

## Core Content

**Cluster Title: Use the four operations with whole numbers to solve problems.**

**Standard 1:** Interpret a multiplication equation as a comparison, e.g., interpret  $35 = 5 \times 7$  as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

**MASTERY Patterns of Reasoning:**

**Conceptual:**

Students will recognize that any two factors and their product can be read as a comparison (e.g., 8 is the same as 4 sets of 2 or 2 sets of 4; 8 is 4 times as many as 2, or 2 times as many as 4).

Students will recognize that multiplication represents groupings of numbers, and identify that the first factor in the equation represents the number of groups and the second factor represents how many within each group.

Students should be able to make a comparison that 5 groups of 7 is the same as 7 groups of 5. Both products are 35.

Students will understand that this representation illustrates the Commutative Property of Multiplication.

**Procedural:**

Students can interpret a multiplication equation. Solve for the product.

**Representational:**

Students can represent and solve multiplication equations through the use of models (e.g., arrays), illustrations, and writing.

Students should be able to illustrate that 5 groups of 7 is the same product as 7 groups of 5.

## Supports for Teachers

**Critical Background Knowledge**

**Conceptual:**

Students will possess an understanding of number sense, such as decomposing numbers (35 is the same as  $10 + 10 + 10 + 5$  or  $30 + 5$  or ...) and the reasonableness of answers.

Students will be able to identify place value, including writing numbers in expanded form to recognize grouping by

place value.

Students will understand the base ten number operations of addition.

**Procedural:**

Students can skip count to compute.

Students can solve problems using repeated addition.

Students can fluently use basic multiplication facts 0-9.

**Representational:**

Students can model skip counting, repeated addition and basic multiplication facts using manipulatives, drawings, algorithms, and journaling.

**Academic Vocabulary and Notation**

multiply, compare, equation, represent, base ten, array, operation, factor, product, Commutative Property of Multiplication, expanded form, place value, decompose

**Instructional Strategies Used**

1. Concrete—Pictorial—Abstract Representation
  - a. Have students use manipulatives to show what  $x$  groups of  $y$  looks like (e.g., 3 groups of 5; 4 groups of 7). Solve for the product.
  - b. Build arrays for equations using the Commutative Property of Multiplication (e.g., with 5 groups of 7 and 7 groups of 5, 5 rows with 7 chairs in each row looks different from 7 rows with 5 chairs in each row, but there are 35 chairs in both sets).
  - c. In math journals, have the students create a representation (e.g., array or picture illustrating the grouping) of the process that they completed using manipulatives. Write the two equations that are equivalent to the given representations, and solve for the product.

**Resources Used**

Number and Operations (Grades 3-5) Rectangle Multiplication—This virtual manipulative tool allows students to create arrays displaying different grouping (e.g., 3 groups of 6 and 6 groups of 3):  
[http://Nlvm.usu.edu/en/nav/topic\\_t\\_1.html](http://Nlvm.usu.edu/en/nav/topic_t_1.html)

This resource includes a short lesson and a game for students to practice building arrays, writing equations, and solving for a product:  
<http://Mathstory.com/mathlessons/arrayrace.htm>

Locate the activity “Groups of Dogs” at the following site for students to look at arrays using objects:  
[http://www.internet4classrooms.com/grade\\_level\\_help/solve\\_problems\\_math\\_fourth\\_4th\\_grade.htm](http://www.internet4classrooms.com/grade_level_help/solve_problems_math_fourth_4th_grade.htm)

<ol style="list-style-type: none"> <li>2. In cooperative learning groups, have each group create either an equation or a model. Then have the students rotate through each group and construct an equivalent form of what is observed.</li> <li>3. Fact families—reinforce the principles of related facts using triangle flash cards or Memory-type games.</li> </ol>	
<b>Assessment Tasks Used</b>	
<p><b>Skill-Based Task:</b>            Evaluate <math>8 \times 6</math>, <math>5 \times 9</math>, <math>7 \times 3</math>, etc. Write the equations for each multiplication problem using the Commutative Property of Multiplication (e.g., <math>8 \times 6 = 6 \times 8</math>). Write and then solve the given equation using another method. Use a verbal statement to explain the chosen method.</p>	<p><b>Problem Task:</b>            Pedro has invited 8 of his friends to a summer party. He asked each of them to bring 7 pieces of candy. Create a representation of the total number of candy pieces the friends will share. Write the equation that represents the illustration you created. Solve for the answer.</p>