**Making Connections to Addition Algorithms**

**NC.4.NBT.4**

This document is intended to help teachers and parents understand the strategies students use to add multi-digit numbers. These strategies help students mentally compute sums and better understand the standard addition algorithm, which they are expected to learn in fourth grade. It is important for students to understand that our standard algorithm is based on place value - we are not just adding single digits, but rather the value of the numbers. Students should be able to utilize the strategies below as they solve computation problems.

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| **Making Landmark or Friendly Numbers**  Students will adjust addends by using multiples of 10, 100, 1,000 as well as 25 and 50 to make the numbers easier to work with. Students may adjust one or all of the addends by adding or subtracting amounts to make a friendly number.  **Example:**  226 + 174 = ?    226 + 174  -1 +1  More friendly problem  **2** 225 + 175 = 400  The one that was taken away from 226 was given to 174 in order to make this problem easier to solve. | **Doubles/Near-Doubles**  Sums of doubles (2 + 2, 4 + 4, 15 + 15) are useful when mentally adding numbers. Students will adjust one or both addends to make doubles or near-double combinations.  **Example:**  117 + 119 = ?    117 + 119  -2 -4  115 + 115  115 + 115 = 230  2 + 4 = 6  230 + 6 = 236    Since the total of 6 was removed from the initial addends that quantity had to be added back. |
| **Making Tens**  Students break numbers apart quickly to make combinations of ten. The purpose of this strategy is to make ten in order to expedite adding.  **Example:**  126 + 137  (120 + 3 + 3) + 137  (120 + 3) + (137 + 3)  123 + 140 = 163      The six is decomposed into 3 + 3 in order to add three to seven to make ten.  Note: A student may mentally think to take 3 from 126 and add it to 137 to make 140. This is a very simple way to quickly add two numbers, 123 + 140 = 163. | **Adding Chunks**  In this strategy, students keep one addend whole. The second addend is decomposed and then added to the first number in smaller chunks.  **Example:**  117 + 119  117 + (100 + 10 + 3 + 6)  117 + 100 = 217  217 + 10 = 227  227 + 3 = 230  230 + 6 = 236  Students can model this strategy on a number line.  **Example:**  Start with 267 and add 100. Then add 30 to 367. Break nine into three and six. Add three to 397. Finally, add six to 400.  267 + 139  +100 +30 +3 +6  267 367 397 400 406 |
| **Partial Sums or Place Value**  Students write each addend in expanded form – decomposing the number by place value. Then, combine like place values. Students will add all place value sums together for their final answer. The place values may be added in any order – the sum will remain the same.  **Example:**  267 + 139 = ?  (200 + 60 + 7) + (100 + 30 + 9)    200 + 100 = 300  60 + 30 = 90  7 + 9 = 16  300 + 90 + 16 = 406  OR  7 + 9 = 16  60 + 30 = 90  200 + 100 = 300  16 + 90 + 300 = 406 | **Standard Algorithm**  The standard addition algorithm uses place value to add each set of digits. Students write the problem *vertically* and add like place values *right to left.*  **Example:**  359 + 422 = ?  1  359 359  + 422 +422  781 11  70  700  11 + 70 + 700 = 781  The traditional algorithm is a place value short cut method:   1. Digits in the ones place are added together. 9 + 2 = 11 (11 is regrouped into 10 and 1, so only 1 is remaining in the one’s place now) 2. Digits in the tens place are added together. 50 + 20 = 70 (now add the 10 from the regrouped 11 for a total of 80) 3. Digits in the hundreds place are added together. 300 + 400 = 700 4. 700 + 80 + 1 = 781 |