Extend your Understanding: A Progression of Learning

The development of flexible strategies for addition and subtraction is a process that begins in Kindergarten and continues throughout elementary school. Teachers at different grade levels benefit from continuing collaborative conversations about how the learning at one level leads to and supports learning at the next level.

For example, skills and concepts that support **flexible addition strategies** might include:

- Understanding that number can be decomposed into parts without changing the original quantity (8 can be "broken apart" into 3 and 5, or 1 and 7, or 4 and 4)

- Developing an understanding of the meaning of addition through the use of real-world contexts and hands-on activities.

- Developing strategies for combining single digit numbers (basic addition facts). For example:

    o Counting all or counting on

    o Making ten

    o Using doubles to help with near doubles

- Mastering combinations of two numbers that equal 10 (e.g. 2 and 8, 4 and 6)

- Using an understanding of place value to decompose 2-digit numbers (e.g. 32 is equal to 30 and 2, or 22 and 10)

- Adding two multiples of 10 (30 + 10, 20 + 40)

- Adding on by multiples of 10 (25 + 10 = 35, 25 + 30 = 55)

Development of skills like these begins in Kindergarten, as students represent, describe and compare numbers to 10, and continues through to Grade 3 and beyond, as students describe and apply mental math strategies for addition.

When formatively assessing a Grade 3 student's ability to apply mental math strategies for addition of 2-digit numbers, a teacher might consider skills and concepts like those listed above to identify areas of need and next steps for instruction.

One resource for more information on developing and assessing flexible strategies for operations is *Elementary and Middle School Mathematics: Teaching Developmentally* (John Van de Walle et al, 2014).