



## **CONSTRUCTING TASK: HOW BIG IS A DESK?**

**APPROXIMATE TIME:** 2-3 Days

### **STANDARDS FOR MATHEMATICAL CONTENT**

**MCC.3.MD.7** Relate area to the operations of multiplication and addition.

**MCC.3.MD.8** Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

### **STANDARDS FOR MATHEMATICAL PRACTICE**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

### **BACKGROUND KNOWLEDGE**

In this task, students will use square units to estimate and measure the perimeter and area of a figure and compare the perimeter and area using different units.

It is very likely that the multiplication involved for finding area will be larger than a 1-digit number by a 2-digit number. Students may use calculators for this activity. The goal of this task is to explore the relationship between the size of linear units used to measure and the resulting perimeter and area. Therefore, the use of a calculator is appropriate.

Students should recognize that as the size of the unit of measure increases the number of units required to describe perimeter and area decreases. Conversely, as the size of the unit of measure decreases the number of units required to describe perimeter and area increases. In other words, if the pieces are smaller, you will need more of them to cover the same area; and if the pieces are larger you will need fewer of them to cover the same area.

Students should have had several opportunities to work with the perimeter and area of a rectangle and understand the difference between linear and square units.

## **ESSENTIAL QUESTIONS**

- How do the measure of lengths change when the unit of measure changes?
- How are the perimeter and area of a shape related?
- What methods can you use to determine the area of an object?

## **MATERIALS**

- Square units (i.e. centimeter cubes, 1-inch square tiles, 1x1 foot square pieces of paper)
- *Bigger, Better, Best!* by Stuart J. Murphy or a similar book about measuring area

## **GROUPING**

Whole Group/Partner Task

## **TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION**

### **Part I**

As an introduction to this task, read *Bigger, Better, Best!* by Stuart J. Murphy or a similar book about measuring area. Then, review perimeter and area and the units that can be used for each (linear units vs. square units). Throughout the lesson, emphasize the key vocabulary used in determining perimeter and area. Create an anchor chart as students discuss vocabulary and concepts.

### **Part II**

Students will follow the directions below from the “How Big Is a Desk?” student recording sheet.

How would you describe the size of your desk? You will measure your desk using one inch tiles, a one foot ruler, and one centimeter cubes.

- Before measuring, look at the one inch tiles and record an estimate for the length and width of your desk in the table below.
- Use the tiles to find the actual measurement and record it in the table below.
- Find the perimeter of your desk using the tiles (or a method of your choice) and record it below.
- Find the area of your desk using the tiles (or a method of your choice) and record it below.
- Repeat steps 1 through 4 for the ruler and then for the centimeter cubes. Note: There are probably not enough centimeter cubes to measure the area of the desks. What other method could be used?

Part III

**My Desk**

	Length		Width		Perimeter	Area
	Estimate	Actual	Estimate	Actual		
<b>1 Inch Tiles</b>						
<b>1 Foot Ruler</b>						
<b>1 Centimeter Cubes</b>						

1. Write to explain how you found the perimeter of your desk. What is a different way to find perimeter?
2. Write to explain how you found the area of your desk. What is a different way to find area?
3. What happened to the perimeter and area of the desk as different units of measure were used?

**FORMATIVE ASSESSMENT QUESTIONS**

- What unit is the most appropriate to use to measure the desk? Why?
- What method would you choose to use when measuring a rectangle? Why?
- Describe how you found the perimeter of your desk.
- Describe how you found the area of your desk.

**DIFFERENTIATION**

**Extension**

Have students use 3” squares and/or 6” squares (cut from paper) to use as one square unit. In a math journal, ask students to estimate the area and perimeter of their desk and explain how they determined their estimates. Then ask them to find the area of their desk by tiling or multiplying.

**Intervention**

Have one inch and one centimeter grid paper available for those students who would like to “tile” their desks to find the area. If the grid paper is cut into 10 x 10 squares, counting to find the area will be easier. Or, have students measure a smaller item, such as a tissue box.

**TECHNOLOGY CONNECTION**

- [http://www.shodor.org/interactivate/activities/ShapeExplorer/?version=1.6.0\\_07&browse\\_r=MSIE&vendor=Sun\\_Microsystems\\_Inc.&flash=10.0.32](http://www.shodor.org/interactivate/activities/ShapeExplorer/?version=1.6.0_07&browse_r=MSIE&vendor=Sun_Microsystems_Inc.&flash=10.0.32) Randomly generated rectangles for which the perimeter and the area can be found
- [http://www.bgfl.org/bgfl/custom/resources\\_frp/client\\_frp/ks2/maths/perimeter\\_and\\_area/index.html](http://www.bgfl.org/bgfl/custom/resources_frp/client_frp/ks2/maths/perimeter_and_area/index.html) Instruction on finding area and perimeter of shapes with practice. Levels 2 and 3 for area require finding the area of several rectangles and adding the areas together.

Name \_\_\_\_\_ Date \_\_\_\_\_

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2. Write to explain how you found the area of your desk. What is a different way to find area?

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3. What happened to the perimeter and area of the desk as different units of measure were used?

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