2nd Grade

2018-2019 Curriculum Guide

November 12, 2019 – February 1, 2019

Math in Focus

Unit 2: Measurement & Adding and Subtracting within 200

ORANGE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

OFFICE OF MATHEMATICS

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Unit 2 Overview

- Children will learn to estimate and measure medium and short lengths using the standard metric units of meter and centimeter. They will see that the length of a curved line can be measured by placing a string along the curved line.
- Children learn to apply addition and subtraction concepts taught in ealier chapters to real-world problems involving metric length.
- The basic units of length in the customary system are feet and inches. Studnets will learn to estimate and measure the lengths of objects using a foot ruler.
- Children are taught the meaning of sum and difference, and mental addition and subtraction using the basic add or subtract the ones, tens, or hundreds strategy, as well as the more advance add 10 then subtract the extra ones and add 100 then subtract the extra tens strategies.
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Unit 2: Measurement & Adding and Subtracting within 200		
Topic	**Activity**	**Standard**
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	Lesson 5: Real – World Problems- Customary Length	2.MD.5, 2.MD.6, 2.OA.1
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	Lesson 5: Rounding Numbers to Estimate (Day 1)	2.MD.6, 2.NBT.5, 2.NBT.6, 2.NBT.9
	Lesson 5: Rounding Numbers to Estimate (Day 2)	

Eureka Module 4: Addition and Subtraction within 200 with Word Problems to 100		
Topic	**Lesson**	**Student Lesson Objective/ Supportive Videos**
Topic A: Sums and Differences within 100	Lesson 1	Relate 1 more, 1 less, 10 more, and 10 less to addition and subtraction of 1 and 10. https://www.youtube.com/watch?v
	Lesson 2	Add and subtract multiples of 10 including counting on to subtract https://www.youtube.com/watch?v
	Lesson 3 &4	Add and subtract multiples of 10 and some ones within 100 https://www.youtube.com/watch?v https://www.youtube.com/watch?v
	Lesson 5	Solve one- and two-step word problems within 100 using strategies based on place value. https://www.youtube.com/watch?v
Topic B: Strategies for Composing a Ten	Lesson 6	Use manipulatives to represent the composition of 10 ones as 1 ten with two-digit addends https://www.youtube.com/watch?v
	Lesson 7	Relate addition using manipulatives to a written vertical method https://www.youtube.com/watch?v
	Lesson 8	Use math drawings to represent the composition and relate drawings to a written method https://www.youtube.com/watch?v
	Lesson 9 &10	Use math drawings to represent the composition when adding a two-digit to a three-digit addend https://www.youtube.com/watch?v https://www.youtube.com/watch?v
Topic C: Strategies for Decomposing a Ten	Lesson 11	Represent subtraction with and without the decomposition of 1 ten as 10 ones with manipulatives. https://www.youtube.com/watch?v
	Lesson 12	Relate manipulative representations to a written method https://www.youtube.com/watch?v
	Lesson 13	Use math drawings to represent subtraction with and without decomposition and relate drawings to a written method https://www.youtube.com/watch?v
	Lesson 14 &15	Represent subtraction with and without the decomposition when there is a three-digit minuend https://www.youtube.com/watch?v https://www.youtube.com/watch?v
	Lesson 16	Solve one- and two-step word problems within 100 using strategies based on place value. https://www.youtube.com/watch?v

Topic D: Strategies for Composing Tens and Hundreds	Lesson 17	Use mental strategies to relate compositions of 10 tens as 1 hundred to 10 ones as 1 ten https://www.youtube.com/watch?v
	Lesson 18	Use manipulatives to represent addition with two compositions https://www.youtube.com/watch?v
	Lesson 19	Relate manipulative representations to a written method https://www.youtube.com/watch?v
	Lesson 20 &21	Use math drawings to represent additions with up to two compositions and relate drawings to a written method https://www.youtube.com/watch?v https://www.youtube.com/watch?v
	Lesson 22	Solve additions with up to four addends with totals within 200 with and without two compositions of larger units https://www.youtube.com/watch?v
Topic E: Strategies for Decomposing Tens and Hundreds	Lesson 23	Use number bonds to break apart three-digit minuends and subtract from the hundred. https://www.youtube.com/watch?v
	Lesson 24	Use manipulatives to represent subtraction with decompositions of 1 hundred as 10 tens and 1 ten as 10 ones https://www.youtube.com/watch?v
	Lesson 25	Relate manipulative representations to a written method https://www.youtube.com/watch?v
	Lesson 26	Use math drawings to represent subtraction with up to two decompositions and relate drawings to a written method https://www.youtube.com/watch?v
	Lesson 27& 28	Subtract from 200 and from numbers with zeros in the tens place. https://www.youtube.com/watch?v https://www.youtube.com/watch?v
Topic F: Student Explanations of Written Method	Lesson 29	Use and explain the totals below method using words, math drawings, and numbers https://www.youtube.com/watch?v
	Lesson 30	Lesson 30: Compare totals below to new groups below as written methods https://www.youtube.com/watch?v
	Lesson 31	Solve two-step word problems within 100 https://www.youtube.com/watch?v

New Jersey Student Learning Standards: Operations and Algebraic Thinking	
2.OA.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Second Grade students extend their work with addition and subtraction word problems in two major ways. First, they represent and solve word problems within 100, building upon their previous work to 20. In addition, they represent and solve one and two-step word problems of all three types (Result Unknown, Change Unknown, Start Unknown). Please see Table 1 at end of document for examples of all problem types.

One-step word problems use one operation. Two-step word problems use two operations which may include the same operation or opposite operations.

One Step Word Problem One Operation	Two-Step Word Problem Two Operations, Same	Two-Step Word Problem Two Operations, Opposite
There are 15 stickers on the page. Brittany put some more stickers on the page. There are now 22 stickers on the page. How many stickers did Brittany put on the page? $15 + \square = 22$ $22 - 15 = \square$	There are 9 blue marbles and 6 red marbles in the bag. Maria put in 8 more marbles. How many marbles are in the bag now? $9 + 6 + 8 = \square$	There are 9 peas on the plate. Carlos ate 5 peas. Mother put 7 more peas on the plate. How many peas are on the plate now? $9 - 5 + 7 = \square$

Two-Step Problems: Because Second Graders are still developing proficiency with the most difficult subtypes (shaded in white in Table 1 at end of the glossary): Add To/Start Unknown; Take From/Start Unknown; Compare/Bigger Unknown; and Compare/Smaller Unknown, two-step problems do not involve these sub-types (Common Core Standards Writing Team, May 2011). Furthermore, most two-step problems should focus on single-digit addends since the primary focus of the standard is the problem-type.

Table 1 Common addition and subtraction situations[1]

	Result Unknown	**Change Unknown**	**Start Unknown**
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ? (K)	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2 + ? = 5 (1st)	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? ? + 3 = 5 **One-Step Problem** (2nd)
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ? (K)	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 – ? = 3 (1st)	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? ? – 2 = 3 **One-Step Problem** (2nd)
	Total Unknown	**Addend Unknown**	**Both Addends Unknown[2]**
Put Together/ Take Apart[3]	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ? (K)	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 – 3 = ? (K)	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2 (1st)
	Difference Unknown	**Bigger Unknown**	**Smaller Unknown**
Compare[4]	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? (1st)	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? **One-Step Problem** (1st)	(Version with "more"): Julie has 3 more apples than Lucy. Julie has five apples. How many apples does Lucy have? 5 – 3 = ? ? + 3 = 5 **One-Step Problem** (2nd)
Compare[4]	("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 – 2 = ? (1st)	(Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ? **One-Step Problem** (2nd)	(Version with "fewer"): Lucy has three fewer apples than Julie. Julie has five apples. How many apples does Lucy have? **One-Step Problem** (1st)

K: Problem types to be mastered by the end of the Kindergarten year.
1st: Problem types to be mastered by the end of the First Grade year, including problem types from the previous year(s). However, First Grade students should have experiences with all 12 problem types.
2nd: Problem types to be mastered by the end of the Second Grade year, including problem types from the previous year(s).

New Jersey Student Learning Standards: Operations and Algebraic Thinking	
2.OA.3	Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

Second graders apply their work with doubles to the concept of odd and even numbers. Students should have ample experiences exploring the concept that if a number can be decomposed (broken apart) into two equal addends or doubles addition facts (e.g., 10 = 5 +5), then that number (10 in this case) is an even number. Students should explore this concept with concrete objects (e.g., counters, cubes, etc.) before moving towards pictorial representations such as circles or arrays.

Example: **Is 8 an even number? Justify your thinking.**

Student A

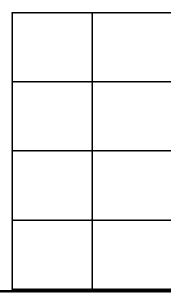
I grabbed 8 counters. I paired counters up into groups of 2. Since I didn't have any counters left over, I know that 8 is an even number.

Student B

I grabbed 8 counters. I put them into 2 equal groups. There were 4 counters in each group, so 8 is an even number.

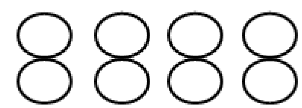
Student C

I drew 8 boxes in a rectangle that had two columns. Since every box on the left matches a box on the right, I know that 8 is even.



Student D

I drew 8 circles. I matched one on the left with one on the right. Since they all match up I know that 8 is an even number.



Student E

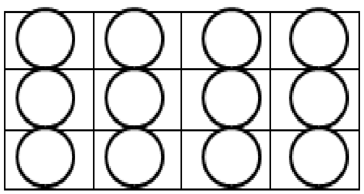
I know that 4 plus 4 equals 8. So 8 is an even number.

The focus of this standard is placed on the conceptual understanding of even and odd numbers. An even number is an amount that can be made of two equal parts with no leftovers. An odd number is one that is not even or cannot be made of two equal parts. The number endings of 0, 2, 4, 6, and 8 are only an interesting and useful pattern or observation and should not be used as the definition of an even number. (Van de Walle & Lovin, 2006, p. 292)

2.OA.4	Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends

Second graders use rectangular arrays to work with repeated addition, a building block for multiplication in third grade. A rectangular array is any arrangement of things in rows and columns, such as a rectangle of square tiles. Students explore this concept with concrete objects (e.g., counters, bears, square tiles, etc.) as well as pictorial representations on grid paper or other drawings. Due to the commutative property of multiplication, students can add either the rows or the columns and still arrive at the same solution.

Example: **What is the total number of circles below?**



Student A	Student B
I see 3 counters in each column and there are 4 columns. So I added 3 + 3 + 3 + 3. That equals 12.	I see 4 counters in each row and there are 3 rows. So I added 4 + 4 + 4. That equals 12.
3 + 3 + 3 + 3 = 12	4 + 4 + 4 = 12

New Jersey Student Learning Standards: Numbers and Operations in Base Ten	
2.NBT.2	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones.
Second Grade students count within 1,000. Thus, students "count on" from any number and say the next few numbers that come afterwards. Example: What are the next 3 numbers after 498? 499, 500, 501. When you count back from 201, what are the first 3 numbers that you say? 200, 199, 198. Second grade students also begin to work towards multiplication concepts as they skip count by 5s, by 10s, and by 100s. Although skip counting is not yet true multiplication because students don't keep track of the number of groups they have counted, they can explain that when they count by 2s, 5s, and 10s they are counting groups of items with that amount in each group. As teachers build on students' work with skip counting by 10s in Kindergarten, they explore and discuss with students the patterns of numbers when they skip count. For example, while using a 100s board or number line, students learn that the ones digit alternates between 5 and 0 when skip counting by 5s. When students skip count by 100s, they learn that the hundreds digit is the only digit that changes and that it increases by one number.	
2.NBT.5	Count within 1000; skip-count by 5s, 10s, and 100s.
There are various strategies that Second Grade students understand and use when adding and subtracting within 100 (such as those listed in the standard). The standard algorithm of carrying or borrowing is neither an expectation nor a focus in Second Grade. Students use multiple strategies for addition and subtraction in Grades K-3. By the end of Third Grade students use a range of algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction to fluently add and subtract within 1000. Students are expected to fluently add and subtract multi-digit whole numbers using the standard algorithm by the end of Grade 4.	

Example: **67 + 25 = __**

Place Value Strategy:	*Decomposing into Tens:*	*Commutative Property:*
I broke both 67 and 25 into tens and ones. 6 tens plus 2 tens equals 8 tens. Then I added the ones. 7 ones plus 5 ones equals 12 ones. I then combined my tens and ones. 8 tens plus 12 ones equals 92.	I decided to start with 67 and break 25 apart. I knew I needed 3 more to get to 70, so I broke off a 3 from the 25. I then added my 20 from the 22 left and got to 90. I had 2 left. 90 plus 2 is 92. So, 67 + 25 = 92	I broke 67 and 25 into tens and ones so I had to add 60+7+20+5. I added 60 and 20 first to get 80. Then I added 7 to get 87. Then I added 5 more. My answer is 92.

Example: **63 – 32 = __**

Decomposing into Tens:	*Think Addition:*
I broke apart both 63 and 32 into tens and ones. I know that 3 minus 2 is 1, so I have 1 left in the ones place. I know that 6 tens minus 3 tens is 3 tens, so I have a 3 in my tens place. My answer has a 1 in the ones place and 3 in the tens place, so my answer is 31. 63 – 32 = 31	I thought, '32 and what makes 63?'. I know that I needed 30, since 30 and 30 is 60. So, that got me to 62. I needed one more to get to 63. So, 30 and 1 is 31. 32 + **31** = 63

2.NBT.6	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

Second Grade students add a string of two-digit numbers (up to four numbers) by applying place value strategies and properties of operations.

Example: **43 + 34 + 57 + 24 =** __

Student A	Student B
Associative Property I saw the 43 and 57 and added them first. I know 3 plus 7 equals 10, so when I added them 100 was my answer. Then I added 34 and had 134. Then I added 24 and had 158. 43 + 57 + 34 + 24 = 158	*Place Value Strategies* I broke up all of the numbers into tens and ones. First I added the tens. 40 + 30 + 50 + 20 = 140. Then I added the ones. 3 + 4 + 7 + 4 = 18. That meant I had 1 ten and 8 ones. So, 140 + 10 is 150. 150 and 8 more is 158. So, 43 + 34 + 57 + 24 = 158

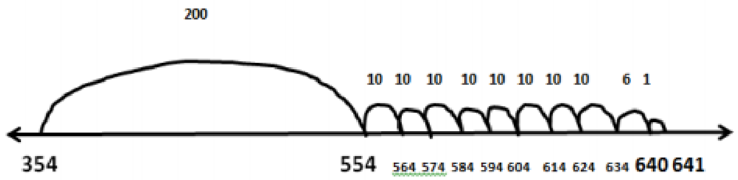
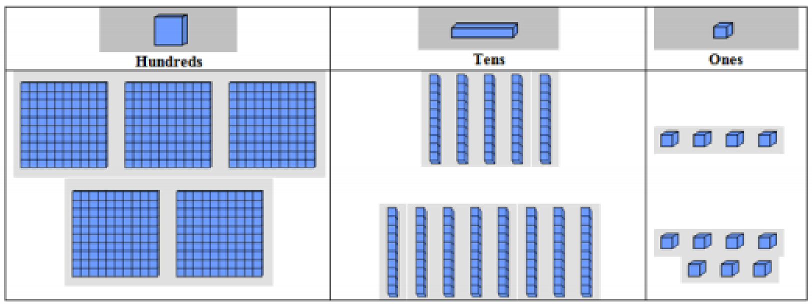
Student C
Place Value Strategies and Associative Property I broke up all the numbers into tens and ones. First I added up the tens. 40 + 30 + 50 + 20. I changed the order of the numbers to make adding easier. I know that 30 plus 20 equals 50 and 50 more equals 100. Then I added the 40 and got 140. Then I added up the ones. 3 + 4 + 7 + 4. I changed the order of the numbers to make adding easier. I know that 3 plus 7 equals 10 and 4 plus 4 equals 8. 10 plus 8 equals 18. I then combined my tens and my ones. 140 plus 18 (1 ten and 8 ones) equals 158.

2.NBT.7	Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Second graders extend the work from 2.NBT. to two 3-digit numbers. Students should have ample experiences using concrete materials and pictorial representations to support their work. This standard also references composing and decomposing a ten.

This work should include strategies such as making a 10, making a 100, breaking apart a 10, or creating an easier problem. The standard algorithm of carrying or borrowing is not an expectation in Second Grade. Students are not expected to add and subtract whole numbers using a standard algorithm until the end of Fourth Grade.

<u>Example:</u> **354 + 287 = __**

Student A	I started at 354 and jumped 200. I landed on 554. I then made 8 jumps of 10 and landed on 634. I then jumped 6 to land on 640. Then I jumped 1 more and landed on 641. 354 + 287 = 641 
Student B	I used place value blocks and a place value mat. I broke all of the numbers and placed them on the place value mat. I first added the ones.4 + 7 = 11. I then added the tens. 50 + 80 = 130. I then added the hundreds. 300 + 200 = 500. I then combined my answers. 500 + 130 = 630. 630 + 11= 641. 

2.NBT.8	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

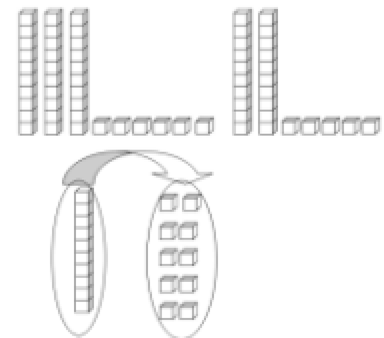
Second Grade students mentally add or subtract either 10 or 100 to any number between 100 and 900. As teachers provide ample experiences for students to work with pre-grouped objects and facilitate discussion, second graders realize that when one adds or subtracts 10 or 100 that only the tens place or the digit in the hundreds place changes by 1. As the teacher facilitates opportunities for patterns to emerge and be discussed, students notice the patterns and connect the digit change with the amount changed.

Opportunities to solve problems in which students cross hundreds are also provided once students have become comfortable adding and subtracting within the same hundred.

Example: *Within the same hundred* **What is 10 more than 218?** **What is 241 – 10?** Example: *Across hundreds* **293 + 10 = ☐** **What is 10 less than 206?** This standard focuses only on adding and subtracting 10 or 100. Multiples of 10 or multiples of 100 can be explored; however, the focus of this standard is to ensure that students are proficient with adding and subtracting 10 and 100 mentally.	
2.NBT.9	Add up to four two-digit numbers using strategies based on place value and properties of operations.
Second graders explain why addition or subtraction strategies work as they apply their knowledge of place value and the properties of operations in their explanation. They may use drawings or objects to support their explanation. Once students have had an opportunity to solve a problem, the teacher provides time for students to discuss their strategies and why they did or didn't work. Example: **There are 36 birds in the park. 25 more birds arrive. How many birds are there? Solve the problem and show your work.**	

Student A
I broke 36 and 25 into tens and ones 30 + 6 + 20 + 5. I can change the order of my numbers, since it doesn't change any amounts, so I added 30+ 20 and got 50. Then I added 5 and 5 to make10 and added it to the 50. So, 50 and 10 more is 60. I added the one that was left over and got on 6 to get 61. So there are 61 birds in the park.

Student B
I used place value blocks and made a pile of 36 and a pile of 25. Altogether, I had 5 tens and 11 ones. 11 ones is the same as one ten and one left over. So, I really had 6 tens and 1 one. That makes 61.

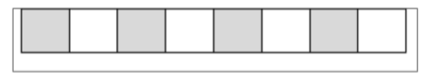
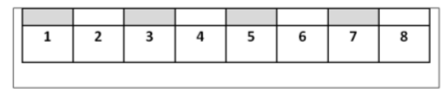
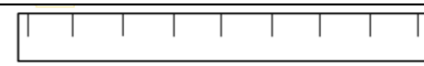
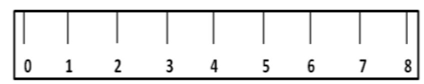


2.MD.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

Second Graders build upon their non-standard measurement experiences in First Grade by measuring in standard units for the first time. Using both customary (inches and feet) and metric (centimeters and meters) units, Second Graders select an attribute to be measured (e.g., length of classroom), choose an appropriate unit of measurement (e.g., yardstick), and determine the number of units (e.g., yards). As teachers provide rich tasks that ask students to perform real measurements, these foundational understandings of measurement are developed:

- Understand that larger units (e.g., yard) can be subdivided into equivalent units (e.g., inches) (partition).
- Understand that the same object or many objects of the same size such as paper clips can be repeatedly used to determine the length of an object (iteration).
- Understand the relationship between the size of a unit and the number of units needed (compensatory principal). Thus, the smaller the unit, the more units it will take to measure the selected attribute.

When Second Grade students are provided with opportunities to create and use a variety of rulers, they can connect their understanding of non-standard units from First Grade to standard units in second grade. <u>For example:</u>

By helping students progress from a "ruler" that is blocked off into colored units (no numbers)	
…to a "ruler" that has numbers along with the colored units…	
…to a "ruler" that has inches (centimeters) with and without numbers, students develop the understanding that the numbers on a ruler do not count the individual marks but indicate the spaces (distance) between the marks. This is a critical understand students need when using such tools as rulers, yardsticks, meter sticks, and measuring tapes.	 

By the end of Second Grade, students will have also learned specific measurements as it relates to feet, yards and meters:

- There are 12 inches in a foot.
- There are 3 feet in a yard.

There are 100 centimeters in a meter

2.MD.3	Estimate lengths using units of inches, feet, centimeters, and meters

Second Grade students estimate the lengths of objects using inches, feet, centimeters, and meters prior to measuring. Estimation helps the students focus on the attribute being measured and the measuring process. As students estimate, the student has to consider the size of the unit- helping them to become more familiar with the unit size. In addition, estimation also creates a problem to be solved rather than a task to be completed. Once a student has made an estimate, the student then measures the object and reflects on the accuracy of the estimate made and considers this information for the next measurement.

Example:

Teacher: How many inches do you think this string is if you measured it with a ruler?

Student: An inch is pretty small. I'm thinking it will be somewhere between 8 and 9 inches.

Teacher: Measure it and see.

Student: It is 9 inches. I thought that it would be somewhere around there.

2.MD.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit

Second Grade students determine the difference in length between two objects by using the same tool and unit to measure both objects. Students choose two objects to measure, identify an appropriate tool and unit, measure both objects, and then determine the differences in lengths.

Example:

Teacher: Choose two pieces of string to measure. How many inches do you think each string is?

Student: I think String A is about 8 inches long. I think string B is only about 4 inches long. It's really short. **Teacher**: Measure to see how long each string is. *Student measures.* What did you notice?

Student: String A is definitely the longest one. It is 10 inches long. String B was only 5 inches long. I was close!

Teacher: How many more inches does your short string need to be so that it is the same length as your long string?

Student: Hmmm. String B is 5 inches. It would need 5 more inches to be 10 inches. 5 and 5 is 10

2.MD.5	Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

Second Grade students apply the concept of length to solve addition and subtraction word problems with numbers within 100. Students should use the same unit of measurement in these problems. Equations may vary depending on students' interpretation of the task. Notice in the examples below that these equations are similar to those problem types in Table 1 at the end of this document.

Example: **In P.E. class Kate jumped 14 inches. Mary jumped 23 inches. How much farther did Mary jump than Kate? Write an equation and then solve the problem.**

Student A

My equation is 14 + __ = 23 since I thought, "14 and what makes 23?" I used Unifix cubes. I made a train of 14. Then I made a train of 23. When I put them side by side, I saw that Kate would need 9 more cubes to be the same as Mary. So, Mary jumped 9 more inches than Kate. 14 + **9** = 23.

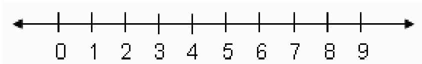
Student B

My equation is 23 - 14 = __ since I thought about what the difference was between Kate and Mary. I broke up 14 into 10 and 4. I know that 23 minus 10 is 13. Then, I broke up the 4 into 3 and 1. 13 minus 3 is 10. Then, I took one more away. That left me with 9. So, Mary jumped 9 more inches than Kate. That seems to make sense since 23 is almost 10 more than 14. 23 – 14 = **9**.

	23 – 10 = 13 13 – 3 = 10 10 – 1 = 9	

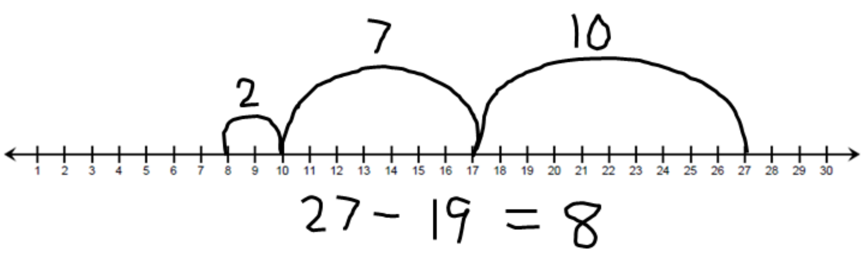
2.MD.6	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, and represent whole-number sums and differences within 100 on a number line diagram.

Building upon their experiences with open number lines, Second Grade students create number lines with evenly spaced points corresponding to the numbers to solve addition and subtraction problems to 100. They recognize the similarities between a number line and a ruler.



Example: **There were 27 students on the bus. 19 got off the bus. How many students are on the bus?**

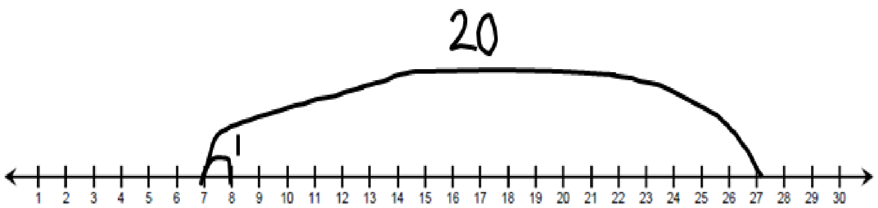
Student A: I used a number line. I started at 27. I broke up 19 into 10 and 9. That way, I could take a jump of 10. I landed on 17. Then I broke the 9 up into 7 and 2. I took a jump of 7. That got me to 10. Then I took a jump of 2. That's 8. So, there are 8 students now on the bus.



Student B: I used a number line. I saw that 19 is really close to 20. Since 20 is a lot easier to work with, I took a jump of 20. But, that was one too many. So, I took a jump of 1 to make up for the extra. I landed on 8. So, there are 8 students on the bus.

27 - 20 = 7

7 + 1 = 8



2.G.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them

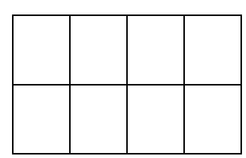
S Second graders partition a rectangle into squares (or square-like regions) and then determine the total number of squares. This work connects to the standard 2.OA.4.

Where students are arranging objects in an array of rows and columns. This standard is a precursor to learning about the area of a rectangle and using arrays for multiplication

Example:

Teacher: Partition the rectangle into 2 rows and 4 columns. How many small squares did you make?

= **Student**: There are 8 squares in this rectangle. See- 2, 4, 6, 8. I folded the paper to make sure that they were all the same size.



	LESSON STRUCTURE	RESOURCES	COMMENTS
PRE TEST	**Chapter Opener** Assessing Prior Knowledge *The Pre Test serves as a diagnostic test of readiness of the upcoming chapter*	**Teacher Materials** Quick Check Pretest (Assessm't Bk) Recall Prior Knowledge **Student Materials** Student Book (Quick Check); Copy of the Pre Test; Recall prior Knowledge	Recall Prior Knowledge (RPK) can take place just before the pre-tests are given and can take 1-2 days to front load prerequisite understanding Quick Check can be done in concert with the RPK and used to repair student misunderstandings and vocabulary prior to the pre-test ; Students write Quick Check answers on a separate sheet of paper Quick Check and the Pre Test can be done in the same block *(See Anecdotal Checklist; Transition Guide)* Recall Prior Knowledge – Quick Check – Pre Test
DIRECT ENGAGEMENT	**Direct Involvement/Engagement** Teach/Learn *Students are directly involved in making sense, themselves, of the concepts – by interacting the tools, manipulatives, each other, and the questions*	**Teacher Edition** 5-minute warm up Teach; Anchor Task **Technology** Digi **Other** Fluency Practice	• The Warm Up activates prior knowledge for each new lesson • Student Books are CLOSED; Big Book is used in Gr. K • Teacher led; Whole group • Students use concrete manipulatives to explore concepts • A few select parts of the task are explicitly shown, but the majority is addressed through the hands-on, constructivist approach and questioning • Teacher facilitates; Students find the solution
GUIDED LEARNING	**Guided Learning and Practice** Guided Learning	**Teacher Edition** Learn **Technology** Digi **Student Book** Guided Learning Pages Hands-on Activity	Students-already in pairs /small, homogenous ability groups; Teacher circulates between groups; Teacher, anecdotally, captures student thinking **Small Group w/Teacher circulating among groups** Revisit Concrete and Model Drawing; Reteach Teacher spends majority of time with struggling learners; some time with on level, and less time with advanced groups Games and Activities can be done at this time

INDEPENDENT PRACTICE	**Independent Practice** *A formal formative assessment*	**Teacher Edition** Let's Practice **Student Book** Let's Practice **Differentiation Options** All: Workbook Extra Support: Reteach On Level: Extra Practice Advanced: Enrichment	**Let's Practice** determines readiness for Workbook and small group work and is used as formative assessment; Students not ready for the Workbook will use Reteach. The Workbook is continued as Independent Practice. Manipulatives **CAN** be used as a communications tool as needed. Completely Independent On level/advance learners should finish all workbook pages.
ADDITIONAL PRACTICE	**Extending the Lesson**	Math Journal Problem of the Lesson Interactivities Games	
	Lesson Wrap Up	Problem of the Lesson Homework (Workbook , Reteach, or Extra Practice)	Workbook or Extra Practice Homework is only assigned when students fully understand the concepts (as additional practice) Reteach Homework (issued to struggling learners) should be checked the next day
POST TEST	**End of Chapter Wrap Up and Post Test**	**Teacher Edition** Chapter Review/Test Put on Your Thinking Cap **Student Workbook** Put on Your Thinking Cap **Assessment Book** Test Prep	Use Chapter Review/Test as "review" for the End of Chapter Test Prep. Put on your Thinking Cap prepares students for novel questions on the Test Prep; Test Prep is graded/scored. The Chapter Review/Test can be completed • Individually (e.g. for homework) then reviewed in class • As a 'mock test' done in class and doesn't count • As a formal, in class review where teacher walks students through the questions Test Prep is completely independent; scored/graded Put on Your Thinking Cap (green border) serve as a capstone problem and are done just before the Test Prep and should be treated as Direct Engagement. By February, students should be doing the Put on Your Thinking Cap problems on their own.

Math Background:

- Children learned how to find and compare lengths in Grade 1 using non-standard units of measure. They learned to estimate and compare length with reference to a non-standard unit such as a paper clip.

- Every measuremnet is an estimate. The precision of measurements depends on the size of the unit used to measure an object. The smaller the unit used, the more precise the measuremnet and the more of the units wil be needed.

- In Grade 1, childrean learned to read, write, count, and compare numbers up to 100. Children will extend their concept of numbers and learn how to count, read, and write up to 1,000. Base-ten blocks, place-value charts, and number lines are used to develop the assciation between the physical representation of the number, the number symbol, and the number word.

- The concept of place value of ones and tens is reinforced and children are now taught the hundreds place value. Children are encouraged to compare and verbally describe more than two numbers in a set using the terms least and greatest.

- Using the concept of number bonds, children are taught the strategy of grouping numbers into tens and ones, and subsequently adding or subtracting the tens and ones respectively.

Misconceptions:

- Describing how two measuremnets relate to the size of the unit chosen is a very difficult concept for second graders to articulate. Provide ongoing experiences and activities for students to learn to predict and measure.

- Some studnets may begin to measure with "1" on a ruler, yardstick, or meter stick. The teacher can use a large number line on the foor to demonstrate when the students must begin before "one" and relate this to all measuring done with linear measuring tools.

- Some second graders may think that the numbers of a ruler or yardstick are counting the marks instead of the units or spaces between the marks. Some studnets might think that they can only measure lengths with a ruker starting at the left edge. Engage students in discussions about measuring devices and demonstrate how to measure.

- ***Second grade students do not need to have facility using the standard algorithm adding and subtracting. They should focus their work on developing and using efficient strategies that make sense to them and their understanding of place value.***

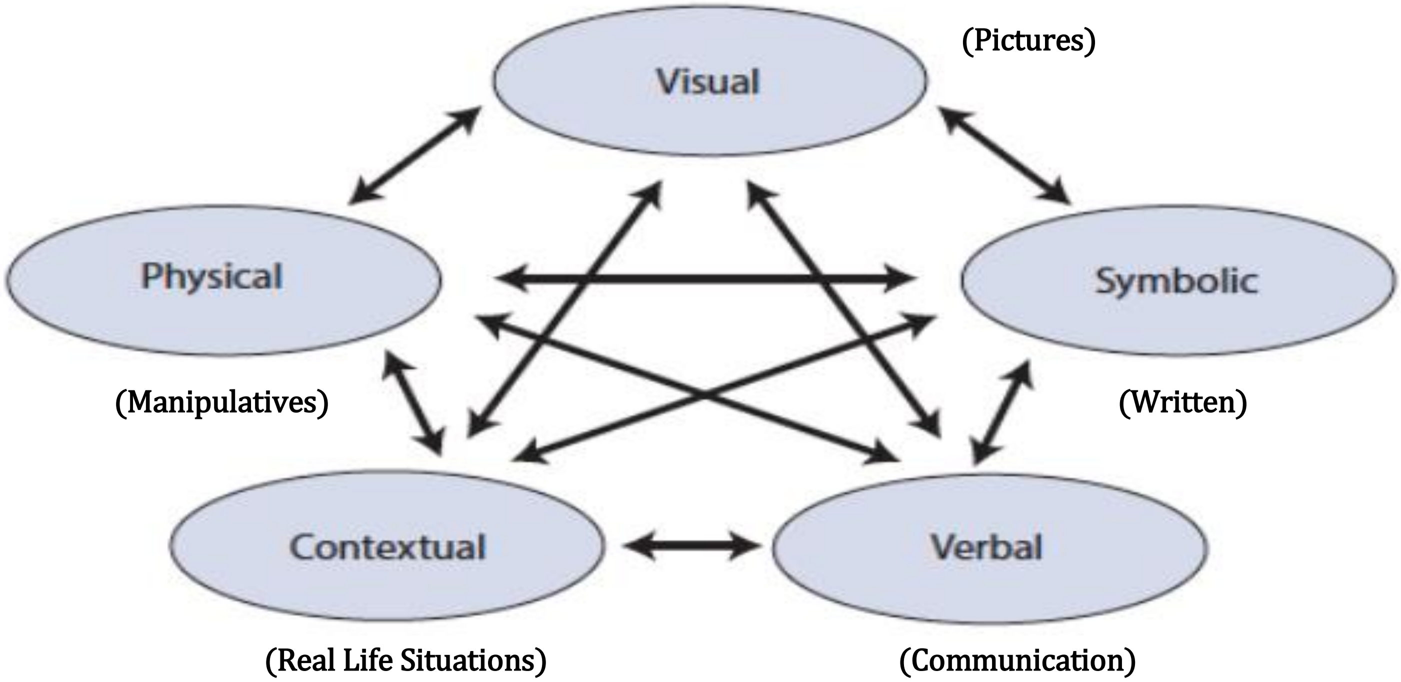
- Help studnets using inefficient strategies to make connections to more efficient strategies.

- Students who do not know basic facts may be inaccurate in competeition. Although these studnets should contunue to work on facts, physical models will help in accurate addition and subtraction.

PARCC Assessment Evidence/Clarification Statements			
CCSS	**Evidence Statement**	**Clarification**	**Math Practices**
2.NBT.2	Count within 1000; skip-count by 5s, 10s, and 100s.	• Skip-counting may start at any multiple of 5, 10 or 100 within 1000.	MP 7, 8
2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	• Tasks do not have a context. • Sums and differences beyond 20 but within 100 should be emphasized in 75% of the tasks. • Only the answer is required (strategies, representations, etc. are not assessed here).	MP 7,8
2.NBT.6	Add up to four two-digit numbers using strategies based on place value and properties of operation	• Tasks do not have a context. • Only the answer is required (strategies, representations, etc. are not assessed here)	MP 7,8
2.NBT.7	Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundred	• Emphasis is on adding and subtracting hundreds. • Tasks do not have a context.	MP 7,8
2.OA.1-1	Use addition and subtraction within 100 to solve one- step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for	• All problem situations and all of their subtypes and language variants are included but 40% of tasks should include the most difficult problem subtypes and language variants. • Addition and subtraction is	MP 1, 4

	the unknown number to represent the problem.	emphasized beyond 20 but within 100 • For more information see CCSS Table 1, p. 88 and the OA Progression	
2.OA.1-2	Use addition and subtraction within 100 to solve two- step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	• The majority of problems (75%) involve single-digit addends. • The most difficult problem subtypes and language variants should not be included in these problems. • For more information see CCSS Table 1, p. 88 and the OA Progression.	MP 1, 4
2.MD.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes	i)Length may be measured in whole units within the same measurement system using metric or U.S. customary. ii) Units are limited to those found in 2.MD.3	MP 5
2.MD.3	Estimate lengths using units of inches, feet, centimeters, and meters.	i) Rulers are not used to estimate.	MP 5,6
2.MD.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	i.Length may be measured in whole units within the same measurement system using metric or U.S. customary. ii. Units are limited to those in 2.MD.3.	MP 5,6

Use and Connection of Mathematical Representations



The Lesh Translation Model

Each oval in the model corresponds to one way to represent a mathematical idea.

Visual: When children draw pictures, the teacher can learn more about what they understand about a particular mathematical idea and can use the different pictures that children create to provoke a discussion about mathematical ideas. Constructing their own pictures can be a powerful learning experience for children because they must consider several aspects of mathematical ideas that are often assumed when pictures are pre-drawn for students.

Physical: The manipulatives representation refers to the unifix cubes, base-ten blocks, fraction circles, and the like, that a child might use to solve a problem. Because children can physically manipulate these objects, when used appropriately, they provide opportunities to compare relative sizes of objects, to identify patterns, as well as to put together representations of numbers in multiple ways.

Verbal: Traditionally, teachers often used the spoken language of mathematics but rarely gave students opportunities to grapple with it. Yet, when students do have opportunities to express their mathematical reasoning aloud, they may be able to make explicit some knowledge that was previously implicit for them.

Symbolic: Written symbols refer to both the mathematical symbols and the written words that are associated with them. For students, written symbols tend to be more abstract than the other representations. I tend to introduce symbols after students have had opportunities to make connections among the other representations, so that the students have multiple ways to connect the symbols to mathematical ideas, thus increasing the likelihood that the symbols will be comprehensible to students.

Contextual: A relevant situation can be any context that involves appropriate mathematical ideas and holds interest for children; it is often, but not necessarily, connected to a real-life situation.

The Lesh Translation Model: Importance of Connections

As important as the ovals are in this model, another feature of the model is even more important than the representations themselves: The arrows! The arrows are important because they represent the connections students make between the representations. When students make these connections, they may be better able to access information about a mathematical idea, because they have multiple ways to represent it and, thus, many points of access.

Individuals enhance or modify their knowledge by building on what they already know, so the greater the number of representations with which students have opportunities to engage, the more likely the teacher is to tap into a student's prior knowledge. This "tapping in" can then be used to connect students' experiences to those representations that are more abstract in nature (such as written symbols). Not all students have the same set of prior experiences and knowledge. Teachers can introduce multiple representations in a meaningful way so that students' opportunities to grapple with mathematical ideas are greater than if their teachers used only one or two representations.

Concrete Pictorial Abstract (CPA) Instructional Approach

The CPA approach suggests that there are three steps necessary for pupils to develop understanding of a mathematical concept.

Concrete: "Doing Stage": Physical manipulation of objects to solve math problems.

Pictorial: "Seeing Stage": Use of imaged to represent objects when solving math problems.

Abstract: "Symbolic Stage": Use of only numbers and symbols to solve math problems.

CPA is a gradual systematic approach. Each stage builds on to the previous stage. Reinforcement of concepts are achieved by going back and forth between these representations and making connections between stages. Students will benefit from seeing parallel samples of each stage and how they transition from one to another.

Read, Draw, Write Process

READ the problem. Read it over and over…. And then read it again.

DRAW a picture that represents the information given. During this step students ask themselves: Can I draw something from this information? What can I draw? What is the best model to show the information? What conclusions can I make from the drawing?

WRITE your conclusions based on the drawings. This can be in the form of a number sentence, an equation, or a statement.

Students are able to draw a model of what they are reading to help them understand the problem. Drawing a model helps students see which operation or operations are needed, what patterns might arise, and which models work and do not work. Students must dive deeper into the problem by drawing models and determining which models are appropriate for the situation.

While students are employing the RDW process they are using several Standards for Mathematical Practice and in some cases, all of them.

Mathematical Discourse and Strategic Questioning

Discourse involves asking strategic questions that elicit from students both how a problem was solved and why a particular method was chosen. Students learn to critique their own and others' ideas and seek out efficient mathematical solutions.

While classroom discussions are nothing new, the theory behind classroom discourse stems from constructivist views of learning where knowledge is created internally through interaction with the environment. It also fits in with socio-cultural views on learning where students working together are able to reach new understandings that could not be achieved if they were working alone.

Underlying the use of discourse in the mathematics classroom is the idea that mathematics is primarily about reasoning not memorization. Mathematics is not about remembering and applying a set of procedures but about developing understanding and explaining the processes used to arrive at solutions.

Asking better questions can open new doors for students, promoting mathematical thinking and classroom discourse. Can the questions you're asking in the mathematics classroom be answered with a simple “yes” or “no,” or do they invite students to deepen their understanding?

To help you encourage deeper discussions, here are 100 questions to incorporate into your instruction by Dr. Gladis Kersaint, mathematics expert and advisor for Ready Mathematics.

100 questions that promote Mathematical Discourse

Help students **work together** to make sense of mathematics

1. What **strategy** did you use?
2. Do you **agree**?
3. Do you **disagree**?
4. Would you **ask the rest of the class** that question?
5. Could you **share your method** with the class?
6. What part of what he said **do you understand**?
7. Would someone like to **share** ___?
8. Can you **convince the rest of us** that your answer makes sense?
9. **What do others think** about what [student] said?
10. Can someone **retell or restate** [student]'s explanation?
11. Did you **work together**? In what way?
12. Would anyone like to **add to what was said**?
13. Have you **discussed** this with your group? With others?
14. Did anyone get a **different answer**?
15. **Where** would you go for **help**?
16. **Did everybody get a fair chance** to talk, use the manipulatives, or be the recorder?
17. How could you help another student **without telling them the answer**?
18. **How would you explain** ___ to someone who missed class today?

Help students **rely more on themselves** to determine whether something is mathematically correct

19. Is this a **reasonable answer**?
20. Does that make **sense**?
21. **Why** do you think that? Why is that true?
22. Can you **draw a picture or make a model** to show that?
23. **How** did you reach that conclusion?
24. Does anyone want to **revise** his or her answer?
25. **How were you sure** your answer was right?

Ready

Help students learn to **reason mathematically**

- 26 **How did you begin** to think about this problem?
- 27 What is **another way** you could solve this problem?
- 28 How could you **prove** ______?
- 29 Can you **explain how your answer is different from or the same as** [student]'s answer?
- 30 Let's **break the problem into parts**. What would the parts be?
- 31 Can you **explain this part more specifically**?
- 32 Does that **always work**?
- 33 Can you think of a case where that **wouldn't work**?
- 34 How did you **organize** your information? Your thinking?

Help students **evaluate their own processes** and engage in productive peer interaction

- 35 What do you need to do **next**?
- 36 What have you **accomplished**?
- 37 What are your **strengths and weaknesses**?
- 38 Was your **group participation appropriate and helpful**?

Help students with **problem comprehension**

- 39 What is this problem about? What can you **tell me about it**?
- 40 Do you need to **define or set limits** for the problem?
- 41 How would you **interpret** that?
- 42 Could you **reword that in simpler terms**?
- 43 Is there something that can be **eliminated** or that is **missing**?
- 44 Could you **explain** what the problem is asking?
- 45 What **assumptions** do you have to make?
- 46 What do you **know** about this part?
- 47 Which words were **most important**? Why?

Help students learn to **conjecture, invent, and solve** problems

48 **What would happen if ___?**

49 Do you see a **pattern**?

50 What are some **possibilities** here?

51 Where could you find the **information** you need?

52 How would you **check your steps** or your answer?

53 What **did not work**?

54 How is your solution method the **same as or different from** [student]'s method?

55 Other than retracing your steps, **how can you determine** if your answers are appropriate?

56 How did you **organize** the information? Do you have a **record**?

57 How could you solve this using **tables, lists, pictures, diagrams**, etc.?

58 What have you tried? What **steps** did you take?

59 How would it look if you used this **model** or these **materials**?

60 How would you draw a **diagram or make a sketch** to solve the problem?

61 Is there **another possible answer**? If so, explain.

62 Is there **another way to solve** the problem?

63 Is there **another model** you could use to solve the problem?

64 Is there anything you've **overlooked**?

65 **How did you think** about the problem?

66 What was your **estimate or prediction**?

67 How **confident** are you in your answer?

68 **What else** would you like to know?

69 What do you think comes **next**?

70 Is the solution **reasonable**, considering the context?

71 Did you have a **system**? Explain it.

72 Did you have a **strategy**? Explain it.

73 Did you have a **design**? Explain it.

Help students learn to **connect mathematics, its ideas, and its application**

74 What is the **relationship** between ___ and ___?

75 Have we ever solved a problem **like this before**?

76 What uses of mathematics did you find in the **newspaper** last night?

77 What is the **same**?

78 What is **different**?

79 Did you use skills or build on concepts that were **not necessarily mathematical**?

80 Which **skills or concepts** did you use?

81 What **ideas** have we explored before that were useful in solving this problem?

82 Is there a **pattern**?

83 **Where else** would this strategy be useful?

84 How does this **relate** to ___?

85 Is there a **general rule**?

86 Is there a **real-life situation** where this could be used?

87 How would your method work with **other problems**?

88 What other problem does this seem to **lead to**?

Help students **persevere**

89 Have you tried making a **guess**?

90 **What else** have you tried?

91 Would **another method** work as well or better?

92 Is there **another way** to draw, explain, or say that?

93 Give me another **related problem**. Is there an easier problem?

94 How would you **explain** what you know right now?

Help students focus on the mathematics from **activities**

95 What was **one thing you learned** (or two, or more)?

96 Did you **notice any patterns**? If so, describe them.

97 What **mathematics topics** were used in this investigation?

98 What were the **mathematical ideas** in this problem?

99 What is mathematically **different about these two situations**?

100 What are the **variables** in this problem? What stays **constant**?

Conceptual Understanding

Students demonstrate conceptual understanding in mathematics when they provide evidence that they can:

- recognize, label, and generate examples of concepts;
- use and interrelate models, diagrams, manipulatives, and varied representations of concepts;
- identify and apply principles; know and apply facts and definitions;
- compare, contrast, and integrate related concepts and principles; and
- recognize, interpret, and apply the signs, symbols, and terms used to represent concepts.

Conceptual understanding reflects a student's ability to reason in settings involving the careful application of concept definitions, relations, or representations of either.

Procedural Fluency

Procedural fluency is the ability to:

- apply procedures accurately, efficiently, and flexibly;
- to transfer procedures to different problems and contexts;
- to build or modify procedures from other procedures; and
- to recognize when one strategy or procedure is more appropriate to apply than another.

Procedural fluency is more than memorizing facts or procedures, and it is more than understanding and being able to use one procedure for a given situation. Procedural fluency builds on a foundation of conceptual understanding, strategic reasoning, and problem solving (NGA Center & CCSSO, 2010; NCTM, 2000, 2014). Research suggests that once students have memorized and practiced procedures that they do not understand, they have less motivation to understand their meaning or the reasoning behind them (Hiebert, 1999). Therefore, the development of students' conceptual understanding of procedures should precede and coincide with instruction on procedures.

Math Fact Fluency: Automaticity

Students who possess math fact fluency can recall math facts with automaticity. Automaticity is the ability to do things without occupying the mind with the low-level details required, allowing it to become an automatic response pattern or habit. It is usually the result of learning, repetition, and practice.

K-2 Math Fact Fluency Expectation
K.OA.5 Add and Subtract within 5.
1.OA.6 Add and Subtract within 10.
2.OA.2 Add and Subtract within 20.

Math Fact Fluency: Fluent Use of Mathematical Strategies

First and second grade students are expected to solve addition and subtraction facts using a variety of strategies fluently.

1.OA.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; and
- creating equivalent but easier or known sums.

2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on:

- place value,
- properties of operations, and/or
- the relationship between addition and subtraction;

Evidence of Student Thinking

Effective classroom instruction and more importantly, improving student performance, can be accomplished when educators know how to elicit evidence of students' understanding on a daily basis. Informal and formal methods of collecting evidence of student understanding enable educators to make positive instructional changes. An educators' ability to understand the processes that students use helps them to adapt instruction allowing for student exposure to a multitude of instructional approaches, resulting in higher achievement. By highlighting student thinking and misconceptions, and eliciting information from more students, all teachers can collect more representative evidence and can therefore better plan instruction based on the current understanding of the entire class.

Mathematical Proficiency

To be mathematically proficient, a student must have:

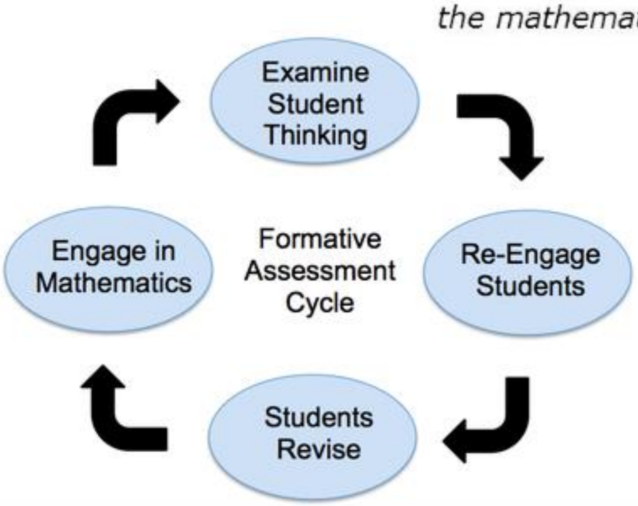
- Conceptual understanding: comprehension of mathematical concepts, operations, and relations;
- Procedural fluency: skill in carrying out procedures flexibly, accurately, efficiently, and appropriately;
- Strategic competence: ability to formulate, represent, and solve mathematical problems;
- Adaptive reasoning: capacity for logical thought, reflection, explanation, and justification;
- Productive disposition: habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy.

Evidence should:

- Provide a window in student thinking;
- Help teachers to determine the extent to which students are reaching the math learning goals; and
- Be used to make instructional decisions during the lesson and to prepare for subsequent lesso

Formative assessment is an essentially interactive process, in which the teacher can find out whether what has been taught has been learned, and if not, to do something about it. Day-to-day formative assessment is one of the most powerful ways of improving learning in the mathematics classroom.

(Wiliam 2007, pp. 1054; 1091)



Unit 2 Assessment / Authentic Assessment Framework			
Assessment	**CCSS**	**Estimated Time**	**Format**
Chapter 7			
Optional Chapter 1 Test/ Performance Task	2.MD.1, 3-6	1 block	Individual
Authentic Assessment #1	2.NBT.1-4	½ block	Individual
Chapter 13			
Optional Chapter 2 Test/ Performance Task	2.MD.1,2,4-6 2.OA.1	1 block	Individual
Chapter 10			
Optional Chapter 3 Test/ Performance Task	2.NBT.5-9 2.MD.6 2.OA.1	1 block	Individual
Authentic Assessment #	2.NBT5.7,9	1 block	Individual
Optional Mid-Module Eureka Math Module 4 Assessment	2.NBT.5-9 2.OA.1	1 block	Individual
Grade 2 Interim Assessment 2	2.NBT.2-9 2.OA.1,3 2.G.2 2.MD.1. 3-6	1 Block	Individual

	PLD	**Genesis Conversion**
Rubric Scoring	PLD 5	100
	PLD 4	89
	PLD 3	79
	PLD 2	69
	PLD 1	59

Connections to the Mathematical Practices

Student Friendly Connections to the Mathematical Practices

1. I can solve problems without giving up.
2. I can think about numbers in many ways.
3. I can explain my thinking and try to understand others.
4. I can show my work in many ways.
5. I can use math tools and tell why I choose them.
6. I can work carefully and check my work.
7. I can use what I know to solve new problems.
8. I can discover and use short cuts.

The **Standards for Mathematical Practice** describe varieties of expertise that mathematics educators at all levels should seek to	
1	**Make sense of problems and persevere in solving them** Mathematically proficient students in Second Grade examine problems and tasks, can make sense of the meaning of t new tasks. In Second Grade, students' work continues to use concrete manipulatives and pictorial representations as continue to solve the task. Lastly, mathematically proficient students complete a task by asking themselves the quest
2	**Reason abstractly and quantitatively** Mathematically proficient students in Second Grade make sense of quantities and relationships while solving tasks. T children in the cafeteria and they are joined by 17 more children. How many students are in the cafeteria? " Second G task above, students can refer to the context of the task to determine that they need to subtract 19 since 19 children l
3	**Construct viable arguments and critique the reasoning of others** Mathematically proficient students in Second Grade accurately use definitions and previously established solutions to 74 - 18, students may use a variety of strategies, and after working on the task, can discuss and critique each other's r
4	**Model with mathematics** Mathematically proficient students in Second Grade model real-life mathematical situations with a number sentence

	explanation of the equation. Likewise, Second Grade students are able to create an appropriate problem situation fro gumballs are now in the machine?”
5	**Use appropriate tools strategically**
	Mathematically proficient students in Second Grade have access to and use tools appropriately. These tools may inclu Students also have experiences with educational technologies, such as calculators and virtual manipulatives, which su During classroom instruction, students have access to various mathematical tools as well as paper, and determine wh
6	**Attend to precision**
	Mathematically proficient students in Second Grade are precise in their communication, calculations, and measureme In all mathematical tasks, students in Second Grade communicate clearly, using grade-level appropriate vocabulary a For example, while measuring an object, care is taken to line up the tool correctly in order to get an accurate measure
7	**Look for and make use of structure**
	Mathematically proficient students in Second Grade carefully look for patterns and structures in the number system a in the Numbers in Base Ten domain, students work with the idea that 10 ones equal a ten, and 10 tens equals 1 hund In addition, Second Grade students also make use of structure when they work with subtraction as missing addend p
8	**Look for and express regularity in repeated reasoning**
	Mathematically proficient students in Second Grade begin to look for regularity in problem structures when solving n independently on future tasks. Further, students begin to look for strategies to be more efficient in computations, including doubles strategies and m Lastly, while solving all tasks, Second Grade students accurately check for the reasonableness of their solutions durin

Effective Mathematics Teaching Practices
Establish mathematics goals to focus learning. Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.
Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.
Use and connect mathematical representations. Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.
Facilitate meaningful mathematical discourse. Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.
Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.
Build procedural fluency from conceptual understanding. Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.
Support productive struggle in learning mathematics. Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.
Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

5 Practices for Orchestrating Productive Mathematics Discussions	
Practice	Description/ Questions
1. Anticipating	What strategies are students likely to use to approach or solve a challenging high-level mathematical task? How do you respond to the work that students are likely to produce? Which strategies from student work will be most useful in addressing the mathematical goals?
2. Monitoring	Paying attention to what and how students are thinking during the lesson. Students working in pairs or groups Listening to and making note of what students are discussing and the strategies they are using Asking students questions that will help them stay on track or help them think more deeply about the task. (Promote productive struggle)
3. Selecting	This is the process of deciding the *what* and the *who* to focus on during the discussion.
4. Sequencing	What order will the solutions be shared with the class?
5. Connecting	Asking the questions that will make the mathematics explicit and understandable. Focus must be on mathematical meaning and relationships; making links between mathematical ideas and representations.

1st & 2nd Grade Ideal Math Block

Essential Components

FLUENCY: Partner/Small Group — 5 min.

CONCRETE, PICTORIAL, and **ABSTRACT** approaches to support **ARITHMETIC FLUENCY** and **FLUENT USE OF STRATEGIES.**

LAUNCH: Whole Group — 15-20 min.

Anchor Task: Math In Focus Learn

EXPLORATION: Partner / Small Group

Math In Focus Hands-On, Guided Practice, Let's Explore

INDEPENDENT PRACTICE: Individual

Math In Focus Let's Practice, Workbook, Reteach, Extra Practice, Enrichment

MATH WORKSTATIONS: Pairs / Small Group/ Individual — 15-20 min.

DIFFERENTIATED activities designed to **RETEACH, REMEDIATE, ENRICH** student's understanding of concepts.

Small Group Instruction	Technology Lab	Problem Solving Lab	Fluency Lab	Math Journal Lab

SUMMARY: Whole Group

Lesson Closure: Student Reflection; Real Life Connections to Concept

EXIT TICKET (DOL): Individual — 5 min.

Students complete independently; Used to guide instructional decisions; Used to set instructional goals for students;

Note:

- Place emphasis on the flow of the lesson in order to ensure the development of students' conceptual understanding.
- Outline each essential component within lesson plans.
- Math Workstations may be conducted in the beginning of the block in order to utilize additional support staff.
- Recommended: 5-10 technology devices for use within **TECHNOLOGY** and **FLUENCY** workstations.

Second Grade PLD Rubric

Got It Evidence shows that the student essentially has the target concept or big math idea.		**Not There Yet** Student shows evidence of a major misunderstanding, incorrect concepts or procedure, or a failure to engage in the task.		
PLD Level 5: 100% **Distinguished command**	**PLD Level 4: 89%** **Strong Command**	**PLD Level 3: 79%** **Moderate Command**	**PLD Level 2: 69%** **Partial Command**	**PLD Level 1: 59%** **Little Command**

Student work shows **distinguished levels of understanding** of the mathematics.
 	
Student **constructs** and **communicates** a **complete response** based on explanations/reasoning using the:
• Tools:
  ○ Manipulatives
  ○ Five Frame
  ○ Ten Frame
  ○ Number Line
  ○ Part-Part-Whole Model
• Strategies:
  ○ Drawings
  ○ Counting All
  ○ Count On/Back
  ○ Skip Counting
  ○ Making Ten
  ○ Decomposing Number
• Precise use of math vocabulary
Response includes an **efficient and logical progression** of mathematical reasoning and understanding.
	Student work shows **strong levels of understanding** of the mathematics.
	
	Student **constructs** and **communicates** a **complete response** based on explanations/reasoning using the:
	• Tools:
	  ○ Manipulatives
	  ○ Five Frame
	  ○ Ten Frame
	  ○ Number Line
	  ○ Part-Part-Whole Model
	• Strategies:
	  ○ Drawings
	  ○ Counting All
	  ○ Count On/Back
	  ○ Skip Counting
	  ○ Making Ten
	  ○ Decomposing Number
	• Precise use of math vocabulary
	
	Response includes a **logical progression** of mathematical reasoning and understanding.
		Student work shows **moderate levels of understanding** of the mathematics.
		
		Student **constructs** and **communicates** a **complete response** based on explanations/reasoning using the:
		• Tools:
		  ○ Manipulatives
		  ○ Five Frame
		  ○ Ten Frame
		  ○ Number Line
		  ○ Part-Part-Whole Model
		• Strategies:
		  ○ Drawings
		  ○ Counting All
		  ○ Count On/Back
		  ○ Skip Counting
		  ○ Making Ten
		  ○ Decomposing Number
		• Precise use of math vocabulary
		
		Response includes a **logical but incomplete progression** of mathematical reasoning and understanding.
		Contains **minor errors.**
			Student work shows **partial understanding** of the mathematics.
			
			Student **constructs** and **communicates** an **incomplete response** based on student's attempts of explanations/ reasoning using the:
			• Tools:
			  ○ Manipulatives
			  ○ Five Frame
			  ○ Ten Frame
			  ○ Number Line
			  ○ Part-Part-Whole Model
			• Strategies:
			  ○ Drawings
			  ○ Counting All
			  ○ Count On/Back
			  ○ Skip Counting
			  ○ Making Ten
			  ○ Decomposing Number
			• Precise use of math vocabulary
			
			Response includes an **incomplete or illogical progression** of mathematical reasoning and understanding.
				Student work shows **little understanding** of the mathematics.
				
				Student **attempts** to **constructs** and **communicates** a response using the:
				• Tools:
				  ○ Manipulatives
				  ○ Five Frame
				  ○ Ten Frame
				  ○ Number Line
				  ○ Part-Part-Whole Model
				• Strategies:
				  ○ Drawings
				  ○ Counting All
				  ○ Count On/Back
				  ○ Skip Counting
				  ○ Making Ten
				  ○ Decomposing Number
				• Precise use of math vocabulary
				
				Response includes **limited evidence of the progression** of mathematical reasoning and understanding.

5 points	**4 points**	**3 points**	**2 points**	**1 point**

2^{nd} Grade Performance Task : Measuring Objects

Materials and Directions:

1. Gather a variety of objects all less than 1 foot in length, such as a pencil, a crayon, a marker, a school box and piece of yarn.
2. Give the student a ruler with inches on one side and centimeters on the other.
3. Ask student to measure each object to the nearest ½ inch AND the nearest centimeter.

Choose at least 4 objects that students will be able to measure.

2. MD. 1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

Student learning targets for this task may include:

- I can select an appropriate tool (e.g., ruler, yardstick, meter stick, measuring tape) to measure an object.
- I can measure the length of an object using a tool.

Assure that Students are able to correctly line up the objects to the ruler from the correct starting point and that they are able to recognize the measurement intervals on the ruler.

Level 5: Distinguished Command	**Level 4: Strong Command**	**Level 3: Moderate Command**	**Level 2: Partial Command**	**Level 1: No Command**
Student can answer all parts correctly. Clearly constructs and communicates a complete response based on explanations/ reasoning using the: • properties of operations • relationship between addition and subtraction relationship Response includes an **efficient** and logical progression of steps.	**Student can at least 3 parts correctly.** Clearly constructs and communicates a complete response for at least one part based on explanations/ reasoning using the: • properties of operations • relationship between addition and subtraction Response includes a logical progression of steps	**Student can at least 2 parts correctly.** Constructs and communicates a complete response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction Response includes a logical but incomplete progression of steps. Minor calculation errors	**Student can at least 1 parts correctly.** Constructs and communicates an incomplete response based on explanations/reasoning using the: • properties of operations • relationship between addition and subtraction Response includes an incomplete or Illogical progression of steps.	**Student cannot respond.** The student shows no work or justification.

2nd Grade Performance Task : Saving Money

Louis wants to give $15 to help kids who need school supplies. He also wants to buy a pair of shoes for $39.

a. How much money will he have to save for both?

b. Louis gets $5 a week for his allowance. He plans to save his allowance every week. How many weeks does it take him to reach this goal?

c. Louis remembers his sister's birthday is next month. He sets a goal of saving $16 for her gift. How many weeks does he have to save his allowance to reach this goal? How many weeks does he have to save his allowance for all three of his goals?

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

2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

A. $54

B. 11

C. 3 weeks, 14 weeks in total

<table>
<tr><th>Level 5: Distinguished Command</th><th>Level 4: Strong Command</th><th>Level 3: Moderate Command</th><th>Level 2: Partial Command</th><th>Level 1: No Command</th></tr>
<tr>
<td>Student can answer all parts correctly.

Clearly constructs and communicates a complete response based on explanations/ reasoning using the:
properties of operations
relationship between addition and subtraction relationship
Response includes an efficient and logical progression of steps.</td>
<td>Student can at least 3 parts correctly.

Clearly constructs and communicates a complete response for at least one part based on explanations/ reasoning using the:
properties of operations
relationship between addition and subtraction
Response includes a logical progression of steps</td>
<td>Student can at least 2 parts correctly.

Constructs and communicates a complete response based on explanations/reasoning using the:
properties of operations
relationship between addition and subtraction
Response includes a logical but incomplete progression of steps. Minor calculation errors</td>
<td>Student can at least 1 parts correctly.

Constructs and communicates an incomplete response based on explanations/reasoning using the:
properties of operations
relationship between addition and subtraction
Response includes an incomplete or Illogical progression of steps.</td>
<td>Student cannot respond.

The student shows no work or justification.</td>
</tr>
</table>

21st Century Career Ready Practices

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

For additional details see **21st Century Career Ready Practices** .

Resources

Engage NY
http://www.engageny.org/video-library?f[0]=im_field_subject%3A19

Common Core Tools
http://commoncoretools.me/
http://www.ccsstoolbox.com/
http://www.achievethecore.org/steal-these-tools

Achieve the Core
http://achievethecore.org/dashboard/300/search/6/1/0/1/2/3/4/5/6/7/8/9/10/11/12

Manipulatives
http://nlvm.usu.edu/en/nav/vlibrary.html
http://www.explorelearning.com/index.cfm?method=cResource.dspBrowseCorrelations&v=s&id=USA-000
http://www.thinkingblocks.com/

Illustrative Math Project :http://illustrativemathematics.org/standards/k8

Inside Mathematics: http://www.insidemathematics.org/index.php/tools-for-teachers

Sample Balance Math Tasks: http://www.nottingham.ac.uk/~ttzedweb/MARS/tasks/

Georgia Department of Education:https://www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx
Gates Foundations Tasks:http://www.gatesfoundation.org/college-ready-education/Documents/supporting-instruction-cards-math.pdf

Minnesota STEM Teachers' Center: http://www.scimathmn.org/stemtc/frameworks/721-proportional-relationships

Singapore Math Tests K-12: http://www.misskoh.com

Mobymax.com: http://www.mobymax.com