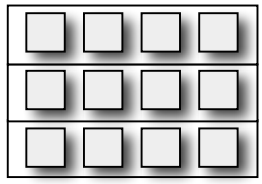
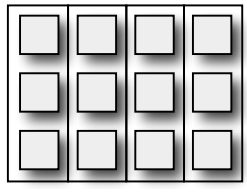
Lesson 5.1c

Arrays

Objectives	**California Standards**
• Model multiplication situations with arrays.	**NS 3.1** Use repeated addition, arrays, and counting by multiples to do multiplication. **MR 1.2** Use tools, such as manipulatives or sketches, to model problems. **MR 3.0** Students note connections between one problem and another.
Materials • Square tiles or counters that can be displayed • Number cubes 1–6 and 4–9 for each group • Connect-a-Cubes or square graph paper	**Vocabulary/Phrases** Column Row

Teaching Strategies		
Arrays	Display objects, such as squares or counters, in two equivalent rectangular arrays, or draw them on the whiteboard. Draw lines to group the objects in one array into rows, and those in the other array into columns. Point to the first group, where the array is in rows. Ask students how many rows there are (3). Ask students how many objects there are in each row (4). Ask them how many objects there are altogether (12). Write the addition equation on the whiteboard under this first group. **Note** Define rows and columns by pointing to examples in arrays you draw on the whiteboard. Some students may need more review of these terms.	 4 + 4 + 4 = 12
	Point to the second group, where the array is in columns. Ask students how many columns there are (4). Ask them how many objects there are in each column (3).	

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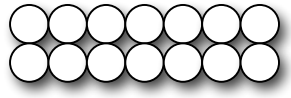
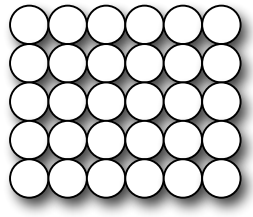
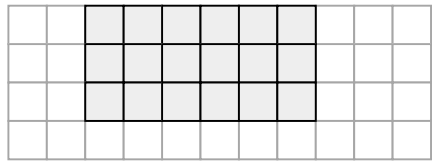
	Ask students how many objects there are altogether (12). Write the addition equation on the whiteboard under the second group.	3 + 3 + 3 + 3 = 12
	Ask students what two multiplication equations we can write to show the total. Lead students to see that to solve 4 × 3 they can do the following. Add 4 three times (4 + 4 + 4) Add 3 four times (3 + 3 + 3 + 3) The answer is the same for both.	4 × 3 = 12 3 × 4 = 12 4 × 3 = 3 × 4
	Write the problem "7 × 2" on the whiteboard. Illustrate it with an array. Ask them whether it is easier to find the answer using: 2 + 2 + 2 + 2 + 2 + 2 + 2 or 7 + 7 Some students might prefer counting by 2's, others might prefer adding 7 and 7.	7 × 2 or 2 × 7 
	Repeat with the problem 6 × 5. Point out that it is easier to count by 5's than to add 6 + 6 + 6 + 6 + 6.	6 × 5 or 5 × 6 
Assess	Have students do **task 4, Textbook p. 92**. Ask them whether they counted by 4's or 2's in the first problem, and by 5's or 3's in the second problem.	Textbook p. 92 4. (a) 4 × 2 = 8 2 × 4 = 8 (b) 5 × 3 = 15 3 × 5 = 15
Activity	Divide students into groups. Provide each group with two number cubes, one labeled with 1–6 and the other with 4–9, or four sets of number cards 1–9. Give each student Connect-a-Cubes or a hundreds board (they use the reverse side) and dry erase markers, or centimeter graph paper. Each player throws both number cubes, or, from the number cards, draws 2 cards. They form an array using the two numbers. They write 2 equations for the array and determine the answer.	 6 × 3 = 18 3 × 6 = 18
Practice	Workbook Exercise 3, p. 96–97	

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Chapter 2 Division

Students were introduced to the concept of division in *Primary Mathematics (Standards Edition) Grade 1*. This section is a review. The emphasis is on understanding the meaning of division. Students do not need to know division facts or find division facts from multiplication facts yet. Allow students to use pictures or manipulatives to solve all problems in this section.

The division symbol (÷) is introduced in this section.

Textbook p. 94 illustrates two kinds of division situations:

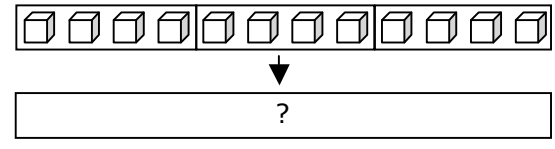
Sharing:
Start with a set of objects (12 balloons).
Make a given number of equal groups (3 groups).
Find the number of objects in each group (4 balloons).

Grouping:
Start with a set of objects (12 balloons).
Make equal groups of a given size (4 balloons in each group).
Find the number of groups made (3 groups).

Previously, students learned that addition and subtraction are associated with the part-whole concept. If we are given two parts, we can add to find the whole. If we are given the whole and a part, we can subtract to find the other part.

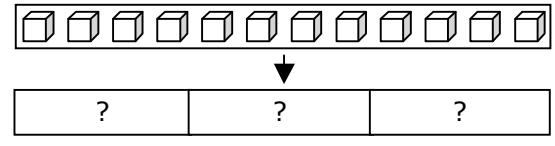
Multiplication and division are also associated with the part-whole concept. Instead of two different parts making a whole, a specified number of equal parts make the whole.

Given the number of equal parts and the number in each part, we can multiply to find the whole (total).



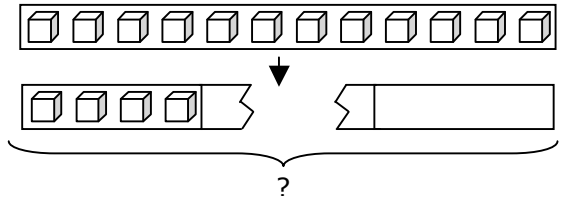
$3 \times 4 = 12$

Given the whole and the number of parts, we can divide to find the number in each part (sharing).



$12 \div 3 = 4$

Given the whole and the number in each part, we can divide to find the number of parts (grouping).



$12 \div 4 = 3$

In *Primary Mathematics (Standards Edition) Grade 3*, students will be introduced to the term "unit" for the equal parts. At this level, they should understand that both multiplication and division are associated with equal parts.

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