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Grade 2 Mathematics – Curriculum Recommendations for SY 2011-2012

Purpose of this document:

1. Provide recommendations regarding which Hawaii Content and Performance Standards (HCPS) III benchmarks that Grade 2 teachers should continue to teach during SY 2011-2012 **in addition to** the 2nd grade Common Core State Standards (CCSS).
2. Enable the Grade 2 teacher to compare 2nd grade Common Core standards (that they will be teaching in SY 2011-2012) to 1st grade HCPS III benchmarks (that their students will have learned in SY 2010-2011).
3. Provide additional insights to better understand the 2nd grade Common Core standards.

In SY 2011-2012, Grade 2 teachers are expected to design and implement learning and assessment opportunities that are aligned with the CCSS for mathematics. During the initial years of implementation of the CCSS, teachers will need to be particularly mindful of any curricular gaps between grade levels. For example, in SY 2011-2012 second graders will be learning the mathematics CCSS, but the following school year they will be learning HCPS III benchmarks in grade 3. Therefore, the following recommendations are being made to help ensure students are prepared as they transition from one grade to the next:

a. Second grade teachers should address all of the CCSS grade 2 learning expectations.
b. While the majority of the 2nd grade Common Core standards will prepare students for the 3rd grade HCPS III standards, there are a few gaps areas that need to be addressed. Thus, to ensure students will be prepared for the grade 3 HCPS III benchmarks next school year, second grade teachers should continue to address the following HCPS III grade 2 benchmarks:

HCPS III 2nd grade benchmarks that should continue to be addressed	**Recommendation of which Common Core 2nd grade standards to connect with** *(i.e., address the HCPS III benchmark as an extension of the Common Core standard indicated below)*	**Comments**
2.2.2: Demonstrate multiplication as repeated addition of equal groups 2.2.3: Demonstrate division as "separating equal groups"	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. 2.G.2: Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	Continuing to address HCPS III benchmarks 2.2.2 and 2.2.3 will better prepare students for the 3rd grade HCPS III benchmarks regarding multiplication and division.
2.9.1: Describe and create addition and subtraction number patterns	2.OA.2: Fluently add and subtract within 20 using mental strategies. 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. 2.NBT.2: Count within 1000; skip count by 5s, 10s, and 100s. 2.NBT.8: Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.	Continuing to address HCPS III benchmark 2.9.1 will prepare students for the 3rd grade HCPS III benchmarks regarding creating, describing and using patterns.
2.4.2: Identify appropriate units for measuring length, area, capacity, and weight.	2.MD.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	Common Core standard 2.MD.1 only deals with length. Thus, teachers should continue to address HCPS III benchmark 2.4.2 **with respect to capacity and weight** so that students will be prepared for the 3rd grade HCPS III benchmark 3.4.3.
2.4.4: Tell time to the minute.	2.MD.7: Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	Teachers should continue to address HCPS III benchmark 2.4.4 **with respect to telling time to the minute** so that students will be prepared for the 3rd grade HCPS III benchmark 3.4.4.

[1] Explanations include excerpts from the Hawaii Department of Education Curriculum and Instruction Branch's crosswalk documents (http://standardstoolkit.k12.hi.us/index.html) and from the Arizona Department of Education Standards and Assessment Division's 2010 Academic Content Standards for Mathematics (http://www.ade.az.gov/standards/math/2010MathStandards/) with permission granted by Dr. Mary Knuck, Deputy Associate Superintendent.

The next several pages are intended to provide teachers with some further insight into the second grade mathematics learning expectations in the CCSS. Teachers should have multiple opportunities to review and discuss the pages that follow, collaborating within and across grade level teams. Conversations in professional learning teams should focus upon aligning learning and assessment opportunities) with the intended targets of the standards.

In addition, during instruction, teachers are strongly encouraged to turn students' misconceptions into learning opportunities. Whenever students express an incorrect answer or a misconception, the teacher's response should be something like, "How did you get that?" ***Formative assessment is most effective when it occurs in real time***. Thus, the best way to help a student overcome a misconception is to have him or her talk about it so the teacher can identify what specifically needs to be addressed. Talking openly about misconceptions (in a safe, non-judgmental manner) helps foster a classroom learning culture in which students expect mathematics to make sense, in which they learn that effort and perseverance are necessary for learning mathematics, and in which making mistakes is a natural and important part of the learning process. Promoting a classroom culture that nurtures a disposition to learn from one's mistakes is not only an important part of the learning process, but a powerful life lesson to give to students.

Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Operations and Algebraic Thinking Cluster: Represent and solve problems involving addition and subtraction.	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.	Word problems that are connected to students' lives can be used to develop fluency with addition and subtraction. Table 1 (on page 16 of this document) describes the four different addition and subtraction situations and their relationship to the position of the unknown. Examples: • Take-from example: David had 63 stickers. He gave 37 to Susan. How many stickers does David have now? 63 – 37 = ☐ • Add to example: David had $37. His grandpa gave him some money for his birthday. Now he has $63. How much money did David's grandpa give him? $37 + ☐ = $63 • Compare example: David has 63 stickers. Susan has 37 stickers. How many more stickers does David have than Susan? 63 – 37 = ☐ o Even though the modeling of the two problems above is different, the equation, 63 - 37 = ?, can represent both situations (How many more do I need to make 63?) • Take-from (Start Unknown) David had some stickers. He gave 37 to Susan. Now he has 26 stickers. How many stickers did David have before? ☐ - 37 = 26 It is important to attend to the difficulty level of the problem situations in relation to the position of the unknown. • Result Unknown problems are the least complex for students followed by Total Unknown and Difference Unknown. • The next level of difficulty includes Change Unknown, Addend Unknown, followed by Bigger Unknown. • The most difficult are Start Unknown, Both Addends Unknown, and Smaller Unknown. Second grade students should work on ALL problem types regardless of the level of difficulty. This standard focuses on developing an algebraic representation of a word problem (e.g., a number sentence) through addition and subtraction --the intent is not to introduce traditional algorithms or rules.	1.3.2: Use a variety of strategies to solve number problems involving addition and subtraction (e.g., comparing sets, counting on, counting backwards, doubles, doubles plus one).

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Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Operations and Algebraic Thinking Cluster: Add and subtract within 20.	2.OA.2: Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.	"Fluently" does not imply that all learning opportunities for this standard should be at the "recall" level. By the end of grade 2 students should be able to know the sums from memory. However, instruction should be designed to build upon students' prior knowledge and experiences with efficient strategies learned in grade 1. This standard is strongly connected to all the standards in this domain. It focuses on students being able to fluently add and subtract numbers to 20. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. Mental strategies help students make sense of number relationships as they are adding and subtracting within 20. The ability to calculate mentally with efficiency is very important for all students. Mental strategies may include the following: • Counting on • Making tens (9 + 7 = 10 + 6) • Decomposing a number leading to a ten (14 – 6 = 14 – 4 – 2 = 10 – 2 = 8) • Fact families (8 + 5 = 13 is the same as 13 - 8 = 5) • Doubles • Doubles plus one (7 + 8 = 7 + 7 + 1) The use of objects, diagrams, or interactive whiteboards, and various strategies will help students develop fluency.	1.2.1: Demonstrate that addition and subtraction of whole numbers can undo each other. 1.3.1: Recall single-digit addition facts. 1.3.2: Use a variety of strategies to solve number problems involving addition and subtraction (e.g., comparing sets, counting on, counting backwards, doubles, doubles plus one).
Domain: Operations and Algebraic Thinking Cluster: Work with equal groups of objects to gain foundations for multiplication.	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.	Students explore odd and even numbers in a variety of ways including the following: students may investigate if a number is odd or even by determining if the number of objects can be divided into two equal sets, arranged into pairs or counted by twos. After the above experiences, students may derive that they only need to look at the digit in the ones place to determine if a number is odd or even since any number of tens will always split into two even groups. Example: Students need opportunities writing equations representing sums of two equal addends, such as: 2 + 2 = 4, 3 + 3 = 6, 5 + 5 = 10, 6 + 6 = 12, or 8 + 8 =16. This understanding will lay the foundation for multiplication and is closely connected to 2.OA.4. The use of objects and/or interactive whiteboards will help students develop and demonstrate various strategies to determine even and odd numbers.	1.1.1: Count whole numbers up to 100 in a variety of ways (e.g., skip counts by 2's, 5's, 10's).

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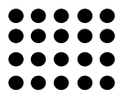
Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Operations and Algebraic Thinking Cluster: Work with equal groups of objects to gain foundations for multiplication.	2.OA.4: Use 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.	This standard provides a critical foundation for 3rd grade mathematics (i.e., an introduction to the notion of "repeated addition" represented in rectangular arrays). Students may arrange any set of objects into a rectangular array. Objects can be cubes, buttons, counters, etc. Objects do not have to be square to make an array. Geoboards can also be used to demonstrate rectangular arrays. Students then write equations that represent the total as the sum of equal addends as shown below.   4 + 4 + 4 = 12 5 + 5 + 5 + 5 = 20 Interactive whiteboards and document cameras may be used to help students visualize and create arrays.	1.3.2: Use a variety of strategies to solve number problems involving addition and subtraction (e.g., comparing sets, counting on, counting backwards, doubles, doubles plus one).
Domain: Number and Operations in Base Ten Cluster: Understand place value.	2.NBT.1: Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a "hundred." b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight or nine hundreds (and 0 tens and 0 ones).	This standard is closely related to the two standards that follow (2.NBT.3 and 2.NBT.4). This standard describes an expectation to "understand" an important mathematical idea, while 2.NBT.3 and 2.NBT.4 describes an expectation of applying that understanding to perform a task or skill. Understanding that 10 ones make one ten and that 10 tens make one hundred is fundamental to students' mathematical development. Students need multiple opportunities counting and "bundling" groups of tens in first grade. In second grade, students build on their understanding by making bundles of 100s with or without leftovers using base ten blocks, cubes in towers of 10, ten frames, etc. This emphasis on bundling hundreds will support students' discovery of place value patterns. As students are representing the various amounts, it is important that emphasis is placed on the language associated with the quantity. For example, 243 can be expressed in multiple ways such as 2 groups of hundred, 4 groups of ten and 3 ones, as well as 24 tens with 3 ones. When students read numbers, they should read in standard form as well as using place value concepts. For example, 243 should be read as "two hundred forty-three" as well as two hundreds, 4 tens, 3 ones. A document camera or interactive whiteboard can also be used to demonstrate "bundling" of objects. This gives students the opportunity to communicate their counting and thinking.	1.1.3: Represent whole numbers up to 100 in flexible ways (e.g., relating, composing, and decomposing numbers), including the use of tens as a unit.

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Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Number and Operations in Base Ten Cluster: Understand place value.	2.NBT.2: Count within a 1000; skip count by 5s, 10s, and 100s.	Students need many opportunities counting, up to 1000, from different starting points. They should also have many experiences skip counting by 5s, 10s, and 100s to develop the concept of place value. Examples: • The use of the 100s chart may be helpful for students to identify the counting patterns. • The use of money (nickels, dimes, dollars) or base ten blocks may be helpful visual cues. • The use of an interactive whiteboard may also be used to develop counting skills. The ultimate goal for second graders is to be able to count in multiple ways with no visual support.	1.1.1: Count whole numbers up to 100 in a variety of ways (e.g., skip counts by 2's, 5's, 10's).
Domain: Number and Operations in Base Ten Cluster: Understand place value.	2.NBT.3: Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	Students need many opportunities reading and writing numerals in multiple ways. • Using "base-ten numerals": 968. • Using "number names": nine hundred sixty-eight. • Using "expanded form": 900 + 60 + 8.	1.1.3: Represent whole numbers up to 100 in flexible ways (e.g., relating, composing, and decomposing numbers), including the use of tens as a unit.
Domain: Number and Operations in Base Ten Cluster: Understand place value.	2.NBT.4: Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.	Building on standards 1.NBT.3 and 2.NBT.1, this standard extends students' number sense so that they can apply their conceptual understanding (of place value) in a way that helps them to make comparisons between quantities. Students may use models, number lines, base ten blocks, interactive whiteboards, document cameras, written words, and/or spoken words that represent two three-digit numbers. To compare, students apply their understanding of place value. They first attend to the numeral in the hundreds place, then the numeral in tens place, then, if necessary, to the numeral in the ones place. Comparative language includes but is not limited to: more than, less than, greater than, most, greatest, least, same as, equal to and not equal to. Students use the appropriate symbols to record the comparisons.	1.1.3: Represent whole numbers up to 100 in flexible ways (e.g., relating, composing, and decomposing numbers), including the use of tens as a unit. *Note: Second grade teacher will need to supplement instruction to prepare students to understand the Grade 2 CCSS.*

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Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Number and Operations in Base Ten Cluster: Use place value understanding and properties of operations to add and subtract.	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.	Looking forward to grade 3 standards (e.g., 3.NBT.2), students will be expected to compute with larger numbers. Thus, it is critically important in second grade for students to develop fluency with efficient strategies so they have the appropriate background knowledge to deal with larger numbers. The strategy of "partitioning" utilizes students' understanding of place value. When adding 36 and 43, students should develop the ability to mentally decompose each addend into (30 + 6) and (40 + 3), and then combine the number of like units: 70 + 9 = 79. The strategy of "partitioning" provides a foundation for students to make sense of the standard algorithm, building upon their understanding of place value in the base ten system. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. Students should have experiences solving problems written both horizontally and vertically. They need to communicate their thinking and be able to justify their strategies both verbally and with paper and pencil. Addition strategies based on place value for 48 + 37 may include: • Adding by place value (partitioning): 40 + 30 = 70 and 8 + 7 = 15 and 70 + 15 = 85. • Incremental adding (breaking one number into tens and ones); 48 + 10 = 58, 58 + 10 = 68, 68 + 10 = 78, 78 + 7 = 85 • Compensation (making a friendly number): 48 + 2 = 50, 37 – 2 = 35, 50 + 35 = 85 Subtraction strategies based on place value for 81 - 37 may include: • Adding Up (from smaller number to larger number): 37 + 3 = 40, 40 + 40 = 80, 80 + 1 = 81, and 3 + 40 + 1 = 44. • Incremental subtracting: 81 -10 = 71, 71 – 10 = 61, 61 – 10 = 51, 51 – 7 = 44 • Subtracting by place value: 81 – 30 = 51, 51 – 7 = 44 ***(the explanation of this standard continues on the next page)***	1.1.3: Represent whole numbers up to 100 in flexible ways (e.g., relating, composing, and decomposing numbers), including the use of tens as a unit. 1.2.1: Demonstrate that addition and subtraction of whole numbers can undo each other.

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Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
		Properties that students should know and use are: • Commutative property of addition, e.g., 3 + 5 = 5 + 3 • Associative property of addition, e.g., (2 + 7) + 3 = 2 + (7 + 3) • Identity property of 0 (Example: 8 + 0 = 8) Students in second grade should investigate whether the commutative property works with subtraction. Students should develop an understanding that taking 5 from 8 is not the same as taking 8 from 5. However, recognizing that the associative property does not work for subtraction requires much more complex thinking that second graders may not be ready for, and thus, investigating this idea may not be an appropriate extension to pursue at this grade level (it may be too difficult for grade 2 students to understand this notion as it is challenging to determine all the possibilities).	
Domain: Number and Operations in Base Ten Cluster: Use place value understanding and properties of operations to add and subtract.	2.NBT.6: Add up to four two-digit numbers using strategies based on place value and properties of operations.	The strategy of "partitioning" (described above in 2.NBT.5) is an example of a strategy based on place value. In addition, students should learn to apply the associative property for this learning expectation. For example, when being asked to add **34 + 37 + 16 = _____**, the teacher should model ("think aloud") and encourage students to use a process like the following: • Since all I'm doing is adding numbers, I can combine the numbers in any order I want. • It's always a good idea to try to make 10s, so I'll add the 34 and the 16 first because I know that 4 and 6 will make 10. • Since 34 means 30 + 4 and 16 means 10 + 6, 34 + 16 = 40 + 10 = 50. • Now, I need to add the 37. Since 37 means 30 + 7, 50 + 37 = 80 + 7 = 87. Students demonstrate addition strategies with up to four two-digit numbers either with or without regrouping. Problems may be written in a story problem format to help develop a stronger understanding of larger numbers and their values. Interactive whiteboards and document cameras may also be used to model and justify student thinking.	1.1.3: Represent whole numbers up to 100 in flexible ways (e.g., relating, composing, and decomposing numbers), including the use of tens as a unit. 1.2.1: Demonstrate that addition and subtraction of whole numbers can undo each other. 1.3.2: Use a variety of strategies to solve number problems involving addition and subtraction (e.g., comparing sets, counting on, counting backwards, doubles, doubles plus one).

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Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Number and Operations in Base Ten Cluster: Use place value understanding and properties of operations to add and subtract.	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.	This standard extends students' prior learning experiences (e.g., 2.NBT.5) to apply efficient strategies for adding and subtracting with larger numbers. Fluency should be developed over time, building on students' understanding of place value to promote understanding of multi-digit addition and subtraction. The standard algorithm is not expected to be mastered here, but could be introduced after students develop fluency with other strategies (e.g., partitioning, the relationship between addition and subtraction, place value). There is a strong connection between this standard and place value understanding with addition and subtraction of smaller numbers. Students may use concrete models or drawings to support their addition or subtraction of larger numbers. Strategies are similar to those stated in 2.NBT.5, as students extend their learning to include greater place values moving from tens to hundreds to thousands. Interactive whiteboards and document cameras may also be used to model and justify student thinking.	1.1.3: Represent whole numbers up to 100 in flexible ways (e.g., relating, composing, and decomposing numbers), including the use of tens as a unit. 1.2.1: Demonstrate that addition and subtraction of whole numbers can undo each other. 1.3.2: Use a variety of strategies to solve number problems involving addition and subtraction (e.g., comparing sets, counting on, counting backwards, doubles, doubles plus one).
Domain: Number and Operations in Base Ten Cluster: Use place value understanding and properties of operations to add and subtract.	2.NBT.8: Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.	Students need many opportunities to practice mental math by adding and subtracting multiples of 10 and 100 up to 900 using different starting points. They can practice this by counting and thinking aloud, finding missing numbers in a sequence, and finding missing numbers on a number line or hundreds chart. Explorations should include looking for relevant patterns. Mental math strategies may include: • counting on; 300, 400, 500, etc. • counting back; 550, 450, 350, etc. Examples: • 100 more than 653 is _____ (753) • 10 less than 87 is _____ (77) • "Start at 248. Count up by 10s until I tell you to stop."	1.1.1: Count whole numbers up to 100 in a variety of ways (e.g., skip counts by 2's, 5's, 10's). 1.1.3: Represent whole numbers up to 100 in flexible ways (e.g., relating, composing, and decomposing numbers), including the use of tens as a unit. *Note: The second grade teacher will have to emphasize the mental aspect of adding and subtracting 10.*

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Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Number and Operations in Base Ten Cluster: Use place value understanding and properties of operations to add and subtract.	2.NBT.9: Explain why addition and subtraction strategies work, using place value and the properties of operations. (Explanations may be supported by drawings or objects.)	Students need multiple opportunities explaining their addition and subtraction thinking. Operations embedded within a meaningful context promote development of reasoning and justification. Example: ***Mike read 473 pages in June. He read 227 pages in July. How many pages did Mike read altogether?*** • Ryan's explanation: 473 + 227 = _____. I added the ones together (3 + 7) and got 10. Then I added the tens together (70 + 20) and got 90. I knew that 400 + 200 was 600. So I added 10 + 90 for 100 and added 100 + 600 and found out that Mike had read 700 pages altogether. • Malia's explanation: 473 + 227 = _____. I started by adding 200 to 473 and got 673. Then I added 20 to 673 and I got 693 and finally I added 7 to 693 and I knew that Mike had read 700 pages altogether. • Corey's explanation: I used base ten blocks on a base ten mat to help me solve this problem. I added 3 ones (units) plus 7 ones and got 10 ones which made one ten. I moved the 1 ten to the tens place. I then added 7 tens rods plus 2 tens rods plus 1 tens rod and got 10 tens or 100. I moved the 1 hundred to the hundreds place. Then I added 4 hundreds plus 2 hundreds plus 1 hundred and got 7 hundreds or 700. So Mike read 700 pages. • Taylor's explanation: I know that 473 means 400 + 70 + 3 and 227 means 200 + 20 + 7. So I counted up the number of hundreds and there are 6 so that's 600. Then I counted up the number of tens and there are 9 so that's 90. Then I added the ones and got 10. So I added that last 10 to the 90 and got 100. And I added that 100 to the 600 and got 700. Students should be able to connect different representations and explain the connections. Representations can include numbers, words (including mathematical language), pictures, number lines, and/or physical objects. Students should be able to use any/all of these representations as needed.	1.2.1: Demonstrate that addition and subtraction of whole numbers can undo each other. 1.3.2: Use a variety of strategies to solve number problems involving addition and subtraction (e.g., comparing sets, counting on, counting backwards, doubles, doubles plus one).

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Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Measurement and Data Cluster: Measure and estimate lengths in standard units.	2.MD.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	This standard includes an expectation to measure lengths using both standard (U.S. Customary) units and metric units. Learning activities must provide actual opportunities for students to measure objects. Students in second grade will build upon what they learned in first grade from measuring length with non-standard units to the new skill of measuring length in metric and U.S. Customary with standard units of measure. They should have many experiences measuring the length of objects with rulers, yardsticks, meter sticks, and tape measures. They will need to be taught how to actually use a ruler appropriately to measure the length of an object especially as to where to begin the measuring. Do you start at the end of the ruler or at the zero?	1.4.4: Identify measurement tools that could be used to measure length, capacity, and weight.
Domain: Measurement and Data Cluster: Measure and estimate lengths in standard units.	2.MD.2: Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.	Example: students should be asked to measure the length of an object first using inches, and then measure it again, but using centimeters. Then, students should be prompted to compare and analyze both of those measurements in relation to the length being measured. Students should conclude that it took more than twice the number of centimeter units to measure the object than it took using inches. Eventually, we want students to understand that the smaller the unit you choose to measure with, the more iterations you will need. This will lead to students being expected to make a decision about which unit(s) would be most appropriate to measure certain lengths (depending on the size of the object being measured). Students need multiple opportunities to measure using different units of measure. They should not be limited to measuring within the same standard unit. Students should have access to tools, both U.S. Customary and metric. The more students work with a specific unit of measure, the better they become at choosing the appropriate tool when measuring. Students measure the length of the same object using different tools (ruler with inches, ruler with centimeters, a yardstick, or meter stick). This will help students learn which tool is more appropriate for measuring a given object. They describe the relationship between the size of the measurement unit and the number of units needed to measure something. For instance, a student might say, "The longer the unit, the fewer I need." Multiple opportunities to explore provide the foundation for relating metric units to customary units, as well as relating within customary (inches to feet to yards) and within metric (centimeters to meters).	1.4.1: Measure with multiple copies of standard (e.g., inch tiles, foot-long lengths of string) or non-standard (e.g., paper clips, pencils) units of the same size.

[1] Explanations include excerpts from the Hawaii Department of Education Curriculum and Instruction Branch's crosswalk documents (http://standardstoolkit.k12.hi.us/index.html) and from the Arizona Department of Education Standards and Assessment Division's 2010 Academic Content Standards for Mathematics (http://www.ade.az.gov/standards/math/2010MathStandards/) with permission granted by Dr. Mary Knuck, Deputy Associate Superintendent.

Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Measurement and Data Cluster: Measure and estimate lengths in standard units.	2.MD.3: Estimate lengths using units of inches, feet, centimeters, and meters.	Estimation helps develop familiarity with the specific unit of measure being used. To measure the length of a shoe, knowledge of an inch or a centimeter is important so that one can approximate the length in inches or centimeters. Students should begin practicing estimation with items that are familiar to them (length of desk, pencil, favorite book, etc.). Some useful benchmarks for measurement are: • First joint to the tip of a thumb is about an inch. • Length from your elbow to your wrist is about a foot. • If your arm is held out perpendicular to your body, the length from your nose to the tip of your fingers is about a yard . 	None.
Domain: Measurement and Data Cluster: Measure and estimate lengths in standard units.	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 graders should be familiar enough with inches, feet, yards, centimeters, and meters to be able to compare the differences in lengths of two objects. They can make direct comparisons by measuring the difference in length between two objects by laying them side by side and selecting an appropriate standard length unit of measure. Students should use comparative phrases such as "It is longer by 2 inches" or "It is shorter by 5 centimeters" to describe the difference between two objects. An interactive whiteboard or document camera may be used to help students develop and demonstrate their thinking.	1.4.1: Measure with multiple copies of standard (e.g., inch tiles, foot-long lengths of string) or non-standard (e.g., paper clips, pencils) units of the same size.
Domain: Measurement and Data Cluster: Relate addition and subtraction to length.	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.	Related to standard 2.OA.1, this standard provides an opportunity to solve problems that have a measurement context. This should be taught as an extension of 2.OA.1. Students need experience working with addition and subtraction to solve word problems that include measures of length. It is important that word problems stay within the same unit of measure. Counting on and/or counting back on a number line will help tie this concept to previous knowledge. Some representations students can use include drawings, rulers, pictures, and/or physical objects. An interactive whiteboard or document camera may be used to help students develop and demonstrate their thinking.	1.10.1: Use objects, pictures, words, and number sentences to represent and solve numerical problem situations involving addition and subtraction.

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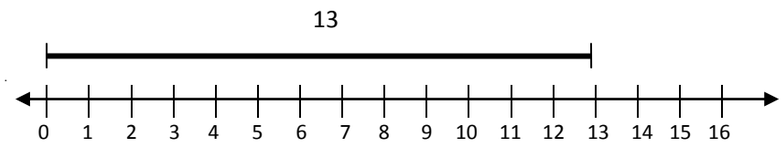
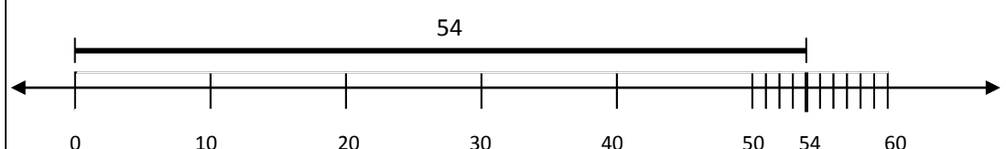
Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Measurement and Data Cluster: Relate addition and subtraction to length.	2.MD.6: Represent whole numbers as lengths from 0 on a number 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.	In previous grades students learned that a number names the number of objects in a set, and often used concrete objects (e.g., square tiles or linking cubes) to develop their understanding of one-to-one correspondence. For this standard, students are being expected to use the number line to represent whole numbers, so they must be able to recognize a semi-abstract representation of a number. Using a number line, students must understand that the "objects" they are counting up are the number of equally sized spaces along the number line. Thus, an emphasis of this standard must include developing and building upon the understanding that any number represents the length between 0 and that number. For example, the number 13 can be represented by showing 13 equally spaced units, and thus, the number 13 represents the distance between 0 and 13).  When representing large numbers, teachers should be reasonable about expecting students to show *all* of the tick marks on the number line. For example, to represent the number 54 on the number line, it is not recommended to have students make all 54 equally spaced units ("tick marks") on the number line. Rather, something like the following may be reasonable as long as the teacher helps students develop an understanding of what the spaces between each decade number means:  In addition, this standard asks students to represent their thinking when adding and subtracting within 100 by using a number line. Example: 10 – 6 = 4 ➔  This standard could be taught as an extension of related standards in grade 2 (e.g., 2.OA.1, 2.NBT.5).	None.

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Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Measurement and Data Cluster: Work with time and money.	2.MD.7: Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. ad p.m.	In first grade, students learned to tell time to the nearest hour and half-hour. Students build on this understanding in second grade by skip-counting by 5 to recognize 5-minute intervals on the clock. They need exposure to both digital and analog clocks. It is important that they can recognize time in both formats and communicate their understanding of time using both numbers and language. Common time phrases include the following: quarter till ___, quarter after ___, ten till ___, ten after ___, and half past ___. Students should understand that there are 2 cycles of 12 hours in a day - a.m. and p.m. Recording their daily actions in a journal would be helpful for making real-world connections and understanding the difference between these two cycles. An interactive whiteboard or document camera may be used to help students demonstrate their thinking.	1.4.3: Tell time to the half-hour and quarter-hour.
Domain: Measurement and Data Cluster: Work with time and money.	2.MD.8: Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ (dollars) and ¢ (cents) symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?	In the CCSS, this is the first learning expectation regarding money. Grades K and 1 do not have standards that introduce the identification and value of coins. Since money is not specifically addressed in kindergarten, first grade, or third grade, students should have multiple opportunities to identify, count, recognize, and use coins and bills in and out of context. They should also experience making equivalent amounts using both coins and bills. "Dollar bills" should include denominations up to one hundred ($1.00, $5.00, $10.00, $20.00, $100.00). This standard could be taught as an extension of 2.NBT.2. Counting up the value of a set of nickels or a set of dimes, students will draw upon their prior experiences with skip counting. Students should solve story problems connecting the different representations. These representations may include objects, pictures, charts, tables, words, and/or numbers. Students should communicate their mathematical thinking and justify their answers. An interactive whiteboard or document camera may be used to help students demonstrate and justify their thinking. Example: Sandra went to the store and received $ 0.76 in change. What are three different sets of coins she could have received?	1.4.2: Identify the value of coins and count coin combinations (using like coins) to a dollar.

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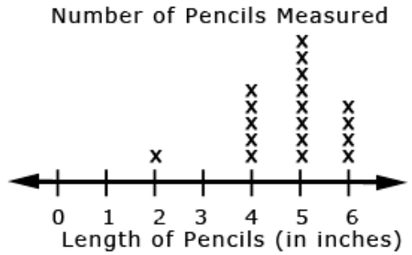
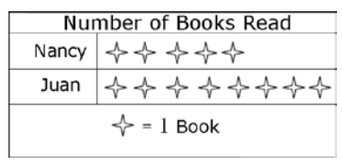
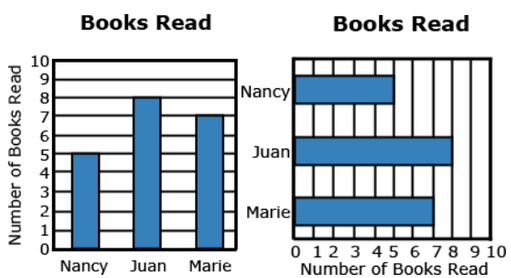
Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Measurement and Data Cluster: Represent and interpret data.	2.MD.9: Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.	This standard emphasizes representing data using a line plot. Students will use the measurement skills learned in earlier standards to measure objects. Line plots are first introduced in this grade level. A line plot can be thought of as plotting data on a number line. An interactive whiteboard may be used to create and/or model line plots.  	1.4.1: Measure with multiple copies of standard (e.g., inch tiles, foot-long lengths of string) or non-standard (e.g., paper clips, pencils) units of the same size.
Domain: Measurement and Data Cluster: Represent and interpret data.	2.MD.10: Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.	Students should draw both picture and bar graphs representing data that can be sorted up to four categories using single unit scales (e.g., scales should count by ones). The data should be used to solve put together, take-apart, and compare problems as listed in Table 1. In second grade, picture graphs (pictographs) include symbols that represent single units. Pictographs should include a title, categories, category label, key, and data.  Second graders should draw both horizontal and vertical bar graphs. Bar graphs include a title, scale, scale label, categories, category label, and data.  	1.11.1: Collect and organize information using concrete objects and pictures. 1.12.1: Interpret data using simple language (e.g., *more*, *less*, *fewer*, *equal*).

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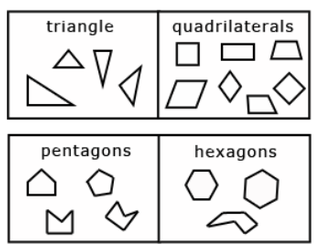
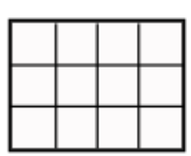
Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Geometry Cluster: Reason with shapes and their attributes.	2.G.1: Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)	For example, if asking a student to draw (or identify) an isosceles triangle, the student does not have to measure the sides, but should be able to recognize that two sides are equal (with a 3rd side that is either larger or smaller). When drawing an isosceles triangle, the second equal side should replicate the approximate length of the first segment that was drawn. Students identify, describe, and draw triangles, quadrilaterals, pentagons, and hexagons. Pentagons, triangles, and hexagons should appear as both regular (equal sides and equal angles) and irregular. Students recognize all four sided shapes as quadrilaterals. Students use the vocabulary word "angle" in place of "corner" but they do not need to name angle types. Interactive whiteboards and document cameras may be used to help identify shapes and their attributes. Shapes should be presented in a variety of orientations and configurations. 	1.5.1: Identify basic three-dimensional geometric solids (e.g., cube, sphere, rectangular prism). 1.5.2: Identify attributes and parts of common two- and three-dimensional shapes.
Domain: Geometry Cluster: Reason with shapes and their attributes.	2.G.2: Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	This standard is related to 2.OA.4, and should be learned as an extension of students' prior knowledge and experiences with arrays. This standard is a precursor to learning about the area of a rectangle and using arrays for multiplication. An interactive whiteboard or manipulatives such as square tiles, cubes, or other square-shaped objects can be used to help students partition the rectangles. Rows are horizontal and columns are vertical. 	None.

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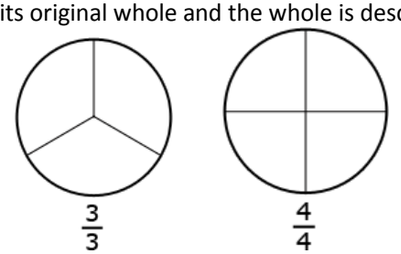
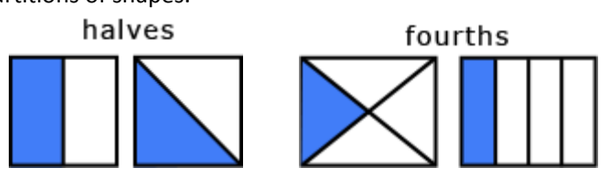
Domain and Cluster	2nd Grade Common Core State Standard	Explanation of the Standard[1]	Students' Prior Learning Experiences *(Related grade 1 HCPS III benchmarks)*
Domain: Geometry Cluster: Reason with shapes and their attributes.	2.G.3: Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.	This standard builds upon students' prior knowledge and experiences in grade 1 (e.g., 1.G.3). This learning expectation provides a concrete representation of and a rudimentary introduction to the concepts of division (partitioning into "equal shares") and fractions. In addition, this standard compels a variety of learning activities (including *kinesthetic* learning activities) with objects that should be purposefully designed to help students **make a connection between their actions performed upon the concrete objects** (e.g., folding a sheet of paper to show 2 equal parts) **and the mathematical idea being represented as a result of that action** (e.g., that one side of the fold represents one-half of the whole). This standard introduces fractions in an area model. Students need experiences with different sizes, circles, and rectangles. For example, students should recognize that when they cut a circle into three equal pieces, each piece would equal one third of its original whole. In this case, students should describe the whole as three thirds. If a circle is cut into four equal pieces, each piece will equal one fourth of its original whole and the whole is described as four fourths.  $\frac{3}{3}$ $\frac{4}{4}$ Students should see circles and rectangles partitioned in multiple ways so they learn to recognize that equal shares can be different shapes within the same whole. An interactive whiteboard may be used to show partitions of shapes.  It is critical that students develop an understanding of fractions as numbers. The number $^1/_2$ (or $^1/_3$, $^2/_3$, $^1/_4$, $^2/_4$, or $^3/_4$) means, for example, "I sliced the pizza into 2 equal parts and I took 1 of those pieces." Students should develop a cognitive map for reading a fraction, such as, "the bottom number tells me how many equal parts there are in the whole pizza, and the top number tells me how many of those parts I took." Further, learning experiences should help students develop an understanding of $^2/_2$, $^3/_3$, and $^4/_4$ as equivalents of 1. Students should have numerous experiences relating concrete and pictorial representations of fractions to their symbolic representation.	1.1.2: Identify representations of simple fractions (e.g., one-half, one-third, one fourth).

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Table 1. Common addition and subtraction situations. (Adapted from Box 2-4 of Mathematics Learning in Early Childhood, National Research Council, 2009, pp. 32, 33).

	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 = ?	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	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
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ?	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 – ? = 3	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
	Total Unknown	**Addend Unknown**	**Both Addends Unknown** (Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.)
Put Together / Take Apart (These "take apart" situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.)	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 – 3 = ?	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
	Difference Unknown	**Bigger Unknown**	**Smaller Unknown**
Compare (For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.)	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("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 = ?	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 – 3 = ?, ? + 3 = 5

[1] Explanations include excerpts from the Hawaii Department of Education Curriculum and Instruction Branch's crosswalk documents (http://standardstoolkit.k12.hi.us/index.html) and from the Arizona Department of Education Standards and Assessment Division's 2010 Academic Content Standards for Mathematics (http://www.ade.az.gov/standards/math/2010MathStandards/) with permission granted by Dr. Mary Knuck, Deputy Associate Superintendent.