TEACHER GUIDE

INTRO TO FINDING AREA

GRADES 3–5

COMMON MISCONCEPTIONS

• Area and length are measured the same way.
  Students may attempt to add lengths together to find area in a misunderstanding of the dimensionality of length as one-
  dimensional and area as two-dimensional. Emphasize the idea that area measures the amount of space that a shape
  covers and length measures along one side of a shape. Reinforce this concept by having students discuss the difference
  between one inch and one square inch.

• You can use different sizes of squares to measure the area of a shape.
  Discuss that while the size of the square units used to measure a shape can be different, only one size can be used to
  measure the area at a time. Explain that square units are stated in only one unit, for example 150 square inches, instead
  of combined units such as 1 square foot and 6 square inches.

• Square units do not need to completely cover a shape or can overlap.
  When covering a shape with squares, students may attempt to make the shape fit the square units by overlapping the
  squares or moving the squares apart. In early work involving area, side lengths of shapes use whole numbers, but in the
  real-world measurements are less precise. Lead a discussion on why it might be important in a real-world situation to
  not have gaps, leading to a measurement that is too small, and to not have overlap, leading to a measurement that is too
  large.

MEASURES OF LENGTH

Students have prior knowledge of measuring the side lengths of shapes using both standard and non-standard units.
This is a key element for finding area when side lengths are unknown, but it can also lead to a misconception of area as
a two-dimensional measure. Emphasis in area measures should be placed on square units, and the difference between
the sizes of square units can focus on the side length of one square unit (square centimeters versus square inches).

PERIMETER

Students have prior understanding of the measure of perimeter in a shape. They have worked with polygonal shapes
and found the measure of each side to find the total perimeter as well as used the formula for perimeter of squares and rectangles. Understanding of formulas in geometric measurements can be reinforced with the formula for area, but it must be emphasized that perimeter and area are measured using different types of measurement units. Moving forward, students will relate perimeter and area by creating shapes with a given area and finding its perimeter, and vice versa.

**ARRAYS**

Students have begun work with multiplication including a focus on the structure of an array. They have used arrays to find multiplication facts by adding the total in each row or column as a means of connecting to foundational understanding of multiplication. Moving forward, students will use area models to work with multiplication of greater numbers and multiplication of fractions. A deep conceptual understanding of area is a key factor in the progression of these later multiplication concepts.

**TEACHER TIPS**

Area is a mathematical topic that is easily connected to real-world situations. Use the opportunity to show ways this connection applies directly to students and their families. Situations that include area apply to all student backgrounds, from farmers needing to know the area of their fields to conference planners needing to find the area of a room to determine how many people can attend.

For students who struggle, consider having students model shapes on a piece of grid paper, and then write a count of the square units inside the shape.