**Finding Areas of Rectilinear Figures: Part Three**

 (This task builds from Finding Areas of Rectilinear Figures: Parts 1 and 2)

*Adapted from North Carolina Department of Public Instruction*

**Student Objective:** “I can find and communicate the area of a large rectilinear figure by decomposing the figure into smaller rectangles.”

|  |  |
| --- | --- |
| **Common Core Standards to Measure** | **Mathematical Practices Addressed** |
| **3.MD.7** Relate area to the operations of multiplication and addition.**d.** Recognize area as additive. Find areas of rectilinear figures bydecomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. | #7 Look for and make use of structure.#8 Look for and express regularity in repeated reasoning. |

**Materials:**

Grid paper

Square tiles, large construction paper

Scenario

Interactive Notebooks (if used)

|  |  |  |
| --- | --- | --- |
| G**Engage Students with the Goal** | State and RateObjective: “I can find area of a large rectilinear figure by decomposing the figure into smaller rectangles.” Students rate themselves to the goal (1, 2, 3, 4). | Setting Objectives and Providing Feedback |
| A**Access Prior****Knowledge** | Review and discuss the “Areas of Complex Figures II” sheet from Lesson 14 at the beginning the lesson. Ask students, “How did you find area in the last lesson? How do you think you could find area if the grid wasn’t provided? ” Have them generate ideas and share with a partner. | Nonlinguistic RepresentationsGenerating and Testing Hypotheses |
| N**New Information** | In this lesson, students will find the areas of complex figures using given side length measurements without grids. Students may have difficulty identifying the measurements to use for the rectangles. The teacher may wish to trace the rectangle in a color and circle or write the measurements used to find the area of the rectangle with the same color.Display and read the opening problem to the class.*Michelle is painting a design on her bedroom wall:**How much of her wall will be covered by the design?*Discuss the figure:• How is this shape like the ones used yesterday for area?• How is this shape different from the ones we used yesterday?• How do you suppose we find the area of this figure?Find the area of the figure:• Where can I break this figure apart into rectangles? Allow students to suggest horizontal or vertical lines and draw them on the figure.• How can I now find the dimensions and areas of the rectangles?Choose one student for each step of the process: locate the length, locate the width, and calculate the area. Record each step on the board or document projector. This calculation should be displayed during the student activity for reference. Have students take notes in their interactive notebooks, if used.**Continue by asking:**• What can I do to find the area of the whole figure? How can I check my work?• Is there another way I could separate the rectangles? Turn and talk to a partner about a different way to separate the rectangles.• Have volunteers or choose students to demonstrate two additional ways of separating the figure into rectangles and calculating the area. | Identifying Similarities and DifferencesProviding FeedbackNonlinguistic RepresentationsCues, Questions, and Advance OrganizersIdentifying Similarities and DifferencesSummarizing and Note-Taking |
| A**Application** | Here, students take turns solving the problems one step at a time in pairs. It is necessary for students to be reminded of appropriate pair behaviors and expectations before beginning the activity. The pairs can be assigned by the teacher or chosen by the students. Students will only complete problems 1-3 during this activity. Students may use calculators to solve the problems.**Distribute** “What is the Area?” activity sheet, one per pair.Review and demonstrate the steps for each problem:• Student A uses a colored pencil to draw one rectangle and find the area.• Student B uses a different color to draw and find the area of the next rectangle.• Student A repeats for the following rectangle.• Student B repeats for the next rectangle, or finds the area for the figure.• During the activity, the students pass the paper back and forth, with each student completing one step of the process until the problem is done.• Each student much check the previous step before proceeding.Allow students to work through the activity. Provide questions to help them but do not over teach or give answers during this phase.Choose a student to display their work and explain their solution to problem 1 Follow up by asking:• Who solved the problem by making **different** rectangles? Allow volunteers or choose students to share their solutions on the document projector.• How did you find the dimensions of this rectangle? Choose a rectangle which may have required students to use a partial side measurement.• How do you know your answer is correct?• Is there another way to break apart the figure?Repeat for Problems 2 and 3. If any further misunderstandings or difficulties were observed while students were working, address them here.If necessary, the lesson may be continued the next day. The computer activity aligns with problems 4 and 5 on the Area Answers sheet. Students may notice that some of the words are spelled differently than they are accustomed. It may be necessary to point out to students that this difference is simply due to European spelling rules.**Display** http://www.bgfl.org/bgfl/custom/resources\_ftp/client\_ftp/ks2/maths/perimeter\_and\_area/index.html Choose the Area example. Beginning with Level 1, work through each of the levels with the class. Have them record their answers in their interactive notebooks.**Problems 4 and 5** on the Area Answers sheet provide a further challenge to students by removing some of the length measurements. The students must determine the missing measurements using the given measures. Students may work with the same partners or choose different partners for this activity.Begin the activity by giving students directions:**For problems 4 and 5**, you will work together to find the areas of the figures. Please notice, though, that some side length measurements are missing. Work with your partner to find the lengths of the sides and the area of the figure.As students work, continue to support their exploration by asking questions about how they are finding the dimensions and areas of figures. | Cooperative LearningHomework and PracticeProviding Feedback |
| G**Revisit the Goal** | Have students write a statement of learning in their interactive notebooks/journals using words and pictures. Have students share their entry with other students.State and RateObjective: “I can find and communicate the area of a large rectilinear figure by decomposing the figure into smaller rectangles.” Students rate themselves to the goal (1, 2, 3, 4). | Setting Objectives and Providing FeedbackSummarizing and Note-Taking |

**Evaluation:**

**Formative**- As students work, pose questions and observe them to check for their understanding.

**Summative-** Students’ work can be used as a summative assessment.

**Plans for Individual Differences:**

**Intervention**- Provide scaffolding questions for the students, reminding them to think step-by step when solving these types of problems.

• Can we cut the figure into smaller pieces? How can we find the areas of the smaller pieces?

What can we do with the areas of the smaller pieces to find the area of the larger figure?

**Extension-** “Garden Walkway” task



****

