3.M.5 Find the area of a rectangle with whole-number side lengths by modeling with unit squares, and show that the area is the same as would be found by multiplying the side lengths. Identify and draw rectangles with the same perimeter and different areas or with the same area and different perimeters. (E)

Reporting Category: Geometry, Measurement, and Data Analysis	**Subdomain**: Measurement and Data

3.M.5 Instructional Framework

Assessed On:

☐ Checkpoint 1   ☐ Checkpoint 2   ☑ Checkpoint 3   ☑ Summative

Content Limits:
- Limit side lengths of rectangles to whole numbers.
- Limit multiplication factors to whole numbers of 0 through 10.
- Items may include real-world context.

Clarifications:
- The formula for the area of a rectangle is not included in the instruction or assessment of this standard.

Calculator Availability: Not Allowed

Expected Academic Vocabulary: unit square, square unit, area, perimeter, length, width, dimension, square inch, square foot, square yard, square centimeter, square meter

Examples of Context and Varying Difficulty Levels	
Context: Easy	Models of rectangles divided into unit squares are provided; Side measurements may be limited to factors of 1, 2, 5, and 10.
Context: Medium	Models provided are not divided; Side measurements may be limited to include factors of 3, 4, 6, and 9.
Context: Difficult	Models are not provided; Side measurements may include factors of 7 and 8.

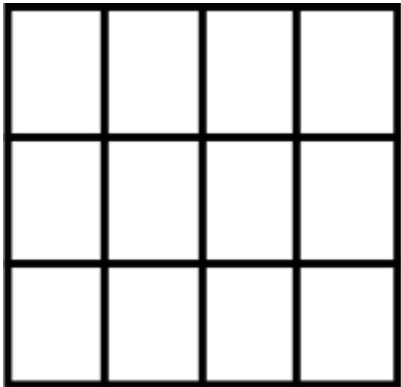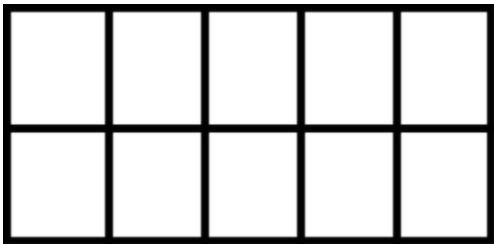| **Proficiency Level Descriptors and Example Items**	
Looking Back: This concept is not specifically addressed in the Indiana Academic standards prior to this grade level.	**Looking Ahead**: 4.M.4 ILEARN Item Specification

Below Proficiency: Label the length and width of a given rectangle divided into unit squares and/or count the individual unit squares to find area.

Part A: Enter the length and width of the rectangle in the boxes.

Length: ☐

Width: ☐

Part B: What is the area of the rectangle, in square units?

Answers:
Part A: Length: 4, Width: 3
Part B: 12 square units

This is a DOK 1 item because students must identify the length and width of a given rectangle divided into unit squares and calculate the area of the given rectangle.

This item is medium difficulty because it includes side measurements that are factors of 4.

Approaching Proficiency: Identify or create an equation to find the perimeter or area of a given rectangle divided into unit squares.

Which expression can be used to find the area of the rectangle, in square units?

   a. 2 + 2 + 5 + 5
   b. 2 x 5
   c. 2 x 5 x 2 x 5
   d. 2 + 5

This is a DOK 1 item because students must identify the expression that can be used to calculate the area of a given rectangle divided into unit squares.

This item is easy because the model of the rectangle divided into unit squares is given and the side measurements are factors of 2 and 5.

Write an expression that can be used to find the perimeter of the rectangle.

This is a DOK 2 item because students must
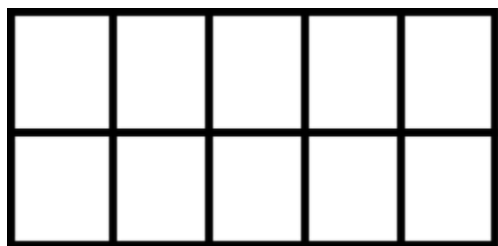
Answer: 2 + 2 + 5 + 5 or an equivalent form of this answer

create the expression that can be used to calculate the perimeter of a given rectangle divided into unit squares.

This item is easy because the model of the rectangle divided into unit squares is given and the side measurements are factors of 2 and 5.

At Proficiency: Calculate the area and/or perimeter of a rectangle when given both the length and width. Identify and construct rectangles with the same perimeter and different areas or with the same area and different perimeters.

Marci draws four rectangles. The length and width of each rectangle are given in the table.

	Length	Width
Rectangle A	2 inches	4 inches
Rectangle B	3 inches	3 inches
Rectangle C	2 inches	6 inches
Rectangle D	1 inch	5 inches

Which statement is true?

a. Only rectangles A, B and C have a perimeter of 12 in.
b. Only rectangles A, C, and D have a perimeter of 12 in.
c. All four rectangles have a perimeter of 12 in.
d. **Only rectangles A, B, and D have a perimeter of 12 in.**

This is a DOK 1 item because students must identify rectangles with the same perimeter as a given measurement.
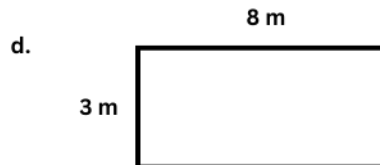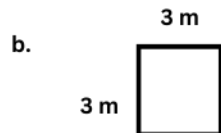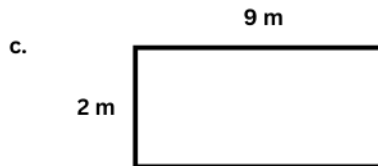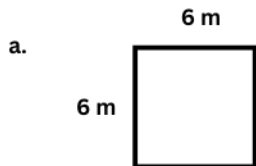
This item is difficult because a model is not provided.

Marci draws a rectangle.

3 m

9 m
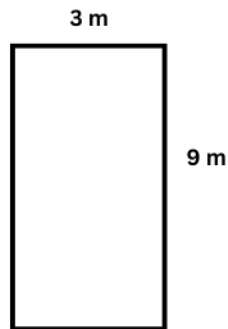
Which rectangle has the same perimeter as Marci's rectangle?

a.

6 m

6 m

c.

9 m

2 m

b.

3 m

3 m

d.

8 m

3 m

This is a DOK 2 item because students must identify a rectangle with the same perimeter as the given rectangle.
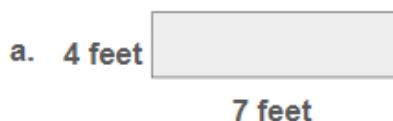
This item is medium because the rectangles are not divided into unit squares.

Beth draws a rectangle.

6 feet

8 feet

Which rectangle has the same perimeter as Beth's rectangle but a different area?

a.   4 feet

7 feet

c.

6 feet

7 feet

b.

7 feet

7 feet

d.

5 feet

8 feet

Answer: b

This is a DOK 2 item because students must identify rectangles with the same perimeter as a given model or measurement.
This item is medium difficulty because the models provided are not divided into unit squares.

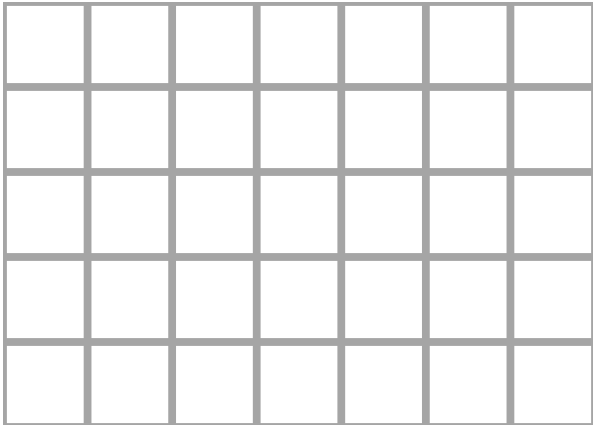**Above Proficiency:** Solve real-world problems through the application of area and perimeter concepts.

A rectangular park has a width of 8 miles and a length greater than the width. Which of these are possible areas of the park?[+]

   a.   24 mi^2
   b.   27 mi^2
   c.   55 mi^2
   d.   63 mi^2
   e.   72 mi^2
   f.   96 mi^2

This is a DOK 3 because students must solve a real-world problem about an unknown side length through the application of area concepts.

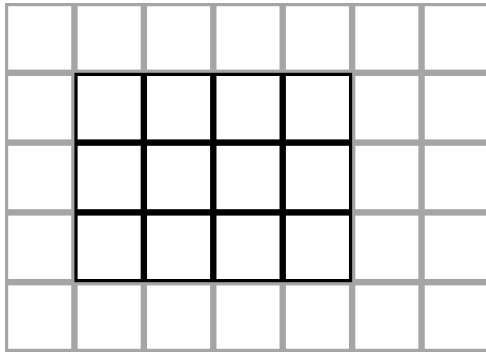This item is difficult because a model is not

	provided.
Patty has a garden in the shape of a square. ● The perimeter of Patty's garden is 32 feet. ● The length of Patty's garden is 8 feet. What is the width of Patty's garden? a. 24 ft b. 16 ft **c. 8 ft** d. 4 ft	This is a DOK 1 item because students must identify an unknown length or width of a rectangle when given corresponding measurements. This item is difficult because a model is not provided.
A city is planning to open a new city park. The area must be between 70 and 85 square miles. What are two possible length and width measures for the park? Length: _____ Width: _____ Length: _____ Width: _____ **Answers: 9 x 8 and 9 x 9**	This is a DOK 3 item because students must solve a real-world problem about unknown side lengths through the application of area concepts. This item is difficult because a model is not provided.
Part A: Click on the squares in the grid to construct a rectangle with an area of 12 square units. **Part B:** Write a multiplication equation that can be used to find the area of the rectangle.	This is a DOK 2 item because students must use a model to represent the connection between modeling area with unit squares and calculating area using side lengths. This item is difficult because a model is not provided.

Answers may vary. The rectangle constructed in Part A must have an area of 12. The factors of the multiplication equations must correspond with the side lengths of the constructed rectangle. Possible Answer:

Part A

Part B: 3 x 4 = 12 or 4 x 3 = 12