Teacher Guide to Clarification

**3.NBT.2**

**Use place value understanding and properties of operations to preform multi-digit arithmetic. 4  (footnote- a range of algorithms may be used)**

3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

**Fluently Add and Subtract within 1000**

**Explanations and Examples:**

This standard says fluently, which means accuracy, efficiency (using a reasonable number of steps and time), and flexibility (using strategies such as the distributive property). The word algorithm refers to a procedure or a series of steps. There are other algorithms other than the standard/traditional algorithm.

Third grade students should have experiences beyond the standard/traditional algorithm.

Problems should include both vertical and horizontal forms, including opportunities for students to apply the commutative and associative properties. Students explain their thinking and show their work by using strategies and algorithms, and verify that their answer is reasonable.

**Example**:

There are 178 fourth graders and 225 fifth graders on the playground. What is the total number of students on the playground?

Student 1 – Place Value

100 + 200 = 300

70 + 20 = 90

8 + 5 = 13

300 + 90 + 13 =

403 students

Student 2 – Making a 10

I added 2 to 178 to get 180. I added 220 to get 400. I added the 3 left over to get 403.

Student 3 – Decompose and Compose to make easier known sums

I know the 75 plus 25 equals 100. I then added 1 hundred from 178 and 2 hundreds from 275. I had a total of 4 hundreds and I had 3 more left to add. So I have 4 hundreds plus 3 more which is 403.

Student 4 – Place Value

178+225=?

178+200=378

378+20+398

398+5=403

**Example:**

* Mary read 573 pages during her summer reading challenge. She was only required to read 399 pages. How many extra pages did Mary read beyond the challenge requirements?

Students may use several approaches to solve the problem including the traditional algorithm. Examples of other methods students may use are listed below:

* 399 + 1 = 400, 400 + 100 = 500, 500 + 73 = 573, therefore 1+ 100 + 73 = 174 pages (Adding up strategy)
* 400 + 100 is 500; 500 + 73 is 573; 100 + 73 is 173 plus 1 (for 399, to 400) is 174 (Compensating strategy)
* Take away 73 from 573 to get to 500, take away 100 to get to 400, and take away 1 to get to 399. Then 73 +100 + 1 = 174 (Subtracting to count down strategy)
* 399 + 1 is 400, 500 (that’s 100 more). 510, 520, 530, 540, 550, 560, 570, (that’s 70 more), 571,572, 573 (that’s 3 more) so the total is 1 + 100 + 70 + 3 = 174 (Adding by tens or hundreds strategy)

Kansas Association of Teachers of Mathematics (KATM) Flipbooks. Questions or to send feedback: melisa@ksu.edu. Retrieved from: <http://katm.org/wp/wp-content/uploads/flipbooks/3FlipBookedited.pdf>

Answer: 174

**Open Number Line:**

 1 100 70 3

 399 400 500 570 573

Start at the smaller number and “hop” up the target number 573. This drawing allows students to think about subtraction as addition. In the upper grades this visual can be taken away and students can do this strategy mentally.

Example Algorithms would include:

Partial sums and differences

Traditional regrouping or borrow and carry

These algorithms should not be taught until the students have built the conceptual understanding and built fluency to the point that they could solve most of these problems mentally.

**Coherence and Connections: Need to Know**

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| --- | --- | --- |
| Below Grade Level | At Grade Level  | Above Grade Level |
| 2.NBT.72.NBT.8 | **3.NBT.2** | 4.NBT.44.NBT.64.NBT.5 |

**PARCC Evidence Tables**

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| --- | --- | --- | --- |
| **Evidence****Statement Key** | **Evidence Statement Text** | **Clarifications** | **MP** |
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|  |
| --- |
| 3.NBT.2 |
| EOY |

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| --- |
| Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.  |

 | i) Tasks have no context.  |

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*PARCC Mathematics Evidence Tables. (*2013, April). Retrieved from:
 <http://www.parcconline.org/assessment-blueprints-test-specs>

Third grade students will continue to use strategies they learned in 2nd grade 2.NBT.5. This standard 3.NBT.2 builds on to those strategies and the word algorithms is found here. In 4th grade 4.NBT.4 students will be expected to be proficient in using the standard algorithm (the traditional regrouping method). Some 3rd graders may be ready to add and subtract fluently using the standard algorithm, but if they are not proficient at it a range of strategies will need to be used.

**Fluency Expectations or Examples of Culminating Standards**

**3.NBT.2** Students fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (Although 3.OA.7 and 3.NBT.2 are both fluency standards, these two standards do not represent equal investments of time in grade 3. Note that students in grade 2 were already adding and subtracting within 1000, just not fluently. That makes 3.NBT.2 a relatively small and incremental expectation. By contrast, multiplication and division are new in grade 3, and meeting the multiplication and division fluency standard 3.OA.7 with understanding is a major portion of students’ work in grade 3.)

*PARCC Model Content Frameworks: Mathematics Grades 3-11 (version 3)*. (2012, November
 1). Retrieved June 3, 2014, from <http://parcconline.org/sites/parcc/files/PARCCMCFMathematicsNovember2012V3_FINAL_0.pdf>

 **Use place value understanding and properties of operations to perform multi-digit arithmetic**

Students continue adding and subtracting within 1000. They achieve fluency with strategies and algorithms that are based on place value, properties of operations, and/or the relationship between addition and subtraction. Such fluency can serve as preparation for learning standard algorithms in

Grade 4, if the computational methods used can be connected with those algorithms.

Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common
 Core State Standards in Mathematics(draft). K-5 Number and Operations in Base 10.* Tucson, AZ: Institute for Mathematics and Educations, University of Arizona.

**Classroom Resources**

Have **Daily Discourse**s and use the Power Point to practice addition and subtraction within 1,000.

**HOT Questions**

1. Add 354 + 288 show two different strategies.

2. Will the difference of 567 – 345 be greater than or less than 200? How do you know?

3. My friend solved the addition problem below. Why did he split up the numbers this way?

679 + 306

 679 + 300 + 5 + 1

 985 is the answer

4. Choose all the correct ways to show 146 + 235

 100 + 40 + 6

+ 200 + 30 + 5

 300 + 60 + 12=372

1. + =

 146

+ 235

 100

 200

 40

 30

 5

 + 6

 381

c.

+6

+40

+100100

 d.

 235 335 375 381

5. Which can you use to check the difference of 739-254. Show your work.

1. 739+ 485
2. 254+739
3. 485+254
4. 485-254

**Additional Resources**

**MARS task Adding Numbers from Inside Mathematics**<http://www.insidemathematics.org/common-core-math-tasks/3rd-grade/3-2007%20Adding%20Numbers.pdf>

**Illustrative Mathematics**<https://www.illustrativemathematics.org/illustrations/1315>

**Performance Assessment Task – Inside Mathematics** <http://www.insidemathematics.org/assets/common-core-math-tasks/a%20question%20of%20numbers.pdf>
<http://www.insidemathematics.org/assets/common-core-math-tasks/adding%20numbers.pdf>

**Problem of the Month**<http://www.insidemathematics.org/assets/problems-of-the-month/miles%20of%20tiles.pdf>
<http://www.insidemathematics.org/assets/problems-of-the-month/once%20upon%20a%20time.pdf>

**K-5 Teaching Resources**<http://www.k-5mathteachingresources.com/support-files/3-digit-addition-split.pdf>
<http://www.k-5mathteachingresources.com/support-files/differenceadd.pdf>