Garden Grade 6 Area and Perimeter Clarification

CCSSM: Grade 6

Domain: Expressions and Equations

Cluster: Reason about and solve one-variable equations and inequalities.

Standard: 6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all nonnegative rational numbers.

CCSSM: Grade 4

DOMAIN: Measurement and Data

Cluster: Solve problems involving measurement and conversion of measurements for a larger unit to a smaller unit.

Standard: **4.MD.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Clarification of Math Discussion Terms

The **DIMENSIONS** of a rectangle are typically referred to as the **LENGTH** and **WIDTH** of the rectangle.

The sum of the measures of the sides of a rectangle is the **PERIMETER** of the rectangle. The **FORMULA** for the **PERIMETER** of a rectangle can be written several ways: $P = l + w + l + w$ or $P = 2l + 2w$ or $P = 2(l + w)$.

The **AREA** of a rectangle is the measure of the interior of the rectangle or the region inside it. The **AREA** is measured in square units. The **FORMULA** for the **AREA** of a rectangle is $A = l \bullet w$ or $A = lw$.

Classroom Example 1
The length of a rectangle is 8 cm and its width is 5 cm. What is the perimeter of the rectangle?
The perimeter is 26 cm.

The length of a rectangle is 8 cm and its width is 5 cm. What is the area of the rectangle?
The area is 40 cm^2.

Sometimes the Perimeter and Area of a rectangle are used to determine possible dimensions for the rectangle.

Classroom Example 2
A rectangle has a perimeter of 10 cm. What are the possible whole numbers that could represent the dimensions of this rectangle?
The rectangle could have dimensions of 1 cm by 4 cm, or 2 cm by 3 cm.

A rectangle has an area of 56 cm^2. What are the possible whole numbers that could represent the dimensions of this rectangle?
The rectangle could have dimensions of 1 cm by 56 cm, or 2 cm by 28 cm, or 4 cm by 14 cm, or 7 cm by 8 cm.

A rectangle has a perimeter of 26 cm and an area of 40 cm^2. What are the dimensions of the rectangle?
The rectangle has dimensions of 5 cm by 8 cm.

The Math in the Puzzle

In the Garden Puzzle, the player must size and place rectangles having the correct dimensions to match the given area (number of plants) and perimeter (number of fence sections) for each plant. In levels 1 and 2, plants may not be placed on the gnomes because they will be eaten. Extra space inside the fence will be overtaken by weeds.

In the screen shot above the crop "Prickletoe" has been planted and is shown in green. The work order required 24 plants (the area) and 22 sections of fencing (the perimeter.) The rectangle has been sized to have dimensions of 8 units by 3 units, producing the

required area (8 x 3 = 24) and perimeter (8 + 3 + 8 + 3 = 22.) The crop "Blotchweed" has also been planted and is shown in blue; it required 4 plants (the area) and 10 sections of fencing (the perimeter.)

In level 3 of the puzzle, friendly gnomes will not eat plants, but they do take up space in the area if they are inside the fencing. The player must determine a rectangle with the correct perimeter, but must use the gnomes to take up the "extra" spaces inside the fence in order to get the correct number of plants.