

LESSON 2

Objective

Multiply a number by 5 using grouping and skip-counting.

Common Core State Standards

- **3.OA.1** Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .
- **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Operations and Algebraic Thinking

Multiplying by 5

Students may already be familiar with counting by 5s from counting their fingers to make 10 and 20. Also, students are familiar with grouping manipulatives to multiply by single-digit numbers. Multiplying by 5 and skip-counting teach students that patterns can help them remember number facts.

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

Talk About It

Discuss the Try It! activity.

- **Ask:** Did you get the same answer for 4×5 when you used the Two-Color Counters to multiply as you did when you skip-counted on the Hundred Chart?
- **Ask:** Was it easier to count all the counters one by one to solve 4×5 , or to skip-count by 5s?
- **Ask:** What do you notice about your answers to all of the multiplication facts of 5? Do you think the answer would still end in 5 or 0 if we multiplied a larger number, like 5×17 ? What about $2,378 \times 5$? Can we use this pattern to help us solve any multiplication problem that uses 5?

Solve It

With students, reread the problem. Have students write a short paragraph summarizing how they know 4 groups of 5 paintbrushes will be a number ending in 5 or 0. Then have them explain how they can solve 4×5 as proof. Encourage them to describe using a counter array or hundred chart as support.

More Ideas

For other ways to teach about multiplying by 5—

- Have students work in groups to create number lines from 1 to 50 on paper. Have students use Centimeter Cubes to show skip-counting by 5s on the number line and explain how it relates to multiplication facts involving 5.
- Challenge groups of students to model multiples of 5 through 5×20 using Color Tiles to build arrays and skip-count. Have students record the algorithms for these facts and discuss the patterns involved.

Formative Assessment

Have students try the following problem.

In gym class, there are 5 teams with 5 players on each team. How many students are in the gym?

- A. 15 B. 20 C. 25 D. 30

Try It! 20 minutes | Pairs

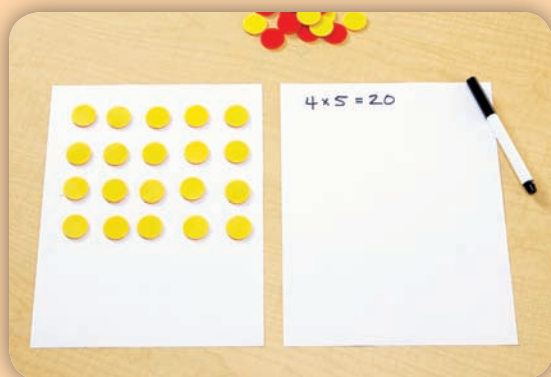
Here is a problem about multiplying by 5.

The art teacher divided the class into 4 equal-sized groups. Each group needs 5 paintbrushes. How many paintbrushes are needed in all?

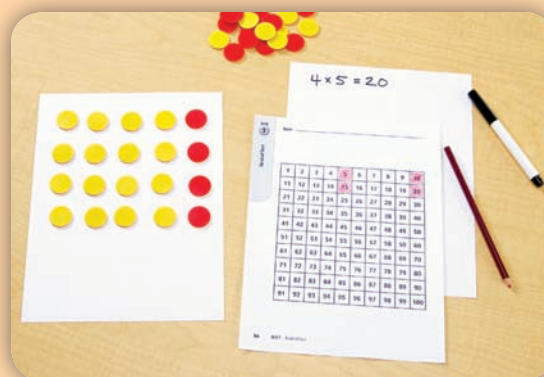
Introduce the problem. Then have students do the activity to solve the problem. Distribute Two-Color Counters, Hundred Chart (BLM 1), pencils, and paper to each pair of students.

Materials

- Two-Color Counters (50 per pair)
- Hundred Chart (BLM 1; 1 per pair)
- pencils (1 per pair)
- paper (2 sheets per pair)



1. Direct students to divide counters into 4 rows of 5 counters, all yellow-side up. Have students represent the model by writing the multiplication sentence 4×5 . Have students solve the problem 4×5 by counting each individual counter (1 to 20).



2. Have students repeat counting and flip over every fifth counter to red as they count. Then have students transfer the value the red counters represent to their Hundred Charts by circling or shading appropriate values (5, 10, 15, 20). Discuss the pattern created on the Hundred Chart and its link to the array of counters.

Ask: How many rows are in the counter array? How many numbers did we shade on our Hundred Chart? How many counters are in each row? How much does the value of each shaded number on the chart increase each time?



3. Have students continue skip-counting on their Hundred Charts to complete multiples of 5 through 50. Discuss the pattern of numbers when skip-counting or multiplying by 5s (the place value of ones is 5 or 0). Challenge students to use their completed charts to create multiplication sentences for facts up to 5×10 .

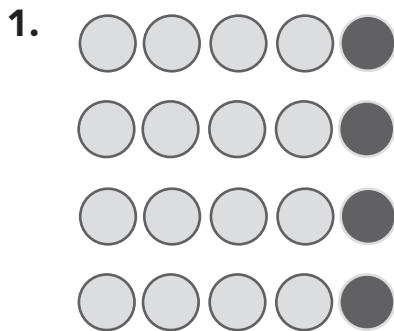
Look Out!

Watch out for students who can complete multiplication facts involving 5, but cannot represent multiples of 5 with an array or a hundred chart. This is an indication that rote memory has been used to solve the facts, but that the solid number sense driving the algorithms is not yet understood. Provide guided assistance to make sure students can model multiplication facts as well as solve their algorithms.



Use Two-Color Counters to build the multiples of 5 shown. Write the multiplication fact for each multiple of 5 modeled by the darker counters.

(Check students' work.)



$$\underline{1} \times \underline{5} = \underline{5}$$

$$\underline{2} \times \underline{5} = \underline{10}$$

$$\underline{3} \times \underline{5} = \underline{15}$$

$$\underline{4} \times \underline{5} = \underline{20}$$

Build each multiplication fact using Two-Color Counters. Then sketch the model and use a Hundred Chart to find the next two multiples of 5.

(Check students' models.)

2. $4 \times 5 = 20$

$$\underline{5} \times \underline{5} = \underline{25}$$

$$\underline{6} \times \underline{5} = \underline{30}$$

3. $8 \times 5 = 40$

$$\underline{9} \times \underline{5} = \underline{45}$$

$$\underline{10} \times \underline{5} = \underline{50}$$

Write the next four multiples of 5.

4. $2 \times 5 = 10$

$$\underline{3} \times \underline{5} = \underline{15}$$

$$\underline{4} \times \underline{5} = \underline{20}$$

$$\underline{5} \times \underline{5} = \underline{25}$$

$$\underline{6} \times \underline{5} = \underline{30}$$

5. $5 \times 5 = 25$

$$\underline{6} \times \underline{5} = \underline{30}$$

$$\underline{7} \times \underline{5} = \underline{35}$$

$$\underline{8} \times \underline{5} = \underline{40}$$

$$\underline{9} \times \underline{5} = \underline{45}$$

6. $7 \times 5 = 35$

$$\underline{8} \times \underline{5} = \underline{40}$$

$$\underline{9} \times \underline{5} = \underline{45}$$

$$\underline{10} \times \underline{5} = \underline{50}$$

$$\underline{11} \times \underline{5} = \underline{55}$$

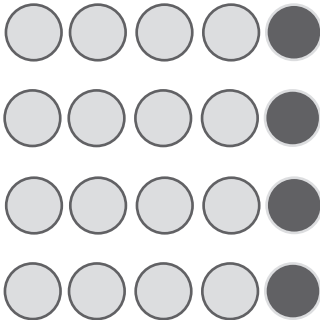
Answer Key

Challenge! When you use Two-Color Counters and a Hundred Chart to find all the multiples of 5 less than or equal to 100, how many numbers do you color? Describe the pattern of the colored numbers.

Challenge: (Sample) 20; Every fifth number is colored red. The multiples of 5 to 100 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, and 100.

Use Two-Color Counters to build the multiples of 5 shown. Write the multiplication fact for each multiple of 5 modeled by the darker counters.

1.



$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

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Name _____

Challenge! When you use Two-Color Counters and a Hundred Chart to find all the multiples of 5 less than or equal to 100, how many numbers do you color? Describe the pattern of the colored numbers.

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Name _____

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100