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| **Prerequisite Skills** | **Trimester 2**  **Grade 1** | **Looking Ahead** |
| Count to 120.  (Trimester 1) | Numbers and Operations in Base Ten 1: Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral   * I can write numerals up to 120. * I can write a numeral to represent a number of objects. * I can count to 120 starting with a given number. | 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.  (Grade 2) |
| Compose and decompose numbers from 11 to 19.  (Kindergarten)  Draw an equation.  (Kindergarten) | Numbers and Operations in Base Ten 2: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases.  a. 10 can be thought of as a bundle of ten ones – called a “ten”  b. The numbers from 11 – 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.  c. The numbers 10,20,30,40,50,60, 70, 80, 90 refer to one, two, three, four, five, six, seven eight, or nine tens (0 ones).   * I can explain what each digit of a two-digit number represents. * I can identify a bundle of 10 ones as a “ten”. * I can represent numbers 11 to 19 as a 10 and ones. * I can represent numbers 20 to 90 as tens and zero ones. |
| Number and Operations in Base Ten 4: Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.   * I can show that in adding 2 digit numbers, you add ones to ones and tens to tens. * I can add a 2 digit number and a 1 digit number within 100. * I can add a 2 digit number and a multiple of 10 within 100. * I can relate the strategy to an equation and explain why I used it. | I can recognize when to regroup to compose (make) a ten. (Trimester 3) |
| \*This concept is introductory in first grade. | Number and Operations in Base Ten 6: Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.   * I can choose a strategy to solve subtraction problems with multiples of 10 up to 90. * I can choose a strategy to solve subtraction problems with multiples of 10, * I can relate the strategy to an equation and explain why I chose the strategy. | Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900. |
| Word problems within 10. (Trimester 1) | Operations and Algebraic Thinking 1: Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.   * I can solve word problems * I can use equations to represent a problem. * I can use a symbol (e.g. ?, x) to represent an unknown number in a problem. * I can determine the operation to solve word problems with unknowns.   **Note: Word problems with sums within 20.** | Word problems with sums within 20 using higher level problems. (Trimester 3) |
| Fluently add and subtract within 5.  (Kindergarten) | Operations and Algebraic Thinking 3: Apply properties of operations as strategies to add and subtract  *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*   * I can use strategies to solve addition and subtraction problems. | I can explain how properties of addition and subtraction work.  (Trimester 3) |

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| **Prerequisite Skills** | **Trimester 2**  **Grade 1** | **Looking Ahead** |
| Solve subtraction story problems within 10 by using objects or drawings.  (Kindergarten) | Operations and Algebraic Thinking 4: Understand subtraction as an unknown-addend problem*.*  *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.*  **Add and subtract within 20.**   * I can identify the unknown in a subtraction problem. * I can solve subtraction problems to find the missing addend. | I can explain the relationship of addition and subtraction.  (Trimester 3) |
| Count to 100 by ones and by tens.  Count forward beginning from a given number. | Operations and Algebraic Thinking 5: Relate counting to addition and subtraction ( by counting on 2 to add 2).   * I can count on from a given number and explain how it relates to addition. * I can count back from a given number and how it relates to subtraction. | Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.  (Grade 2) |
| Fluently add and subtract within 5.  Decompose numbers less than or equal to 10 | Operations and Algebraic Thinking 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 (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).   * I can use strategies to add and subtract within 20. * I can add and subtract fluently within 10. * I can subtract fluently within 10. * I can decompose numbers within 10. | Fluently add and subtract within 20 using mental strategies. By the end of grade 2, know from memory all sums of two one-digit numbers.  (Grade 2)  Students will continue practice with this standard in Trimester 3. |
| Compare two objects to see which object has “more of”/“less of”. | Measurement and Data 1: Order three objects by length; compare the lengths of two objects indirectly by using a third object.   * I can put 3 objects in order by length and compare them. * I can compare the lengths of two objects by using a third object to compare them. | Measure and estimate using standard units (metric + standard).  (Grade 2) |
| Describe the length of a single object. | Measurement and Data 2: Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.  *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*   * I can measure and show the length using a variety of non-standard units. * I can express the length of the measured object as a number. |
| \*Telling time is introductory in first grade. | Measurement and Data 3: Tell and write time in hours and half-hours using analog and digital clocks.   * I can recognize and identify that analog and digital clocks are objects that measure time. * I can identify hour hand and minute hand and distinguish between the two. * I can determine where the minute hand must be when the time is to the hour (o’clock) and half hour (thirty). * I can tell time to the hour and half hour using analog and digital clocks. * I can write and show time to the hour and half hour using analog and digital clocks. * I can describe the relationship among standard units of time: minutes, hours, days, weeks, months and years. | Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.  (Grade 2) |
| \*Introductory in first grade. | Measurement and Data 4: Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.   * I can identify different methods to organize and represent data (e.g. tally chart, sorting, classifying, categorizing). * I can interpret data representation by asking and answering questions about data. * I can represent and organize data with up to 3 categories (e.g. tally, chart, bar graph, pictograph, etc.) | Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories.  (Grade 2) |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Number and Operations in Base Ten 1:  Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. | * I can write a numeral to represent a number of objects. * I can count to 120 starting with a given number. * I can read and write numerals up to 120. |  |  | | --- | | **What does this standard mean the students will know and be able to do?** | | * Rote count forward to 120 by *Counting On* from any number less than 120 * Count from different starting points (e.g., start at 83; count to 120). * See patterns between numbers on the hundreds chart (ex. all of the numbers in a column on the hundreds chart have the same digit in the ones place) * Write and represent a number of objects with a written numeral (number form or standard form) * Represent a number of objects with cubes, place value (base 10) blocks, pictorial representations or other concrete materials. * Use objects, words, and/or symbols to express their understanding of numbers * Develop accurate counting strategies (counting by 1s, 2s, 5s or 10s) * Build an understanding of how the numbers in the counting sequence are related—each number is one more (or one less) than the number before (or after) * After counting objects, students write the numeral or use numeral cards to represent the number. * Given a numeral, students read the numeral, identify the quantity that each digit represents using numeral cards, and count out the given number of objects.   **Strategies:**   * Students use materials to count by ones and tens to a build models that represent a number, then they connect this model to the number word and its representation as a written numeral. * Students learn to use numerals to represent numbers by relating their place-value notation to their models. * They build on their experiences with numbers 0 to 20 in Kindergarten to create models for 21 to 120 with groupable and pregroupable materials. * Students represent the quantities shown in the models by placing numerals in labeled hundreds, tens and ones columns. They eventually move to representing the numbers in standard form, where the group of hundreds, tens, then singles shown in the model matches the left-to-right order of digits in numbers. * Listen as students orally count to 120 and focus on their transitions between decades and the century number. These transitions will be signaled by a 9 and require new rules to be used to generate the next set of numbers. * Students need to listen to their rhythm and pattern as they orally count so they can develop a strong number word list. |  |  |  | | --- | --- | | **Supplemental Resources for Number and Operations in Base Ten 1** | | | [Rainbow Numbers](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32155.pdf) |  |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Numbers and Operations in Base Ten 2:  Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases.  a. 10 can be thought of as a bundle of ten ones – called a “ten”  b. The numbers from 11 – 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.  c. The numbers 10,20,30,40,50,60, 70, 80, 90 refer to one, two, three, four, five, six, seven eight, or nine tens (0 ones). | * I can explain what each digit of a two-digit number represents. * I can identify a bundle of 10 ones as a “ten”. * I can represent numbers 11 to 19 as a 10 and ones. * I can represent numbers 20 to 90 as tens and zero ones. |  |  |  |  | | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | **NBT.2a**   * This is the foundation of the place value system. * Students can see ten cubes as a bundle- one bundle of ten. | **NBT.2b**   * Explore the idea that teen numbers (11 to 19)can be expressed as 1 ten and some leftover ones   **Example:** For the number 12, do you have enough to make a ten? Would you have any leftover? If so, how many leftovers would you have?  Student 1: I filled a ten frame to make one ten and had two counters left over. I had enough to make a ten with some leftover. The number 12 has 1 ten and 2 ones.  Student 2: I counted out 12 place value cubes. I had enough to trade 10 cubes for a ten-rod (stick). I now have 1 ten-rod and 2 cubes left over. So the number 12 has 1 ten and 2 ones. | **NBT.2c**   * Builds on the work of NBT.2b. * Explore the idea that decade numbers (e.g. 10, 20, 30, 40) are groups of tens with no left over ones. | | **Strategies**   * Opportunities to count books, cubes, pennies, etc. Counting 30 or more objects supports grouping to keep track of the number of objects.) * Count between 10 and 20 objects and make a bundle of 10 with or without some left over * Ask students to represent various amounts * Use multiple representations of making tens using base-ten blocks, bundles of tens and ones, and ten-frames | | |  |  |  | | --- | --- | | **Supplemental Resources for Number and Operations in Base Ten 2** | | | [Cube Collections](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32164.pdf) | [Button Boxes](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32165.pdf) |  |  |  |  |  | | --- | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision2.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Number and Operations in Base Ten 4:  Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. | * I can show that in adding 2 digit numbers, you add ones to ones and tens to tens. * I can add a 2 digit number and a 1 digit number within 100. * I can add a 2 digit number and a multiple of 10 within 100. |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | | | | * Use concrete models, drawings and place value strategies to add and subtract within 100 * Represent a problem situation using any combination of words, numbers, pictures, physical objects, or symbols * Develop addition strategies- the intent is not to introduce traditional algorithms or rules * Record expressions horizontally * Connect a 0-99 chart or a 1-100 chart to their invented strategy for finding 10 more and 10 less than a given number. Ask them to record their strategy and explain their reasoning. | | | | | | | **Examples** | | | | | | | **43 + 36**  Student counts the 1s (10, 20, …70 or 1, 2,…7 tens) and then the 1s. | **28 + 34**  Student thinks: 2 tens plus 3 tens is 5 tens or 50. She counts the ones notices there is another 10 plus 2 more. 50 and 10 is 60 plus 2 more is 62. | **45 + 18**  Student thinks: Fours 10s and on 10 are 5 tens or 50. Then 5 and 8 is 5 + 5 + 3 or (8 + 2 + 3) or 13. 50 and 13 is 6 tens plus 3 more or 63. | **29 + 14**  Student thinks: 29 is almost 30. I added one to 29 to get to 30. 30 and 14 is 44. Since I added one to 29, I have to subtract one so the answer is 43. | **There are 37 children on the playground. 20 more children show up. How many children are now on the playground?**  Student uses mental math. I started at 37 and counted on 3 to get to 40. Then, I added 20 which is 2 tens, to land on 60. So, there are 60 people on the playground. | **There are 37 children on the playground. 20 more children show up. How many children are now on the playground?**  I used a number line. I started on 37. Then I broke up 23 into 20 and 3 in my head. Next, I added 3 ones to get to 40. I then jumped 10 to get to 50 and 10more to get to 60. So, there are 60 children on the playground. |  |  | | --- | | **Supplemental Resources for Number and Operations in Base Ten 4** | | Teachers will use Investigations materials to teach this standard. If more practice is needed teams of teachers may find or create more experiences with this concept. |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others5.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics4.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Number and Operations in Base Ten 6:  Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used. | * I can choose a strategy to solve subtraction problems with multiples of 10 up to 90. * I can choose a strategy to solve subtraction problems with multiples of 10,   I can relate the strategy to an equation and explain why I chose the strategy. |  |  |  | | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | |  | | --- | | * Use concrete models, drawings and place value strategies to subtract multiples of 10 from decade numbers (e.g., 30, 40, 50). * Have multiple experiences representing numbers that that are multiples of 10 (e.g.90) with models or drawings and then using these multiples to subtract. * Develop fluency of addition and subtraction facts. | | | | **Examples:** | | | **70 - 30:** Seven 10s take away three 10s is four 10s.  **80 - 50:** 80, 70 (one 10), 60 (two 10s), 50 (three 10s), 40 (four 10s), 30 (five 10s).  **60 - 40:** I know that 4 + 2 is 6 so four 10s + two 10s is six 10s so 60 - 40 is 20. | **There are 60 students in the gym. 30 students leave. How many students are still in the gym?**   |  |  |  |  | | --- | --- | --- | --- | | **Student 1**  I used a hundreds chart and started at 60. I moved up 3 rows to land on 30. There are 30 students left. | **Student 2**  I used place value blocks or unifix cubes to build towers of 10. I started with 6 towered of 10 and removed 3. Had 3 towers left. 3 towers have a value of 30. There are 30 students left. | **Student 3**  Students mentally apply their knowledge of addition to solve this subtraction problem. I know that 30 plus 30 is 60, so 60 minus 30 equals 30. There are 30 students left. | **Student 4**  I used a number line. I started at 60 and moved back 3 jumps of 10 and landed on 30. There are 30 students left. | |  |  | | --- | | **Supplemental Resources for Number and Operations in Base Ten 6** | | Teachers will use Investigations materials to teach this standard. If more practice is needed teams of teachers may find or create more experiences with this concept. |  |  |  |  |  | | --- | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others5.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations and Algebraic Thinking 1:  Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. | * I can solve word problems. * I can use equations to represent a problem. * I can use a symbol (e.g. ?, x) to represent an unknown number in a problem. * I can determine the operation to solve word problem.   Note: word problems with sums within 20 |  |  |  | | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | * Builds on the work in Kindergarten by having students use a variety of mathematical representations (e.g., objects, drawings, and equations) during their work. The unknown symbols should include boxes or pictures, and not letters.   **Strategies:**   * Teachers should be cognizant of the three types of problems: Result Unknown, Change Unknown, and Start Unknown. Students use objects or drawings to represent the different situations. * Use informal language (and, minus/subtract, the same as) to describe joining situations (putting together) and separating situations (breaking apart). * Use the addition symbol (+) to represent joining situations, the subtraction symbol (-) to represent separating situations, and the equal sign (=) to represent a relationship regarding quantity between one side of the equation and the other. * A helpful strategy is for students to recognize sets of objects in common patterned arrangements (0-6) to tell how many without counting (subtizing). * Contextual problems that are closely connected to students’ lives should be used to develop fluency with addition and subtraction. | | | **Examples:** | | | **Take From**  Abel has 9 balls. He gave 3 to Susan. How many balls does Abel have now? | **Compare**  Abel has 9 balls. Susan has 3 balls. How many more balls does Abel have than Susan?  A student will use 9 objects to represent Abel’s 9 balls and 3 objects to represent Susan’s 3 balls. Then they will compare the 2 sets of objects. |  |  |  |  | | --- | --- | --- | | **Supplemental Lessons and Resources for Operations and Algebraic Thinking 1** | | | | Kathy Richardson: 1:3-10, Grow and Compare, page 158 | Kathy Richardson: 1:3-13, Stack, Tell, Spin & Win, page 161 -162 | Kathy Richardson: 1:3-18, Comparing Handfuls, page 168-169 |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them5.html) | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others5.html) | | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics4.html) | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically5.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision2.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations and Algebraic Thinking 3:  Apply properties of operations as strategies to add and subtract. *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)* | * I can use strategies to solve addition and subtraction problems. |  |  | | --- | | **What does this standard mean the students will know and be able to do?** | | * Apply properties of operations as strategies to **add** and **subtract**. Students do not need to use formal terms for these properties. * Use mathematical tools, such as cubes and counters, and representations such as the number line and a 100 chart to model these ideas.   A student can build a tower of 8 green cubes and 3 yellow cubes and another tower of 3 yellow and 8 green cubes to show that order does not change the result in the operation of addition. Students can also use cubes of 3 different colors to prove that (2 + 6) + 4 is equivalent to  2 + (6 + 4) and then to prove 2 + 6 + 4 = 2 + 10.  Students should understand the important ideas of the following properties:   * Identity property of addition (e.g., 6 = 6 + 0) * Identity property of subtraction (e.g., 9 – 0 = 9) * Commutative property of addition--Order does not matter when you add numbers. e.g. 4 + 5 = 5 + 4) * Associative property of addition--When adding a string of numbers you can add any two numbers first. (e.g., 3 + 9 + 1 = 3 + 10 = 13)   Another student uses a number balance to investigate the commutative property. If I put a weight on 8 *first* and *then* 2, I think that it will balance if I put a weight on 2 *first* this time *then* on 8.    Students need several experiences investigating whether the commutative property works with subtraction. The intent is not for students to experiment with negative numbers but only to recognize that taking 5 from 8 is not the same as taking 8 from 5. Students should recognize that they will be working with numbers later on that will allow them to subtract larger numbers from smaller numbers. However, in first grade we do not work with negative numbers. |  |  | | --- | | **Supplemental Lessons and Resources for Operations and Algebraic Thinking 3** | | Teachers will use Investigations materials to teach this standard. If more practice is needed teams of teachers may find or create more experiences with this concept. |  |  |  |  |  | | --- | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | | [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them5.html) | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others5.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics4.html) | | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically5.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision2.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations and Algebraic Thinking 4:  Understand subtraction as an unknown-addend problem*.*  *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.* **Add and subtract within 20.** | * I can identify the unknown in a subtraction problem. * I can solve subtraction problems to find the missing addend. |  |  |  |  | | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | * Usesubtraction in the context of unknown addend problems (e.g. If I have5, how many more do I need to make 12?) * Record thinking symbolically, 5+?=12 * Use a variety of strategies: counting objects, creating drawings, counting up, using number lines or 10 frames to determine an answer | | | | **Example:**  **12 – 5 = \_\_ could be expressed as 5 + \_\_ = 12.**  Students should use cubes and counters, and representations such as the number line and the100 chart, to model and solve problems involving the inverse relationship between addition and subtraction. | | | | **Student 1**  I used a ten frame. I started with 5 counters. I now that I had to have 12, which is one full ten frame and two left overs. I needed 7 counters, so 12 – 5 = 7 | **Student 2**  I used a part-part-whole diagram. I put 5 counters on one side. I wrote 12 above the diagram. I put counters into the other side until there were 12 in all. I know I put 7 counters into the other side, so 12 - 5 = 7. | **Student 3**  Draw a number line.  I started at 5 and counted up until I reached 12. I counted 7 numbers, so I knew that 12 – 5 = 7. |  |  | | --- | | **Supplemental Lessons and Resources for Operations and Algebraic Thinking 4** | | Teachers will use Investigations materials to teach this standard. If more practice is needed teams of teachers may find or create more experiences with this concept. |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations and Algebraic Thinking 5:  Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). | * I can count on from a given number and explain how it relates to addition. * I can count back from a given number and how it relates to subtraction. |  |  |  |  |  | | --- | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | | * Make a connection between counting and adding and subtraction * Use various counting strategies, including **counting all, counting on, and counting back** with numbers up to 20 * Move beyond counting all and become comfortable at counting on and counting back * Students are able to hold the ―start number‖ in their head and count on from that number   **Strategies:**   * Help students make connections when counting on 3 from 4, they should write this as 4 + 3 = 7. When students count back (3) from 7, they should connect this to 7 – 3 = 4. Students often have difficulty knowing where to begin their count when counting backward. | | | | | **Examples:** | | | | | **Counting All**  5 + 2 = \_\_\_\_  The student counts five counters. The student adds two more. The student counts 1, 2, 3, 4, 5, 6, 7 to get the answer. | **Counting On**  5 + 2 = \_\_\_\_  The student counts five counters. The student adds the first counter and says 6, then adds the second counter and says 7. The student knows the answer is 7 because they counted on 2. | **Counting All**  12 – 3 = \_\_\_\_  The student counts twelve counters. The student removes 3 of them. The student counts 1, 2, 3, 4, 5, 6, 7, 8, 9 to get the answer. | **Counting Back**  12 – 3 = \_\_\_\_  The student counts 12 counters. The student removes a counter and says 11, removes another counter and says 10, removes another counter and says 9. The student knows the answer is 9, since they counted back 3. |  |  |  |  | | --- | --- | --- | | **Supplemental Lessons and Resources for Operations in Algebraic Thinking 5** | | | | Kathy Richardson: 1:3-9, Build a Stack, page 157 | Kathy Richardson: 1:3-10, Grow and Compare, p. 158 | Kathy Richardson: 1:3-18, Comparing Handfuls, page 168 - 169 |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations and Algebraic Thinking 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 (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13). | * I can use strategies to add and subtract within 20. * I can add and subtract fluently within 10. * I can subtract fluently within 10. * I can decompose numbers within 10. |  |  |  |  |  | | --- | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | | * Fluently add and subtract numbers to 10. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly (use of different strategies), accurately, and efficiently. * Experience adding and subtracting within 20 * Use a **variety** of strategies when adding and subtracting numbers within 20. Students should have ample experiences modeling these operations before working on fluency.   **Strategies:**   * Differentiate using smaller numbers. * Move beyond the strategy of counting on because it can become a hindrance when working with larger numbers. | | | | | **Examples:** | | | | | **Making 10 and Decomposing a Number**  **8 + 7 = \_\_\_\_\_**  I know that 8 plus 2 is 10, so I decomposed (broke) the 7 up into 2 and 5. First, I added 8 and 2 to get 10, and then added the 5 to get 15.  8+7=(8+2) +5=10 +5=15 | **Creating an Easier Problem with Known Sums**  **14 – 6 = \_\_\_\_\_**  I know that 8 is 7+1. I also know that 7 and 7 equal 14 and I added 1 more to get 15.  8+7=(7+7)+1=15 | **Decomposing the number you subtract**  **14 – 6 = \_\_\_\_\_**  I know that 14 minus 4 is 10 so I broke the 6 up into a 4 and a 2. 14 minus 4 is 10. Then I take away 2 more to get 8.  14-6=(14-4)-2=10-2=8 | **Relationship between addition and subtraction**  **14 – 6 = \_\_\_\_\_**  6 +\_\_\_\_=14. I know that 6 plus 8 is 14, so that means that 14-6=8.  6+8=14 so 14-6=8 |  |  |  |  | | --- | --- | --- | | **Supplemental Lessons and Resources for Operations in Algebraic Thinking 6** | | | | Kathy Richardson: 2:2-12, Snap It, page 56-57 | Kathy Richardson: 2:2-12, Counting Boards: Number Combinations, p. 73 | Kathy Richardson: 2:2-15, Number Arrangements Using Color Tiles, page 80 | | Kathy Richardson: 2:2-27, Building and Rebuilding, p. 98 | Kathy Richardson: 2:2-22,24,25,26, Number Train Arrangements, page 92-97 | Kathy Richardson: 2:3-15, Build-A-Floor Race, p. 133-135 |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Measurement and Data 1:  Order three objects by length; compare the lengths of two objects indirectly by using a third object. | * I can put 3 objects in order by length and compare them. * I can compare the lengths of two objects by using a third object to compare them. |  |  |  | | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | * Indirectly measure objects by comparing the length of two objects by using a third object as a measuring tool. (transitivity) * Understand length is measured from one end point to another end point * Use bigger and smaller to compare objects and explain why * Understand that both the length and the width of an object are measurements of length * Understand what a unit of measure is and how it is used to find a measurement * Experience with informal or nonstandard units promote the need for measuring with standard units * Create measuring tools   **Example:**  Which is longer: the height of the bookshelf or the height of a desk? | | | **Examples:** | | | * Order three students by their height * Order pencils, crayons, and/or markers by length * Build three towers (with cubes) and order them from shortest to tallest * Three students each draw one line, then order the lines from longest to shortest | **Comparing Indirectly:**  Two students each make a dough ―snake.‖ Given a tower of cubes, each student compares his/her snake to the tower. Then students make statements such as, ―My snake is longer than the cube tower and your snake is shorter than the cube tower. So, my snake is longer than your snake.‖ |  |  |  | | --- | --- | | **Supplemental Lessons and Resources for Measurement and Data 1** | | | [Put Them In Order](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32166.pdf) | [Longer, Shorter or the Same](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32306.pdf) |  |  |  | | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision2.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learer Objectives** | | Measurement and Data 2: Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.  *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.* | * I can measure and show the length using a variety of non-standard units. * I can express the length of the measured object as a number. |  |  |  | | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | * Use multiple copies of one object to measure a larger object. (*iteration)* T * Recognize the importance of making sure that there are not any gaps or overlaps in order to get an accurate measurement. * Understand not all objects will measure to an exact whole unit (e.g. about 6 paper clips long) | | | **Examples:** | | | **How long is the paper in terms of paper clips?** | **Ask students to use multiple units of the same object to measure the length of a pencil. (How many paper clips will it take to measure how long the pencil is?)** |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Supplemental Lessons and Resources for Measurement and Data 2** | | | | | | [Popsicle Sticks](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32310.pdf) | [Unifix Cubes](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32311.pdf) | [Jump Rope](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32312.pdf) | [Feet](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32468.pdf) | [Giant Feet](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32469.pdf) |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically5.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision2.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objective** | | Measurement and Data 3:  Tell and write time in hours and half-hours using analog and digital clocks. | * I can recognize and identify that analog and digital clocks are objects that measure time. * I can identify hour hand and minute hand and distinguish between the two. * I can determine where the minute hand must be when the time is to the hour (o’clock) and half hour (thirty). * I can tell time to the hour and half hour using analog and digital clocks. * I can write and show time to the hour and half hour using analog and digital clocks. * I can describe the relationship among standard units of time: minutes, hours, days, weeks, months and years. |  |  | | --- | | **What does this standard mean the students will know and be able to do?** | | * Read both analog and digital clocks. * Orally tell and write the time to the hour and half-hour.   **Ideas to support telling time**:   * within a day, the hour hand goes around a clock twice (the hand moves only in one direction) * when the hour hand points exactly to a number, the time is exactly on the hour * time on the hour is written in the same manner as it appears on a digital clock * the hour hand moves as time passes, so when it is half way between two numbers it is at the half hour * there are 60 minutes in one hour; so halfway between an hour, 30 minutes have passed * half hour is written with ―30‖ after the colon * The idea of 30 being ―halfway‖ is difficult for students to grasp. Students can write the numbers from 0 - 60 counting by tens on a sentence strip. Fold the paper in half and determine that halfway between 0 and 60 is 30. A number line on an interactive whiteboard may also be used to demonstrate this. |  |  |  |  | | --- | --- | --- | | **Supplemental Lessons and Resources for Measurement and Data 3** | | | | [The Alarm Clock](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32322.pdf) | [Analog and Digital Clocks](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32323.pdf) | [Danny’s School Day](https://s3.amazonaws.com/quantile-resources/resources/downloads/QuantileResource32325.pdf) |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically5.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision2.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure3.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objective** | | Measurement and Data 4:  Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. | * I can identify different methods to organize and represent data (e.g. tally chart, sorting, classifying, categorizing). * I can interpret data representation by asking and answering questions about data. * I can represent and organize data with up to 3 categories (e.g. tally, chart, bar graph, pictograph, etc.) |  |  | | --- | | **What does this standard mean the students will know and be able to do?** |  |  | | --- | | * Create graphs and tally charts using data relevant to their own lives (e.g. favorite ice, eye color, ect.) * Work with data in multiple ways---organize, represent, and interpret * Experience posing a question with 3 possible responses |  |  | | --- | | **Example** | | **Students pose a question and the 3 possible responses.**  Which is your favorite flavor of ice cream: chocolate, vanilla or strawberry?  Students collect their data by using tallies or another way of keeping track.  Students organize their data by totaling each category in a chart or table.   |  |  | | --- | --- | | **What is Your Favorite Flavor of Ice Cream?** | | | Chocolate | 12 | | Vanilla | 5 | | Strawberry | 6 |   Students interpret the data by comparing categories. (See example comparisons below)  **Examples of comparisons:**  *What does the data tell us? Does it answer our question?*   * More people like chocolate than the other two flavors. * Only 5 people liked vanilla. * Six people liked Strawberry. * 7 more people liked Chocolate than Vanilla. * The number of people that liked Vanilla was 1 less than the number of people who liked Strawberry. * The number of people who liked either Vanilla or Strawberry was 1 less than the number of people who liked chocolate. * 23 people answered this question. |  |  |  |  | | --- | --- | --- | | **Supplemental Lessons and Resources for Measurement and Data 4** | | | | Kathy Richardson: 1:1-38, Sorting Colors, p. 65-66 |  |  |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively1.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others5.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics4.html) | | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically5.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision2.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) | |

**Optional Lesson Progression**

Unit 3: Solving Story Problems – Addition, Subtraction and the Number System 2

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| **Investigation** | **Page Numbers** | **Primary Focus** | | **Standard** |
| 2.1 | 80 – 85 | I can determine the operation to solve word problems with unknown.  I can use strategies to add and subtract within 20. | OA.1  OA.6 | |
| 2.2 | 86 – 92 |
| 2.3 | 93 – 99 |
| 3.1 | 106 - 109 |
| 3.2 | 110 - 116 | I can explain the properties of addition and subtraction.  I can decompose numbers up to 10. | OA.3 | |
| 3.3 | 117 – 121 | I can explain the properties of addition and subtraction.  I can decompose numbers up to 10.  I can determine the operation to solve word problems with unknown.  I can use strategies to add and subtract within 20. | OA.3  OA.1  OA.6 | |
| 3.4 | 122 – 126 |
| 3.5 | 127 – 132 | I can determine the operation to solve word problems with unknown. |  | |
| Tens and some more  Van De Walle K – 3 page 55 and ten and some more activities, select one | | I can build numbers with base ten blocks.   * Supplemental Unit Activities * From O’Connell – Ten & Some More, Cookie activitiy, Ten More, Ten more chocolate chips | NBT.2 | |
| Richardson Book 3  Page 68 – 75  (select whole group activities) | | I can build numbers with base ten blocks. | NBT.2 | |
| Richardson Book 3  Page 76 – 88  (select small group activities) | | I can build numbers with base ten blocks. | NBT.2 | |
| 4.1 | 140 – 143 | I can count and write numerals up to 120. | NBT.1 | |
| 4.2 | 144 – 147 |
| 4.3 | 148 – 152 |
| 4.4 | 153 – 156 |
| 4.5 | 157 – 160 |
| 4.6 | 161 – 165 | I can count and write numerals up to 120.   * Use 120 chart (LINK) or 101-200 chart (provided in Investigations) | NBT.1 | |
| 4.7 | 166-170 | I can count and write numerals up to 120.   * Use 120 chart (LINK) or 101-200 chart (provided in Investigations) | NBT.1 | |
| 4.8 | 171-175 | I can explain the properties of addition and subtraction.  I can decompose numbers up to 10.  I can determine the operation to solve word problems with unknown.  I can use strategies to add and subtract within 20. | NBT.1 | |

**\*Units length is approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**

**Optional Lesson Progression**

Unit 4

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| **Investigation** | **Page Numbers** | **Primary Focus** | | **Standard** |
| 1.1 | 22 – 27 | I can identify different methods to organize and represent data.  I can identify attributes that make a shape. | MD.4  G.1 | |
| 1.2 | 28 – 33 | I can classify shapes by their attributes. | G.1 | |
| 1.3 | 34 – 39 |
| 1.4 | 40 – 46 |
| 2.1 | 52 – 59 | I can identify different methods to organize and represent data. | MD.4 | |
| 2.2 | 60 – 66 | I can identify different methods to organize and represent data.  I can organize and represent data up to 3 categories.  I can interpret data representation by asking and answering questions about the data. | MD.4 | |
| 2.3 | 67 – 74 |
| 2.4 | 75 - 79 |
| 2.5 | 80 – 84 |
| 3.4A | CC 23 – CC 27 |
| 3.4 | 110 – 114 |

**\*Unit length is approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**

Unit 5

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| **Investigation** | **Page Numbers** | **Primary Focus** | | **Standard** |
| 1.1 | 22 – 27 | I can use the same size nonstandard objects to measure length.  I can express the length of the measured object as a number. | MD.2 | |
| 1.2 | 28 – 33 |
| 1.3 | 34 – 40 |
| 1.4 | 41 – 47 | I can determine the operations to solve word problems with unknowns. | OA.1 | |
| 1.5A | CC 31 – CC 36 | I can recognize the analog and digital clocks are objects that measure time.  I can identify hour hand and minute hand and distinguish between the two. | MD.3 | |
| 2.1 | 62 – 67 | I can measure length of a variety of nonstandard units.  I can express the length of the measured object as a number. | MD.2 | |
| 2.2 | 68 – 72 |
| 2.3 | 73 – 77 |
| 2.4 | 78 – 81 | I can measure length of a variety of nonstandard units.  I can express the length of the measured object as a number.  I can identify parts in a word problem and add 3 numbers.  I can show how to solve word problems. | MD.2  OA.2 | |
| 2.5 | 82 – 86 |
| 3A.1 | CC | I can describe shares as halves.  I can tell and write time to the half hour. | G.3  MD.3 | |
| 3A.2 | CC 43 – CC 48 | I can describe shares as halves. | G.3 | |
| 3A.3 | CC 49 – CC 53 | I can describe shares as fourths. | G.3 | |
| 3A.4 | CC54 – CC56 | I can describe shares as halves.  I can describe shares as fourths. | G.3 | |

**\*Unit length is an approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**