2016 – 2017

Grade 4

Mathematics Curriculum

Documents



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# Grade 4 Year at a Glance – Quarter 1

|  |  |
| --- | --- |
| **Unit 5: Landmarks and Large Numbers**  **Estimated Duration: 25 days**   * Investigation 1: 6 lessons (Including 1.5A, combine 1.5 & 1.6) * Investigation 2: 5 lessons (Combine 2.3 & 2.4) * Investigation 3: 6 lessons (Including 3.6A) * Investigation 4: 8 lessons (Including 4.4A) | **Unit 1: Factors, Multiples, and Arrays**  **Estimated Duration: 13 days**   * Investigation 1: 6 lessons (Including 1.6A, CMS Lesson, combine 1.2 & 1.3) * Investigation 2: 3 lessons (Combine 2.1 & 2.2 and 2.4 & 2.5) * Investigation 3: 4 lessons |
| **CMS Area Unit**  **Estimated Duration: 5 days**   * 4 lessons |

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| **Quarter 1 (43 Days)** | | | | |
| **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
| **August 29** | 30 | 31 | **September 1** | 2 |
| 5 | 6 | 7 | 8 | 9 |
| 12 | 13 | 14 | 15 | 16 |
| 19 | 20 | 21 | 22 | 23 |
| 26 | 27 | 28 | 29 | 30 |
| **October 3** | 4 | 5 | 6 | 7 |
| 10 | 11 | **12ER** | 13 | 14 |
| 17 | 18 | 19 | 20 | 21 |
| 24 | 25 | 26 | 27 | **28Q** |

**Calendar Key:**

|  |  |
| --- | --- |
|  | Teacher Workday |
|  | Holiday/Annual Leave |
| **ER** | Early Release Day |
| **Q** | End of Quarter |

# Grade 4 Year at a Glance – Quarter 2

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| **Unit 3: Multiple Towers and Division Stories**  **Estimated Duration: 19 days**   * Investigation 1: 4 lessons * Investigation 2: 6 lessons * Investigation 3: 4 lessons * Investigation 4: 5 lessons | **CMS Geometry Unit**  **Estimated Duration: 18 days**   * Angles: 3 lessons * Triangles: 3 lessons * Quadrilaterals: 4 lessons * Symmetry: 2 lessons * Area and Perimeter: 4 lessons |
| **Unit 6: Fraction Cards and Decimal Squares**  **Estimated Duration: 34 days (8 days in quarter 2)**   * Investigation 1: 8 lessons (including 1.8A) |

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| **Quarter 2 (45 Days)** | | | | |
| **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
| 31 | **November 1** | 2 | 3 | 4 |
| 7 | 8 | 9 | 10 | 11 |
| 14 | 15 | 16 | 17 | 18 |
| 21 | 22 | 23 | 24 | 25 |
| 28 | 29 | 30 | **December 1** | 2 |
| 5 | 6 | 7 | 8 | 9 |
| 12 | 13 | 14 | 15 | 16 |
| 19 | 20 | 21 | 22 | 23 |
| 26 | 27 | 28 | 29 | 30 |
| **January 2** | 3 | 4 | 5 | 6 |
| 9 | 10 | 11 | 12 | 13 |
| 16 | 17 | 18 | 19 | 20 |
| **23ERQ** |

**Calendar Key:**

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|  | Teacher Workday |
|  | Holiday/Annual Leave |
| **ER** | Early Release Day |
| **Q** | End of Quarter |

# Grade 4 Year at a Glance – Quarter 3

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| --- | --- |
| **Unit 6: Fraction Cards and Decimal Squares**  **Estimated Duration: 34 days (8 days taught in quarter 2)**   * Investigation 1: 8 lessons (Including 1.8A) * Investigation 2: 9 lessons (Including 2 Bridge Lessons, 2.7A) * Line Plot: 2 lessons * Investigation 3A: 3 lessons (Including 3A.1, 3A.2, 3A.3) * Multiplying Fractions: 3 lessons * Investigation 3: 7 lessons | **Unit 8: How Many Packages? How Many Groups?**  **Estimated Duration: 19 days**   * Investigation 1: 5 lessons * Investigation 2: 6 lessons (Including 2.4A) * Investigation 3: 7 lessons (Including 3.5A) |

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| **Quarter 3 (45 Days)** | | | | |
| **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
| **January 23ERQ** | 24 | 25 | 26 | 27 |
| 30 | 31 | **February 1** | 2 | 3 |
| 6 | 7 | 8 | 9 | 10 |
| 13 | 14 | 15 | 16 | 17 |
| 20 | 21 | 22 | 23 | 24 |
| 27 | 28 | **March 1** | 2 | 3 |
| 6 | **7ER** | 8 | 9 | 10 |
| 13 | 14 | 15 | 16 | 17 |
| 20 | 21 | 22 | 23 | 24 |
| 27 | 28 | 29 | **30Q** | 3/31 |

**Calendar Key:**

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|  | Teacher Workday |
|  | Holiday/Annual Leave |
| **ER** | Early Release Day |
| **Q** | End of Quarter |

# Grade 4 Year at a Glance – Quarter 4

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| --- | --- |
| **Unit 9: Penny Jars and Plant Growth**  **Estimated Duration: 9 days**   * Investigation 2: 6 lessons (Skip session 2.4 & 2.7) * Shape and Number Patterns: 3 lessons | **CMS Measurement Unit**  **Estimated Duration: 10 days**   * Weight: 5 lessons * Capacity: 3 lessons * Line Plot: 2 lessons |
| **CMS EOG Review Unit**  **Estimated Duration: 15 days** |

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| **Quarter 4 (43 Days)** | | | | |
| **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
| **April 3** | 4 | 5 | 6 | 7 |
| 10 | 11 | 12 | 13 | 14 |
| 14 | 18 | 19 | 20 | 21 |
| 24 | 25 | **26ER** | 27 | 28 |
| **May** **1** | 2 | 3 | 4 | 5 |
| 8 | 9 | 10 | 11 | 12 |
| 15 | 16 | 17 | 18 | 19 |
| 22 | 23 | 24 | 25 | 26 |
| 29 | 30 | 31 | **June 1** | 2 |
| 5 | 6 | 7 | 8 | **9Q** |

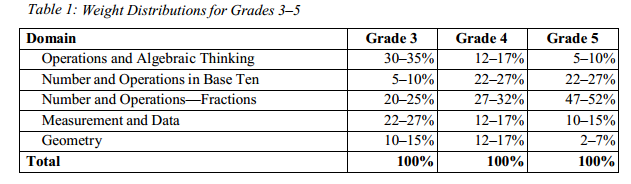
**Calendar Key:**

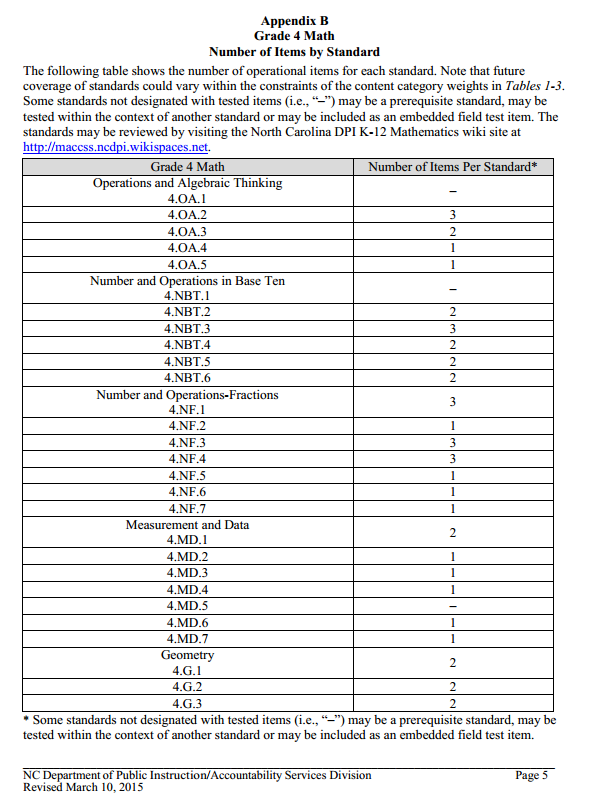
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| --- | --- |
|  | Teacher Workday |
|  | Holiday/Annual Leave |
| **ER** | Early Release Day |
| **Q** | End of Quarter |

# Grade 4 Scope and Sequence

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit 5** | **Unit 1** | **CMS Unit** | **Unit 3** | **CMS Unit** | **Unit 6** | | **Unit 8** | **Unit 9** | **CMS Unit** |
| ***Landmarks and Large Numbers*** | ***Factors, Multiples, and Arrays*** | ***Area*** | ***Multiple Towers and Division Stories*** | ***Geometry*** | ***Fraction Cards and Decimal Squares*** | | ***How Many Packages? How Many Groups*** | ***Penny Jars and Plant Growth*** | ***Measurement*** |
| Place Value, addition, and subtraction | Multiplication and division of whole numbers | Area of rectangles and  rectilinear figures | Multiplication and division of whole numbers | Angles, classifying triangles, and quadrilaterals, lines of symmetry | Representing, adding, and subtracting, fractions and decimals, multiplying fractions | | Multiplication and division | Patters of whole numbers | Weight, capacity, area, perimeter, line plots |
| 4.NBT.1  4.NBT.2  4.NBT.3  4.NBT.4 | 4.OA.1  4.OA.2  4.OA.3  4.OA.4  4.NBT.5 | 4.MD.3 | 4.OA.1  4.OA.2  4.OA.3  4.OA.4  4.NBT.5  4.NBT.6 | 4.MD.5  4.MD.6  4.MD.7  4.G.1  4.G.2  4.G.3 | 4.NBT.2  4.NF.1  4.NF.2  4.NF.3  4.NF.4  4.NF.5  4.NF.6  4.NF.7  4.MD.4 | | 4.OA.3  4.OA.5  4.NBT.5  4.NBT.6  4.MD.2 | 4.OA.5 | 4.MD.1  4.MD.2  4.MD.3 |
| **25 days**  *8/29 – 10/4* | **13 days**  *10/5 – 10/21* | **5 days**  *10/24 – 10/28* | **19 days**  *11/1 – 12/2* | **18 days**  *12/5 – 1/10* | **34 days**  *1/11 – 3/3* | | **19 days**  *3/6 – 3/30* | **9 days**  *4/3 – 4/21* | **10 days**  *4/24 – 5/5* |
| **Quarter 1**  *August 29th - October 28th* | | | **Quarter 2**  *November 1st - January 23rd* | | | **Quarter 3**  *January 24th - March 30th* | | **Quarter 4**  *March 31st - June 9th* | |
| **Percentage of Instructional Time Devoted to Each Unit** | | | | | | | | | |
| **16%** | **8%** | **3%** | **12%** | **13%** | **23%** | | **11%** | **6%** | **6%** |

# North Carolina End of Grade Test Specifications





# **Unit 5: *Landmarks and Large Numbers***

*Estimated Duration: 25 days (August 29, 2016 – October 4, 2016)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * The sequence of numbers to 10,000 * In the Base Ten System, the value of each place is 10 times the place to the immediate right * The structure of 1,000 and its equivalence to one hundred 10s and ten 100s * The structure of 10,000 and its equivalence to one thousand 10s, one hundred 100s, and ten 1,000s * The role of commas * The relationship between the standard algorithm for addition and subtraction and other strategies * The standard algorithm for addition and subtraction | **Students will be able to:**   * Read, write, and sequence numbers to 10,000 * Identify the place value of digits in numbers to 1,000,000 * Add and subtract multiples of 10, 100, and 1,000 * Add and subtract 3- and 4-digit numbers * Use the standard algorithm to add and subtract 3- and 4-digit numbers * Represent addition and subtraction on a number line * Solve single and multi-step addition and subtraction story problems * Round numbers to the nearest ten, hundred, and thousand * Write numbers to 1,000,000 in expanded form * Use <, >, and = to compare numbers to 1,000,000 * Use clear and concise notation for recording addition and subtraction strategies * Justify why two addition expressions are equivalent * Justify how the differences represented by two subtraction expressions are related * Use story contexts and representations to support explanations to solving addition and subtraction story problems |
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| **Investigation 1**  **Estimated Duration: 6 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **1.1** | * I will read, write, and sequence numbers to 1,000. | * The number \_\_\_ will be on chart \_\_\_. I know because \_\_\_. * The value of the digit \_\_\_ is \_\_\_ because it is in the \_\_\_ place. | * Informally assess students as they construct their 1,000’s book. Note the following: * Are students able to read and write number up to 1,000? * Do students know what number follows each multiple of 10 and 100? * Do students use landmark numbers to identify missing numbers on their 1,000 chart? * Do students understand the value of digits in the ones, tens, and hundreds place? |
| **1.2** | * I will read, write, and sequence numbers to 1,000. | * I can use the landmark number \_\_\_ to help me find \_\_\_ because \_\_\_. * I know that \_\_\_ is closer to \_\_\_ than \_\_\_ because \_\_\_. | * Student Activity Book (SAB) page 2 will help to determine if students are able to use landmark numbers and place value to identify the sequence of numbers to 1,0000. |
| **1.3** | * I will visualize how numbers plus or minus 10, 100, and 1,000 are related to each other. * I will add and subtract multiples of 10, 100, and 1,000. | * When I add a multiple of 10, my new number is bigger/smaller because \_\_\_. * When I subtract a multiple of 100, the \_\_\_ digit changed. This is the only place that changed because \_\_\_. * I started with the number \_\_\_. My equation was \_\_\_. I wrote the number \_\_\_ in my 1,000 book. | * Informally assess students as they play *Changing Places* with a partner. Note the following: * Can students easily add and subtract multiples of 10, 100, and 1,000? * Do students understand which digit is changing? * Are students able to locate where to write numbers in their 1,000’s book? |
| **1.4** | * I will find the difference between 3-digit numbers and 1,000. * I will use a number line as a tool for solving addition and subtraction word problems. | * I solved the problem by \_\_\_. First I \_\_\_. Next I \_\_\_. Then I \_\_\_. * There are \_\_\_ more miles to 1,000. I know because \_\_\_. | * SAB pages 9 & 10 will help determine if students are able to visualize and represent the difference between two quantities. Analyze student responses to determine:   + Do students add up or subtract back?   + What size are the “chunks” of numbers students use?   + Do students make use of landmark numbers? |
| **1.5A** | * I will round numbers to the nearest ten and the nearest hundred. * I will write numbers to 1,000 in expanded form. * I will use <, >, and = to compare numbers to 1,000. | * \_\_\_ rounded to the nearest ten/hundred is \_\_\_. I know because \_\_\_. * There are \_\_\_ hundreds in the number \_\_\_. | * SAB pages 13A, 13B, and 13C will help determine if students are able to round, compare, and identify place value for numbers to 1,000. Analyze student work samples and note the following:   + Do students correctly use the symbols < and > to compare numbers?   + Do students demonstrate an understanding of tens and ones when explaining how to round numbers? |
| **1.5 & 1.6**  ***combine*** | * I will add and subtract multiplies of 10, 100, and 1,000. * I will find the difference of any 3-digit number and 1,000 using multiplies of 10, 100, and 1,000. | * The digit in the \_\_\_ place changed when I added \_\_\_. * The digit in the \_\_\_ place changed when I subtracted \_\_\_. * The difference between 1,000 and \_\_\_ is \_\_\_. I know because \_\_\_. | * Formally assess students’ ability to read, write, and sequence numbers to 1,000 using assessment M19. Utilize Assessment Checklist: Numbers to 1,000 (M20) as students are working. * SAB page 13 will help determine if students are able to visualize and represent the difference between 1,000 and a 3-digit number. |

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| **Investigation 2**  **Estimated Duration: 5 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **2.1** | * I will solve addition problems about combining distances. * I will use, compare, and analyze addition strategies for combining distances. | * The first thing I did to solve the problem was \_\_\_. * My strategy is the same as \_\_\_ strategy because \_\_\_. * My strategy is different from \_\_\_ strategy because \_\_\_. | * Informally assess students as they complete SAB page 17. Note the following:   + Do students use an accurate and efficient strategy for combining distances?   + How do students break the numbers apart to make them easier to add?   + Are students able to record their strategies and solutions clearly? |
| **2.2** | * I will identify the first step in solving addition problems about distance. * I will use, compare, and analyze addition strategies for combining distances. | * I used \_\_\_ strategy to solve the problem. * First I \_\_\_. Next I \_\_\_. Then I \_\_\_. | * Informally assess students as they complete SAB page 21. Note the following:   + Are students able to a identify strategy for combining distances?   + Are students able to describe each step for combining distances?   + Do students use accurate an efficient strategy for combining distances? |
| **2.3 & 2.4**  ***combine*** | * I will use, compare, and analyze addition strategies. * I will justify why two addition expressions are equivalent. | * I know 597+375 is equivalent to 600+372 because \_\_\_. (Session 2.3 discussion) * Solution 1 and Solution 2 are the same because \_\_\_. (Session 2.4 activity) | * Informally assess students during the discussion – Making an Equivalent Problem (Teacher Edition (TE) page 72). Making and proving generalizations is an important part of mathematics so pay close attention to the story context students’ use. * SAB page 29 will help determine if students are able to make sense of how two strategies for addition are related. |
| **2.5** | * I will use place value to determine how close a number is to 1,000. * I will make two 3-digit numbers that have a sum close to 1,000. | * The first thing I did when I looked at the digit cards was \_\_\_. Then I \_\_\_. * \_\_\_ + \_\_\_ is close to 1,000 because \_\_\_. * The difference between my my sum of \_\_\_ and 1,000 is \_\_\_. I know because \_\_\_. | * Informally assess students as they play *Close to 1,000*. Note the following:   + How do students determine the first number?   + What strategies do students use to determine the second number?   + Are students able to correctly identify the difference between their number and 1,000? |
| **2.6** | * I will solve an addition problem using two different strategies. * I will use place value to determine how close a number is to 1,000. * I will make two 3-digit numbers that have a sum close to 1,000. | * The first strategy I used was \_\_\_. The second strategy I used was \_\_\_. * My strategies are related because \_\_\_. * The difference between my my sum of \_\_\_ and 1,000 is \_\_\_. I know because \_\_\_. | * Formally assess students’ ability to solve a 4-digit plus 3-digit number using two different strategies using assessment M23. * Informally assess students as they play *Close to 1,000*. Note the following:   + How do students determine the first number?   + What strategies do students use to determine the second number?   + Are students able to correctly identify the difference between their number and 1,000? |

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| **Investigation 3**  **Estimated Duration: 6 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **3.1** | * I will read, write, and sequence numbers to 10,000. * I will identify how many 100’s and 1,000’s is in 10,000. | * If I counted by 1,000’s to 10,000 and stopped at 3,000, I have to count \_\_\_ more thousands to get to 10,000. * If we counted the class by 100’s to get to 10,000, we would need \_\_\_ students because there are \_\_\_ 100’s in 10,000. | * Informally assess students as they work in small groups to create a wall sized 10,000 chart from blank 100 charts. Note the following:   + Are students able to identify the first and last number on each chart?   + Do students understand the pattern of numbers throughout the 100 charts? |
| **3.2** | * I will read, write, and sequence numbers to 10,000. * I will identify how many 10’s, 100’s, and 1,000’s is in 10,000. | * If I counted by 10’s to 10,000, I would count \_\_\_ numbers because \_\_\_. * If I counted by 100’s to 10,000, I would count \_\_\_ numbers because \_\_\_. * If I counted by 1,000’s to get to 10,000, I would count \_\_\_ numbers because \_\_\_. | * Informally assess students as they work in small groups to create a wall sized 10,000 chart from blank 100 charts. Note the following:   + Are students able to identify the first and last number on each chart?   + Do students understand the pattern of numbers throughout the 100 charts? * SAB page 40 will help determine if students are able to identify the sequence numbers to 10,000. |
| **3.3** | * I will read, write, and sequence numbers to 10,000. * I will identify the place values in 3- and 4- digit numbers. * I will add and subtract multiples of 10, 100, and 1,000. | * When I add 50 to \_\_\_, I have to pay attention to the \_\_\_ place(s) because \_\_\_. * When I subtract 100 from \_\_\_, I have to pay attention to the \_\_\_ place(s) because \_\_\_. | * Informally assess students as they work with a partner to complete SAB page 41 – *Changing Places on the 10,000 Chart*. Note the following:   + Do students use accurate and efficient strategies for adding and subtracting multiplies of 10, 100, and 1,000?   + Are students able to identify which digits of their starting number will change when they add or subtract? |
| **3.4** | * I will use addition strategies to solve 3- and 4-digit addition problems about combining distances. * I will add and subtract multiples of 10, 100, and 1,000. * I will make two 3-digit numbers that have a sum close to 1,000. | * I started my trip in \_\_\_ and traveled to \_\_\_. The total distance was \_\_\_. I used \_\_\_ strategy to solve the problem. * When I add 4,000 to \_\_\_, I have to pay attention to the \_\_\_ place(s) because \_\_\_. * \_\_\_ + \_\_\_ is close to 1,000 because \_\_\_. | * SAB page 47 will help determine if students are able to add 3- and 4-digit numbers. * Informally assess students as they work with a partner to complete SAB page 41 – *Changing Places on the 10,000 Chart*. * Informally assess students as they play *Close to 1,000.* |
| **3.5** | * I will use addition strategies to solve 3- and 4-digit addition problems about combining distances. * I will add and subtract multiples of 10, 100, and 1,000. * I will make two 3-digit numbers that have a sum close to 1,000. | * My problem was \_\_\_ + \_\_\_ + \_\_\_. I made the problem easier by \_\_\_. * When I subtract 3,000 from \_\_\_, I have to pay attention to the \_\_\_ place(s) because \_\_\_. * \_\_\_ + \_\_\_ is close to 1,000 because \_\_\_. | * SAB page 47 will help determine if students are able to add 3- and 4-digit numbers. * Informally assess students as they work with a partner to complete SAB page 41 – *Changing Places on the 10,000 Chart*. * Informally assess students as they play *Close to 1,000.* |
| **3.6A** | * I will round and identify the place values in numbers to 1,000,000. * I will write numbers to 1,000, 000 in expanded form. * I will use <, >, and = to compare numbers to 1,000,000. | * The \_\_\_ in the ten thousands place means \_\_\_. * There are \_\_\_ thousands in the number \_\_\_. * The number \_\_\_ is </> than the number \_\_\_. I know because \_\_\_. | * SAB pages 51A, 51B, and 51C will help determine if students are able to write, round, compare, and identify place values for numbers to 1,000,000. |

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| **Investigation 4**  **Estimated Duration: 8 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **4.1** | * I will visualize and represent the action of subtraction story problems. * I will use a number line as a tool for solving addition and subtraction word problems. | * I used \_\_\_ to show what is happening in the story. * Problem 2 and 6 are alike because \_\_\_. * Problem 1 and 4 are different because \_\_\_. | * SAB pages 51 & 52 can be used to determine if students are able to represent and solve a variety of subtraction story problems; finding a missing part, comparing two amounts, and removing part of and amount to determine what is left. |
| **4.2** | * I will solve subtraction story problems by breaking numbers apart. * I will make two 3-digit numbers that have a sum close to 1,000. | * I used \_\_\_ strategy to solve the problem. * \_\_\_ + \_\_\_ is close to 1,000 because \_\_\_. | * Informally assess students during the discussion Strategies for Subtraction (TE page 139). Read pages 183 – 187 in the TE before the discussion for key points to lift as students share strategies. * SAB pages 55 – 57 can be used to determine if students are able to represent and solve problems involving subtraction of 3- and 4-digit numbers. As students work, note the following:   + Do students interpret the story problems correctly?   + Are students able to keep track of their strategies as they show their solutions?   + Are students able to write a subtraction story problem that represents a subtraction situation? |
| **4.3** | * I will use, compare, and analyze subtraction strategies. * I will solve subtraction story problems by breaking numbers apart. * I will make two 3-digit numbers that have a sum close to 1,000. | * My strategy is different from \_\_\_ strategy because \_\_\_. * My strategy is the same as \_\_\_ strategy because \_\_\_. * The difference between the sum of \_\_\_ and 1,000 is \_\_\_. I know because \_\_\_. | * Formally assess students’ ability to read, write, and sequence numbers to 10,000 using assessment M27. Utilize Assessment Checklist: Numbers to 10,000 (M28) as students are working. |
| **4.4A** | * I will use, compare, and analyze subtraction strategies. | * If I don’t have enough ones, I know I have to \_\_\_ from the \_\_\_ place and add it to \_\_\_. * If I don’t have enough tens, I know I have to \_\_\_ from the \_\_\_ place and add it to \_\_\_. | * SAB pages 62A – 62D can be used to determine if students are able subtract 3-digit numbers using the U.S. Algorithm. * Use the exit ticket below as an informal assessment of students’ ability to solve subtraction story problems.   + The Panther’s Café cooked 1,542 chicken wings. They sold 885 before half-time. How many chicken wings do they have left? |
| **4.4** | * I will use mental math to solve 2- and 3-digit subtraction problems. * I will use story contexts and representations to justify how two subtraction expressions are related. | * \_\_\_ - \_\_\_ and \_\_\_ - \_\_\_ are related because \_\_\_. * I solved \_\_\_ - \_\_\_ using \_\_\_ strategy. First I \_\_\_, then I \_\_\_. | * Informally assess students during the discussion Do I Add or Subtract (TE page 152). Read pages 152 – 154 in the TE before the discussion for key points to lift as students share strategies. * SAB page 62 can be used to determine if students re about to use mental math to solve 2- and 3-digit subtraction problems. |
| **4.5** | * I will solve subtraction problems by breaking numbers apart. * I will solve multistep addition and subtraction problems. | * I used \_\_\_ strategy to solve the problem. * My problem was \_\_\_. I made the problem easier by \_\_\_. * When I visualize the problem, I know \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to solve problems?   + Are students able to record their strategies clearly? |
| **4.6** | * I will solve subtraction problems by breaking numbers apart. * I will solve multistep addition and subtraction problems. | * I used \_\_\_ strategy to solve the problem. * My problem was \_\_\_. I made the problem easier by \_\_\_. * When I visualize the problem, I know \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to solve problems?   + Are students able to record their strategies clearly? |
| **4.7** | * I will use strategies for solving addition and subtraction story problems. | * I used \_\_\_ to show what is happening in the story. * My problem was \_\_\_. I made the problem easier by \_\_\_. * When I visualize the problem, I know \_\_\_. | * Formally assess students’ ability to solve subtraction problems with up to 4 digits using assessment M29. Analyze student strategies after reviewing TE pages 188 – 194. Consider creating a spreadsheet to record student strategies. |

# **Unit 1: *Factors, Multiples, and Arrays***

*Estimated Duration: 13 days (October 5, 2016 – October 21, 2016)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * The area of a rectangular array is the product * The quantity being multiplied and which number tells how many time * The length and width of a rectangular array are factors of the product * Factors are two numbers that are multiplied to get a product * The relationship between factors and multiples * The difference between factors and multiples * Multiplicative comparisons focus on comparing two quantities by showing one quantity is a specified number of times larger or smaller than the other * Prime numbers have exactly two factors * Composite numbers have more than two factors | **Students will be able to:**   * Use rectangular arrays to model multiplication situations * Break a rectangular array into parts to find the product represented by the array * Fluently multiply combinations to 12x12 * Use known multiplication combinations to find related multiplication combinations for a given product * Justify and explain strategies used to for multiplication * Use representations solve multiplication story problems * Write and identify equations and statements for multiplicative comparisons * Translate comparative situations into equations with unknowns * Relate skip counting to creating equal groups * Use skip counting to find the multiples of a number * Identify the factors of a given number * Identify all the factors of 100 * Identify a number as prime or composite * Identify the multiples of a given number |
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| **Investigation 1**  **Estimated Duration: 6 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **1.1** | * I will visualize, model, draw, and label groups of things that come in rectangular arrays. * I will use skip counting to find the multiples of a number. | * The dimensions of my array is \_\_\_ x \_\_\_. There are \_\_\_ total in my array. * I figured out there were \_\_\_ total in my array by \_\_\_. | * Informally assess students as they complete the activity *Things that Come in Arrays* (TE page 28). Note the following:   + Are students able to determine the total number of items in their array?   + Do students use multiplication combinations they know to help them determine the product of their array? |
| **1.2 & 1.3**  ***combine*** | * I will use a rectangular array to find all the factors of 2-digit numbers. * I will identify/describe the factors of 2-digit numbers as prime, square, or composite. | * The numbers \_\_\_ only have one array because \_\_\_. * The numbers \_\_\_ have a square array because \_\_\_. * The numbers \_\_\_ have the most arrays because \_\_\_. | * Informally assess students as they work with a partner to find all the arrays related to a pair of numbers. Note the following:   + Do students use multiplication combinations that know to help them generate additional arrays?   + Are students able to find all the arrays for their number?   + What strategies are students using to make sure their product is accurate? |
| **1.4** | * I will use multiplication combinations I know to determine the products of combinations I don’t know. * I will break an array into parts to find the product represented by the array. | * I used the factor pair \_\_\_ x \_\_\_ to help me find the product of \_\_\_ x \_\_\_. * I figured out the product on my array card \_\_\_ x \_\_\_ by \_\_\_. | * Informally assess students as they play *Factor Pairs* with a partner (Consider creating a spreadsheet to document combinations students know). Note the following:   + Are students fluent with multiplication combinations for products to 50?   + What strategies do students use to determine the product of factor pairs they do not know? |
| **1.5** | * I will use multiplication combinations I know to determine the products of combinations I don’t know. * I will break an array into parts to find the product represented by the array. | * There were \_\_\_ juice cans in the case when it was full. I know because \_\_\_. * There were \_\_\_ apples in the case when it was full. I know because \_\_\_. | * Informally assess students as they complete Array Picture Problems A and B (SAB pages 11 & 12). Note the following:   + Are students able to visualize what the array looks like?   + What strategies do students use to solve the problem?   + Are students able to explain their solutions? |
| **1.6A** | * I will visualize and draw a picture that shows what is happening in multiplication story problems. * I will write an equation that represents what is happening in a multiplication story problem. | * I am trying to figure out \_\_\_. I can figure it out by \_\_\_. * The equation that matches this situation is \_\_\_ because \_\_\_. * I know that \_\_\_ is \_\_\_ times as \_\_\_\_. I figured it out by \_\_\_. | * Informally assess students as the complete SAB page 15A. Note the following:   + What strategies do students use to solve each problem?   + Do students draw pictures that match the action in each problem?   + Do students write the correct equation for each problem? |
| **CMS Lesson** | * I will visualize and draw a picture that represents what is happening in multiplication story problems. * I will write an equation that represents what is happening in a multiplication story problems. | * I am trying to figure out \_\_\_. I can figure it out by \_\_\_. * The equation that matches this situation is \_\_\_ because \_\_\_. * I know that \_\_\_ is \_\_\_ times as \_\_\_\_. I figured it out by \_\_\_. | * Informally assess students as the complete SAB page 15A. Note the following:   + What strategies do students use to solve each problem?   + Do students draw pictures that match the action in each problem?   + Do students write the correct equation for each problem? |

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| **Investigation 2**  **Estimated Duration: 3 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **2.1 & 2.2**  ***combine*** | * I will use drawings, notes, or equations to describe equal groups of dots arranged in different patterns. * I will use multiplication combinations I know to determine the products of combinations I don’t know. | * I used the factor pair \_\_\_ x \_\_\_ to help me find the product of \_\_\_ x \_\_\_. * When I visualize the product of \_\_\_ x \_\_\_ I see \_\_\_. | * Informally assess students as they complete the Multiplication Cards activity (TE page 65). Note the following:   + Are students fluent with multiplication combinations for products to 50?   + What strategies do students use to determine the product of factor pairs they do not know? |
| **2.3** | * I will identify and describe the difference between factors and multiplies. * I will use multiplication combinations I know to determine the products of combinations I don’t know. | * I know that \_\_\_ is a factor of \_\_\_ because \_\_\_. * I know that \_\_\_ is a multiple of \_\_\_ because \_\_\_. | * Informally assess students as they play *Multiple Turn Over* with a partner. Note the following:   + Do students correctly use the terms factor and multiple?   + Do students use multiplication combinations they know to identify multiples?   + What strategies do students use to determine the factors of more difficult multiples? |
| **2.4 & 2.5**  ***combine*** | * I will identify if a number is a factor or multiple of another. * I will use multiplication combinations I know to determine the products of combinations I don’t know. | * I named \_\_\_ as a factor and turned over \_\_\_. * I used the factor pair \_\_\_ x \_\_\_ to help me find the product of \_\_\_ x \_\_\_. | * Formally assess students’ ability to solve multiplication combinations to 12 x 12 using assessment M51. Although there is time built into Investigation 2 to work on multiplication combinations, may students will need additional practice during and after this unit. Read pages 120 – 122 in the TE for suggestions. |

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| **Investigation 3**  **Estimated Duration: 4 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **3.1** | * I will identify all the factors of 100. * I will use what I know about factors of 100 to find factors of multiples of 100. * I will use skip counting to find the multiples of a number. | * If we count the class by 7s and everyone said a number, we would end up on \_\_\_. I know because \_\_\_. * A number larger than \_\_\_ cannot be a factor of 100 because \_\_\_. * I know \_\_\_ is a factor of 200 because \_\_\_. | * Informally assess students during the discussion *Identifying all the Factors* (TE page 92). Consider including visuals on the chart for future reference for students. * SAB pages 28 & 29 can be used to determine if students are able to use what they know about factors of 100, to determine factors of 200 and 300. |
| **3.2** | * I will use what I know about factors of 100 to find factors of multiples of 100. * I will use multiplication combinations I know to find related combinations for a given product. | * \_\_\_ is a factor of 100, but is not a factor of \_\_\_. I know because \_\_\_. * I know that \_\_\_ is a factor of 400 because the product of \_\_\_ x \_\_\_ is \_\_\_. | * SAB pages 33 & 34 can be used to determine if students are able to use what they know about factors of 100, to determine factors numbers larger than 300. * Informally assess students during the discussion *Finding Multiples of 100* (TE page 102). Prime factorizations is one method students can use to determine all the factors of a number. Consider how this can be shared with students as a strategy. Read the Math Note on page 103 in the TE for a detailed explanation. * SAB page 35 can be used to determine if students are able to fluently add and subtract 3- and 4-digit numbers. |
| **3.3** | * I will identify the factors of a given number. * I will use representations to justify if a factor of a number is also a factor of its multiples. | * I agree that all the factors of \_\_\_ are also the factors of \_\_\_ because \_\_\_. * I disagree that all the factors of \_\_\_ are also the factors of \_\_\_ because \_\_\_. | * SAB pages 39 & 40 can be used to determine if students are able to identify all the factors of 16 and 48 and justify using representations if all the factors of 16 are also the factors of 48. Students extend their thinking to show the relationship between 32 and 64. |
| **3.4** | * I will use a rectangular array to model multiplication situations. * I will use a rectangular array to find the factors of 2-digit numbers. | * I used the factor pair \_\_\_ x \_\_\_ to help me find the product of \_\_\_ x \_\_\_. * When I visualize the product of \_\_\_ x \_\_\_ I see \_\_\_. * The factors of \_\_\_ are \_\_\_. I know because \_\_\_. | * Formally assess students’ understanding of using arrays to model multiplication situations and identifying factors of 2-digit numbers using assessment M55 & M56. Analyze student strategies after reviewing TE pages 123 - 127. Consider creating a spreadsheet to record student strategies. |

# **CMS Area Unit**

*Estimated Duration: 5 days (October 24, 2016 – October 28, 2016)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * Area is used to measure the amount of space in an item * The length multiplied by the width equals the area * The number of rows and columns of an array determine the dimensions * The dimensions are the factors in a multiplication equation and the product is the area. * The total area is found by multiplying each length and for width for each rectangle then adding all the areas together. | **Students will be able to:**   * Represent area using color tiles * Determine the formula for the area of rectangles as *A = l x w* * Compare the area of multiple rectangles * Create/use arrays to solve real world area problems * Create arrays using given dimensions * Decompose rectangles and rectilinear shapes into smaller rectangles to determine the area * Find the missing dimension of a rectangle given one dimension and the area |
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| **CMS Area Unit**  **Estimated Duration: 5 days** | | | |
| **Lesson** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **1** | * I will use color tiles to represent the area of rectangular shapes. * I will compare the area of multiple rectangles. | * The area for rectangle A is \_\_\_. I found the area by \_\_\_. * Rectangle \_\_\_ is the larger/smaller than rectangle \_\_\_ because \_\_\_. | * Informally assess students as they work in groups to order the rectangles from largest to smallest. Note the following:   + How do students determine the order of the rectangles?   + Do students use any many tools to help determine the size of each rectangle? |
| **2** | * I will find the missing dimension of a rectangle given one dimension and the area. * I will determine the formula for finding the area of rectangles. | * I broke \_\_\_ into \_\_\_ x \_\_\_ and \_\_\_ x \_\_\_ because \_\_\_. * The dimensions of my rectangle is \_\_\_ x \_\_\_. The area is \_\_\_. I know because \_\_\_. | * Informally assess students as they play *Rolling a Rectangle*. Note the following:   + Are students able to identify the dimensions of each rectangle?   + What strategies do students use to determine the area? * Informally assess students as they complete Breaking Apart Arrays. Note the following:   + What strategies do students use to break apart arrays?   + Are students able to break apart the array multiple ways? |
| **3** | * I will decompose rectangles and rectilinear shapes into smaller rectangles to determine the area. | * The area of my shape is \_\_\_. I determined the area by \_\_\_. * Two equations that match my shape are \_\_\_ x \_\_\_ and \_\_\_ x \_\_\_ because \_\_\_. | * Informally assess students as they complete Designing a Storage Unit. Note the following:   + Are students able to identify the dimensions of each rectangle?   + What strategies do students use to break apart arrays?   + Are students able to break apart the array multiple ways? |
| **4** | * I will use color tiles to represent the area of rectangular shapes. * I will decompose rectangles and rectilinear shapes into smaller rectangles to determine the area. | * I broke this shape into \_\_\_ rectangles because \_\_\_. The dimensions for each rectangle are \_\_\_. * I found the missing side to my shape by \_\_\_. | * Informally assess students as they work to determine the area of irregular figures. Note the following:   + What strategies do students use to break apart arrays?   + Are students able to identify the dimensions of each rectangle? |
| **5** | * I will use color tiles to represent the area of rectangular shapes. * I will decompose rectangles and rectilinear shapes into smaller rectangles to determine the area. | * The dimensions for room 1 is \_\_\_. The area is \_\_\_. I found the area by \_\_\_. * The dimensions for room 2 is \_\_\_. The area is \_\_\_. I found the area by \_\_\_. | * Informally assess students as they complete the task for today. Note the following:   + What strategies do students use to break apart arrays?   + Are students able to identify the dimensions of each rectangle? |

# **Unit 3: *Multiple Towers and Division Stories***

*Estimated Duration: 19 days (November 1, 2016 – December 2, 2016)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * The relationship between numbers and their factors * The structure of the Base Ten Number System makes it convenient and efficient to break numbers apart by place (Distributive Property) * Multiplication and division are related operations * A division story problem can be solved using multiplication or division * Division involves making equal groups * Reminders should be put in context for interpretation | **Students will be able to:**   * Fluently multiply combinations to 12x12 * Break numbers apart to create problems that make multiplication easier * Justify and explain strategies used to for multiplication * Use a variety of representations to solve multiplication story problems * Compare visual representation of multiplication situations * Multiply multiples of 10 * Justify the effect on the product when a factor is doubled or halved * Identify the factors of a given number * Use their understanding of patterns to describe and predict multiples * Use known multiplication combinations to find related multiplication combinations for a given product * Use known multiplication combinations to solve division problems * Justify and explain strategies used for division * Use a variety of representations to solve division story problems * Use a variety of representations to solve multi-step story problems |
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| **Investigation 1**  **Estimated Duration: 4 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **1.1** | * I will develop strategies for multiplying that involve breaking numbers apart. * I will represent multiplication problems using pictures, diagrams, or models. | * I broke \_\_\_ into \_\_\_ to make solving the problem easier. * I represented \_\_\_ using \_\_\_. * The product of \_\_\_ x \_\_\_ is \_\_\_. I know because \_\_\_. | * SAB page 1 can be used to determine if students are able to interpret, represent, and solve multiplication story problems. Pay close attention to the strategies students use for the discussion. * During the discussion *Showing Your Solution* (TE page 30) highlight strategies students used to solve the first problem. Connect student strategies for solving the remaining problems. * SAB page 2 can be used to determine if students are able to use multiplication combinations they know to find the solution to problems with larger numbers. |
| **1.2** | * I will use rectangular arrays to model multiplication. * I will develop strategies for multiplying that involve breaking numbers apart. | * I used \_\_\_ x \_\_\_ and \_\_\_ x \_\_\_ to make \_\_\_. * I broke apart \_\_\_ to make \_\_\_ x \_\_\_ and \_\_\_ x \_\_\_. | * Informally assess students as they complete the activity *Two Arrays Make a Rectangle* (TE page 35). Note the following:   + Which factor do students select to break apart?   + Are students able show more than one way to break apart an array? |
| **1.3** | * I will use rectangular arrays to model multiplication. * I will develop strategies for multiplying that involve breaking numbers apart. | * I used \_\_\_ x \_\_\_ and \_\_\_ x \_\_\_ to make \_\_\_. * I broke apart \_\_\_ to make \_\_\_ x \_\_\_ and \_\_\_ x \_\_\_. | * Informally assess students as the play *Small Array/Big Array* with a partner. Note the following:   + Are students able to visualize other arrays that will complete a match?   + Do students accurately record their matches with an equation? * Formally assess students’ ability to represent multiplication problems using pictures, diagrams, or models using assessment M43 (include this assessment during Math Workshop) |
| **1.4** | * I will use rectangular arrays to model multiplication. * I will develop strategies for multiplying that involve breaking numbers apart. | * There are \_\_\_ wheels on 27 cars. I solved the problem by \_\_\_. * I solved \_\_\_ x \_\_\_ by \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + Are students able to visualize other arrays that will complete a match?   + Are students able to write an equation that describes how a larger array is broken apart.   + Are students able to show their thinking with multiplication notation? * Formally assess students’ ability to represent multiplication problems using pictures, diagrams, or models using assessment M43 (include this assessment during Math Workshop) |

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| **Investigation 2**  **Estimated Duration: 6 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **2.1** | * I will visualize, represent, and solve division story problems using pictures, diagrams, or models. | * The first thing I did to solve the problem was \_\_\_. Next I \_\_\_. * I used the multiplication combination \_\_\_ x \_\_\_ to help me figure out the solution. | * SAB pages 16 & 17 can be used to determine if students are able to visualize, represent, and solve division story problems. Note the following:   + What strategies do students use to solve each problem?   + Do students use multiplication combinations they know to help them figure out their solutions? |
| **2.2** | * I will visualize, represent, and solve division story problems using pictures, diagrams, or models. * I will make sense of remainders in a story problem. | * The first thing I did to solve the problem was \_\_\_. Next I \_\_\_. * I used the multiplication combination \_\_\_ x \_\_\_ to help me figure out the solution. | * Informally assess students during the activity - *Problems with Remainders* (TE page 68). Prior to the activity, refer to 4.OA.3 in the NC Unpacking document for a detailed breakdown for addressing remainders for grade 4 students. The Math Note in the TE page 69 also provides context for helping students make sense of this important idea. * SAB pages 21 & 22 can be used to determine if students are able to make sense of division story problems that have extras. |
| **2.3** | * I will visualize, represent, and solve division story problems using pictures, diagrams, or models. * I will make sense of remainders in a story problem. | * The first thing I did to solve the problem was \_\_\_. Next I \_\_\_. * I used the multiplication combination \_\_\_ x \_\_\_ to help me figure out the solution. | * Informally assess students as they complete activities during math workshop. Note the following:   + Are students able to visualize other arrays that will complete a match?   + What strategies do students use to solve each problem?   + Do students use multiplication combinations they know to help them figure out their solutions? |
| **2.4** | * I will visualize, represent, and solve division story problems using pictures, diagrams, or models. * I will make sense of remainders in a story problem. | * The missing factor is \_\_\_. I know because \_\_\_. * I used the multiplication combination \_\_\_ x \_\_\_ to help me figure out the solution for \_\_\_ divided by \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to determine the missing factor?   + What strategies do students use to solve each problem?   + Do students use multiplication combinations they know to help them figure out their solutions? |
| **2.5** | * I will use multiplication combinations I know to solve division problems. * I will visualize, represent, and solve division story problems using pictures, diagrams, or models. | * \_\_\_ x \_\_\_ is related to \_\_\_ divided by \_\_\_ because \_\_\_. * The missing factor is \_\_\_. I know because \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to determine the missing factor?   + What strategies do students use to solve each problem?   + Do students use multiplication combinations they know to help them figure out their solutions? |
| **2.6** | * I will visualize, represent, and solve division story problems using pictures, diagrams, or models. * I will create a division story problem that matches a division expression. | * \_\_\_ x \_\_\_ is related to \_\_\_ divided by \_\_\_ because \_\_\_. * Problem 1a and 1b are related because \_\_\_. | * Formally assess students’ ability to write and solve a division story problem using assessment M46. |

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| **Investigation 3**  **Estimated Duration: 4 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **3.1** | * I will describe the effect of multiplying by a multiple of 10. * I will find multiples of 2-digit numbers. | * There are \_\_\_ multiples in our tower. I know because \_\_\_. * The 20th multiple on our tower would be \_\_\_. I know because \_\_\_. | * Informally assess students as they complete the activity – *Building Multiple Towers* with a partner. Note the following:   + Are students able to easily determine the 10th multiple in the sequence?   + Do students use the 10th multiple to determine other multiples? |
| **3.2** | * I will describe the effect of multiplying by a multiple of 10. * I will visualize, represent, and solve multiplication story problems using pictures, diagrams, or models. * I will compare visual representations of multiplication situations. | * \_\_\_ x \_\_ and \_\_\_ x \_\_\_ are related because \_\_\_. * I used a \_\_\_ to create a visual representation of \_\_\_ x \_\_\_ and \_\_\_ x \_\_\_ because \_\_\_. * The 25th multiple on our tower would be \_\_\_. I know because \_\_\_. | * SAB page 41 can be used to determine if students are able to if students are able to visualize, represent, and solve related multiplication story problems. * Informally assess students as they complete activities during math workshop. Note the following:   + Are students able to explain the mathematical relationship between related problems?   + Are students able to use pictures or models to create a visual representation for related problems? |
| **3.3** | * I will multiply multiples of 10. * I will compare visual representations of multiplication situations. | * I used the first problem to help me solve the second problem by \_\_\_. * My story problem matches the equations because \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + Are students able to explain the mathematical relationship between related problems?   + Do students accurately multiply by 10?   + Are students able to show their thinking using visual representations? |
| **3.4** | * I will describe the effect of multiplying by a multiple of 10. * I will compare visual representations of multiplication situations. | * When I multiply a number by zero, the \_\_\_ is changing because \_\_\_. * Multiplying a number by zero is different from adding zero to a number because \_\_\_. | * Formally assess students’ ability to solve multiplication combinations to 12 x 12 using assessment M50. Students were last assessed on combinations unit 1 Session 2.5. Analyze student strategies after reviewing TE pages 151 - 153. Consider creating a spreadsheet to record student strategies. |

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| **Investigation 4**  **Estimated Duration: 5 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **4.1** | * I will describe the effect on the product when a factor is doubled or halved. * I will visualize, represent, and solve multiplication and division problems using pictures, diagrams, or models. | * Problem 1 and 2 are related because \_\_\_. * The factor in problem \_\_\_ is doubled / halved. I know because \_\_\_. | * SAB pages 53 & 54 can be used to determine if students are able to solve related problems in which one factor is doubled or halved and the other factor is doubled. Note the following:   + What strategies do students use to solve problems with larger factors?   + Are students able to make representations that show the relationships between doubling and halving? |
| **4.2** | * I will develop strategies for multiplying that involve breaking numbers apart. * I will use rectangular arrays to model multiplication. | * \_\_\_ x \_\_\_ is related to the cluster problem \_\_\_ x \_\_\_ because \_\_\_. * I used \_\_\_ x \_\_\_ to help me solve the final problem \_\_\_ x \_\_\_ because \_\_\_. | * SAB pages 57 & 58 can be used to determine if students are able to choose strategies for solving multiplication problems by considering ways to use number relationships they know. Note the following:   + Do students easily multiply multiples of 10?   + Do students break part the numbers in the final problem into smaller manageable parts?   + Do students use their knowledge of doubling and halving to solve problems? |
| **4.3** | * I will describe the effect on the product when a factor is doubled or halved. * I will develop strategies for multiplying that involve breaking numbers apart. | * I broke apart the \_\_\_ to make the problem easier. My new equation was \_\_\_. The product is \_\_\_. I know because \_\_\_. * \_\_\_ x \_\_\_ is related to the cluster problem \_\_\_ x \_\_\_ because \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + Do students easily multiply multiples of 10?   + Do students break part the numbers in the final problem into smaller manageable parts?   + Do students use their knowledge of doubling and halving to solve problems? |
| **4.4** | * I will describe the effect on the product when a factor is doubled or halved. * I will develop strategies for multiplying that involve breaking numbers apart. | * My strategy is different from \_\_\_’s strategy because \_\_\_. We have the same product because \_\_\_. * My strategy is the same as \_\_\_’s strategy. We can double check our strategy by \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + Do students easily multiply multiples of 10?   + Do students break part the numbers in the final problem into smaller manageable parts?   + Do students use their knowledge of doubling and halving to solve problems? |
| **4.5** | * I will use multiplication combinations I know to solve division problems. * I will visualize, represent, and solve division story problems using pictures, diagrams, or models. * I will develop strategies for multiplying that involve breaking numbers apart. | * In problem \_\_\_, I knew I need to multiply because \_\_\_. * I problem \_\_\_, I knew I needed to divide because \_\_\_. | * Formally assess students’ ability to solve multiplication and division problems using assessment M51 & M52. Analyze student strategies after reviewing TE pages 173 - 177. Consider creating a spreadsheet to record student strategies. |

# **CMS Geometry Unit**

*Estimated Duration: 21 days (December 5, 2016 – January 13, 2017)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * An angle is the union of two rays, *a* and *b*, with the same initial point *P* * Rays are sometimes called sides of angles * Angles are measured with reference to a circle (a 360-degree rotation makes a complete circle) * A right angle is 90 degrees * An acute angle is between 0 and 90 degrees * An obtuse angle is between 90 and 180 degrees * A straight angle is 180 degrees * A reflex angle is between 180 and 360 degrees * Two angles are complementary if their measurements have a sum of 90 degrees * Two angles are supplementary if their measurements have a sum of 180 degrees * Two angles are adjacent if they have the same vertex that only overlap at a boundary * Two lines are parallel if they never intersect * Two lines are perpendicular if they intersect in right angles (90 degrees) * A kite is a quadrilateral whose four sides can be grouped into two pairs of equal-length sides that are adjacent(beside) to each other * Area = *l* x *w* (length x width) * Perimeter = 2*l* + 2*w* (length + length + width + width) | **Students will be able to:**   * Distinguish between points, line segments, lines, rays, and angles * Measure angles in degrees using a protractor * Describe, identify, and draw right, acute, obtuse, straight, and reflex angles * Determine the number and type of angles in shapes * Classify triangles based on attributes * Create acute, obtuse, right, scalene, isosceles, and equilateral triangles * Describe, identify, and draw perpendicular and parallel lines * Describe, identify, and draw quadrilaterals (trapezoid, rhombus, kite, rectangle, square, parallelogram, and dart) * Compare and contrast quadrilaterals (trapezoid, rhombus, kite, rectangle, square, parallelogram, and dart) * Identify lines of symmetry in shapes * Classify, compare, and contrast shapes by lines of symmetry * Determine the area of two-dimensional shapes * Determine the perimeter of two-dimensional shapes * Determine the area of two-dimensional shapes with missing sides * Determine the perimeter of two-dimensional shapes with missing sides |
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| **CMS Geometry Unit**  **Estimated Duration: 21 days (Extra time is built into the unit to provide students with sufficient time to make sense of the concepts throughout the unit.)** | | | |
| **Lesson** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **1** | * I will distinguish between points, line segments, lines, rays, and angles. | * The labels for the five towns are \_\_\_. I know because \_\_\_. * One road that extends for a long time is \_\_\_. I know because \_\_\_. | * Student activity *Connecting Towns Activity Shape* can be used to determine if students are able to identify the difference between line segments, lines, rays, and angles. |
| **2** | * I will learn how to read the degrees of an angle on a protractor. * I will identify types of angles based on their measurement. | * An angle is a right angle if \_\_\_. * An obtuse angle is different from a straight angle because \_\_\_. | * Informally assess students as they work in groups to create different types of angles. Note the following:   + Are students able to identify each type of angle?   + Are students able to draw each angle? |
| **3** | * I will learn how to read the degrees of an angle on a protractor. * I will determine the angles in different shapes. | * Shape \_\_\_ has \_\_\_ angles. The angles are \_\_\_. * The angles in shape \_\_\_ are different from the angles in shape \_\_\_ because \_\_\_. | * Student activity *Angle Shape Sort Activity Sheet* can be used to determine if students are able to identify the number of angles in different shapes. |
| **4** | * I will sort and classify triangles based on attributes. | * I triangle is the same/different from my neighbor’s triangle because \_\_\_. * I can/cannot make a triangle with an obtuse angle and a right angle in the same triangle because \_\_\_. | * Informally assess students as they complete the task cards on geoboards in small groups. Note the following:   + Are students able to identify characteristics of triangles?   + Do students know the name for different triangles? |
| **5** | * I will classify triangles based on attributes. * I will draw triangles based on attributes. | * Triangle \_\_\_ has \_\_\_ angles. I know because \_\_\_. * Triangle \_\_\_ and \_\_\_ are the same because \_\_\_. | * Informally assess students as they complete the Triangle Sorting Activity. Note the following:   + Are students able to identify characteristics of triangles?   + Do students know the name for different triangles? |
| **6** | * I will describe and create different types of lines. | * Street \_\_\_ intersects with street \_\_\_ and forms a \_\_\_ angle. * Street \_\_\_ and street \_\_\_ are parallel because \_\_\_. | * Student activity *Create a Town* can be used to determine if students are able to draw different types of lines, angles, and triangles. |
| **7** | * I will draw and identify attributes for different types of quadrilaterals. | * I trapezoid with one right angle has \_\_\_ pairs of parallel lines. * Rectangles and \_\_\_ have \_\_\_ perpendicular sides. | * Student activity Classifying Quadrilaterals can be used to determine if students are able to identify the number of parallel sides, perpendicular sides, and types of angles in different quadrilaterals (trapezoid, rhombus, kite, rectangle, square, parallelogram, and dart). |
| **8** | * I will draw and classify different types of quadrilaterals. | * A \_\_\_ and a \_\_\_ have the same number of congruent sides. * A dart has \_\_\_ angles. The angles are \_\_\_. | * Student activity Classifying Quadrilaterals can be used to determine if students are able to identify the pairs of congruent sides and types and number of angles in different quadrilaterals (trapezoid, rhombus, kite, rectangle, square, parallelogram, and dart). |
| **9** | * I will sort and classify different types of quadrilaterals. | * My rule was \_\_\_ and cards \_\_\_ the rule. * Shape card(s) \_\_\_ fit/do not fit the rule because \_\_\_. | * Informally assess students as they work in groups to to play “Guess My Rule.” Note the following:   + Are students able to determine different ways to classify the quadrilaterals?   + Are students to identify the rule and why cards do/don’t fit the rule? |
| **10** | * I will draw different types of quadrilaterals based on attributes. | * My rule was \_\_\_ and cards \_\_\_ the rule. * Shape card(s) \_\_\_ fit/do not fit the rule because \_\_\_. | * Continue to informally assess students as they work in groups to to play “Guess My Rule.” Note the following:   + Are students able to determine different ways to classify the quadrilaterals?   + Are students to identify the rule and why cards do/don’t fit the rule? * Student activity Classifying Quadrilaterals can be used to determine if students are able to draw and write the names of quadrilaterals based on defined attributes. |
| **11** | * I will explore and reason about lines of symmetry in shapes. | * Shape card \_\_\_ has \_\_\_ lines of asymmetry. I know because \_\_\_. * Shape card \_\_\_ has more/less lines of symmetry than shape \_\_\_. I know because \_\_\_. | * Informally assess students as they determine the lines of symmetry for triangles and quadrilaterals. Note the following:   + How do students determine the number of lines of symmetry for each shape?   + Are students able the explain why a shape has a line of symmetry? |
| **12** | * I will identify the lines of symmetry in different shapes. * I will use a geoboard to make shapes with different lines of symmetry. | * Shape card 3 has more lines of symmetry than shape card 4 because \_\_\_. * Shape cards \_\_\_ have 2 lines of symmetry. I know because \_\_\_. | * Informally assess students as they complete the Exploring Symmetry Activity Sheet. Note the following:   + How do students determine the number of lines of symmetry for each shape?   + Are students able the explain why a shape has a line of symmetry? |
| **13** | * I will determine the area and perimeter of 2-D shapes. | * When finding the perimeter of a shape, it is important to focus on \_\_\_. * The relationship I see between area and perimeter is \_\_\_. | * Informally assess students as they find different ways to arrange 12 tiles. Note the following:   + Do students use known multiplication combinations to determine the number of arrangements?   + How do students keep track of the arrangements they make? |
| **14** | * I will determine the area and perimeter of 2-D shapes with missing sides. | * To determine the missing side of figure \_\_\_, I need to \_\_\_. | * Student activity *Missing Sides* can be used to determine if students are determine missing side lengths and perimeter. |
| **15** | * I will determine the area and perimeter of 2-D shapes. | * To determine the area of this figure, I \_\_\_. * To determine the perimeter of this shape I \_\_\_. | * Student Tasks cards can be used to determine if students are able to find the area and perimeter of different shapes. |
| **16** | * I will determine the area and perimeter of 2-D shapes. | * To determine the area of this figure, I \_\_\_. * To determine the perimeter of this shape I \_\_\_. | * Student Tasks cards can be used to determine if students are able to find the area and perimeter of different shapes. |

# **Unit 6: *Fraction Cards and Decimal Squares***

*Estimated Duration: 34 days (January 11, 2017 – March 3, 2017)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * Equivalent fractions can be created by multiplying both the numerator and denominator by the same number or by dividing a shaded region into various parts * Fractions can be compared by creating a visual model, finding common denominators or numerators, or using landmarks 0, ½, and 1. * A fraction with a numerator of one is called a unit fraction * An improper fraction can be converted into a mixed number by decomposing the fraction into a sum of a whole number less than 1 * How to use and create visual fraction models to multiply a whole number by a fraction * The relationship between fractions with denominators of 10 and denominators of 100 and the place value the chart * The decimal point is used to signify the location of the ones place * How to build area and other models to compare decimals | **Students will be able to:**   * Find fractional parts of a rectangular area * Identify equivalent fractions * Compare the same fractional part of different sized wholes * Compare fractions to landmarks 0, ½, 1, and 2 * Order fractions and justify their order through reasoning about fraction equivalence * Represent fractions using a number line * Find fractional parts of a group * Interpret the meaning of the numerator and denominator * Use visual representations to add fractions with like denominators (2, 3, 4, 5, 6, 8, 10, 12, and 100) * Use visual representations to subtract fractions with like denominators (2, 3, 4, 5, 6, 8, 10, 12, and 100) * Use visual representations to multiply a whole number and a fraction * Identify decimal and fraction equivalences * Read and write tenths and hundredths * Represent tenths and hundredths as parts of an area * Compare and order decimals |
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| **Investigation 1**  **Estimated Duration: 9 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **1.1** | * I will find fractional parts of a rectangular area. * I will interpret the meaning of the numerator and the denominator of a fraction. | * The shaded part is \_\_\_ of the rectangle. I know because \_\_\_. * The shaded part is not ¼ of the rectangle. I know because \_\_\_. | * SAB page 1 can be used to determine if students are able to identify and label fractional parts on a 4x6 rectangle. |
| **1.2** | * I will find fractional parts of a rectangular area. * I will identify relationships between unit fractions. * I will identify equivalent fractions. | * The shaded part of the rectangle is \_\_\_. I know because \_\_\_. * 3/6 is equal to \_\_\_. I know because \_\_\_. | * SAB page 5 can be used to determine if students are able to identify fractional parts of a rectangular area. |
| **1.3** | * I will find fractional parts of a group. * I will compare the fractional parts of different sized wholes. | * Ruby will get \_\_\_ marbles. I solved the problem by \_\_\_. * Ethan will get \_\_\_ cars. I solved the problem by \_\_\_. | * SAB pages 6 &v7 can be used to determine if students are able to find fractional parts of a group. |
| **1.4** | * I will find fractional parts of a rectangular area. * I will find fractional parts of a group. * I will compare the fractional parts of different sized wholes. | * I know \_\_\_ is \_\_\_ of the total because \_\_\_. * ½ of \_\_\_ is different from ½ of \_\_\_ because \_\_\_. | * SAB page11 can be used to determine if students are able to identify and label fractional parts on a 5x12 rectangle. * SAB pages 12 & 13 can be used to determine if students are able to find fractional parts of a group. |
| **CMS Lesson #1** | * I will use visual representations to add fractions with like denominators. * I will add fractions with like denominators. | * The total of \_\_\_ + \_\_\_ = \_\_\_. I know because \_\_\_. | * Student Activity Page (SAP) 1 can be used to determine if students are able to add fractions with like denominators. |
| **CMS Lesson #2** | * I will use visual representations to add fractions with like denominators. * I will add fractions with like denominators. | * Stephen has \_\_\_ cupcakes. I solved the problem by \_\_\_. * Jada walked \_\_\_ miles. I solved the problem by \_\_\_. | * SAP 2 can be used to determine if students are able to add fractions with like denominators. |
| **1.8A** | * I will use visual representations to subtract fractions with like denominators. * I will subtract fractions with like denominators. | * Marisol has to walk \_\_\_ further. I solved the problem by \_\_\_. * Richard has \_\_\_ left. I solved the problem by \_\_\_. | * SAB 26A & 26B can be used to determine if students are able to subtract fractions with like denominators. |
| **CMS Lesson #3** | * I will use visual representations to subtract fractions with like denominators. * I will add and subtract fractions with like denominators. | * The total of \_\_\_ + \_\_\_ = \_\_\_. I solved the problem by \_\_\_. * \_\_\_ - \_\_\_ = \_\_\_. I solved the problem by \_\_\_. | * SAP 3 can be used to determine if students are able to add and subtract fractions with like denominators. |

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| **Investigation 2**  **Estimated Duration: 10 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **2.1** | * I will interpret the meaning of the numerator and the denominator of a fraction. * I will represent fractions greater than 1. * I will find fractional parts of a rectangular area. | * I chose the fraction \_\_\_. I was easy/hard to make because \_\_\_. * In the fraction \_\_\_, the numerator is \_\_\_ and the denominator is \_\_\_. | * Informally assess students as they complete activity *Making Fraction Cards*. Note the following:   + Do students’ drawings show understanding of the meaning of the fraction or mixed number?   + Do students recognize the fractions in which the numerator and the denominator are the same equal 1?   + Are students able to represent fractions that are more than one whole? |
| **2.2** | * I will interpret the meaning of the numerator and the denominator of a fraction. * I will find fractional parts of a rectangular area. | * When the numerator is larger than the denominator it means \_\_\_. * One way I can decide if two fractions are equivalent is \_\_\_. | * Informally assess students during the discussion One Piece Is Missing (TE 76). Note the following:   + How do students compare fractions that are one fractional part less than 1?   + Are students able to make arguments based on their knowledge of the meaning of fractions or do they rely on their drawings? |
| **2.3** | * I will interpret the meaning of the numerator and the denominator of a fraction. * I will identify equivalent fractions. | * I turned over \_\_\_ and my partner turned over \_\_\_. \_\_\_ is larger because \_\_\_. * I turned over \_\_\_ and my partner turned over \_\_\_. \_\_\_ is smaller because \_\_\_. | * SAB page 33 can be used to determine if students are able to write equations that show equivalent fractions. |
| **2.4** | * I will identify equivalent fractions. * I will compare fractions to the landmarks 0, ½, 1, and 2. | * The fractions cards that are between 0 and ½ are \_\_\_. I know because \_\_\_. * The fraction cards that are equal to 1 are \_\_\_. I know because \_\_\_. | * SAB page 37 can be used to determine if students are able to determine the relationship of fractions to ½ and 1. |
| **2.5** | * I will order fractions and justify their order through reasoning about fraction equivalences and relationships. * I will represent fractions using a number line. * I will compare fractions to the landmarks 0, ½, 1, and 2. | * When comparing \_\_\_, I used the landmark fraction \_\_\_ because \_\_\_. * I worked with fraction cards \_\_\_. The order from least to greatest is \_\_\_. I used \_\_\_ to help me. | * SAB page 39 can be used to determine if students are able to order fractions using landmarks 0, ½, 1, and 2. |
| **2.6** | * I will order fractions and justify their order through reasoning about fraction equivalences and relationships. * I will represent fractions using a number line. * I will compare fractions to the landmarks 0, ½, 1, and 2. | * \_\_\_ (fraction) is larger than \_\_\_ (fraction). I know because \_\_\_. * I worked with fraction cards \_\_\_. The order from least to greatest is \_\_\_. I used \_\_\_ to help me. | * Formally assess students’ ability to compare fractions using assessment M23. Analyze student responses after reading pages TE 153 – 156. Consider creating a spreadsheet to record student strategies. |
| **2.7A** | * I will make a line plot to display a data set of measurements involving fractions. * I will add and subtract mixed numbers with like denominators. | * One statement that describes the data is \_\_\_. * There were \_\_ butterflies with a wingspan larger than 3. | * SAB page 44A can be used to determine if students are able to make a line plot to display a data set of measurements involving fractions. * SAB page 44B can be used to determine if students are able to solve addition and subtraction problems involving fractions. |
| **CMS Line Plot Lesson #1** | * I will make a line plot to display a data set of measurements involving fractions. * I will add and subtract mixed numbers with like denominators. | * One statement that describes the data is \_\_\_. * The total length of \_\_\_ + \_\_\_ is. I solved the problem by \_\_\_. | * Student Activity Page (STP) 1 can be used to determine if students are able to make a line plot to display a data set of measurements involving fractions and solve addition and subtraction problems involving fractions. |
| **CMS Line Plot Lesson #2** | * I will make a line plot to display a data set of measurements involving fractions. * I will add and subtract mixed numbers with like denominators. | * One statement that describes the data is \_\_\_. * The difference between \_\_\_ and \_\_\_ is \_\_\_. I solved the problem by \_\_\_. | * Student Activity Page (STP) 2 can be used to determine if students are able to make a line plot to display a data set of measurements involving fractions and solve addition and subtraction problems involving fractions. |

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| **Investigations and the Common Core Multiplying Fractions & CMS Multiplying Fractions Lessons**  **Estimated Duration: 7 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **3A.1** | * I will multiply a whole number and a fraction. * I will use visual models to solve world problems involving multiplication of a whole number and a fraction. | * If I count by ¼’s, the 6th number will be \_\_\_. An equation that represents 6 people counting by ¼’s is \_\_\_. I know because \_\_\_. * When a number line is used to represent 3 x ½, it is important to \_\_\_. | * SAB page 44D can be used to determine if students are able to use visual models to solve real world problems involving multiplication of a whole number and a fraction. |
| **3A.2** | * I will multiply a whole number and a fraction. * I will use visual models to solve world problems involving multiplication of a whole number and a fraction. | * If Steve ran ½ of a 7-mile race, her ran \_\_\_ miles. I solved the problem by \_\_\_. * If Mr. Garcia has 15 grandchildren and 2/3 are girls, \_\_\_ are girls. I solved the problem by \_\_\_. | * SAB page 44F, 44G, and 44H can be used to determine if students are able to use visual models to solve problems involving multiplication of a whole number and a fraction. |
| **3A.3** | * I will multiply a whole number and a fraction. * I will use visual models to solve world problems involving multiplication of a whole number and a fraction. | * I solved \_\_\_ x \_\_\_ by \_\_\_. I used this strategy to solve the problem because \_\_\_. * I know my answer is reasonable because \_\_\_. | * Formally assess students’ ability to use visual models to solve problems involving multiplication of a whole number and a fraction using assessment C41. Analyze student responses after reading *Investigations and the Common Core Standards* page CC70. Consider creating a spreadsheet to record student strategies. |
| **CMS Lesson #1** | * I will multiply a whole number and a fraction. * I will use visual models to solve world problems involving multiplication of a whole number and a fraction. | * There are \_\_\_ pieces of cake. I know because \_\_\_. * An equivalent fraction for my answer is \_\_\_. I know because \_\_\_. | * Informally assess students as they complete the *Birthday Cake* activity. Note the following:   + What strategies do students use to determine the total pieces of cake?   + Are students able to justify if the candles are evenly distributed or fairly distributed? |
| **CMS Lesson #2** | * I will multiply a whole number and a fraction. * I will use visual models to solve world problems involving multiplication of a whole number and a fraction. | * I can model multiplication of a whole number by a fraction by \_\_\_. * Multiplying a whole number by a fraction is different from multiplying a whole number by another whole number because \_\_\_. | * Student mini-fraction books can be used to determine if students are able to use visual models to solve problems involving multiplication of a whole number and a fraction. |
| **CMS Lesson #3** | * I will multiply a whole number and a fraction. * I will use visual models to solve world problems involving multiplication of a whole number and a fraction. | * I filled up \_\_\_ circle first because \_\_\_. * If I roll a high number, the best circle to fill is \_\_\_ because \_\_\_. * If I roll a low number, the best circle to fill is \_\_\_ because \_\_\_. | * Informally assess students while they play the Fraction Pie Game. Note the following:   + What strategies do students use to determine which circles to fill?   + Are students able to keep track as they play? |

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| **Investigation 3**  **Estimated Duration: 8 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **3.1** | * I will identify everyday uses of fractions and decimals. * I will read, write, and represent tenths and hundredths. | * Fractions and decimals are related because \_\_\_. * I shade 1/10 on grid A by \_\_\_ and grid B by \_\_\_. They are the same because \_\_\_. | * SAB pages 44 & 45 can be used to determine if students are able to represent tenths and hundredths as parts of an area. |
| **3.2** | * I will read, write, and represent tenths and hundredths. * I will order decimals and justify their order through reasoning about representations and meaning of the numbers. | * 0.23 is larger/smaller than 0.3 because \_\_\_. * I turned over \_\_\_ and my partner turned over \_\_\_. \_\_\_ is largest because \_\_\_. | * Informally assess students while they play *Decimal Compare*. Note the following:   + How do students say each number?   + What strategies do students use to determine which number is largest? |
| **3.3** | * I will read, write, and represent tenths and hundredths. * I will use representations to combine tenths and hundredths. | * I know that 0. \_\_\_ + 0. \_\_\_ = \_\_\_ because \_\_\_. * I filled in the two squares using cards \_\_\_. I know the sum is 2 because \_\_\_. | * Informally assess students while they *play Fill Two*. Note the following:   + What strategies do students use to determine which cards to use?   + How do students combine the decimals to show the total? |
| **3.4** | * I will estimate the sum of decimal numbers. * I will use representations to combine tenths and hundredths. | * 0.\_\_\_ + 0. \_\_\_ is more than 0.5. I know because \_\_\_. * Tony ran a total of \_\_\_ miles. I solved the problem by \_\_\_. | * SAB pages 52 & 53 can be used to determine if students are able to use representations to combine tenths and hundredths. |
| **3.5** | * I will order decimals and justify their order through reasoning about representations and meaning of the numbers. * I will use representations to combine tenths and hundredths. | * I made 10.5 miles by \_\_\_. I double checked my work by \_\_\_. * I turned over \_\_\_ and my partner turned over \_\_\_. \_\_\_ is smallest because \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + Do students notice when their sum is not reasonable?   + What strategies do students use to add the numbers?   + Are students able to add the numbers accurately? |
| **3.6** | * I will order decimals and justify their order through reasoning about representations and meaning of the numbers. * I will use representations to combine tenths and hundredths. | * I made 10.5 miles by \_\_\_. I double checked my work by \_\_\_. * I turned over \_\_\_ and my partner turned over \_\_\_. \_\_\_ is largest because \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + Do students notice when their sum is not reasonable?   + What strategies do students use to add the numbers?   + Are students able to add the numbers accurately? |
| **3.7** | * I will interpret the meaning of the numerator and the denominator of a fraction. * I will order fractions and justify their order through reasoning about fraction equivalences and relationships. * I will order decimals and justify their order through reasoning about representations and meaning of the numbers. |  | * Formally assess students’ ability to identify fractional parts of a group, order fractions with like and unlike denominators, and read, write, and interpret decimal fractions in tenths and hundredths using assessment M31. Analyze student responses after reading pages TE 159 - 163. Consider creating a spreadsheet to record student strategies. |

# **Unit 8: *How Many Packages? How Many Groups?***

*Estimated Duration: 19 days (March 6, 2017 – March 30, 2017)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * The relationship between numbers and their factors * The structure of the Base Ten Number System makes it convenient and efficient to break numbers apart by place (Distributive Property) * Multiplication and division are related operations * A division story problem can be solved using multiplication or division * Division involves making equal groups * Reminders should be put in context for interpretation | **Students will be able to:**   * Estimate solutions to multiplication and division problems * Multiply multiples of 10 * Fluently multiply combinations to 12x12 * Break numbers apart to create problems that make multiplication easier * Solve multiplication problems involving a 3-digit or 4-digit number by a 1-digit number * Justify and explain strategies used for multiplication * Use a variety of representations to solve multiplication story problems * Identify the factors of a given number * Use known multiplication combinations to solve division problems * Justify and explain strategies used for division * Solve division problems involving a 3-digit or 4-digit number by a 1-digit number * Use a variety of representations to solve division story problems * Use multiples of 10 to solve division problems |
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| **Investigation 1**  **Estimated Duration: 5 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **1.1** | * I will estimate solutions to multiplication problems. * I will multiply multiples of 10. | * I changed \_\_\_ to the landmark number \_\_\_ because \_\_\_. * The closest estimate for \_\_\_ x \_\_\_ is \_\_\_ because \_\_\_. | * SAB page 1 can be used to determine if students are able to identity the closest estimate for multiplication problems. |
| **1.2** | * I will estimate solutions to multiplication problems. * I will develop strategies for multiplying that involve breaking numbers apart. * I will create a multiplication problem to match a multiplication expression. | * \_\_\_ is an overestimate for \_\_\_ x \_\_\_ because \_\_\_. * In the problem \_\_\_ x \_\_\_, the number \_\_\_ tells the size of the group and the number \_\_\_ tells the size of the group. * I kept track of the parts of the problem by \_\_\_. | * Informally assess students as they work with a partner to complete SAB pages 5 & 6. Note the following:   + How do students break the problem apart to make it easier to solve?   + Do students use visual representations to help them solve the problem? |
| **1.3** | * I will develop strategies for multiplying that involve breaking numbers apart. * I will multiply multiples of 10. * I will visualize, represent, and solve multiplication story problems using pictures, diagrams, or models. | * I represented the problem \_\_\_ x \_\_\_ by \_\_\_. I chose this representation because \_\_\_. * In the problem \_\_\_ x \_\_\_, the related problem \_\_\_ x \_\_\_ helped me to find the product because \_\_\_. | * Informally assess students during the discussion *Representing 42x38* (TE page 41). Note the following:   + Are students able to visualize the problem?   + What representations do students use to help them solve the problem?   + Are students able to keep track of all the parts when solving the problem? |
| **1.4** | * I will develop strategies for multiplying that involve breaking numbers apart. * I will multiply multiples of 10. * I will visualize, represent, and solve multiplication story problems using pictures, diagrams, or models. | * I broke the problem \_\_\_ x \_\_\_ into \_\_\_ x \_\_\_ and \_\_\_ x \_\_\_ because \_\_\_. * The first way I showed the solution to \_\_\_ x \_\_\_ was \_\_\_. The second way I showed the solution was \_\_\_. | * Formally assess students using *Assessment Checklist: Solving Multiplication Problems* (M18) as they complete STB pages 14 & 15. |
| **1.5** | * I will develop strategies for multiplying that involve breaking numbers apart. * I will multiply multiples of 10. * I will visualize, represent, and solve multiplication story problems using pictures, diagrams, or models. | * \_\_\_ is a factor of \_\_\_. I know because \_\_\_. * \_\_\_ is not a factor of \_\_\_. I know because \_\_\_. * I represented the problem \_\_\_ x \_\_\_ by \_\_\_. I chose this representation because \_\_\_. | * Continue to formally assess students using *Assessment Checklist: Solving Multiplication Problems* (M18) as they complete STB pages 14 & 15. |

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| **Investigation 2**  **Estimated Duration: 6 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **2.1** | * I will develop strategies for multiplying that involve breaking numbers apart. * I will compare strategies for solving multiplication problems. * I will visualize, represent, and solve multiplication and division story problems using pictures, diagrams, or models. | * I finished Sophia’s/George’s problem by \_\_\_. * In order to solve \_\_\_ x \_\_\_, I used the related problem \_\_\_ x \_\_\_. I used this problem because \_\_\_. | * STB page 19 can be used to determine if students are able to make sense of different strategies for solving multiplication problems. The activity can also be used to determine if students are able to use landmark numbers to make solving multiplication problems easier. |
| **2.2** | * I will develop strategies for multiplying that involve breaking numbers apart. * I will multiply multiples of 10. * I will estimate solutions to multiplication problems. | * To solve the problem \_\_\_ x \_\_\_, I created the following cluster problems \_\_\_. \_\_\_ x \_\_\_ helps me to solve my problem because \_\_\_. * The closest estimate for \_\_\_ x \_\_\_ is \_\_\_ because \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + What problems do students create for their clusters?   + Are students able to solve each of the problems in the cluster?   + Do students recognize all of the parts of the problem that need to be multiplied after the numbers are broken apart? |
| **2.3** | * I will develop strategies for multiplying that involve breaking numbers apart. * I will multiply multiples of 10. * I will estimate solutions to multiplication problems. | * To solve the problem \_\_\_ x \_\_\_, I created the following cluster problems \_\_\_. \_\_\_ x \_\_\_ helps me to solve my problem because \_\_\_. * The closest estimate for \_\_\_ x \_\_\_ is \_\_\_ because \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + What problems do students create for their clusters?   + Are students able to solve each of the problems in the cluster?   + Do students recognize all of the parts of the problem that need to be multiplied after the numbers are broken apart? |
| **2.4A** | * I will estimate solutions to multiplication problems. * I will develop strategies for multiplying numbers that involve breaking numbers apart. | * I broke the problem \_\_\_ x \_\_\_ into \_\_\_ parts because \_\_\_. * Solving multiplication problems with 4-dgit numbers is harder/easier/the same as solving problems with 2-digit numbers because \_\_\_. | * SAB pages 31A & 31B can be used to determine if students are able to apply strategies for solving 2-digit multiplication problems to solving 4-digit multiplication problems. |
| **2.4** | * I will develop strategies for multiplying numbers that involve breaking numbers apart. * I will create a multiplication problem to match a multiplication expression. | * For the expression \_\_\_ x \_\_\_ = \_\_\_, the story problem I created is \_\_\_. This story problem matches the expression because \_\_\_. * I used the strategy \_\_\_ to solve \_\_\_ x \_\_\_. The product is \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + Are students able to write multiplication problems that represent the multiplication in the problem?   + Are students able to record their strategies clearly? |
| **2.5** | * I will develop strategies for multiplying numbers that involve breaking numbers apart. * I will create a multiplication problem to match a multiplication expression. | * For the expression \_\_\_ x \_\_\_ = \_\_\_, the story problem I created is \_\_\_. This story problem matches the expression because \_\_\_. * I represented the problem \_\_\_ x \_\_\_ by \_\_\_. I chose this representation because \_\_\_. | * ***To ensure students understand how to interpret multiplication story problems, please have students write a story problem and solve for 34 x 68 (Assessment M19).*** * Formally assess students’ ability to create and solve a multiplication problem using assessment M19. Analyze student strategies after reviewing TE pages 120 - 123. Consider creating a spreadsheet to record student strategies. |

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| **Investigation 3**  **Estimated Duration: 7 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **3.1** | * I will develop strategies for division problems by breaking the dividend apart. * I will visualize, represent, and solve division story problems using pictures, diagrams, or models. | * I organized the students into \_\_\_ teams. I used \_\_\_ strategy to help me determine the number of students on each team. * I used \_\_\_ x \_\_\_ to help me determine the number of teams because \_\_\_. | * SAB pages 37 & 38 can be used to determine if students are able to solve division story problems. Read page 123 in the TE for a description of division strategies students can use to help them solve problems about teams. |
| **3.2** | * I will use multiples of 10 to solve division problems. * I will develop strategies for division problems by breaking the dividend apart. | * Malia’s 20th multiple is \_\_\_ because \_\_\_. I used \_\_\_ strategy to help me figure it out. * Michael’s 25th multiple is \_\_\_ because \_\_\_. I used \_\_\_ strategy to help me figure it out. | * Informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to solve division problems?   + Are students able to identify landmark multiples?   + Are students able to express remainders in the context of the problem? |
| **3.3** | * I will use multiples of 10 to solve division problems. * I will develop strategies for division problems by breaking the dividend apart. | * Megan is counting by \_\_\_. I know because \_\_\_. * Marco’s 15th multiple is \_\_\_ because \_\_\_. I used \_\_\_ strategy to help me figure it out. | * Continue to informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to solve division problems?   + Are students able to identify landmark multiples?   + Are students able to express remainders in the context of the problem? |
| **3.4** | * I will use multiples of 10 to solve division problems. * I will develop strategies for division problems by breaking the dividend apart. | * Jill is counting by \_\_\_. I know because \_\_\_. * I used \_\_\_ x \_\_\_ to help me solve \_\_\_ because \_\_\_. | * Continue to informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to solve division problems?   + Are students able to identify landmark multiples?   + Are students able to express remainders in the context of the problem? |
| **3.5A** | * I will estimate solutions to multiplication problems. * I will develop strategies for division problems by breaking the dividend apart. | * There are more/fewer bags because \_\_\_. * Using multiplication helped me to solve \_\_\_ because \_\_\_. | * SAB pages 51A & 51B can be used to determine if students are able to divide a 4-digit number by a 1-digit number. |
| **3.5** | * I will use the relationship between multiplication and division to solve division problems. * I will visualize, represent, and solve multiplication and division story problems using pictures, diagrams, or models. | * I used multiplication/division to solve problem \_\_\_ because \_\_\_. * I kept track of the parts of the problem by \_\_\_. | * SAB pages 51 & 52 can be used to determine if students are able to interpret and solve multiplication and division story problems. |
| **3.6** | * I will visualize, represent, and solve multiplication and division story problems using pictures, diagrams, or models. | * I represented the problem \_\_\_ x \_\_\_ by \_\_\_. I chose this representation because \_\_\_. | * Formally assess students’ ability to solve multiplication and division problems using assessment M21. Analyze student strategies after reviewing TE pages 126-130. Consider creating a spreadsheet to record student strategies. |

# **Unit 9: *Penny Jars and Plant Growth***

*Estimated Duration: 9 days (April 3, 2017 – April 21, 2017)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * Patterns involving numbers or symbols either repeat or grow * Patterns and rules are related * A pattern is a sequence that repeats the same process over and over * A rule dictates the sequence that repeats the same process over and over to form a pattern * A t-chart is a tool that can be used to see number patterns | **Students will be able to:**   * Generate a number pattern that follows a given rule * Generate a shape pattern than follows a given rule * Identify and justify features of patterns |
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| **Investigation 2**  **Estimated Duration: 9 days** | | | |
| **Session** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **2.1** | * I will generate a number pattern that follows a given rule. * I will create a representation for a number pattern. | * I started with \_\_\_ pennies and added \_\_\_ to each round. After 6 rounds, I had a total of \_\_\_ pennies. * I used a \_\_\_ to show the number of pennies for each round because \_\_\_. | * Informally assess students as they work in pairs to solve Penny Jar Situation Cards (M19). Note the following:   + Do students correctly interpret each situation?   + Do students create a representation to express the number of pennies in the jar after each round?   + Do students realize they can use multiplication to determine the 6th round? |
| **2.2** | * I will generate a number pattern that follows a given rule. * I will create a table to represent a number pattern. * I will identify and describe features of number patterns. | * I started with \_\_\_ pennies and added \_\_\_ to each round. After 20 rounds, I had a total of \_\_\_ pennies. * Using a table to show the number of pennies in each round helped me \_\_\_. | * Informally assess students during the discussion *Start with 2 and Add 3* (TE page 58). Note the following:   + What strategies do students use to determine the number of pennies in the jar for rounds 10, 15, and 20?   + Do students accurately record the total number of pennies using a table? |
| **2.3** | * I will generate a number pattern that follows a given rule. * I will identify and describe features of number patterns. * I will write an expression that shows how to calculate the total in a number pattern. | * To find the number of pennies in round 15 I wrote the following equation \_\_\_. I wrote this equation because \_\_\_. * Another way I can write my equation is \_\_\_. I know because \_\_\_. | * SAB pages 21 & 22 can be used to determine if students are able to write expressions to find the total number of pennies in a pattern with a given rule. |
| **2.5** | * I will generate a number pattern that follows a given rule. * I will identify and describe features of number patterns. | * There are \_\_\_ windows on the 10th floor of a double tower. I used \_\_\_ strategy to help me figure out the total number of windows. * An expression I can write to help me find the total number of windows on the 8th floor is \_\_\_. | * Informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to determine the number of windows for each floor?   + Are students able to create an expression to find the total number of windows on each floor?   + Are students using representations to express the total number of pennies in the jar after each round?   **\*\*Do not use *Assessment Checklist: Penny Jar Comparisons (M27)*\*\*** |
| **2.6** | * I will generate a number pattern that follows a given rule. * I will identify and describe features of number patterns. | * A single tower can/cannot have exactly 65 windows because \_\_\_. * A double tower can/cannot have exactly 85 windows because \_\_\_. | * Continue to informally assess students as they complete activities during math workshop. Note the following:   + What strategies do students use to determine the number of windows for each floor?   + Are students able to create an expression to find the total number of windows on each floor?   + Are students using representations to express the total number of pennies in the jar after each round? |
| **2.8** | * I will generate a number pattern that follows a given rule. * I will identify and describe features of number patterns. | * For a corner tower, I would find the number of windows if there are 45 floors by \_\_\_. * For a double tower, I would find the number of windows if there were 30 floors by \_\_\_. | * SAB pages 53 & 54 can be used to determine if students are able to generate a number or shape pattern that follows a given rule and identify apparent features of the pattern that were not explicit in the rule itself. |
| **CMS Lesson** | * I will generate a number or shape pattern that follows a given rule. * I will identify and describe features of number and shape patterns. | * On day 2, the students collected \_\_\_ cans. The rule for the pattern is \_\_\_. I know because \_\_\_. * On day 4, the students collected \_\_\_ cans. An expression I can create to help me determine the number of cans is \_\_\_. | * Informally assess students as they complete the Earth Day project. Note the following:   + What patterns do students create to solve each problem?   + Are students able to create an expression to determine the total number of cans? |

# **CMS Measurement Unit**

*Estimated Duration: 10 days (April 24, 2017 – May 5, 2017)*

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| **Expectations for Students at the End of the Unit** | |
| **Students will know:**   * There are 12 inches in one foot * There are 3 feet in one yard * Grams, kilograms, pounds, and ounces are used to measure the weight of an object * There are 1,000 grams in one kilogram * There are 16 ounces in one pound * Volume is the amount of space an object takes up * Capacity is the amount a container will hold | **Students will be able to:**   * Weigh objects using grams and kilograms * Estimate weights of objects using grams and kilograms * Weigh objects using ounces and pounds * Estimate weights of objects using ounces and pounds * Find the capacity of a liquid using standard and metric units * Convert a measurement in one unit to a measurement in a smaller unit within the same system (3 feet = \_\_ inches) |
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| **CMS Measurement Unit**  **Estimated Duration: 10 days** | | | |
| **Day** | **Student I Will Statements** | **Supporting Accountable Talk** | **Assessment** |
| **1** | * I will identify units appropriate for measuring the mass of an object. * I measure and record the weight of different objects using grams and kilograms. | * I estimate it would take \_\_\_ paper clips to equal 10g. * I measured the fruit using \_\_\_ metric unit because \_\_\_. | * Informally assess students as they work in groups measuring and recording the weight of different items. Note the following:   + Do students use the appropriate unit for each item?   + Do students understand the difference between a gram and kilogram?   + Do students use the correct symbol for gram and kilogram? |
| **2** | * I will estimate and weight items using grams and kilograms. | * It would be appropriate to measure \_\_\_ in grams because \_\_\_. * The \_\_\_ is more than/less then/about 1 kilogram because \_\_\_. | * Student activity *Worth the Weight* can be used to determine if students are able to estimate and weigh items using grams and kilograms. |
| **3** | * I will identify units appropriate for measuring the weight of an object. * I will estimate and weight items using pounds. | * It would be appropriate to measure \_\_\_ in pounds instead of grams because \_\_\_. * The \_\_\_ is less/more/about one pound. I know because \_\_\_. | * Student activity *A Pound of What?* can be used to determine if students are able to estimate and weigh items using pounds. |
| **4** | * I will identify units appropriate for measuring the weight of an object. * I will estimate and weight items using ounces. | * It would be appropriate to measure \_\_\_ in ounces instead of pounds because \_\_\_. * Some things that are too small to measure in pounds and should be measured in ounces are \_\_\_. | * Student activity *Exploring an Ounce* can be used to determine if students are able to estimate and weigh items using ounces. |
| **5** | * I will solve problems that require unit conversions within the same system. * I will justify solutions to problems. | * Marvin can/cannot put all three presents in the box because \_\_\_. I solved the problem by \_\_\_. * Kim can/cannot go on the final round because \_\_\_. I solved the problem by \_\_\_. | * Student activity *Too Heavy? Too Light?* can be used to determine if students are able to solve problems that require Metric unit conversions. |
| **6** | * I will identify units appropriate for measuring capacity. * I will estimate and weight capacity using milliliters. | * We ordered the containers \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_, \_\_\_ because \_\_\_. * Size and shape does/does not always affect capacity because \_\_\_. | * Student activity *Capacity Line-Up* can be used to determine if students are able estimate and identify the capacity of liquids in different containers. |
| **7** | * I will solve problems that require unit conversions within the same system. * I will justify solutions to problems. | * There are \_\_\_ cups in 6 pints. I solved the problem by \_\_\_. * \_\_\_ total gallons of punch can be made with the ingredients purchased. I solved the problem by \_\_\_. | * Student activity *More Punch, Please!* can be used to determine if students are able to solve problems that require Customary unit conversions. |
| **8** | * I will solve problems that require unit conversions within the same system. * I will justify solutions to problems. | * Beverly does/does not have enough water to fill each balloon. I solved the problem by \_\_\_. * \_\_\_’s (Charlie/Warren) balloon contains the most water. I solved the problem by \_\_\_. | * Student activity *Water Balloon Fun!* can be used to determine if students are able to solve problems that require Metric and Customary unit conversions. |