

### Core Content

<b>Cluster Title:</b> Use place value understanding and properties of operations to add and subtract.
<b>Standard 6:</b> Add up to four two-digit numbers using strategies based on place value and properties of operations.
<b>MASTERY Patterns of Reasoning:</b>
<p><b>Conceptual:</b></p> <ul style="list-style-type: none"> <li>Students will recognize that adding with more than two addends follows the same process as adding with two addends.</li> <li>Students will understand the commutative property (e.g., <math>23 + 15 = 15 + 23</math>) and associative property (e.g., <math>[13 + 2] + 57 = 13 + [2 + 57]</math>) of addition.</li> <li>Students will understand that “regrouping” may be necessary when adding up to four two-digit numbers.</li> </ul> <p><b>Procedural:</b></p> <ul style="list-style-type: none"> <li>Students can solve double-digit addition problems in both vertical and horizontal form.</li> <li>Students can use more than one strategy to solve a given equation.</li> </ul> <p><b>Representational:</b></p> <ul style="list-style-type: none"> <li>Students can draw a model of a problem with more than two addends.</li> <li>Students can represent sums and differences in oral and written form.</li> <li>Students can demonstrate with manipulatives or writing how to group the order of addends while solving the problem.</li> <li>Students can model addition of two-digit numbers up to four addends with base ten blocks.</li> </ul>

### Supports for Teachers

<b>Critical Background Knowledge</b>
<p><b>Conceptual:</b></p> <ul style="list-style-type: none"> <li>Students will understand how to add more than two single-digit addends.</li> <li>Students will understand computation strategies (e.g., doubles and doubles plus/minus one, making 10, counting on, compensation, incremental adding).</li> <li>Students will understand how to properly line numbers up in the correct place value column when writing addition problems in vertical form.</li> </ul>

<p>Students will understand the “regrouping” process of two-digit addition.</p> <p><b>Procedural:</b>                  Students can model two-digit addition with two addends.                  Students can add two two-digit numbers with or without regrouping.</p> <p><b>Representational:</b>                  Students can show how to solve problems involving two two-digit numbers.                  Students can draw a model of what happens when numbers require regrouping.</p>		
<p><b>Academic Vocabulary and Notation</b></p> <p>add, sum, place value, addend, regrouping, digit</p>		
<p><b>Instructional Strategies Used</b></p> <p>Have students work in pairs. Each player will roll a number cube four (or six or eight) times and record each roll in his/her math journal. Using the four digits rolled, each child will create two two-digit numbers and add them together to find the sum. Players in each pair will compare their sums at the end of each round. Play continues for a total a five rounds; the player who rolled the highest sum the most times is the winner.</p> <p>(Ideas for differentiation: After students have mastery with adding two two-digit numbers, they will play again and create three two-digit numbers, and eventually four two-digit numbers. The teacher can use blank number cubes to make numbers easier or harder to work with, based on students’ individual needs.)</p>		<p><b>Resources Used</b></p> <p>Hulme, Joy N. <i>Sea Sums</i>. Hyperion, 1996.</p> <p>Murphy, Stuart. <i>Mall Mania (MathStart 2)</i>. HarperCollins, 2006.</p>
<p><b>Assessment Tasks Used</b></p>		
<p><b>Skill-Based Task:</b>  <math>24 + 36 + 18 + 32 =</math></p>	<p><b>Problem Task:</b>                  The second grade classes are going on a field trip to the dinosaur museum. There are 24 students in Mrs. Carter’s class, 28 in Mr. Hall’s class, and 27 in Mr. Smith’s class. How many students are going on the field trip? If there are 12 adults going, how many people are going on the field trip altogether? Justify your answer.</p>	