

# A Toy Store Summer: Finding Area

by John Perritano

## Math Objective

Children understand how to find the area of a square or rectangular surface. Children apply the formula for area in real-world and mathematical problems. They count square units to find area and make arrays. Children use standard units of measure, such as customary or metric units. They add areas to find a total. Children use perimeter to find the unknown number in area equations.

## iMath Discover Activity

In this activity, children draw a three-column chart listing the objects that they find that have square or rectangular surfaces. Children use sticky notes as unit tiles to cover the surface and find the total square units of each object. Then children make another chart and use the formula for area on the objects they list there.

### ► Objectives

Children will:

- create charts.
- identify objects with square or rectangular surfaces.
- use unit squares to find the area of an object.
- use the formula for area.

### Materials

- a square pad of sticky notes
- a ruler or yardstick
- paper
- pen or pencil

## Lesson Plan

### Before Reading

#### Investigation

pp. 4–5: Ask children to look at the picture on p. 4. Ask: *What do you think this story will be about?* Record children's

#### Math Concepts

Connecting to what they know helps children engage in the topic.

answers on the board. Read the text on p. 5 aloud. Ask: *Why might Tara need to know how to find the area of a toy for her job?* Record children's answers on the board.

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Distribute graph paper. Say and ask: *Draw your favorite game box lid. Do you remember how to find the area of a square or rectangular box? Measure your box and find its area.* Have children share their ideas and find the area of their box. Children may suggest count tiles or use the formula  $l \times w$ . Have children check each other's work.

Hands-on manipulation connects children to the topic and promotes learning. Check children's understanding.

In this book, children join Tara at the toy store where she works and explore different ways to find the area of shapes.

## During Reading

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### Investigation

pp. 6–9: Have children read these pages silently. Then, reread pp. 6–7 aloud or have a volunteer do so. Provide sticky notes. Let children experiment with using the notes to tile the surface of an object, such as a notebook, and find the area by counting tiles. Answer the question on p. 7. Reread p. 8 aloud. Say: *What is the difference between metric units of length and customary units of length?* Pass out both metric and customary unit measures. Let children work in pairs and measure the length and width of different square or rectangular objects you provide. Have the pairs find the area of each object using the formula for area. Reread p. 9 aloud. Have a volunteer draw the trays on the board and label them. Let another volunteer write and solve the addition problem. Ask: *What if one tray is 5 feet x 5 feet and another is 6 x 4? What would be the total area of those two trays?*

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### Math Concepts

Children recognize area as an attribute of plane figures and understand concepts of area measurement. They apply the area formula for rectangles in real world and mathematical problems. Children measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units) and use tiling and arrays. Children relate area to the operations of multiplication and addition. They recognize area as additive. They find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

## During Reading (continued)

### Investigation

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pp. 12–15: First, have children read these pages silently. Reread p. 12–13 aloud. Use 9 small gift boxes to show what Tara did. Invite a volunteer to draw the array on p. 13 on the board. Then, ask children to find the area. Demonstrate how to find the area by counting tiles. Then, ask: *What is another way to find the area?* Reread p. 14 aloud. Ask: What is a good strategy for finding the area in this case? Have children volunteer their ideas and find the area. Ask: *What is the number line in the Did You Know box called? (a timeline) How many years were cast iron cars popular?* Reread p. 15 aloud. Ask: *Do you remember the formula for perimeter?* Write  $l + l + w + w$  on the board, or  $2l + 2w$ . Say: *We know the length of the sides is 3 ft., and we know the area is 6 ft.* Ask: *How could we write the perimeter and area equations showing the unknown numbers? ( $3 + 3 + ? + ? = ?$ ;  $3 \times ? = 6$ )* Have children find the unknowns and apply the same strategy to the problem at the bottom of p. 15.

pp. 16–17: Have children read these pages silently. Reread p. 16 aloud and answer the question. Draw the window on the board and label its measurements. Invite a volunteer to find the area of the window's opening. Reread the first half of p. 17 aloud. Ask: *What do we need to do first with the measurements of the box? The area of the window is in feet.* Children should suggest that the inches of the box's measurements be converted to feet. Invite a volunteer to do this conversion and write the problem on the board using the formula for area. Then, have children answer the question at the bottom of p. 17.

pp. 18–20: Have children read pp. 18–20 silently. Reread pp. 18–20 aloud. Have children discuss the text on p. 18. Ask: *How can we figure out the area of one gift box?* Record children's answers on the board. Reread pp. 20–21 aloud. Ask: *Are teddy bears still popular? What makes the story and stuffed teddy bears so appealing? Say: President Roosevelt loved the*

### Math Concepts

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Children use tiling, arrays, and a formula to find area. They tiling to show in a concrete case that the area of a rectangle with whole-number side lengths  $a$  and  $b + c$  is the sum of  $a \times b$  and  $a \times c$ . Use area models to represent the distributive property in mathematical reasoning. Children use perimeter and area formulas and the total area to find unknown numbers. They find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

Children work through a several step problem to solve a real-world situation. Children convert units of measurement and use the formula for finding area. They recognize area as additive.

Children use tiling, arrays, and a formula to find area. They apply the area and perimeter formulas for rectangles in real world and mathematical problems. Decompose elements of area equations to find the size of unit parts.

*American wilderness and its animals. He started our national park system.*

### During Reading (continued)

#### Investigation

pp. 21–23: Read these pages silently or aloud. Reread p. 23 aloud. Ask: *How is the checkerboard like an array?* Let the children answer the questions and solve the problems on this page. Have children discuss their strategies for solving the problems.

pp. 24–25: Read p. 24 aloud. Have children work in pairs to solve the problem on p. 24. Walk around and check children’s progress. Read p. 25 together. Discuss the text and let children ask questions.

pp. 26–28: Invite volunteers to read these pages aloud. Have children answer the questions as they come to them.

p. 29: Provide children with library and Internet time to research vintage toys. Then provide drawing materials so that they can design their display box.

#### Math Concepts

Children use a real-world array to find area. They recognize area as additive.

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Children apply the area formula for rectangles in real world and mathematical problems. Children measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units) and use tiling and arrays. Children relate area to the operations of multiplication and addition. They recognize area as additive. They find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

Children learn research techniques related to solving a real-world and mathematical problem.

### After Reading

Ask children to restate the key ideas in the book.

#### Investigation

Have children tour the school grounds looking for square and rectangular surfaces to measure and find the area of. Have students keep an observation log with sketches and problems

#### Understanding Math

Children recognize area as an attribute of plane figures and understand concepts of area measurement. They apply the area formula for rectangles in real world and mathematical problems.

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Have children design a game using colorful sticky notes. Tell them they must use finding area in the game. Have them write the rules to their game.

Children use the different strategies they have learned for area to engineer a game. Children confirm knowledge by writing rules for the game.