

## More than a Green Thumb

### Purpose

Students will solve problems involving perimeters and areas of rectangles, triangles, parallelograms, and trapezoids by finding the amount of fencing and fertilizer needed for different shapes of garden plots.

### Materials

*For the teacher:* chalk, chalkboard, large protractor

*For each student:* protractor, copy of Black Line Master (BLM) *Farmer Fran Is a Mathematician*, pen or pencil

### Activity

#### A. Introduction

1. Tell students to imagine that they are planting a garden for a farmer named Fran. Tell students that Farmer Fran did *not* have much of a green thumb, but luckily Fran had something even better on her side – she was a mathematician.
2. Explain to students that Fran knew exactly how much fertilizer per square foot to put in each garden plot and fenced each plot to keep the animals out of her vegetables. Tell students that she liked to plant each kind of vegetable in its own plot and often built the plots in geometric shapes.
3. Explain to students that they will be helping Farmer Fran measure the area of each plot so that she will know the amount of fertilizer needed for that plot. Tell them they will also measure the perimeter of each plot to determine the amount of fencing Fran will need.
4. Review the definition of *perimeter*. Write the formulas for the areas of a rectangle, square, triangle, parallelogram, and trapezoid on the chalkboard and review each shape and formula.
5. Tell students that it would be nice if Fran would just use those shapes for her plots so that the areas would be easy to find. Explain that Farmer Fran enjoys using unusual geometric shapes for her garden plots, and they will learn how to find the areas of unusual shapes.

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### connecting across the curriculum

#### Social Studies

Have students place transparent inch graph paper over a map of a country and trace the border of the country using only straight lines. Instruct students to divide this irregular shape into smaller shapes and find an approximate area of the country based on the scale given for the map.



### EXTENDING THE ACTIVITY

Have students design a garden using irregularly shaped plots for different plants. Instruct students to trade designs and find the area of each plot using a ruler to measure the sides.

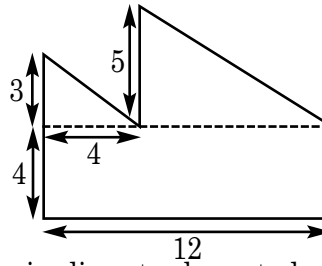
**Standards Links**  
5.2.1, 5.2.4, 5.3.2, 5.7.2

## Activity (continued)

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### B. Class Activity

1. Draw a shape similar to the one below on the board, drawing only the exterior lines at first.



2. Draw the interior lines to show students how to break the shape into simpler shapes that have area formulas. Hold the protractor up and tell students that they may wish to check that the side is the height of the triangle by confirming the right angle in the corner. Have students find the area of each simple shape and add the areas to find the total area.

### C. Partner Activity




1. Divide the class into pairs. Hand each student a copy of the BLM *Farmer Fran Is a Mathematician*.
2. Explain the directions to students. Tell students to use the protractor if they are uncertain whether a side of a triangle is the triangle's height.
3. Allow students to work with their partners to complete the BLM, and discuss the answers in class.

## Questions for Review

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### Basic Concepts and Processes

During the Partner Activity and during the discussion following it, ask the questions below:

-  How would you divide this shape into simpler shapes to find the area of the original shape [*indicate an irregular shape on the BLM*]?
  -  Why is it important to divide the shape into simpler shapes?
  -  After dividing the irregular shape into simpler shapes, what would you do to find the area of the original shape?
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# FARMER FRAN IS A MATHEMATICIAN

## Teacher Directions

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Distribute one copy of the BLM *Farmer Fran Is a Mathematician* to each student. Have students work in pairs and divide the complex shapes into simpler shapes for which they know the area formulas. Instruct students to find the areas and perimeters of each complex shape.

## Answer Key

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Green Beans – Area: 256 square feet; Perimeter: 72 feet

Onions – Area: 178 square feet; Perimeter: 51 feet

Corn – Area: 320 square feet; Perimeter: 80 feet

Tomatoes – Area: 336 square feet; Perimeter: 74 feet

Potatoes – Area: 372 square feet; Perimeter: 99 feet