

Core Content

Cluster Title: Use place value understanding and properties of operations to add and subtract.
Standard 9: Explain why addition and subtraction strategies work, using place value and the properties of operations. Note: Explanations may be supported by drawings or objects.
MASTERY Patterns of Reasoning:
Conceptual: Students will understand place value and the value of each digit, as well as the whole number represented. Students will understand the properties of operations.
Procedural: Students can solve the same problem in more than one way, as well as: Clearly explain their thinking and justify their reasoning. Connect a given addition problem to a related subtraction problem. Connect a given subtraction problem to a related addition problem. Connect models to written numbers in relation to addition and subtraction problems. Connect properties of operations to addition and subtraction strategies.
Representational: Students can represent the connections between strategies and identify similarities and differences of various strategies. Students can use numbers, pictures, or words to explain addition and subtraction strategies.

Supports for Teachers

Critical Background Knowledge
Conceptual: Students will prior understanding of multiple addition and subtraction strategies. (Concepts taught in Standard 2NBT2 must be mastered prior to assessing this standard.) Students will understand how to justify reasoning in math problems. Students will understand how to make connections between strategies (similarities and differences).
Procedural: Students can demonstrate solving one problem with multiple strategies.

<p>Be able to guide student thinking through higher-order questioning. Teachers need to enable their students to explain, clarify, and justify their thinking.</p>	
<p>Representational: Model the process of solving a problem and explaining the steps taken to arrive at a given answer.</p>	
<p>Academic Vocabulary and Notation</p>	
<p>place value, properties of operations, addition, subtraction, strategy, inverse, justify, clarify, reasoning, explain</p>	
<p>Instructional Strategies Used</p>	
<p>Give students a problem, and allow them time to explore the problem. Then have students solve the problem in more than one way (using multiple strategies). Ask students to explain why they chose the strategy they used. Have students share their answers</p> <p>Guide the discussion: “Explain your thinking. Why do you know that your answer is right? How do you know that it will work every time? How are your two strategies different from each other and how are they the same? How do the numbers relate to your picture?”</p>	
<p>Resources Used</p> <p>a variety of types of problem-solving activities with differentiated numbers</p> <p>various manipulatives</p>	
<p>Assessment Tasks Used</p>	
<p>Skill-Based Task: Have children solve a few two- and three-digit addition and subtraction problems, using two different strategies, and explain their process in solving the problem.</p>	<p>Problem Task: Sarah has 33 marbles in a bag. Jeff has 29 marbles in a bag. How many marbles do they have if they put them all together?</p> <ul style="list-style-type: none"> ○ Solve the problem in two different ways. ○ Show both strategies. ○ Explain all of your thinking and how you know that your answer is right. ○ How are your two strategies different from each other and how are they the same? How do the numbers say the same thing as your picture? <p>Have students create a story problem, solve, and justify their answer.</p>