perimeter and area of squares and rectangles. This lesson should only be done if the teacher has already taught perimeter and area. This lesson will reinforce the skills. Keep all multiplication to not more than 12 X 12.

OBJECTIVE:

As a result of this activity, students will be able to:

1. Calculate perimeter and area and utilize the information in designing a shrub and/or flower bed for a professional landscape.

MATERIALS:

- Picture examples of shrub and/or flower beds.
- Samples of edging materials - metal, plastic or stone edging (optional)
- Copies of student worksheet (provided with this lesson plan).

ACTIVITIES AND PROCEDURES:

1. Describe what you do as a professional landscaper / horticulturist. Include the title of your position and others that work with you to give the students ideas for career choices.
2. Show examples of shrub and flower bed plantings. These can be obtained through supplier and/or company brochures, photographs, or printed pictures from on-line sites.
3. Ask students to describe examples of shrub and/or flower beds they have seen at home or in their community. Are there beds around the school?
4. Ask students "What are the benefits of having a planting bed?" Some benefits include:
 - holds soil in place (Optional: can introduce the term erosion and discuss the effects of wind and water erosion)
 - directs people where to walk
 - provides food and shelter for birds, insects and wildlife
 - aesthetically pleasing which adds value to the property
 - people treat the property better when it is aesthetically pleasing
5. Explain to students that landscape designers must evaluate the size of the yard and buildings and then decide on how big the planting beds will be. Beds are commonly edged with black plastic or stone to keep the grass out of the beds. When the installers are constructing the landscape they need to know how much edging to order. By calculating the perimeter of the bed they can figure out how much edging to buy.
6. Draw a bird's-eye view of a rectangular planting bed on the chalk board or white board including the length of each of 2 adjacent sides. Ask students "To find out how much edging to order, would we calculate area or perimeter?" (Answer: perimeter)
7. Ask students, "What would happen if the landscaper had the wrong measurements?" Try to get students to understand/appreciate the importance of **accuracy** in measuring.
8. Using the rectangle on the board, explain/review how to calculate perimeter. Add the lengths of all sides; $A + B + C + D = \text{Perimeter}$

9. Explain:
 - landscapers also need to decide how many shrubs can fit into the bed.
 - shrubs need adequate space to grow to stay healthy; too many plants in a bed get crowded and diseases and insects can become more of a problem.
 - by knowing the area of the bed (amount of space inside the bed) and the size of the plants, the landscaper can use a chart to find how many shrubs fit a bed.
10. Demonstrate how to calculate area by using the example on the board. Use the chart on the worksheet to demonstrate how to find how many shrubs will fit into a planting bed.
11. Have each student complete the "Shrub and Flower Bed Worksheet". Have students correct their own worksheets.

ASSESSMENT: Students will complete the worksheet provided.

ADDITIONAL ACTIVITY: . (OPTIONAL) Lay out edging on the playground and have the students work in groups of 3 and measure the perimeter. Have the groups compare their findings. Stress the importance of accuracy. Presenter will most likely need to provide measuring tapes for this activity.

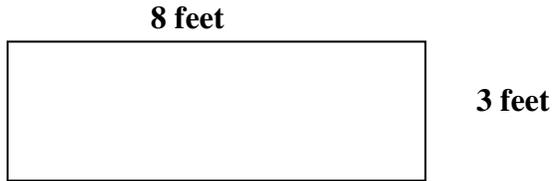
HANDOUTS AND WORKSHEETS:

- "Shrub and Flower Bed Worksheet"

Shrub and Flower Bed Worksheet

Help the landscape designer figure out what supplies would be needed for the 3 projects below.

1.

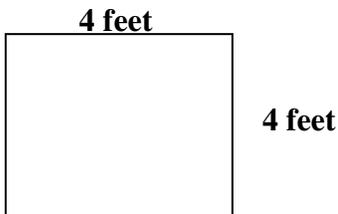


A. How much edging should the landscaper buy for the planting bed shown above? _____

B. What is the area of the planting bed? _____

C. How many shrubs can the landscaper plant into the bed? (Use the table provided) _____

2.



A. How much edging should the landscaper buy for the planting bed shown above? _____

B. What is the area of the planting bed? _____

C. How many shrubs can the landscaper plant into the bed? (Use the table provided) _____

3.

12 feet



4 feet

A. How much edging should the landscaper buy for the planting bed shown above? _____

B. What is the area of the planting bed? _____

C. How many shrubs can the landscaper plant into the bed? (Use the table provided) _____

4. Design and draw a bed of your own.

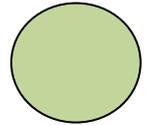
A. How much edging would be needed for your bed? _____

B. What is the area of your planting bed? _____

C. How many shrubs could you plant in the bed? _____

Number of Small Shrubs that Fit into a Planting Bed

One shrub takes up a 2 foot by 2 foot space, or 4 square feet.



Square Feet of Bed Space	Number of Shrubs Needed
4	1
8	2
12	3
16	4
20	5
24	6
28	7
32	8
36	9
40	10
44	11
48	12
52	13
56	14
60	15