Core Content

Cluster Title: Add and subtract within twenty.

Standard 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 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).

MASTERY Patterns of Reasoning:

Conceptual:

Students will understand addition strategies in order to solve math facts to 20.
Students will understand subtraction strategies in order to solve math facts to 20.
Students will be fluent with addition and subtraction facts up to 10. (Note: Fluency is characterized by skill in carrying out procedures flexibly, accurately, efficiently, and appropriately [*Adding it Up,* National Research Council, 2001, p. 116]. It does not necessarily mean rote memorization. By utilizing the strategies listed in this standard, most students will develop fluency.)

Procedural:

Some of the mental strategies students use may include:

Counting on: 8 + 4 = □ (8 …9, 10, 11, 12)

Counting back: 12 - 4 = □ (12…11, 10, 9, 8)

Making tens: 5 + 7 = □ (5 = 2 + 3 so 3 + 7 = 10 therefore 10 + 2 = 12)

Doubles: 6 + 6 = □

Doubles plus/minus one: 6 + 7 = □ (6 + 6 + 1 or 7 + 7 – 1)

Decomposing a number leading to a ten: 15 – 7 = □, so 15 – 5 = 10, therefore 10 – 2 = 8)

Working knowledge of fact families/related facts: 3 + 9 = 12 so 12 – 9 = □

Representational:

Students can model strategies to calculate sums and differences.

Supports for Teachers

Critical Background Knowledge
Conceptual: Students will know how to count to 20. Students will know how to add and subtract. Students will know how to use drawings and manipulatives to solve the math facts up to 20. Students will have familiarity with fact families or number bonds. **Procedural:** Students can recognize numerals 0-20. **Representational:** Students can model adding and subtracting math facts up to 20. Students can represent addition and subtraction equations using manipulatives.
Academic Vocabulary and Notation
doubles, fact families, add/plus, subtract/minus, difference, sum, equation

Instructional Strategies Used	Resources Used
Teachers will provide opportunities for students to develop each of the mental strategies, and encourage students to share their strategies for solving problems. Teachers will also model the strategy with concrete or visual materials and allow for sufficient practice using the same materials. Remember, the goal is to move students to mental computation strategies. Following are some suggestions: **STEP ONE** Develop the strategies using visual representations in a "Number Talk" routine (see resources on the right). ten frames and two-color counters dot pattern cards rekenrek linking cubes **STEP TWO** Apply the strategies to given combinations of numbers. Some strategies lend themselves to specific number sets. (Leading to a ten is very helpful for +8 and +9.) **STEP THREE** Move students toward using the strategy mentally by solving without the use of concrete items. (Note: Each of these steps is essential in providing vital foundational understanding. Repeated practice develops the flexibility required to achieve fluency.)	Game: Ace the Numbers http://www.fuelthebrain.com/Game/play.php?ID=1 Finding Addition Patterns http://illuminations.nctm.org/LessonDetail.aspx?ID=L97

Assessment Tasks Used	
Skill-Based Task: *Counting on:* Example 1: 17 + 3 = 20 *Making Ten:* Example 1: 9 + 7 = 9 + 1 + 6 = 10 + 6 = 16 *Decomposing a number leading to a ten:* Example 1: 14 – 5 = 14 – 4 – 1 = 10 – 1 = 9 *Commutative Property:* Example 1: 5 + 7 = 12 and 12 – 7 = 5 *Doubles plus one:* 7 + 8 = 7 + 7 + 1 = 14 + 1 = 15	**Problem Task:** Give the students an addition or subtraction word problem and have them solve it mentally using one of the above strategies. Do this on a daily basis to give students plenty of practice to develop fluency.