|  |  |  |
| --- | --- | --- |
| **Prerequisite Skills**  | **Trimester 3** **Grade 1** | **Looking Ahead** **(Grade 2)** |
| Compare two sets to determine greater, less than, or equal to within 20.(Trimester One) | Number and Operations in Base Ten 3: Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.* I can identify the value of each digit in a two-digit number.
* I can explain what each symbol means (>, <, =).
* I can use >, <, = symbols to compare two 2 digit numbers **within 100.**
 | Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons. |
| Without regrouping.(Trimester 2) | 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 recognize when to regroup to compose (make) a ten.
* 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.
 | Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. |
| Number and Operations in Base Ten 5: Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.* I can mentally add and subtract 10 from a given 2 digit number.
* I can explain how to find 10 more and 10 less than a given 2 digit number.
 | 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 20. (Trimester 2) | 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: Use more challenging word problem types within 20.** | Use addition and subtraction within 100 to solve one and two step word problems. 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. |
| Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.(Kindergarten) | Operations and Algebraic Thinking 2: Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. * I can add 3 numbers.
* I can identify parts/addends in a word problem.
 | Use addition and subtraction within 100 to solve one- and two-step word problems. |
| Use strategies to solve addition and subtraction problems. (Trimester 2)  | 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 explain how properties of addition and subtraction work.
* I can use strategies to solve addition and subtraction problems.
 | Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.  |

|  |  |  |
| --- | --- | --- |
| **Prerequisite Skills**  | **Trimester 3** **Grade 1** | **Looking Ahead** **(Grade 2)** |
| Identify and solve.(Trimester 2)  | 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.
 | 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 add and subtract within 20 using mental strategies. By the end of grade 2, know from memory all sums of two one-digit numbers.  |
| Fluently add and subtract within 5. Decompose numbers less than or equal to 10.(Kindergarten)Students should be fluently adding and subtracting within 10 by the end of Trimester 3 using strategies. | 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 add and subtract within 20.
* 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.
 |
| Part Part Whole. (Trimester 1) | Operations and Algebraic Thinking 8: Determine the unknown number in a whole-number addition or subtraction equation. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = – 3, 6 + 6 = .** I can recognize part-part-whole relationships of three numbers.
* I can determine the missing value in an addition or subtraction problem/equation.
 |
| Describe several measurable attributes of a single object.Correctly name shapes regardless of location or size. | Geometry 1: Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.* I can classify shapes by their attributes.
* I can identify attributes that do and do not make a shape.
* I can build and draw shapes to show attributes.
* I can draw shapes to show attributes
 | Recognize and draw shapes having specified attributes.(Grade 2) |
| Identify 2D and 3D shapes. | Geometry 2: Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.* I can create composite shapes.
* I can compose new shapes from a composite shape.
* I can recognize that shapes can be composed and decomposed to make new shapes.
* I can describe attributes of original and composite shapes (combined shapes).
* I can determine how the original and created composite shapes (combined shapes) are alike and different.
 | Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.5 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.(Grade 2) |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Standard** | **Learner Objectives** |
| Number and Operations in Base Ten 3: Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <. | * I can identify the value of each digit in a two-digit number.
* I can explain what each symbol means (>, <, =).
* I can use >, <, = symbols to compare two 2 digit numbers within 100.
 |

|  |
| --- |
| **What does this standard mean the students will know and be able to do?** |
| * This standardbuilds on the work of NBT.1 and NBT.2**.**
* Compare two numbers by examining the amount of tens and ones in each number.
* Understand the symbols and vocabulary greater than (>), less than (<) and equal to (=).
 |
| **Example: 42 \_\_\_\_\_ 45** |
| Student 1:42 has 4 tens and 2 ones. 45 has 4 tens and 5 ones. They have the same number of tens, but 45 has more ones than 42. So, 45 is greater than 42. So. 42 < 45. | Student 242 is less than 45. I know this because when I count up I say 42 before I say 45. So 42 < 45. |

|  |
| --- |
| **Supplemental Resources for Number and Operations in Base Ten 3** |
| [Guess My Number](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/1st%20Grade/Guess%20My%20Number.pdf) | [Khan Video](http://www.youtube.com/watch?v=KMwzeYAtJDc&safe=active) | [Raceway Number Values](http://www.abcya.com/comparing_number_values_jr.htm) |

|  |
| --- |
| **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) |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **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 recognize when to regroup to compose (make) a ten.
* 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.
 |

|  |
| --- |
| **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** |
| [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)  | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision2.html) |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Standard** | **Learner Objectives** |
| Number and Operations in Base Ten 5: Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. | * I can mentally add and subtract 10 from a given 2 digit number.
* I can explain how to find 10 more and 10 less than a given 2 digit number.
 |

|  |
| --- |
| **What does this standard mean the students will know and be able to do?** |
| * Understand and apply the concept of 10 by mentally adding ten more and ten less than any number less than 100.
 |
| **Example: There are 74 birds in the park. 10 birds fly away. How many are left?** |
| **Student 1**I used a 100s board. I started at 74. Then, because 10 birds flew away, I moved back one row. I landed on 64. So, there are 64 birds left in the park. | **Student 2**I pictured 7 ten frames and 4 left over in my head. Since 10 birds flew away, I took one of the ten frames away. That left 6 ten frames and 4 left over. So, there are 64 birds left in the park. |

|  |
| --- |
| **Supplemental Resources for Number and Operations in Base Ten 5** |
| Kathy Richardson: 2:3-31, A Ten-Shape and More: Subtraction, p. 160 | Kathy Richardson: 2:3-32, Exploring Number Relationships with the Magic Box, p. 161-162 |

|  |
| --- |
| **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) |

 |

\*Links coming soon

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **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: Harder CGI problem types |

|  |
| --- |
| **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) |

 |

\*Links coming soon!

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Standard** | **Learner Objectives** |
| Operations and Algebraic Thinking 2:  Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.  | * I can add 3 numbers.
* I can identify parts/addends in a word problem.
 |

|  |
| --- |
| **What does this standard mean the students will know and be able to do?** |
| * Students can add (join) three numbers whose sum is less than or equal to 20, using a variety of mathematical representations.
* This does address multi-step word problems.

**Strategies:**To further students’ understanding of the concept of addition, students create word problems with three addends. They can also increase their estimation skills by creating problems in which the sum is less than 5, 10 or 20. * Students solve word problems with three addends
* They use properties of operations and different strategies to find the sum of three whole numbers such as:
* Counting on and counting on again (e.g., to add 3 + 2 + 4 a student writes 3 + 2 + 4 = ? and thinks, ―3, 4, 5, that’s 2 more, 6, 7, 8, 9 that’s 4 more so 3 + 2 + 4 = 9.‖
* Making tens (e.g., 4 + 8 + 6 = 4 + 6 + 8 = 10 + 8 = 18)
* Using ―plus 10, minus 1‖ to add 9 (e.g., 3 + 9 + 6 A student thinks, ―9 is close to 10 so I am going to add 10 plus 3 plus 6 which gives me 19. Since I added 1 too many, I need to take 1 away so the answer is 18.)
* Decomposing numbers between 10 and 20 into 1 ten plus some ones to facilitate adding the ones
* Using doubles
* Using near doubles (e.g.,5 + 6 + 3 = 5 + 5 + 1 + 3 = 10 + 4 =14)

\*\*Students may use document cameras to display their combining strategies. This gives them the opportunity to communicate and justify their thinking. |
| **Adding with a Ten Frame and Counters**I put 4 counters on the 10 Frame for the oatmeal raisin cookies. Then, I put 5 different color counters on the 10-Frame for the chocolate chip cookies. Then, I put another 6 color counters out for the gingerbread cookies. Only one of the gingerbread cookies fit, so I had 5 left over. One 10-Frame and five leftover makes 15 cookies. (Students use concrete models). | **Look for ways to make 10**I know that 4 and 6 equal 10, so the oatmeal raisin and gingerbread equals 10 cookies. Then, I add the 5 chocolate chip cookies and get 15 total cookies.  | **Number Line**I counted on the number line. First, I counted 4, then I counted 5 more and landed on 9. Then, I counted 6 more and landed on 15. So there were a total of 15 cookies. |

|  |
| --- |
| **Supplemental Lessons and Resources for Operations and Algebraic Thinking 2** |
| 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) |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **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 explain how properties of addition and subtraction work.
* 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) |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **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.
* I can explain the relationship of addition and subtraction.
 |

|  |
| --- |
| **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** |
| Kathy Richardson: 2:3-28, Related Combinations: Tall Stacks, page 151-154 | [Mathematical Relations](http://qta.quantiles.com/m/resources/downloads/QuantileResource41998.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) |

 |

\*Link coming soon

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **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: 2:3-30, Working with Ten-Shapes, page 157-159 | Kathy Richardson: 2:3-29, How Do You See It?, p. 155 - 156 | Kathy Richardson: 2:2-27, Building and Rebuilding, p. 98 |
| 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 |  |

|  |
| --- |
| **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) |

 |

\*Links coming soon!

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Standard** | **Learner Objectives** |
| Operations and Algebraic Thinking 8: Determine the unknown number in a whole-number addition or subtraction equation. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = ? – 3, 6 + 6 =? .* | * I can determine the missing value in an addition or subtraction problem/equation.
 |

|  |
| --- |
| **What does this standard mean the students will know and be able to do?** |
| * Understand addition and subtraction as related operations for situations with an unknown
* Understand the meaning of the equal sign and know that the quantity on one side of the equal sign must be the same quantity on the other side of the equal sign.

**Strategies:*** Experience with problems where the unknown in different positions.
* Students create word problems for given equations will help them make sense of the equation and develop strategic thinking.
* Students need to communicate and justify their thinking.
 |
| **Examples:** |
| *8 + ? = 11*: ―8 and some number is the same as 11. 8 and 2 is 10 and 1 more makes 11. So the answer is 3.‖  | *5 =* ? *– 3*: ―This equation means I had some cookies and I ate 3 of them. Now I have 5. How many cookies did I have to start with? Since I have 5 left and I ate 3, I know I started with 8 because I count on from 5. . . 6, 7, 8.‖  |

|  |
| --- |
| **Supplemental Lessons and Resources for Operations and Algebraic Thinking 8** |
| [Double Flap Cards](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/1st%20Grade/Double%20Flap%20Cards.pdf) | [Double Flap Number Cards](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/1st%20Grade/Double%20Flap%20Number%20Cards.pdf) | [Addition and Subtraction Puzzles](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/1st%20Grade/Addition%20and%20Subtraction%20Number%20Puzzles.pdf) | [True or False?](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/1st%20Grade/True%20or%20False.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) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning1.html) |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Standard** | **Learner Objectives** |
| Geometry 1: Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes. | * I can classify shapes by their attributes.
* I can identify attributes that do and do not make a shape.
* I can build and draw shapes to show attributes.
* I can draw shapes to show attributes.
 |

|  |
| --- |
| **What does this standard mean the students will know and be able to do?** |
| * Determine the difference between defining (always present) and non-defining (not always present) attributes
* Use appropriate language to describe a three-dimensional shape: number of faces, number of vertices/points, number of edges
* Students should compare and contrast two-and three-dimensional figures using defining attributes.

**Examples:*** List two things that are the same and two things that are different between a triangle and a cube.
* Given a circle and a sphere, students identify the sphere as being three-dimensional but both are round.
* Given a trapezoid, find another two-dimensional shape that has two things that are the same.
 |
| **Examples:** |
| All triangles must be closed figures and have 3 sides. These are *defining* attributes. Triangles can be different colors, sizes and be turned in different directions, so these are *non-defining*.* Given a circle and a sphere, students identify the sphere as being three-dimensional but both are round.
* Given a trapezoid, find another two-dimensional shape that has two things that are the same.
 |

|  |
| --- |
| **Supplemental Lessons and Resources for Geometry 1** |
| [Independent Practice](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/1st%20Grade/Independent%20Practice.pdf)  | [Properties Everywhere:](http://illuminations.nctm.org/LessonDetail.aspx?ID=L750) | [Amazing Attributes](http://illuminations.nctm.org/LessonDetail.aspx?ID=L751) | [Attribute Blocks](http://nlvm.usu.edu/en/nav/frames_asid_270_g_1_t_4.html?open=instructions&from=search.html)  |

|  |
| --- |
| **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) | [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) |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Standard** | **Learner Objectives** |
| Geometry 2: Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. | * I can recognize that shapes can be composed and decomposed to make new shapes.
* I can describe attributes of original and composite shapes (combined shapes).
* I can determine how the original and created composite shapes (combined shapes) are alike and different.
* I can create composite shapes
* I can compose new shapes from a composite shape
 |

|  |
| --- |
| **What does this standard mean the students will know and be able to do?** |
| This standardcalls for students to compose (build) a two-dimensional or three-dimensional shape from two shapes. This standard includes shape puzzles in which students use objects (e.g., pattern blocks) to fill a larger region. The ability to describe, use and visualize the effect of composing and decomposing shapes is an important mathematical skill. It is not only relevant to geometry, but is related to children’s ability to compose and decompose numbers. **Examples:** * Show the different shapes that you can make by joining a triangle with a square.
* Show the different shapes you can make joining a trapezoid with a half-circle.
* Show the different shapes you can make with a cube and a rectangular prism.

Students may use pattern blocks, plastic shapes, tangrams, or computer environments to make new shapes. The teacher can provide students with cutouts of shapes and ask them to combine them to make a particular shape. **Example:** * What shapes can be made from four squares?

Students can make three-dimensional shapes with clay or dough, slice into two pieces (not necessarily congruent) and describe the two resulting shapes. For example, slicing a cylinder will result in two smaller cylinders.  |

|  |
| --- |
| **Supplemental Lessons and Resources for Geometry 2** |
| [Building Shapes](http://mathforum.org/varnelle/kgeo3.html) | [What’s So Special About Triangles, Anyway?](http://illuminations.nctm.org/LessonDetail.aspx?ID=L794)  |

|  |
| --- |
| **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)  | [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) |

 |

**Optional Lesson Progression**

Unit 6

|  |  |  |  |
| --- | --- | --- | --- |
| **Investigation**  | **Page Numbers** | **Primary Focus** | **Standard** |
| 1.1 | 26 – 32 | I can decompose numbers within 10.  | OA.6 |
| 1.2 | 33 – 38 | I can decompose numbers within 10.I can fluently add and subtract within 20.  | OA.6 |
| 1.3 | 39 – 44 | I can decompose numbers within 10.I can fluently add and subtract within 20. I can show how to solve word problems.  | OA.6OA.2 |
| 1.4 | 45 – 49 |
| 1.5 | 50 – 54 | I can decompose numbers within 10. | OA.6 |
| 1.6 | 55 – 60 | I can fluently add and subtract within10.  | OA.6 |
| 1.7 | 61 – 66 | I can fluently add and subtract within 10. I can decompose numbers within10.  | OA.6 |
| 1.8A |  | I can use a symbol (e.g. ?, x) to represent an unknown number in a problem.  | OA.1 |
| 1.8B | CC68 - 73 |
| 2.1 | 70 – 75 | I can decompose numbers within 10.  | OA.6 |
| 2.2  | 76 – 80  |
| 2.3 | 81 – 87  | I can decompose numbers within 10. I can fluently add and subtract within 20.  | OA.6 |
| 2.4 | 88 – 92 |
| 2.5 | 93 – 96  |
| 2.6A | CC 74 – 78 | I can compare value on each side on an equal sign. I can determine if the equation is true or false. I can explain the meaning of the equal sign.  | OA.7 |
| 3.1 | 102 – 106 | I can use strategies to solve addition and subtraction problems. I can explain how the properties of addition and subtraction work. I can add 3 numbers.  | OA.2OA.3 |
| 3.2 | 107 – 111 | I can subtract within 20. I can determine the operation in word problems with unknowns.  | OA.6OA.1 |
| 3.3 | 112 – 115 | I can add 3 numbers.I can subtract within 20. I can determine the operation in word problems with unknowns.I can explain how counting relates to addition and subtraction.  | OA.2OA.6OA.5 |
| 3.4 | 116 – 119 | I can determine the operation to solve word problems.I can explain how counting relates to addition and subtraction.  | OA.1OA.5 |
| 3.5 | 120 – 127 |
| 3.6 | 128 – 130 | I can add 3 numbers.I can subtract within 20. I can determine the operation in word problems with unknowns.I can explain how counting relates to addition and subtraction.  | OA.1OA.6OA.5 |
| 3.7 | 131 – 133 |
| 3.8 | 134 – 138 | I can determine the operation in word problems with unknowns.  | OA.1 |

**\*Units are designed for one lesson per day. This is an approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**

**Optional Lesson Progression**

Unit 8

|  |  |  |  |
| --- | --- | --- | --- |
| **Investigation**  | **Page Numbers** | **Primary Focus** | **Standard** |
| 1.1 | 26 – 31 | I can explain how counting on relates to addition | OA.6OA.5 |
| 1.2 | 32 – 36 | I can count and write numerals to 120. I can explain how counting on relates to addition.  | NBT.1OA.6OA.8 |
| 1.3A | CC85 - 90 |
| 1.4 | 43 – 47 |
| 3.1 |  96 – 102 | I can fluently add and subtract within 10.  | OA.6 |
| 3.2 | 103 – 108 | I can identify a bundle of 10 ones as a “ten”. I can count on from a given number.  | NBT.2OA.2 |
| 3.3 | 109 – 115 |
| 3.4 | 116 – 119 | 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 fluently add within 20.  | NBT.2b, cOA.6 |
| 3.5 | 120 – 125 |
| 4A.1 | CC 91 – 95  | I can identify the value of each digit in a two-digit number. I can use <, >, or = symbols to compare two 2 digit numbers.  | NBT 3 |
| 4A.2 |  CC96 – CC100 | I can mentally add 10 to a given 2 digit number. I can mentally subtract 10 from a given 2 digit number.  | NBT.5NBT.6 |
| 4A.3 | CC101 – 105 | I can mentally add 10 to a given 2 digit number.  | NBT.5 |
| 4A.4 | CC 106 – 109 | I can subtract multiples of 10 from up to 90.  | NBT.6 |
| 4A.5 | CC 110 – 113 | I can mentally add 10 to a given 2 digit number. I can mentally subtract 10 from a given 2 digit number.  | NBT.5NBT.6 |

**\*Units are designed for one lesson per day. This is an approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**

Unit 9

|  |  |  |  |
| --- | --- | --- | --- |
| **Investigation**  | **Page Numbers** | **Primary Focus** | **Standard** |
| 1.1 | 22 -2 8 | I can build shapes to show attributes | G.1 |
| 1.2 | 29 – 32 | I can build shapes to show attributesI can compose new shapes from a composite shape.  | G.1G.2 |
| 1.3 | 33 – 38 | I can classify shapes by their attributes.  | G.1 |
| 1.4 | 39 – 43 | I can build shapes to show attributesI can compose new shapes from a composite shape.  | G.1G.2 |
| 1.5 | 44 – 48 |
| 2.1 | 68 – 73 | I can draw shapes to show attributes.  | G.1 |
| 2.2 | 74 – 78 | I can draw shapes to show attributes. I can create composite shapes. I can compose new shapes from composite shapes.  | G.1G.2 |
| 2.3A | CC 119 – CC 122 | I can identify attributes that make a shape. I can determine how the original and created composite shapes (combined shapes) are alike and different.  | G.1G.2 |

**\*Units are designed for one lesson per day. This is an approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**