Core Content

Cluster Title: Use place value understanding and properties of operations to add and subtract.

Standard 5: Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

MASTERY Patterns of Reasoning:

Conceptual:

Students will understand a variety of computation strategies for addition and subtraction.

Students will understand related addition and subtraction facts and how to use addition to solve for subtraction (and vice versa).

Students will understand the commutative property, associative property of addition, and identity property of zero. Students will understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and that sometimes it is necessary to compose or decompose tens or hundreds.

Procedural:

Students can solve single- and double-digit addition and subtraction problems in both vertical and horizontal form using a variety of strategies.

Students can use more than one strategy to solve a given equation:

- Adding by place value 58 + 34 (50 + 30 = 80 8 + 4 = 12 80 + 12 = 92)
- Properties of operation—commutative property: 7 + 8 = 15 8 + 7 = 15; associative property: (3 + 8) + 1 = 12 3 + (8 + 1) = 12; identity property of zero: 9 + 0 = 9
- Compensation (48 + 22 22 2 = 20 48 + 2 = 50 50 + 20 = 70)
- Incremental (58 + 34 58 + 10 68 + 10 78 + 10 88 + 4 = 92)

Students can demonstrate the relationship between addition and subtraction.

Example: fact family (25 + 12 = 37) 12 + 25 = 37 37 - 12 = 25 37 - 25 = 12)

Representational:

Students can represent addition and subtraction strategies in oral and written form.

Students can model addition and subtraction problems and their relationship using manipulatives such as base ten blocks, straws, beans, or place value drawings.

Students can use the number line to model addition and subtraction situations.

Supports for Teachers

Critical Background Knowledge

Conceptual:

Students will understand mental math strategies to solve all one-digit-plus-one-digit addition and subtraction facts from "Operations and Algebraic Thinking" (2.0A2) (i.e., doubles, doubles plus/minus one, ways to make ten, counting on, compensation, incremental adding or subtracting).

Students will understand the relationship between addition and subtraction.

Students will understand that in adding or subtracting two-digit numbers one adds or subtracts tens and tens, ones and ones, and that sometimes it is necessary to compose a ten.

Procedural:

Solve addition and subtraction problems within 100 using a variety of strategies. Solve addition and subtraction problems using multiples of ten.

Representational:

Model addition and subtraction problems within 100 using a variety of models.

Academic Vocabulary and Notation

commutative property, associative property, identity property, sum, difference, fact family, related facts, vertical and horizontal format, addition, subtraction, place value

Instructional Strategies Used	Resources Used
1. Have the class play "Race to 100"—each pair of students needs a	Cleary, Brian P. The Mission of Addition.
die, base ten blocks, place value work mat, and a hundreds chart.	Millbrook Press, 2005.
Player one rolls the die, takes the given number of ones cubes to	
put on his/her place value mat, and marks that many spaces on	Cleary, Brian P. The Action of Subtraction.
his/her hundreds chart. Play continues with player two, and player	Millbrook Press, 2006.
one and two alternate take turns. Whenever a ten can be made,	
students will trade their ten ones for a ten rod (showing	Richardson, Kathy. Understanding Numbers:
regrouping), and eventually one player will win by being the first to	Place Value. Math Perspectives, 2004.
trade his/her ten sets of ten rods for a 100 flat.	

To relate this game to subtraction, play "Race to Zero player starts at 100 and subtracts the number he/she he/she tries to clear his/her mat and make it down to	o": Each rolls as zero.	
 Using two colors of linking cubes, each student creates a two-digit number (e.g., 30 blue cubes four red cubes equals 34), then two students join their cubes to find the sum of the two-digit numbers, manipulating cubes to show relationship between addition and subtraction. 		
3. Separate the class into groups. Give each group a domino. Working together, the group must create a fact family for the given domino. The groups then pass their dominos to another group and create a fact family for the new domino. Passing continues until each group has made a fact family for all of the dominos. When students are more proficient in creating fact families, have students work individually to make the fact families.		
Assessment Tasks Used		
Skill-Based Task:	Problem Task: Mr. James' class collected 22 books for the book drive. Mrs.	
Solve 58+34=	Kim's class collected 59 books for the book drive. How many books did the two classes collect all together? How many	
76-47=	more books did Mrs. Kim's class collect than Mr. James' class? Solve using at least two different strategies. Show	
Solve 67 47 <u>+17</u> -29	your work.	