BRIDGES IN MATHEMATICS 3

GRADE 3 SUPPLEMENT

Set D2 Measurement: Area

Includes

Skills & Concepts

- ★ determine area by finding the total number of same-sized units of area that cover a shape without gaps or overlaps
- ★ use non-standard units to estimate and measure area

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Bridges in Mathematics Grade 3 Supplement
Set D2 Measurement: Area

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set D2 ★ Activity 1

ACTIVITY

Measuring the Area of Paper Rectangles

Overview

Students explore the concept of area by covering 4 different paper rectangles with square tile units and then copying one of them onto grid paper.

Skills & Concepts

★ determine area by finding the total number of same-sized units of area that cover a shape without gaps or overlaps

★ use non-standard units to estimate and measure area

You'll need

★ Rectangles (page D2.4, run a half-class set on 3 or 4 different colors of copy paper)

★ Rectangle Z (page D2.5, run 1 copy on a transparency)

★ Grid Paper (page D2.6, run a class set)

★ overhead base 10 units

★ overhead pens

★ square units from the sets of largebase 10 pieces (about 50 for every 2 students)

★ scissors

★ crayons or colored pencils

★ rulers

★ Word Resource Card (area)

Instructions for Measuring the Area of Paper Rectangles

1. Post the area card on the whiteboard and give students a minute to share anything they already know about this term.

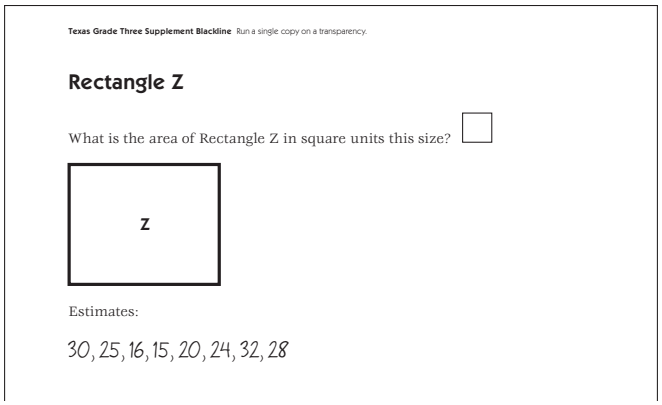
Students *It's something with shapes.*
I think it's a kind of measuring.
I think it's about how big some shapes are, like rectangles and triangles.

2. Explain that when people measure area, they find out how many square units it takes to cover a shape. Today, students are going to use the units from their base 10 kits to measure the area of several different rectangles.

3. Ask students to pair up, or assign partners. Give each pair a copy of the Rectangles blackline, along with about 50 square units from the base 10 kits. (If you give each pair at a table a different color sheet, they'll be able to keep track of their own rectangles more easily.) Have them work together to cut apart the four rectangles along the heavy lines. If someone mentions that one of the shapes on the sheet is a square, ask the class to consider how a square a special kind of rectangle, one with four equal sides.

Activity 1 Measuring the Area of Paper Rectangles (cont.)

4. As the first pairs finish cutting their rectangles apart, ask students to set their materials aside for a minute. Place the Rectangle Z overhead on display. Read the text with your class and ask students to estimate how many square units it would take to measure the area of the rectangle. That is, how many units would it take to cover the entire rectangle, without leaving any holes, gaps, or overlaps? Record some of their estimates and then cover the rectangle with overhead base 10 units as they watch.


Texas Grade Three Supplement Blackline Run a single copy on a transparency.

Rectangle Z

What is the area of Rectangle Z in square units this size? ☐

Z

Estimates:

30, 25, 16, 15, 20, 24, 32, 28

5. Ask students to whisper the number of square units it actually took to cover the rectangle. Can they figure it out without counting the tiles one by one? Perhaps they see 4 rows of 5, or 4 × 5. Others may skip count by 4's or by 5's, and some may see 2 groups of 8 plus 4 more. Write the actual area on the overhead once students agree that it's 20 square units.

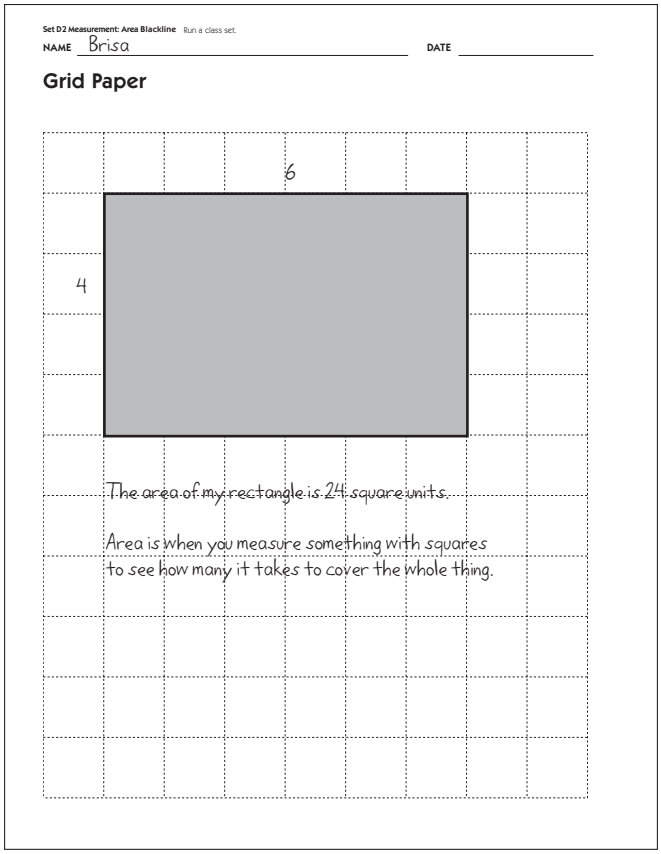
6. Now have them return to their own paper rectangles. Before they measure the area of the rectangles, ask them to use their estimation skills to place the 4 in order, from smallest to greatest area. Have them discuss their thinking with their partners as they sequence the rectangles, and then choose a few volunteers to share their ideas with the class.

> ***Austin*** *We put them on top of each other, like if you put A on top of C, you can see that C is bigger, and D is bigger than B. We're not totally sure about A and B, but we think it's right.*

7. Next, ask students to use their square units to determine the area of each rectangle. Press them to use efficient computation strategies rather than counting the units one by one. Have them record the area directly on the paper rectangles.

8. When the pairs have measured the area of all 4 rectangles, give each student a piece of the 2-Centimeter Grid Paper. Ask them to copy one of the rectangles onto the grid paper by coloring in the correct number of square units. (They may want to outline the rectangle using a pencil and ruler before coloring it in.) Then have them label its dimensions and area. At the bottom of the grid paper, have students write what they know about area right now.

Activity 1 Measuring the Area of Paper Rectangles (cont.)



Set D2 Measurement: Area Blackline Run a class set.

NAME Brisa DATE

Grid Paper

6

4

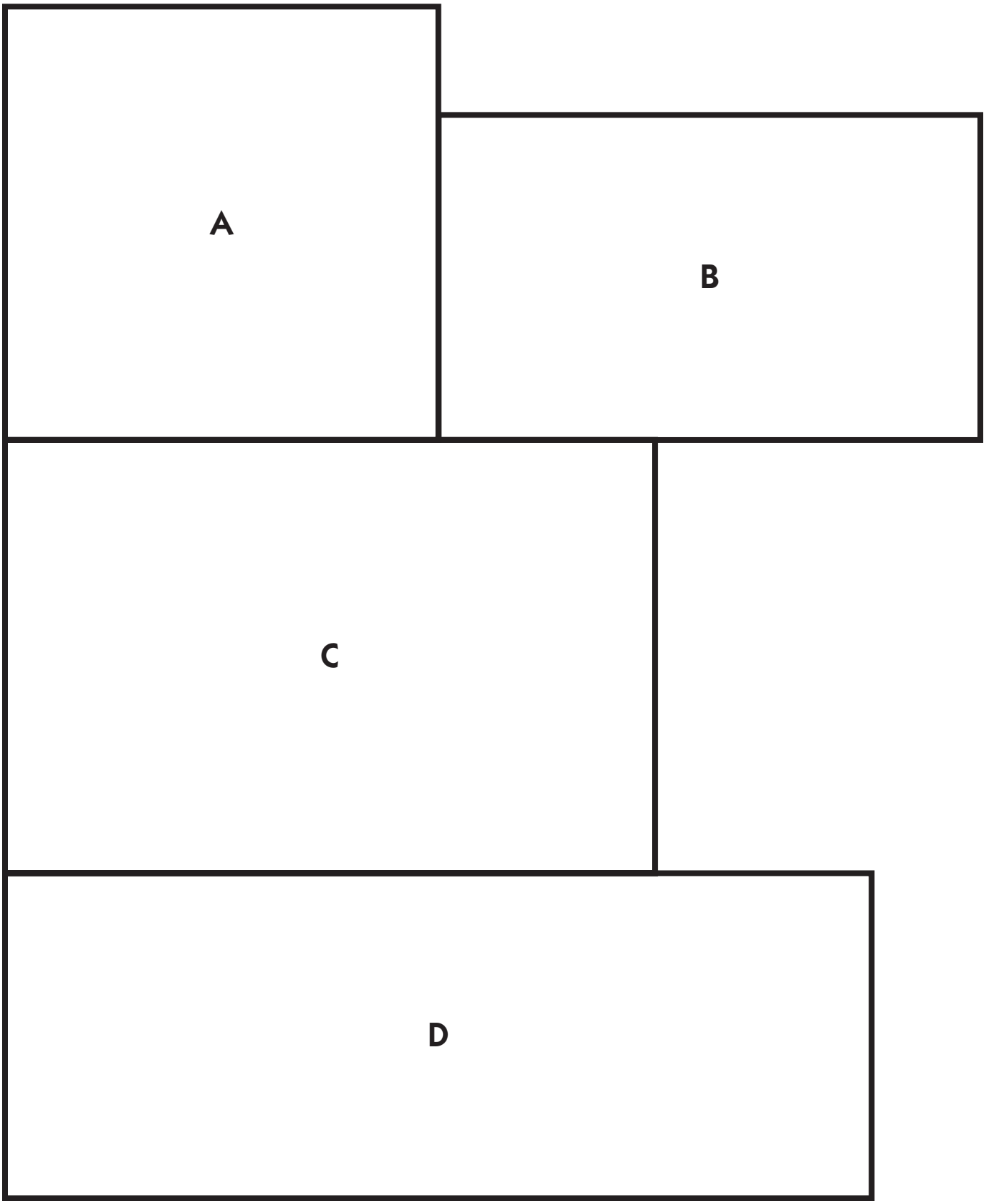
The area of my rectangle is 24 square units.

Area is when you measure something with squares to see how many it takes to cover the whole thing.

Extensions

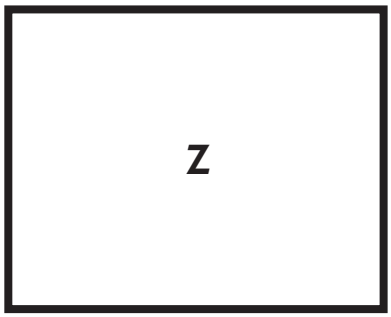
- If some of your students need more of a challenge, have them draw triangles or parallelograms on a piece of grid paper and find the area of these shapes in square units.
- If you have sets of tangrams (like those in Unit Three of *Bridges in Mathematics*), have students use their estimation skills to order the 7 pieces by area. Then have them use the square in the tangram set to find the area of the other pieces. (If the square is assigned an area of 1 unit, each small triangle has an area of one-half. The medium triangle and the parallelogram each have an area of one square unit. The area of the large triangle is 2 square units.)

Rectangles



Rectangle Z

What is the area of Rectangle Z in square units this size? 



Estimates:

Actual Measure: _____ square units

NAME _____ **DATE** _____

Grid Paper

Set D2 ★ Activity 2

ACTIVITY

Finding Areas Large & Small

Overview

Students use construction paper squares to find the area of several different rectangular surfaces in the classroom. They also determine the area of several smaller rectangles that are already marked with square units.

Skills & Concepts

★ determine area by finding the total number of same-sized units of area that cover a shape without gaps or overlaps

★ use non-standard units to estimate and measure area

Recommended Timing

Anytime after Set D2 Activity 1

You'll need

★ Finding Areas Large & Small (pages D2.9 and D2.10, run a class set back-to-back)

★ Grid Paper (Set D2 Actvity 1, page D2.6, class set)

★ 32 four-inch squares of construction paper for each pair of students (see note)

★ a piece of copy paper

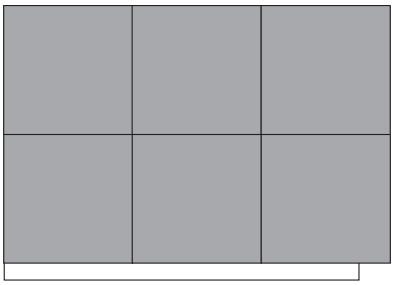
★ 2 or 3 pieces of 18″ × 24″ chart paper

Advance Preparation A sheet of 12″ × 18″ construction paper can be cut into 16 four-inch squares, so you just need to count out and cut 1 sheet per student. It's best to use all one color (not white). Students will need these squares for Set D2 Independent Worksheet 1, so be sure to save them.

Instructions for Finding Areas Large & Small

1. Let students know that they're going to be measuring some rectangular surfaces around the classroom with larger square units today. Show them one of the 4″ paper squares you've cut, along with a piece of copy paper. Ask them to think privately about how many of the squares it might take to cover the piece of paper.

2. Ask volunteers to share their estimates with the class and then use some of the squares to cover a piece of copy paper as the students watch. Note with them that the measurements aren't exact. The paper squares run a little over the length of the paper and don't quite cover the width. What would they say the approximate measurement is in square units?



Activity 2 Finding Areas Large & Small (cont.)

Students *The squares go over the end, but they don't quite cover the paper to the bottom. If you think about cutting the extra off and putting it on the bottom, it's about 6. Yeah, I'd say the paper is about 6 squares big.*

Teacher *So we can say that the approximate area of this paper is 6 square units.*

3. Then explain that they're going to work in pairs to measure some different surfaces around the classroom. Give each student a copy of Finding Areas Large & Small, and review the first side with the class. To complete it, they'll need to locate each of the items shown on the sheet and estimate the area in large paper squares. Then they'll need to measure each item and record its approximate area. Finally, they'll need to find and record the difference between their estimate and the approximate measure.

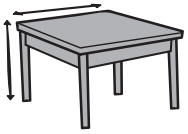
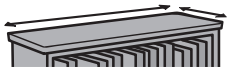
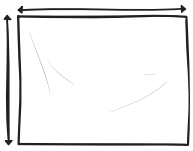
4. Review and clarify the second side of the sheet as necessary and then let students get started. In order to reduce the amount of classroom traffic, you might want to have half of the pairs complete the second side of the sheet first and then do the first side.

INDEPENDENT WORKSHEET

See Set D2 Independent Worksheet 1 for more practice estimating and measuring area. Students will need the 4˝ construction paper squares they used today to complete this assignment, so be sure to save them.

NAME _____ **DATE** _____

Finding Areas Large & Small page 1 of 2

Object	Your Estimate (in square units)	Approximate Measurement (in square units)	The Difference (in square units)
1 Area of a large picture book 			
2 Area of a chair seat 			
3 Area of a desk or small table 			
4 Area of the top of a bookshelf 			
5 Area of a piece of chart paper 			

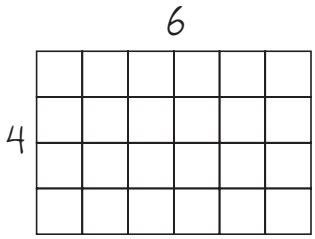
I noticed

NAME _____ **DATE** _____

Finding Areas Large & Small page 2 of 2

7 The rectangles below have already been marked with square units. Record the dimensions of each and then find the area. Write 2 different number sentences to show how you found the area of each.

example



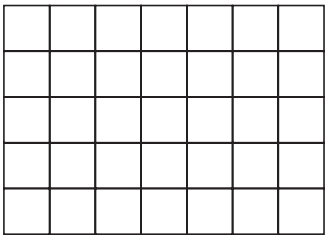
Area = 24 square units

Number sentences:

6 + 6 + 6 + 6 = 24

4 × 6 = 24

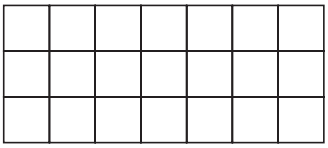
a



Area = _____ square units

Number sentences:

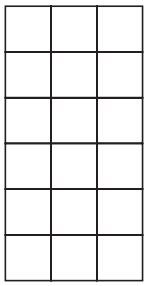
b



Area = _____ square units

Number sentences:

c



Area = _____ square units

Number sentences:

NAME _____ **DATE** _____

Set D2 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

Finding More Areas

1 You'll need a partner and some large square units made out of construction paper to do this sheet. Choose 5 different rectangular surfaces around the room to measure with the large square units. Be sure to estimate the area first.

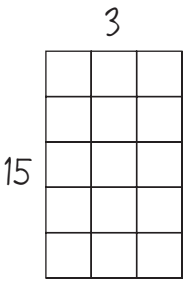
Object	**Your Estimate** (in square units)	**Approximate Measurement** (in square units)	**The Difference** (in square units)
a			
b			
c			
d			
e			

(Continued on back.)

Independent Worksheet 1 Finding More Areas (cont.)

2 The rectangles below have already been marked off in square units. Record the dimensions of each and then find the area. Write 2 number sentences to show how you found the area of each.

example



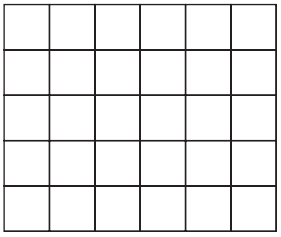
Area = 15 square units

Number sentences:

5 + 5 + 5 = 15

5 × 3 = 15

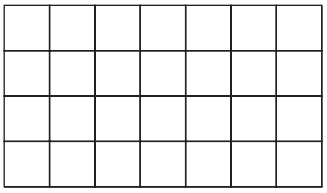
a



Area = _____ square units

Number sentences:

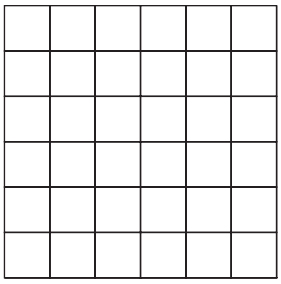
b



Area = _____ square units

Number sentences:

c



Area = _____ square units

Number sentences: