

Core Content

Cluster Title: Represent and solve problems involving addition and subtraction.

Standard 1: Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem).

MASTERY Patterns of Reasoning:

Conceptual:

Students will understand how to solve one-step word problems using addition and subtraction within 100.

Students will understand how to solve two-step word problems using addition and subtraction within 100. (This could include two addition functions, two subtraction functions or both an addition and subtraction function in the same word problem.)

Students will understand how to solve word problems with unknowns in all positions using these problem types:

- adding to
- taking from
- putting together/taking apart
- comparing

(Refer to Glossary, Table 1 and Standard 1.OA.6 for a list of mental strategies.)

Procedural:

Students can solve one- and two-step word problems with the unknown in all positions using objects, drawings, number lines or hundreds charts.

Students can write equations for one- and two-step word problems for each problem type.

Representational:

Students can model each one- and two-step word problem type using objects, drawings, number lines or hundreds.

Students can represent an unknown number with a symbol using drawings and equations.

Supports for Teachers

Code: 1.OA.1

Critical Background Knowledge	
<p>Conceptual: Students will understand basic addition and subtraction problem solving strategies. Students will understand how numbers and symbols are used to represent word problems. Students will understand that the unknown number can be in any position in an equation. Students will understand how to efficiently use objects, models and drawings as tools to represent and solve word problems. See Standard 1.OA.6: Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on, making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows that $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).</p>	
<p>Procedural: Students can solve one- and two-step word problems for all problem types:</p> <ul style="list-style-type: none"> • adding to • taking from • putting together/taking apart • comparing <p>Students can write equations that represent the problem using a symbol to represent the unknown.</p>	
<p>Representational: Students can model addition and subtraction word problems with objects, tools (number lines, hundreds charts), and drawings.</p>	
Academic Vocabulary and Notation	
<p>adding to, taking from, putting together, taking apart, comparing, unknown, position, symbol (plus, minus, equals, unknown symbol), represent, change</p>	
Instructional Strategies Used	Resources Used
<p>Teachers may begin instruction by asking students to role play or visualize the situation before solving.</p>	<p>Carpenter, Fennema, Franke, Levi, and Empsom. <i>Children's Mathematics: Cognitively Guided Instruction</i>. Heinemann, 1999.</p>

<p>Samples of one-step problem types:</p>		<p>Van de Walle, John and Lovin, LouAnn. <i>Teaching Student Centered Mathematics K – 3</i>. Allyn and Bacon, 2005.</p> <p>Wells, Rosemary. <i>Emily’s First 100 Days of School</i>. Turtleback, 2005.</p>
<p>Take From: Result Unknown Patty had 58 gumballs. She gave 27 gumballs to Susan. How many gumballs does Patty have now?</p> <p style="text-align: center;">$58 - 27 = \square$</p>	<p>Add to: Change Unknown Brock had 27 rocks. His friend gave him some more rocks. Now Brock has 58 rocks. How many rocks did his friend give him?</p> <p style="text-align: center;">$27 + \square = 58$</p>	
<p>Compare: Result Unknown Amy has 58 pencils. Jenny has 27 pencils. How many more pencils does Amy have than Jenny? Write an equation for the problem.</p> <p style="text-align: center;">$58 - 27 = \square$ or $27 + \square = 58$</p>	<p>Take From: Start Unknown Ben had some marbles. He gave 27 to Mike. Now Ben has 31 marbles. How many marbles did Ben start with? Write an equation for the problem.</p> <p style="text-align: center;">$\square - 27 = 31$</p>	
<p>Samples of two-step problem types:</p>		
<p>Add to/ take from: Result Unknown There were 67 children on the playground. 20 more children came. Some of the children got on the bus to go home. Now there are 27 children on the playground. How many students got on the bus? Write an equation for the problem.</p> <p style="text-align: center;">$67 + 20 = \square$ $87 - 27 = \square$</p>	<p>Compare Molly has 12 erasers. Jeff has 6 less erasers than Molly. How many erasers do they have all together?</p> <p>Write the equations used to solve the problem.</p> <p style="text-align: center;">$12 - 6 = \square$ $12 + 6 = \square$</p>	

Assessment Tasks Used	
<p>Skill-Based Task: This objective requires a word problem that is embedded into the Problem Task.</p> <p>(Note: This objective has the intent of helping children learn to solve one- and two-step word problems and represent their thinking using an algebraic equation. The intent is not to introduce traditional algorithms or rules.)</p>	<p>Problem Task: Use the pattern of problem types given in the Instructional Strategies section. Create contexts and use numbers that are appropriate for the needs of your learners. Each problem type needs to be assessed separately.</p>