LESSON 10

Objective

Estimate and find the area of irregular figures.

Common Core State Standards

- **3.MD.5a** Understand that a square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
- **3.MD.6** Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

Measurement and Data

Area of Irregular Figures

Students should already be familiar with standard measurement tools, such as rulers or metersticks, used to measure linear distances. However, students must develop strategies for measuring with nonstandard tools, as well as for measuring the area of regular and irregular figures. Students need to understand that familiar measurement tools and strategies may not be appropriate for every situation, especially for irregular figures. Estimating and finding the area of irregular figures offers students the opportunity to discover techniques for finding area when a standard measure cannot be applied, and it will deepen their understanding of measurement and area.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Say:** *Look at your hand tracing.* **Ask:** *Why do we call this an "irregular figure"?*
- **Ask:** *How is finding the area of an irregular figure similar to finding the area of a rectangle? How is it different?*

Solve It

With students, reread the problem. Have students explain in writing how they used Centimeter Cubes to find the area of a hand tracing. Then have the class work together to order their tracings from smallest to largest.

More Ideas

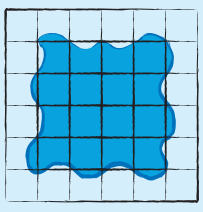
For other ways to teach about finding the area of irregular figures—

- Have students make a design using a Geoboard and then estimate the area. Tell students to count the units in the design to check their estimates.
- Have students estimate and then measure to find the number of Centimeter Cubes necessary to cover various Attribute Blocks. Point out that some of the cubes will probably hang over the edge of the block. Have students count these as $\frac{1}{2}$ or $\frac{1}{4}$ units, depending on how much is on the block.

Formative Assessment

Have students try the following problem.

If each square is 1 square inch, what is the estimated area of this puddle?



A. 10 square inches

B. 16 square inches

C. 21 square inches

D. 25 square inches

Try It! 20 minutes | Pairs

Here is a problem about finding the area of an irregular figure.

Your class is making a wall display of handprints. Each student will trace, cut out, and decorate his or her handprint. Your teacher wants to measure the area of each handprint and display them from smallest to largest. How large do you think the area of your handprint is? How can you find the area?

Introduce the problem. Then have students do the activity to solve the problem. Distribute materials to students. Introduce and discuss the term *irregular figure* and explain that a handprint is an example of an irregular figure.

Materials

- Centimeter Cubes (80 per pair)
- Centimeter Grid (BLM 5; 2 per pair)
- paper (2 sheets per pair)
- pencils (2 per pair)

1. Ask: *How many cubes do you think it will take to cover your hand?* Introduce and discuss the term *estimate.* Have students write down their estimates. Then instruct them to trace their hands onto the Centimeter Grid.

2. Have students take turns using cubes to find the area of their hands on the Centimeter Grid.

3. Have students write down the actual number of cubes it took to cover their hand tracings. **Ask:** *How does your estimate compare to the actual area of your hand?*

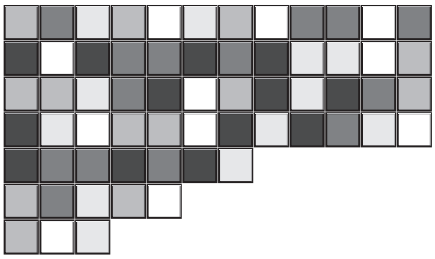
⚠ Look Out!

When finding the area of irregular figures using Centimeter Grids, students will discover that many of the squares have been split by the outline of the figure. Watch out for students who disregard these partial squares. Explain that to accurately find the area, students will need to decide whether enough of the square is included to be counted. Encourage students to count halves of squares as $\frac{1}{2}$ and to combine parts of squares when possible to count as one whole.

Answer Key

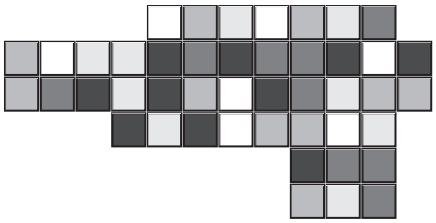
Use Centimeter Cubes to model each irregular shape. The face of each cube equals 1 square centimeter. Find the area of the shape. (Check students' work.)

1.



63 square centimeters

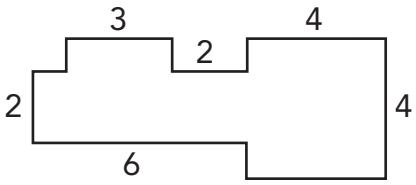
2.



45 square centimeters

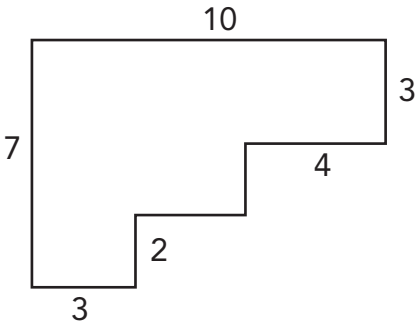
Using Centimeter Cubes, model the shape given. Find the area of the shape. (Check students' models.)

3.



31 square centimeters

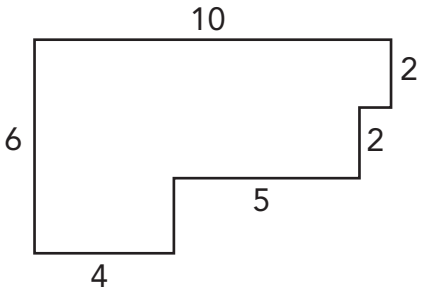
4.



48 square centimeters

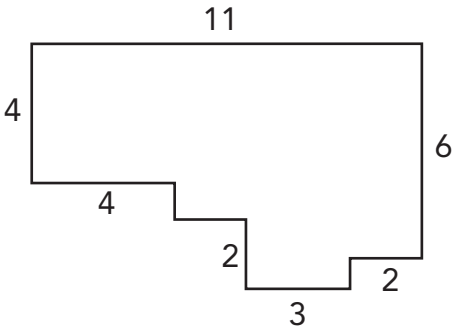
Find the area of each shape.

5.



46 square centimeters

6.



59 square centimeters

Answer Key

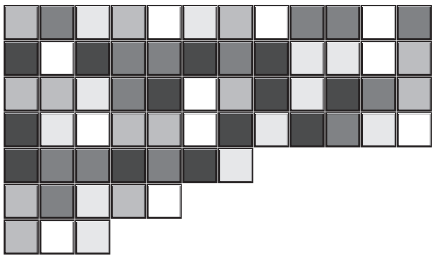
Challenge! Describe two ways you can find the area of the shape in Problem 5 using Centimeter Cubes. Draw pictures to help. Which way is useful for finding the area without using the cubes?

Challenge: (Sample) One way is to build the shape using the cubes dimension by dimension and count the cubes. Another way is to build rectangles using the cubes and then put the rectangles together to form the shape. The second method is helpful for finding the area without cubes because you can find the areas of the parts of the shape and then add the areas together.

Name _____

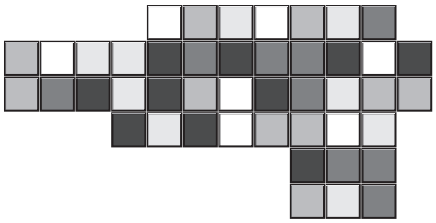
Use Centimeter Cubes to model each irregular shape. The face of each cube equals 1 square centimeter. Find the area of the shape.

1.



_____ square centimeters

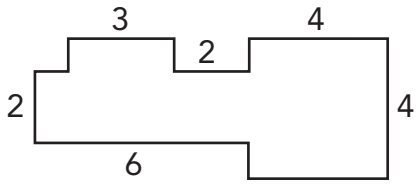
2.



_____ square centimeters

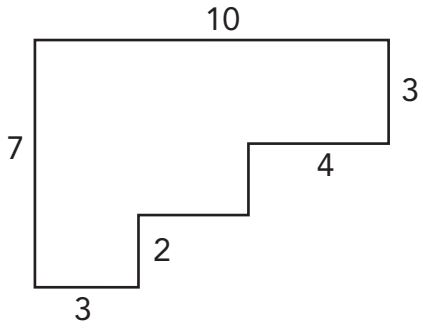
Using Centimeter Cubes, model the shape given. Find the area of the shape.

3.



_____ square centimeters

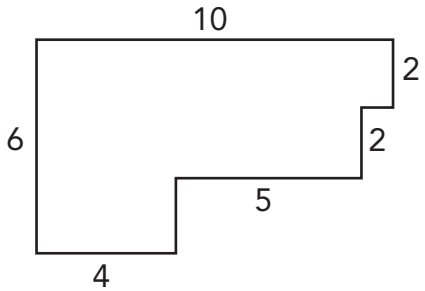
4.



_____ square centimeters

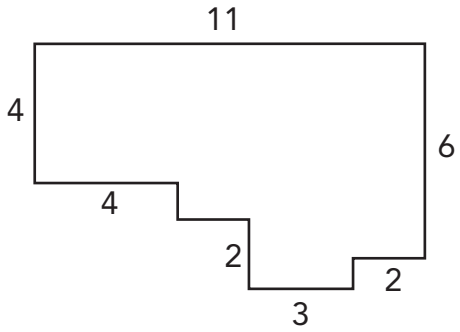
Find the area of each shape.

5.



_____ square centimeters

6.



_____ square centimeters

Name _____

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Name _____