

Core Content

Cluster Title: Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Standard 8: Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Note: This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (i.e., order of operations).

MASTERY Patterns of Reasoning:

Conceptual:

- Students will understand that a symbol/letter can be used to represent an unknown number.
- Students will understand how to use mental math, rounding, and estimation
- Students will understand the definition of reasonableness.
- Students will know the basic order of operations (i.e., multiplication and division come before addition and subtraction).

Procedural:

- Students can solve two-step word problems using addition, subtraction, multiplication and division.
- Students can solve problems where a symbol/letter represents an unknown number.
- Students can solve problems using mental math, rounding, and estimation.
- Students can justify the reasonableness of their answer.
- Students can write and solve a two-step word problem.

Representational:

- Students can draw pictures to represent two-step word problems.
- Students can use manipulatives involving problems where a symbol/letter represents an unknown number.

Supports for Teachers

Critical Background Knowledge

Conceptual:

Students will know what whole numbers are.

Students will know how to solve one-step word problems using addition, subtraction, multiplication and division.

Students will know how to fluently add and subtract within 1,000.

Students will know how to fluently multiply and divide within 100.

Students will know how to add up to four two-digit numbers.

Students will know how to relate the word problem to an equation.

Procedural:

Students can solve addition and subtraction equations within 1,000 flexibly, accurately, efficiently, and appropriately.

Students can solve multiplication and division problems within 100 flexibly, accurately, efficiently, and appropriately.

Students can solve one-step word problems using operations.

Representational:

Students can model using concrete models or drawings to add and subtract within 1,000, and relate the strategy to a written method.

Students can model how addition and subtraction strategies work, using place value and the properties of operations.

Students can model how multiplication and division strategies work, using place value and the properties of operations.

Academic Vocabulary and Notation

Addends, sum, difference, round, estimate, equation, difference, multiplication, factors, product, array, multiples, division, divisor, dividend, quotient, reasonableness, symbol, \times , \div , $/$, interchangeable

Instructional Strategies Used	Resources Used
<p>Have the students write their own word problems that include more than one step and/or operation.</p> <p>Use the <i>Alexander, Who Used to Be Rich...</i> book to set up for two-step problems such as adding each amount spent to get a total and then subtracting that from the dollar.</p> <p>Use the <i>Pigs Will Be Pigs</i> book to set up for two-step problems.</p> <p>Practice estimation strategies:</p> <ul style="list-style-type: none"> • Using benchmark numbers • Front-end estimation • Rounding • Talk about whether the answer is reasonable. How do you know? <p>Multiple problem solving strategies</p> <ul style="list-style-type: none"> • Draw diagrams • Table • Use physical objects • Pictures • Number lines • Models • <p>Use the IXL link for instruction with whole group participation.</p>	<p>Giganti, Paul. <i>Each Orange Had 8 Slices</i>. Greenwillow Books, 1999.</p> <p>Viorst, Judith. <i>Alexander, Who Used to Be Rich Last Monday</i>. Atheneum Books, 1987.</p> <p>Axelrod, Amy. <i>Pigs Will Be Pigs</i>. Aladdin, 1997.</p> <p>http://www.mathplayground.com/gsmbegin.html http://teacher.scholastic.com/maven/zoo/index.htm http://teacher.scholastic.com/maven/adder/index.htm (Good for addition and subtraction review)</p> <p>http://www.mathplayground.com/NewThinkingBlocks/thinking_blocks_multiplication_division.html</p> <p>http://www.mathplayground.com/NewThinkingBlocks/thinking_blocks_addition_subtraction.html http://math.pppst.com/wordproblems.html (the first PowerPoint teaches how to read word problems, and is rewriteable)</p> <p>http://www.ixl.com/math/grade-3/multi-step-word-problems</p>

Assessment Tasks Used	
<p>Skill-Based Task:</p> <p>Solve: $2 + 3 \times 4$</p> <p>Solve: $9 \div 3 + 6$</p> <p>Solve: $15 - 5 \times q = 0$</p> <p>Solve: $35 \div 5 + r = 7$</p>	<p>Problem Task:</p> <p>Joe had 4 packages of bubblegum. Each package had 8 sticks. He shared them with his friends. At the end of the day, he had 10 pieces left. How many sticks were chewed? Model the problem and explain how you know the answer is reasonable.</p> <p>Tami blew up 24 red balloons and 15 blue balloons for her party. Seven balloons popped. How many balloons were left?</p> <p>Juanita did 16 math problems on Monday and 3 pages of math problems on Tuesday. Each page had an equal number of problems. She did 40 problems in all. Write an equation representing this problem using a letter for the unknown quantity. How many problems were on each page? How do you know your answer is reasonable?</p>