

Core Content

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

Standard 2: Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

MASTERY Patterns of Reasoning:

Conceptual:

Students will understand that a symbol represents an unknown variable in an equation.

Students will recognize division as the inverse of multiplication.

Students will distinguish when a word problem is asking to solve using a multiplicative or additive comparison.

Procedural:

Students can use concrete, pictorial, and abstract methods to demonstrate the relationship between multiplication and division.

Students can distinguish the difference between multiplicative comparison (e.g., Maria has 9 stickers. Joe has 3 times as many stickers as Maria. How many stickers do they have altogether?) and additive comparison (e.g., Sara has 5 picture books and 3 chapter books. How many more picture books than chapter books does she have?).

Solve a word problem by creating an equation using a variable or symbol to represent the unknown number.

For example, a pink rod is 4 inches long. A green rod is 3 times as long as the pink rod. How long is the green rod? Let y represent the green rod.

$$3 \times (\text{length of the pink rod}) = y$$

$$3 \times (4 \text{ inches}) = y$$

$$y = 12 \text{ inches}$$

Division example: The green rod is 12 inches long. It is 3 times as long as the pink rod. How long is the pink rod? Let n represent the pink rod.

$$3 \times n = 12 \text{ inches}$$

$$12 \text{ inches} \div 3 = 4 \text{ inches}$$

Representational:

Students can represent multiplicative comparisons in word problems using models, illustrations, and/or writing.

Supports for Teachers

Critical Background Knowledge

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 grouping of quantities, 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 how to solve a word problem using multiplication and division (e.g., I have 4 packs of bubblegum. Each pack contains 8 pieces of gum. How many pieces of bubblegum do I have in all? There are 24 students to ride in vans. Each van has 6 seats. How many vans are needed?)

Procedural:

Students can fluently use basic multiplication and division facts 0-9.

Representational:

Students can model how to solve basic multiplication and division word problems using manipulatives, drawings, algorithms, and journaling.

Academic Vocabulary and Notation

variable, inverse operations, multiplicative comparison, additive comparison, symbol

Instructional Strategies Used

1. Use multiplication and division fact families to show the relationship between division and multiplication.

Resources Used

<http://www.helpingwithmath.com>
Look at Multiplication and Division Word Problems for

<p>Explain how one is the inverse of the other.</p> <p>2. Give the students story problems with multiplicative comparisons. Have them draw a picture or create a model of the problem, write an equation with a symbol for the unknown variable, and solve.</p>	<p>examples to use with students of multiplicative comparison.</p> <p>http://www.mathplayground.com/wordproblems.html Challenging examples of word problems using multiplicative comparison.</p> <p>http://www.mathscore.com/math/standards/Common%20Core/4th%20Grade/ Scroll down to the correct domain and standard to find a listing of online problems displaying multiplicative comparison.</p>
<p>Assessment Tasks Used</p>	
<p>Skill-Based Task: Create and solve an equation from a given word problem.</p>	<p>Problem Task: Over the summer, Raul read 8 books. Natalia read 4 times as many books. How many books did Natalia read? Draw a picture or create a model of the problem, write an equation with a symbol for the unknown variable, and solve.</p>