Sacramento City Unified School District

Curriculum Map

# Mathematics Grade 4



**DRAFT** Last Updated August 14, 2014

Sacramento City Unified School District

# Contents

| Grade 4 - Year-at-a-Glance | | | |
|---|---|---|---|
| | **Month** | **Unit** | **Content Standards** |
| **District Benchmark 1**<br>***Alignment TBD** | September | **Unit 1:**<br>Computation with Whole Numbers, Place Value, & Rounding | 4.NBT.1<br>4.NBT.2<br>4.NBT.3<br>4.NBT.4 |
| | October/November | **Unit 2:**<br>Whole Numbers: Multiplication and Division | 4.OA.1 4.OA.5<br>4.OA.2 4.MD.3<br>4.OA.3 4.NBT.5<br>4.OA.4 4.NBT.6 |
| **District Benchmark 2**<br>***Alignment TBD** | November/<br>December | **Unit 3:**<br>Measurement: Conversions of units | 4.MD.1<br>4.MD.2 |
| | January/February | **Unit 4:**<br>Fractions: Equivalence and Ordering | 4.NF.1<br>4.NF.2<br>4.MD.4 |
| **District Benchmark 3**<br>***Alignment TBD** | February/ March | **Unit 5:**<br>Fractions: Operations | 4.NF.3<br>4.NF.4 |
| | April/May | **Unit 6:**<br>Fractions and Decimals | 4.NF.5<br>4.NF.6<br>4.NF.7 |
| **CAASPP**<br>**(Smarter Balanced Summative Test)** | May/June | **Unit 7:**<br>Geometry: Lines, Angles, and Shapes | 4.G.1<br>4.G.2<br>4.G.3<br>4.MD.5<br>4.MD.6<br>4.MD.7 |

# Unit #1: Computation with Whole Numbers, Place Value, and Rounding

(Approx. # Days- )

Content Standards: 4.NBT.1-4

In this unit students will extend place value understanding to multi-digit whole numbers.

## Common Core State Standards-Mathematics:

***Number and Operations in Base Ten 4.NBT[1]***

**Generalize place value understanding for multi-digit whole numbers.**

1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*
2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
3. Use place value understanding to round multi-digit whole numbers to any place.
4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

***[1]Students need the opportunity to practice adding and subtracting multi-digit whole numbers to build fluency for numbers up to 1,000,000 throughout the school year.***

## Standards for Mathematical Practice:

SMP. 1 Make sense of problems and persevere in solving them
SMP. 2 Reason abstractly and quantitatively
SMP. 3 Construct viable argument and critique the reasoning of others
SMP. 6 Attend to precision
SMP. 7 Look for and make use of structure
SMP. 8 Look for and express regularity in repeated reasoning

## SEL Competencies:

Self-awareness
Self-management
Social awareness
Relationship skills
Responsible decision making

## ELD Standards to Support Unit:

**Part I: Interacting in Meaningful Ways**

A. Collaborative
   1. Exchanging information and ideas with others through oral collaborative conversations on a range of social and academic topics
   2. Interacting with others in written English in various communicative forms (print, communicative technology, and multimedia
   3. Offering and supporting opinions and negotiating with others in communicative exchanges
   4. Adapting language choices to various contexts (based on task, purpose, audience, and text type)

B. Interpretive
   5. Listening actively to spoken English in a range of social and academic contexts

6. Reading closely literary and informational texts and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language
7. Evaluating how well writers and speakers use language to support ideas and opinions with details or reasons depending on modality, text type, purpose, audience, topic, and content area
8. Analyzing how writers and speakers use vocabulary and other language resources for specific purposes (to explain, persuade, entertain, etc.) depending on modality, text type, purpose, audience, topic, and content area

C. Productive

9. Expressing information and ideas in formal oral presentations on academic topics
11. Supporting own opinions and evaluating others' opinions in speaking and writing
12. Selecting and applying varied and precise vocabulary and language structures to effectively convey ideas

**Part II. Learning About How English Works**

A. Structuring Cohesive Texts

1. Understanding text structure
2. Understanding cohesion

B. Expanding and Enriching Ideas

5. Modifying to add details

C. Connecting and Condensing Ideas

6. Connecting ideas
7. Condensing ideas

| Unit #1: Computation with Whole Numbers, Place Value, and Rounding | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NBT.1-4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| Essential Questions are thought-provoking, open-ended questions to be used within daily lessons that and are therefore connected to the Sequence of Learning Outcomes. | Assessments for Learning address Diagnostic, Formative, and Summative assessments used throughout the unit to inform instruction connected to the Sequence of Learning Outcomes.<br><br>*Note: These assessments are suggested, not required.*<br><br>Mid-Point Check and Post-Assessment from engage$^{ny}$: Module 1 | Sequence of Learning Outcomes is intentionally organized for student success. Each outcome is not necessarily intended to be taught within one class session.<br><br>Each Outcome begins with *Students will be able to…* | **General Strategy Support for Unit: From the *CA Mathematics Framework***<br>• "Instructional Strategies" chapter provides research-based strategies for teaching math, K-12<br>• "Supporting High Quality Common Core Instruction" chapter addresses the development, implementation, and maintenance of high-quality, standards-based mathematics instructional programs<br><br>"Universal Design for Learning" from CAST, the Center for Applied Special Technology | **Differentiation Support for Unit:**<br>*Use of math journals for differentiation and formative assessment (use link below)*<br>https://www.teachingchannel.org/videos/math-journals<br><br>**Flexible grouping:**<br>1. Content<br>2. Interest<br>3. Project/product<br>4. Level (Heterogeneous/ Homogeneous)<br><br>**Tiered:**<br>• Independent Management Plan (Must Do/May Do)<br>• Grouping<br>○ Content<br>○ Rigor w/in the concept<br>○ Project-based learning | **CCSS Support for the Unit:**<br>CA *Mathematics Frameworks* "Grade 4"<br>• p. 1-5 "What Students Learn in Grade 4"<br>• p. 13-14 *Number and Operations in Base Ten* domain<br>• p. 41-43 "Essential Learning for the Next Grade"<br>*Kansas Association of Teachers of Mathematics (KATM) 4th Flipbook*,<br>• Provide illustrated examples, instructional strategies, additional resources/tools and misconceptions by standard.<br>• p. 19-26 *Number and Operations in Base Ten* domain<br>North Carolina Unpacked Standards 4th Grade<br>• Provide illustrated examples, instructional strategies, additional resources/tools and misconceptions by standard.<br>• p. 13-18 *Number and Operations in Base Ten* domain<br>Progression for CCSS-M<br>• p. 2-4 Overview<br>• p. 12-15 Grade 4 *Number and Operations in Base Ten* domain |
| How are place value patterns repeated in large numbers?<br><br>How does the position | From Illustrative Mathematics: "Millions and Billions of People" | 1. Reason that the magnitude of a number is based on the place value, where a number is ten times larger than the digit to the left and ten times smaller than | For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.<br>Students can build larger numbers by using graph paper with very small | | CA Framework p. 13-14<br>Flipbook p. 19-20<br>NC Unpacking p. 13<br><br>***enVision*, Topic 3: L1** |

| Unit #1: Computation with Whole Numbers, Place Value, and Rounding | | | | | |
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| of a digit in a number affect its value? | | the digit to the right. Students will make the connection by describing the pattern of the original number and the products from multiplying by 10, 100, and 1,000.<br>4.NBT.1 | squares and labeling examples of each place with digits and words. | ○ Homework<br>○ Grouping<br>○ Formative Assessment<br><br>**Anchor Activities:**<br>1. Content-related<br>2. Tasks for early finishers<br>1. Game<br>2. Investigation<br>3. Partner Activity<br>4. Stations<br><br>**Depth and Complexity Prompts/Icons:**<br>1. Depth<br>○ Language of the Discipline<br>○ Patterns<br>○ Unanswered Questions<br>○ Rules<br>○ Trends<br>○ Big Ideas<br>○ Complexity<br><br>Math Centers (Tubs)<br><br>http://scusd-math.wikispaces.com/home | -Number Talk: Tell me everything you know about 1,358.<br>-Follow lesson, then instead of using "another problem" on page 66 to show on place value chart, use 1,358.<br>-Have students do Guided Practice #s 4, 6, 8, 9, 10, 13, 15.<br>-Use # 21 as exit ticket.<br>***enVision,* Topic 3: L2**<br>-Number talk: In the number 1,234, what is the value of each digit?<br>-Follow lesson, have students to Guided practice #s 3, 4, 5, 7, 22, 23, 30, 31.<br>-Use # 25 as exit ticket. |
| How can the same number be represented in different ways? | From *enVision:* Quick Check Master Lesson 3-1 | 2. Read and write multi-digit numbers using base-ten numerals, number names, and expanded form.<br>4.NBT.2 | Students should have flexibility with the different number forms.<br>• Traditional expanded form is 285=200+80+5<br>• Written forms or number name is Two hundred eighty-five<br>Students should have opportunities to explore the idea that 285 could also be 28 tens plus 5 ones or 1 hundred, 18 tens, and 5 ones. | | CA Framework p. 13-14<br>Flipbook p. 21<br>NC Unpacking p. 14<br><br>***enVision,* Topic 3:**<br>• Lesson 3-1<br>• Lesson 3-2 |
| How are place value patterns repeated in large numbers? | From Illustrative Mathematics: "Ordering 4-digit Numbers" | 3. Compare and contrast multi-digit numbers to identify which number is larger than, smaller than, or equal to another number, by using expanded form of numerals, words, a | Students need to have opportunities to compare numbers with the same number of digits, numbers that have the same number in the leading digit position, and numbers that have different numbers of digits and | | CA Framework p. 13-14<br>Flipbook p. 21<br>NC Unpacking p. 14<br><br>***enVision,* Topic 3, L3:**<br>-Number Talk: Use "Connect" p. 70B. |

| Unit #1: Computation with Whole Numbers, Place Value, and Rounding | | | | | |
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| | | combination of both numerals and words (7 hundreds, 6 tens, and 3 ones = 763), and graphic representations (number lines, hundred charts, etc.). Students read and record the comparisons from left to right with the correct symbols (<, >, and =). 4.NBT.2 | different leading digits; i.e. the concept of magnitude (of the digits in the number).<br>Students use layered place value cards such as those used in earlier grades. | | -Follow lesson, Guided Practice, use #s 1, 3, 5, 9, 11, 17, 18, 22, 24, 25<br>-Use # 6 as exit ticket<br><br>***enVision,* Topic 3, L4:**<br>-Number Talk: How do you compare more than 2 numbers? (Use Visual Learning problem on top of p. 24)<br>-Follow lesson, use Guided Practice #s 4, 6, 7, 8, 15, 16,21, 22,24,25,33,35<br>-Exit ticket #34 |
| How are place value patterns repeated in large numbers? | From engage[ny]: Exit ticket from Module 1, Topic A, Lesson 3 | 4. Understand the role of commas in reading numerals in groups of threes (appropriate base-thousand unit – placing commas from right to left – first comma means thousands and second comma means millions or a thousand thousands). 4.NBT.2 | Students use layered place value cards such as those used in earlier grades. | | CA Framework p. 13-14<br>Flipbook p. 21<br>NC Unpacking p. 14<br><br>***engage[NY], Module 1,Topic A, L 3:***<br>-Number Talk:<br>Tell me everything you know about this number? What can you do to make this number easier to read without changing its value? 117821.<br>-Follow lesson by starting at "Concept Development"<br>-Do Problem Set |
| When is estimation more appropriate than finding the exact answer? | From Illustrative Mathematics: "Rounding to the Nearest 1000" | 5. Apply understanding of place value and number sense to explain and reason about the answers they get when they round to solve problems in real-world situations. 4.NBT.3 | Students can use number lines (utilizing the halfway point), hundred number charts, rulers, etc. to measure the distance (closer to, further than, same distance from) to determine the value of the rounded number.<br>Students round a 6 digit number to the nearest hundred thousand, ten | | CA Framework p. 13-14<br>Flipbook p. 22-23<br>NC Unpacking p. 14-15<br><br>***enVision,* Topic 3, L5:**<br>-Number Talk: Use "Connect" on page 78B<br>-Follow lesson, use Guided Practice #s 1, 3, 4, 8, 9, 11, 14, 19, 21, 27, 31,32 |

| Unit #1: Computation with Whole Numbers, Place Value, and Rounding | | | | | |
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| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NBT.1-4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | | | thousand, one thousand, hundred, and ten. | | -Use # 34 as exit ticket<br>***enVision,*** Topic 3, L 6:<br>-Number Talk: Use problem solving problem on p. 80<br>-Follow lesson, use guided practice #s 1, 2, 4, 5, 7, 10, 12<br>-Use # 9 as exit ticket |
| How can I use place value to decompose numbers to solve addition and subtraction problems?<br><br>How does understanding place value help you solve addition and subtraction problems?<br><br>How does knowing the properties of operations help you solve problems? | From Howard County Public School System Wikispace: "Adding and Subtracting multi-digit numbers | 6. Fluently add and subtract multi-digit whole numbers (up to 1,000) using various methods, such as decomposition and the distributive property of addition. (NBT[1])<br>4.NBT.4 | Students may continue to use concrete models to explain their reasoning.<br>Students may use decomposition, expanded form, the distributive property of addition, or opposite operation to solve addition and subtraction problems fluently. Ideally decomposition and the distributive property would lead to conceptual understanding to the standard algorithm. | | CA Framework p. 14-15<br>Flipbook p. 24-26<br>NC Unpacking p. 16-18<br>Gr. 4 Mod.1 Topic F from engage[ny]: "Solving Addition and Subtraction Word Problems with Tape Diagrams"<br>***enVision***: **Topic 4, L1:**<br>-Number Talk: Use connect p. 90B<br>-Follow lesson, Use guided practice #s 1, 4, 7, 8, 9, 12, 17,19, 20, 21, 22, 24, 27<br>-Use number 25 as exit ticket<br>***enVision,*** **Topic 4, L 2:**<br>-Number Talk: Can you think of a situation where an estimate may be preferable to an exact answer? How can place value help you estimate?<br>-Follow lesson, use guided practice #s 1, 4, 8, 11,13,18, 22, 23, 25, 27, 28, 29<br>-Use number 30 as exit ticket<br>***enVision,*** **Topic 4, L3:**<br>-Number Talk: use connect p. 96B<br>-Follow lesson, use guided practice #s 2, 4, 8, 22, 23, 24, 25, 27, 28, 29, 30, 31<br>-Use number 26 as exit ticket |

[1] ***Students need the opportunity to practice adding and subtracting multi-digit whole numbers to build fluency for numbers up to 1,000,000 throughout the school year***.

# Unit #2: Whole Numbers: Multiplication and Division

(Approx. # Days- )

Content Standards: 4.OA.1-5, 4.NBT.5-6, 4.MD.3

In this unit students will use place value understanding and properties of the four operations to solve problems involving multi-digit arithmetic, find all factor pairs for a whole number, generate and analyze patterns, and apply the area and perimeter formulas in real-world and mathematical situations.

**Common Core State Standards-Mathematics:**

***Operations and Algebraic Thinking 4.OA***

**Use the four operations with whole numbers to solve problems.**

1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including **rounding.**

**Gain familiarity with factors and multiples.**

4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

**Generate and analyze patterns.**

5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

***Number and Operations in Base Ten 4.NBT***

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

***Measurement and Data 4.MD***

**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**

3. Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

**Standards for Mathematical Practice:**

SMP. 1 Make sense of problems and persevere in solving them
SMP. 2 Reason abstractly and quantitatively
SMP. 4 Model with mathematics
SMP. 6 Attend to precision
SMP. 7 Look for and make use of structure
SMP. 8 Look for and express regularity in repeated reasoning

**SEL Competencies:**

Self-awareness
Self-management
Social awareness
Relationship skills
Responsible decision making

**ELD Standards to Support Unit:**

**Part I: Interacting in Meaningful Ways**

A. Collaborative
   1. Exchanging information and ideas with others through oral collaborative conversations on a range of social and academic topics
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C. Productive
   9. Expressing information and ideas in formal oral presentations on academic topics
   11. Supporting own opinions and evaluating others' opinions in speaking and writing
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**Part II. Learning About How English Works**

A. Structuring Cohesive Texts
   1. Understanding text structure
   2. Understanding cohesion

B. Expanding and Enriching Ideas
   5. Modifying to add details

C. Connecting and Condensing Ideas
   6. Connecting ideas
   7. Condensing ideas

| Unit #2: Whole Numbers: Multiplication and Division | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.OA.1-5, 4.NBT.5-6, 4.MD.3** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| Essential Questions are thought-provoking, open-ended questions to be used within daily lessons that and are therefore connected to the Sequence of Learning Outcomes. | Assessments for Learning address Diagnostic, Formative, and Summative assessments used throughout the unit to inform instruction connected to the Sequence of Learning Outcomes.<br>*Note: These assessments are suggested, not required.*<br><br>Mid-point Assessment and Post Assessment – from engage$^{ny}$, Module 3 Assessments | Sequence of Learning Outcomes is intentionally organized for student success. Each outcome is not necessarily intended to be taught within one class session.<br>Each Outcome begins with *Students will be able to…* | **General Strategy Support for Unit:**<br>**From the *CA Mathematics Framework***<br>• "Instructional Strategies" chapter provides research-based strategies for teaching math, K-12<br>• "Supporting High Quality Common Core Instruction" chapter addresses the development, implementation, and maintenance of high-quality, standards-based mathematics instructional programs<br><br>"Universal Design for Learning" from CAST, the Center for Applied Special Technology | **Differentiation Support for Unit:**<br>*Use of math journals for differentiation and formative assessment (use link below)*<br>https://www.teachingchannel.org/videos/math-journals<br><br>**Flexible grouping:**<br>5. Content<br>6. Interest<br>7. Project/product<br>8. Level (Heterogeneous/ Homogeneous)<br><br>**Tiered:**<br>• Independent Management Plan (Must Do/May Do)<br>• Grouping<br>  ○ Content<br>  ○ Rigor w/in the | **CCSS Support for the Unit:**<br>CA *Mathematics Frameworks* "Grade 4"<br>• p. 1-5 "What Students Learn in Grade 4"<br>• p. 6-13 *Operations and Algebraic Thinking*<br>• p. 14-22 *Number and Operations in Base Ten*<br>• p. 35-36 *Measurement and Data*<br>• p. 41-43 "Essential Learning for the Next Grade"<br>*Kansas Association of Teachers of Mathematics (KATM) 4th Flipbook*,<br>• Provide illustrated examples, instructional strategies, additional resources/tools and misconceptions by standard.<br>• p. 5-16 *Operations and Algebraic Thinking*<br>• p. 27-30 *Number and Operations in Base Ten*<br>• p. 53 *Measurement and Data*<br>North Carolina Unpacked Standards 4th Grade<br>• Provide illustrated examples, instructional strategies, additional resources/tools and misconceptions by standard.<br>• p. 5-12 16 *Operations and Algebraic Thinking*<br>• p. 18-25 *Number and Operations in Base Ten*<br>• p. 47-48 *Measurement and Data*<br>Progression for CCSS-M, K-5<br>Operations and Algebraic Thinking<br>• p. 2-3, 29-31, 33, 36-39 |

| Unit #2: Whole Numbers: Multiplication and Division | | | | | |
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| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.OA.1-5, 4.NBT.5-6, 4.MD.3** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | | | | concept<br>○ Project-based learning<br>○ Homework<br>○ Grouping<br>○ Formative Assessment<br><br>**Anchor Activities:**<br>3. Content-related<br>4. Tasks for early finishers<br>5. Game<br>6. Investigation<br>7. Partner Activity<br>8. Stations<br><br>**Depth and Complexity Prompts/Icons:**<br>2. Depth<br>○ Language of the Discipline<br>○ Patterns<br>○ Unanswered Questions<br>○ Rules<br>○ Trends<br>○ Big Ideas<br>○ Complexity | *Number and Operations in Base Ten*<br>• p. 2-4, 12-14<br>Geometric Measurement<br>• p. 2-5, 22 |
| How can I relate what I know about multiples to solve multiplication problems?<br><br>Why does knowing fair shares and equal groups help you explain multiplication and division problems? | From Newark Public Schools:<br>Grade 4 Operations and Algebraic Thinking 1-2 Student Module<br>(Modify pg. 7) | 1. Visualize and interpret multiplicative comparison word problems using tape or bar diagrams to represent the **"unknown product."** Students are not solving these problems just yet.<br>4.OA.1 | Students can use numbers, words, pictures, physical objects, or equations to represent the problem.<br>Avoid telling students that when multiplying, the answer is always bigger – as this will create a misconception carrying into fractions (refer to "Common Misconception" from *Mathematics Framework,* pp.10-11). | | CA Framework p. 6-11<br>Flipbook p. 5-6<br>NC Unpacking p. 5<br><br>***enVision,* Topic 1: Lessons**<br>1-1 "Meanings of Multiplication"<br>1-2 "Patterns of facts" |
| When is it more efficient to use multiplication and division to solve problems?<br><br>Why does knowing fair shares and equal groups help you explain multiplication and division problems? | From NC Wikispace "Three Times As Much" (4.OA.1 Task 2) | 2. Visualize and interpret multiplicative comparison word problems using tape or bar diagrams to represent the **"group size unknown"** and **"number of group unknown."** Students are not solving these problems just yet.<br>4.OA.1 | Present students with a problem then choose from between two or more tape diagrams that would model the problem. As students become familiar and confident with this, give students a tape diagram with information and then they write a variety of word problems that could be solved using the tape diagrams, otherwise, save this part mid to end of the unit. | | CA Framework p. 6-11<br>Flipbook p. 4-6<br>NC Unpacking p. 5<br><br>***enVision,* Topic 1: Lessons**<br>1-3 "Properties"<br>1-4 "Factors"<br>1-5 "Multiplication as a comparison"<br>1-6 "Meaning of Division"<br>1-8 "Special Quotients"<br>1-10 "Problem Solving: Drawing a picture and write an equation" |

| Unit #2: Whole Numbers: Multiplication and Division | | | | | |
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| When is it more efficient to use multiplication and division to solve problems?<br><br>Why does knowing fair shares and equal groups help you explain multiplication and division problems? | From NC Wikispace "Three Times As Much" (4.OA.1 Task 2) | 3. Solve multiplicative comparison word problems using a letter to represent the **"unknown product."** Using the tape or bar diagrams to represent the unknown quantity will continue to help students visualize what is happening in the problem with an equation that represents the problem. Students use mental computation and rounding to assess the reasonableness of their solutions.<br>4.OA.1 | Present students with a problem then choose from between two or more tape diagrams that would model the problem. As students become familiar and confident with this, give students a tape diagram with information and then they write a variety of word problems that could be solved using the tape diagrams, otherwise, save this part mid to end of the unit. | | CA Framework p. 6-11<br>Flipbook p. 5-6<br>NC Unpacking p. 5<br><br>***enVision,* Topic 1: Lessons**<br>1-9 "Using Multiplication Facts to Find Division Facts" |
| When is it more efficient to use multiplication and division to solve problems?<br><br>Why does knowing fair shares and equal groups help you explain multiplication and division problems? | From NC Wikispace: "Fund Raiser" (4.OA.2 Task 3) | 4. Solve multiplicative comparison word problems using a letter to represent the **"group size unknown"** and **"number of group unknown."** Using the tape or bar diagrams to represent the unknown quantity will continue to help students visualize what is happening in the problem with an equation that represents the problem. Students use mental computation and rounding to assess the reasonableness of their solutions.<br>4.OA.2 | Present students with a problem then choose from between two or more tape diagrams that would model the problem. As students become familiar and confident with this, give students a tape diagram with information and then they write a variety of word problems that could be solved using the tape diagrams, otherwise, save this part mid to end of the unit. | | CA Framework p. 6-11<br>Flipbook p. 7-8<br>NC Unpacking p. 5-6<br><br>***enVision, Topic 1: Lessons***<br>1-7 "Multiplication and Division Comparison Problems" |

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| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.OA.1-5, 4.NBT.5-6, 4.MD.3** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| What are multiples? | From *enVision*: Quick Check Master Lesson 5-1 | 5. Multiply single-digit numbers and two-digit numbers by 10, 100, and 1,000. Recognize patterns when multiplying by multiples of 10. Students compare their patterns with a calculator and analyze the patterns for any number multiplied by 10, 100, and 1,000. 4.OA.5 4.NBT.1 | Use area model or partial product as a visual to help students discern the pattern when multiplying multiples of 10.<br>Students may begin to see the patterns of multiplying by 10, 100, and 1,000 can increase the magnitude (the value shifts the digit to the left by 1 place, 2 places, or 3 places) of the final products/results. | | CA Framework p. 12-14<br>Flipbook p. 15-16; 19-20<br>NC Unpacking p. 11-13<br>Module 3, Topic B, Lesson 4 from engage$^{ny}$<br><br>***enVision,* Topic 5: Lessons**<br>5-1 "Arrays and Multiplying by 10 and 100"<br>5-2 "Multiplying by multiples of 10 and 100" |
| When is it more efficient to use multiplication and division to solve problems? | From NC Wikispace:<br>• "Multiplication Strategies" (4.NBT.5 Task 1)<br>• "College Basketball Attendance" (4.NBT.5 Task 3)<br><br>From Illustrative Mathematics: "Mental Division Strategies" | 6. Multiply two-digit by single-digit numbers progressing up to four-digit by single-digit numbers using contextual problems. Students use mental computation and rounding to assess the reasonableness of their solutions. 4.NBT.5 | Draw/use array/area model or partial product as a visual. | | CA Framework p. 14-22<br>Flipbook p. 27-28<br>NC Unpacking p. 18-21<br><br>***enVision,* Topic 6: Lessons**<br>6-1 "Arrays and Using an Expanded Algorithm"<br>6-2 Connecting the Expanded and Standard Algorithms<br>6-3 "Multiplying 2-Digit by 1-Digit Numbers"<br>6-4 "Multiplying 3- and 4-Digit by 1-Digit Numbers"<br>6-5 "Multiplying by 1-Digit Numbers<br><br>***enVision,* Topic 7: Lessons**<br>7-1 "Arrays and Multiplying 2-Digit Numbers by Multiples of 10" |
| How are area and perimeter related?<br><br>What is the difference between an area and a perimeter? | From NC Wikispace: "Area and Perimeter Exploration" (4.MD.3 task 1.doc) | 7. Determine the area and perimeter of rectangles in real-world mathematical problems. Students will begin using the area formula ($\ell \times w$) in square units and perimeter formula ($2\ell + 2w$, or | Ask students to find the areas of objects in the classroom. Elicit from the students how to find the areas of the objects. Develop the concept of Area = length x width. | | CA Framework p. 35-36<br>Flipbook p. 53<br>NC Unpacking p. 47-48<br>Real-World Geometry Lesson video from the Teaching Channel |

| Unit #2: Whole Numbers: Multiplication and Division | | | | | |
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| | SBAC Sample item: http://sampleitems.smarterbalanced.org/itempreview/sbac/index.htm | $2[\ell + w]$) in linear units. 4.MD.3 | Discuss why area is measured in square units.<br><br>Put the students in partners and given them a recording sheet and ask them to find the area of five objects. Bring them back to together and discuss who found the largest area and who found the smallest area. List the areas in between.<br><br>Put students in pairs. Give them rulers and or yardsticks. Ask students to find the perimeter of objects in the room such as their desks, the perimeter of the chalkboard, their math textbooks. Give them a sheet and have them record the objects and the perimeters. Discuss how they found the perimeter. Did they measure all sides and add them up? Or if the object was a rectangle, did they measure the length and width and double it? Remind them to record the unit of measure. Elicit why this is important. | | *Teaching Student-Centered Mathematics (Grades 3-5) by Van de Walle and Lovin*<br>• pg 265 *Fixed Perimeters & Areas- Activities 9.7 & 9.8<br>• pg. 288-289 Fixed Areas - Expanded Lesson,<br>• pg. 262 (Activity 9.4- Tangram Areas),<br>• pg. 263 (Activity 9.5 Fill and Compare)<br><br>***enVision,* Topic 15: Lessons**<br>15-3 "Solving Perimeter and Area Problems" |
| How can the same area model represent multiplication and division? | From Howard County Public School System Wikispace: Assessment Task 6 | 8. Use the area model to develop division strategies. Relate division back to multiplication with the area model. 4.NBT.6 | This outcome is built on a foundation of the use of arrays.<br>Be sure students label rows and columns according to the context of the problem to attend to precision and facilitate conceptual development of the meaning of area models. | | CA Framework p. 14-22<br>Flipbook p. 29-30<br>NC Unpacking p. 21-25<br>Reasoning about Division video from the Teaching Channel<br><br>***enVision,* Topic 1: Lessons** |

| Unit #2: Whole Numbers: Multiplication and Division | | | | | |
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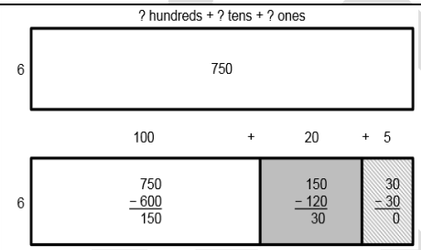
| | | | | | 1-6 "Meanings of Division" p. 20-21 |
| What is the relationship between multiplication and division?<br><br>Which division strategy do you think is best? (Present a mathematically convincing argument.) | From Illustrative Mathematics: "Mental Division Strategy" | 9. Decompose larger dividends into smaller "like" base-ten units, related to distributive property (refer to CA Framework, p.20).<br><br>4.NBT.6 |  <br>For 750 ÷6, provide students with a rectangular area model. 750 represents the area of the rectangle. One side of the rectangle is 6 and the other side is unknown. Partition the rectangle into known groups of hundreds, tens, ones as is necessary to find the unknown side. | | CA Framework p. 14-22<br>Flipbook p. 29-30<br>NC Unpacking p. 21-25 |
| How are remainders and divisors related?<br><br>What is the meaning of a remainder in a division problem?<br><br>How can a remainder affect the answer in a division problem?<br><br>What effect does a remainder have on my | From Howard County Public School System Wikispace: 4.OA.3 Tasks | 10. Solve division word problems and interpret the meaning of remainders. Students interpret the remainders as something leftover and write the appropriate way to write the results.<br><br>4.OA.3 | For example, 200 ÷ 9 = 22 with 2 leftover in the context of if there were 200 pencils are equally distributed among 9 classrooms, then each classroom receives 22 pencils with 2 leftover. | | CA Framework p. 6-11<br>Flipbook p. 9-11<br>NC Unpacking p. 7-9 |

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| rounded answer? | | | | | |
| What are some simple methods for solving multiplication and division problems? | From Illustrative Mathematics: "Comparing Money Raised" | 11. Solve division word problems involving multiplicative comparison. Students use mental computation and rounding to assess the reasonableness of their solutions. 4.OA.2 | Students need many opportunities to solve contextual problems. A tape/bar diagram can help students visualize and solve multiplication and division word problems. Tape diagrams are useful for connecting what is happening in the problem with an equation that represents the problem. I*CA Framework*, pg. 8) | | CA Framework p. 6-11<br>Flipbook p. 7-8<br>NC Unpacking p. 5-6 |
| How can we organize our work when solving a multi-step word problem?<br><br>How can I ensure that my answer is reasonable?<br>What is a sensible answer to a real problem?<br><br>How can we use clues and reasoning to find an unknown number? | From Illustrative Mathematics: "Karl's Garden" | 12. Solve multi-step word problems using the four operations, representing the unknown quantity with a letter symbol in equations. Students use mental computation and rounding to assess the reasonableness of their solutions. 4.OA.3 | Solving Addition & Subtraction Problems with Tape Diagram | | CA Framework p. 6-11<br>Flipbook p. 9-11<br>NC Unpacking p. 7-9<br><br>***enVision,* Topic 2: Lessons**<br>2-6 "Problem Solving: Act It Out and Use Reasoning" |
| How are factors and multiples related?<br><br>What is the difference between a factor and a product? | From Smarter Balanced Assessment Consortium: http://sampleitems.smarterbalanced.or | 13. Use visual representation to find multiplication facts equivalent to a given product and recognize these facts as factor pairs. Students understand that numbers can be multiplicatively decomposed. | Students use rectangular arrays to justify how the number of arrangements determines whether a number is prime or composite.<br>Give students random products (such as 12, 24, or 27) and have students find | | CA Framework p. 11-12 "Common Misconception"<br>Flipbook p. 12-14<br>NC Unpacking p. 9-10 |

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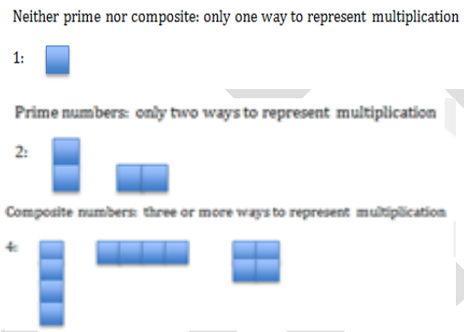
<tr><td>What is a factor?<br><br>What does it mean to factor?<br><br>How can we determine the relationship between numbers?</td><td>g/itempreview/sbac/index.htm</td><td>4.OA.4</td><td>or list all multiplication facts for those products (for example: 24: 1 x 24, 2 x 12, 3 x 8, etc.<br>  <br></td><td></td><td></td></tr>
<tr><td>How are factors and multiples related?<br><br>How do I identify prime numbers?<br><br>How do I identify composite numbers?<br><br>What is the difference between a prime and a composite number?</td><td>From NC Wikispace: “A Ride on the Bus” (4.OA.4 Task 1)</td><td>14. Determine all factor pairs of any given number 1 – 100 and determine if the given numbers are prime or composite.<br><table><tr><th>Prime</th><th>Compos</th></tr><tr><td>2: 1 × 2, 2 × 1</td><td>4: 1 × 4, 4 × 1,</td></tr><tr><td>3: 1 × 3, 3 × 1</td><td>6: 1 × 6, 6 × 1, 3 × 2</td></tr><tr><td>5: 1 × 5, 5 × 1</td><td></td></tr></table>4.OA.4</td><td>Students can sort any given number into a group that has only two ways to represent the product (prime numbers) or another group that has three or more ways to represent the product (composite numbers).<br>Give students the opportunity to ask “What about 1? Where does it fit?” Allow for a class discussion to wonder about the number 1.</td><td></td><td>CA Framework p. 11-12<br>Flipbook p. 12-14<br>NC Unpacking p. 9-10</td></tr>
<tr><td>How can we determine the relationships between numbers?</td><td>From Mathematics Assessment Resources Service (MARS):</td><td>15. Analyze a number or shape pattern based on a given rule. Then use that rule to determine and explain the next unknown</td><td>A pattern is a sequence that repeats or evolves in a predictable process over and over.<br>A rule dictates what that process will</td><td></td><td>CA Framework p. 12-13<br>Flipbook p. 15-16<br>NC Unpacking p. 11-12</td></tr>
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| How can we use patterns to solve problems?<br><br>How can we describe a pattern? | • "Fences"<br>• "John the Jeweler"<br>• "Math Rules" | sequence in the pattern. Students generate their own number patterns based on an identified rule. 4.OA.5 | look like.<br>This type of investigation will reinforce students' fact knowledge and develop their fluency with operations.<br>Students could examine a sequence of dot designs where each design has 4 more dots than the previous one: "Double Plus One" (Illustrative Mathematics 2013) and "Patterns that Grow" | | ***enVision,* Topic 2: Lessons**<br>2-1 "Repeating Patterns"<br>2-2 "Number Sequences"<br>2-3 "Extending Tables"<br>2-4 "Writing Rules for Situations"<br>2-5 "Geometric Patterns" |

# Unit #3: Measurement: Conversions of units

(Approx. # Days- )

Content Standards: 4.MD.1, 4.MD.2

In this unit students will gain familiarity with different measurement units and use properties of the four operations to solve word problems involving measurement.

## Common Core State Standards-Mathematics:

***Measurement and Data 4.MD***

**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**

1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz; l, ml; hr, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

## Standards for Mathematical Practice:

SMP. 1 Make sense of problems and persevere in solving them
SMP .2 Reason abstractly and quantitatively
SMP. 3 Construct viable argument and critique the reasoning of others
SMP. 4 Model with mathematics
SMP. 5 Use appropriate tools strategically
SMP. 6 Attend to precision
SMP. 7 Look for and make use of structure
SMP. 8 Look for and express regularity in repeated reasoning

## SEL Competencies:

Self-awareness
Self-management
Social awareness
Relationship skills
Responsible decision making

## ELD Standards to Support Unit:

**Part I: Interacting in Meaningful Ways**

A. Collaborative
   1. Exchanging information and ideas with others through oral collaborative conversations on a range of social and academic topics
   2. Interacting with others in written English in various communicative forms (print, communicative technology, and multimedia
   3. Offering and supporting opinions and negotiating with others in communicative exchanges
   4. Adapting language choices to various contexts (based on task, purpose, audience, and text type)

B. Interpretive
   5. Listening actively to spoken English in a range of social and academic contexts
   6. Reading closely literary and informational texts and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language
   8. Analyzing how writers and speakers use vocabulary and other language resources for specific purposes (to explain, persuade, entertain, etc.) depending on modality, text type, purpose, audience, topic, and content area

C. Productive
   9. Expressing information and ideas in formal oral presentations on academic topics
   11. Supporting own opinions and evaluating others' opinions in speaking and writing
   12. Selecting and applying varied and precise vocabulary and language structures to effectively convey ideas

**Part II. Learning About How English Works**

A. Structuring Cohesive Texts
   1. Understanding text structure
   2. Understanding cohesion

B. Expanding and Enriching Ideas
   5. Modifying to add details

C. Connecting and Condensing Ideas
   6. Connecting ideas
   7. Condensing ideas

| Unit #3: Measurement: Conversions of Units | | | | | |
|---|---|---|---|---|---|
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| | Note: These assessments are suggested, not required.<br><br>Assessments/Tasks aligned to learning outcomes: | Students will be able to… | | *Use of math journals for differentiation and formative assessment (use link below)* https://www.teachingchannel.org/videos/math-journals<br><br>**Flexible grouping:**<br>9. Content<br>10. Interest<br>11. Project/product<br>12. Level (Heterogeneous/ Homogeneous)<br><br>**Tiered:**<br>• Independent Management Plan (Must Do/May Do)<br>• Grouping<br>○ Content<br>○ Rigor w/in the concept<br>○ Project-based learning<br>○ Homework<br>○ Grouping<br>○ Formative | **CCSS Support for the Unit:**<br>*CA Mathematics Frameworks "Grade 4"*, pp.33-35<br><br>"Instructional Strategies"<br><br>"Supporting High Quality Common Core Instruction"<br><br>*Kansas Association of Teachers of Mathematics (KATM) 4th Flipbook*, pp.49-52<br><br>*Progression for the Common Core State Standards in Mathematics: K-5, Measurement and Date (Geometric Measurement)*, pp.2-5, 20-25<br><br>**Strategies and Tasks:**<br>North Carolina Wikispaces<br><br>**Differentiation:**<br>http://scusd-math.wikispaces.com/home<br><br>Universal Design for Learning |
| • About how far is a meter, a kilometer?<br>• What is a unit? | | 1. Develop benchmarks and mental images about length, such as a meter and a kilometer and also understand that "kilo" means a thousand, | Give students scenarios to visualize how long or short something is and compare those two items. | | |

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<tr>
<td>• Why are units important in measurement?<br>• Why are standard units important?<br>Why do we need to be able to measure distance?</td>
<td></td>
<td>so 3000 meter is equivalent to 3 kilometers.<br><br>Measure objects (for example, desk width, chair height, door width, etc.) using different size “measuring tapes (meter tape, centimeter tape, millimeter tape)” and reason about the measurement and which tape is appropriate to use.<br>4.MD.1</td>
<td>Students can “create” their own measuring tapes and use these tapes to estimate the measurement before actually measuring any objects. Students reason about their estimation and check for reasonableness after the actual measurement.<br>Students reason about the prefix of each metric unit and describe the meaning of the prefixes.</td>
<td rowspan="2">Assessment<br><br>Anchor Activities:<br>5. Content-related<br>6. Tasks for early finishers<br>9. Game<br>10. Investigation<br>11. Partner Activity<br>12. Stations<br><br>Depth and Complexity Prompts/Icons:<br>3. Depth<br>○ Language of the Discipline<br>○ Patterns<br>○ Unanswered Questions<br>○ Rules<br>○ Trends<br>○ Big Ideas</td>
<td></td>
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<tr>
<td>• How are the units of linear measurement within a standard system related?<br>• What happens to a measurement when we change units?<br>• When should we measure with meters? Kilometers?</td>
<td>“Measurement Relationships”<br><br>“Who Is the Tallest?”</td>
<td>2. Use a two-column chart to convert from larger to smaller units and record equivalent length measurements within the same metric system.<br><table><tr><th>Super- or subordinate unit</th><th>Length in terms of basic unit</th></tr><tr><td>kilometer</td><td>$10^3$ or 1000 meters</td></tr><tr><td>hectometer</td><td>$10^2$ or 100 meters</td></tr><tr><td>decameter</td><td>$10^1$ or 10 meters</td></tr><tr><td>meter</td><td>1 meter</td></tr><tr><td>decimeter</td><td>$10^{-1}$ or $\frac{1}{10}$ meters</td></tr><tr><td>centimeter</td><td>$10^{-2}$ or $\frac{1}{100}$ meters</td></tr><tr><td>millimeter</td><td>$10^{-3}$ or $\frac{1}{1000}$ meters</td></tr></table>Use a two-column chart to convert within the customary system (for example: inches, feet, yard, etc.).</td>
<td>Give students opportunity to reason and explain the structure of base-ten units and the prefixes of the metric units (see Progressions Document K-5, Measurement and Date (Geometric Measurement) p.20.<br>Use a tape diagram and number line diagram as another to show equivalence.<br>Use a tape diagram and number line diagram as another to show equivalence.<br>Students discover that the larger the unit, the smaller the number they obtain as they measure.</td>
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<tr><td></td><td></td><td>Centimeter and meter equivalences<br><table><tr><th>cm</th><th>m</th></tr><tr><td>100</td><td>1</td></tr><tr><td>200</td><td>2</td></tr><tr><td>300</td><td>3</td></tr><tr><td>500</td><td></td></tr><tr><td>1000</td><td></td></tr></table>Foot and inch equivalences<br><table><tr><th>feet</th><th>inches</th></tr><tr><td>0</td><td>0</td></tr><tr><td>1</td><td>12</td></tr><tr><td>2</td><td>24</td></tr><tr><td>3</td><td></td></tr><tr><td></td><td></td></tr></table>4.MD.1</td><td></td><td rowspan="3">o Complexity</td><td></td></tr>
<tr><td></td><td>Measurement Conversion Word Problems</td><td>3. Solve measurement problems using all four arithmetic operations involving distances using tape diagrams and number lines.<br>4.MD.2</td><td></td><td></td></tr>
<tr><td>• About how much is a liter, a milliliter?<br>• How are the units of linear measurement within a standard system related?<br>• How do we compare metric measures of milliliters and liters?<br>• When should we measure with liters? Milliliters?<br>• How do we compare customary measures of fluid ounces, cups, pints, quarts, and gallons?</td><td></td><td>4. Develop benchmarks and mental images about liquid volume, such as a liter and a milliliter and also understand that “milli-” means a thousandth, so 3000 milliliter is equivalent to 3 liters.<br><br>Measure liquids using different size measuring spoons or cups (meter tape, centimeter tape, millimeter tape) and reason about the measurement and which spoon or cup is appropriate to use.<br>4.MD.1</td><td>Give students scenarios to visualize how much a container can hold.<br>Students can estimate the measurement before actually measuring any liquids. They reason about their estimation and check for reasonableness after the actual measurement.<br>Students reason about the prefix of each metric unit and describe the meaning of the prefixes.</td><td></td></tr>
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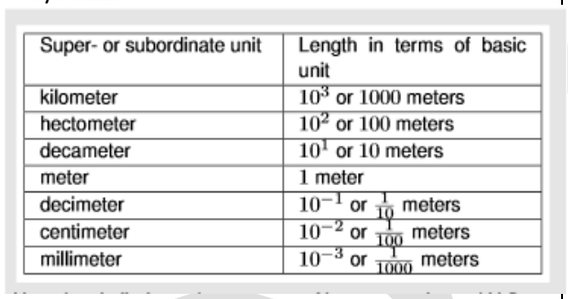
<tr><td>• Can different size containers have the same capacity?</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>• How are milliliters and liters related?<br>• How are fluid ounces, cups, pints, quarts, and gallons related?<br>• How are units in the same system of measurement related?<br>• What happens to a measurement when we change units?</td><td></td><td>5. Use a two-column chart to convert from larger to smaller units and record equivalent liquid volume measurements within the same metric system.<br>  <br><table><tr><th>Super- or subordinate unit</th><th>Length in terms of basic unit</th></tr><tr><td>kilometer</td><td>$10^3$ or 1000 meters</td></tr><tr><td>hectometer</td><td>$10^2$ or 100 meters</td></tr><tr><td>decameter</td><td>$10^1$ or 10 meters</td></tr><tr><td>meter</td><td>1 meter</td></tr><tr><td>decimeter</td><td>$10^{-1}$ or $\frac{1}{10}$ meters</td></tr><tr><td>centimeter</td><td>$10^{-2}$ or $\frac{1}{100}$ meters</td></tr><tr><td>millimeter</td><td>$10^{-3}$ or $\frac{1}{1000}$ meters</td></tr></table><br>Use a two-column chart to convert liquid volume within the same customary system (for example: ounces, cups, pints, quarts, and gallons).<br>4.MD.1</td><td>Give students opportunity to convert metric units and reason about the measurements based on the prefixes (see Progressions Document K-5, Measurement and Date (Geometric Measurement) p.20.<br>Use a tape diagram and number line diagram as another to show equivalence.<br>Use a tape diagram and number line diagram as another to show equivalence.</td><td></td><td></td></tr>
<tr><td>• How do we estimate and measure capacity?</td><td></td><td>6. Solve measurement problems using all four arithmetic operations involving liquid volume using tape diagrams and number lines.</td><td></td><td></td><td></td></tr>
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| Unit #3: Measurement: Conversions of Units | | | | | |
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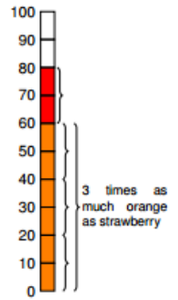
| | | **Using tape diagrams to solve word problems**<br>*Lisa put two flavors of soda in a glass. There were 80 ml of soda in all. She put three times as much orange drink as strawberry. How many ml of orange did she put in?*<br>  <br>In this diagram, quantities are represented on a measurement scale.<br>4.MD.2 | | | |
| • About how heavy is a kilogram?<br>• Why do we measure weight?<br>• What around us weighs about a gram, a kilogram?<br>• How are grams and kilograms related?<br>• When should we measure with grams? Kilograms?<br>• How are units in the same system of measurement related? | Making a Kilogram; Making a Pound Learning Activity | 7. Develop benchmarks and mental images about mass of objects, such as a gram and a kilogram and also understand that "kilo" means a thousand, so 3000 gram is equivalent to 3 kilograms.<br><br>Weigh mass using a scale and reason about the weight.<br>4.MD.1 | Give students scenarios to visualize how light or heavy an object is.<br>Students can estimate the weight before actually weighting any objects. They reason about their estimation and check for reasonableness after the actual weighing.<br>Students reason about the prefix of each metric unit and describe the meaning of the prefixes.<br>Students reason that the weight does not depend on the size of the object. | | |

| Unit #3: Measurement: Conversions of Units | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.MD.1, 4.MD.2** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| • When should we measure with grams? Kilograms? | | | | | |
| • How are the units of linear measurement within a standard system related?<br>• How heavy does one pound feel?<br>• What around us weighs about a pound?<br>• What happens to a measurement when we change units? | | 8. Use a two-column chart to convert from larger to smaller units and record equivalent mass of objects. Use a two-column chart to convert weight within the customary system (for example: ounces and pounds).<br>4.MD.1 | Give students opportunity to convert metric units and reason about the measurements based on the prefixes (see Progressions Document *K-5, Measurement and Date (Geometric Measurement)* p.20.<br>Use a tape diagram and number line diagram as another to show equivalence.<br>Use a tape diagram and number line diagram as another to show equivalence. | | |
| | | 9. Solve measurement problems using all four arithmetic operations involving mass of objects using tape diagrams and number lines.<br>4.MD.2 | | | |
| • How are units in the same system of measurement related? | | 10. Develop benchmarks and mental images about time, such as a second and an hour and also understand that 60 second is a minute and 60 minutes is an hour.<br><br>Measure time interval using timers and reason about the interval of time.<br>4.MD.1 | Give students scenarios to visualize how long or short a time period is.<br>Students can estimate the measurement before actually measuring any intervals of time. They reason about their estimation and check for reasonableness after the actual measurement. | | |
| • How are the units of linear measurement within a standard | | 11. Use a two-column chart to convert from larger to smaller units and record intervals of time.<br>4.MD.1 | Use a tape diagram and number line diagram as another to show equivalence. | | |

| Unit #3: Measurement: Conversions of Units | | | | | |
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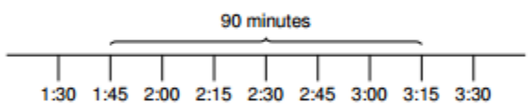
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.MD.1, 4.MD.2** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| system related? | | | | | |
| | "Margie Buys Apples" | 12. Solve measurement problems using all four arithmetic operations involving intervals of time using tape diagrams and number lines.<br><br>*What time does Marla have to leave to be at her friend's house by a quarter after 3 if the trip takes 90 minutes?*<br><br>  <br><br><br>Using a number line diagram to represent time is easier if students think of digital clocks rather than round clocks. In the latter case, placing the numbers on the number line involves considering movements of the hour and minute hands.<br><br>4.MD.2 | | | |
| | Mid-point Check and Post Assessment – engageNY, Module 2 – All Tasks | | | | |

# Unit #4: Fractions: Equivalence and Ordering

(Approx. # Days- )

Content Standards: 4.NF.1, 4.NF.2, 4.MD.4

In this unit students will extend understanding of fraction equivalence and ordering and display measurement data in unit fractions involving addition and subtraction.

## Common Core State Standards-Mathematics:

***Number and Operations – Fractions 4.NF***

**Extend understanding of fraction equivalence and ordering.**

1. Explain why a fraction *a/b* is equivalent to a fraction *(nxa)/(nxb)* by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

***Measurement and Data 4.MD***

**Represent and interpret data.**

4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

## Standards for Mathematical Practice:

SMP. 1 Make sense of problems and persevere in solving them
SMP. 2 Reason abstractly and quantitatively
SMP. 3 Construct viable argument and critique the reasoning of others
SMP. 4 Model with mathematics
SMP. 5 Use appropriate tools strategically
SMP. 6 Attend to precision
SMP. 7 Look for and make use of structure
SMP. 8 Look for and express regularity in repeated reasoning

## SEL Competencies:

Self-awareness
Self-management
Social awareness
Relationship skills
Responsible decision making

**ELD Standards to Support Unit:**

**Part I: Interacting in Meaningful Ways**

A. Collaborative
   1. Exchanging information and ideas with others through oral collaborative conversations on a range of social and academic topics
   2. Interacting with others in written English in various communicative forms (print, communicative technology, and multimedia
   3. Offering and supporting opinions and negotiating with others in communicative exchanges
   4. Adapting language choices to various contexts (based on task, purpose, audience, and text type)

B. Interpretive
   5. Listening actively to spoken English in a range of social and academic contexts
   6. Reading closely literary and informational texts and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language
   8. Analyzing how writers and speakers use vocabulary and other language resources for specific purposes (to explain, persuade, entertain, etc.) depending on modality, text type, purpose, audience, topic, and content area

C. Productive
   9. Expressing information and ideas in formal oral presentations on academic topics
   11. Supporting own opinions and evaluating others' opinions in speaking and writing
   12. Selecting and applying varied and precise vocabulary and language structures to effectively convey ideas

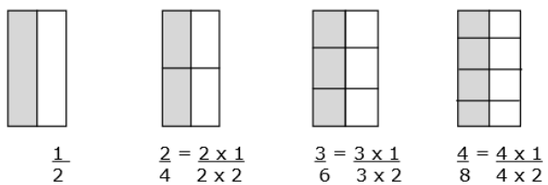
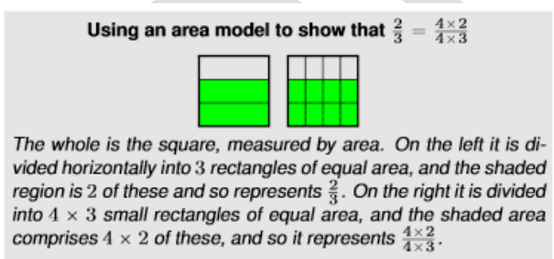
**Part II. Learning About How English Works**

A. Structuring Cohesive Texts
   1. Understanding text structure
   2. Understanding cohesion

B. Expanding and Enriching Ideas
   5. Modifying to add details

C. Connecting and Condensing Ideas
   6. Connecting ideas
   7. Condensing ideas

| Unit #4: Fractions: Equivalence and Ordering | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.1, 4.NF.2, 4.MD.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | Note: These assessments are suggested, not required.<br><br>Assessments/Tasks aligned to learning outcomes: | Students will be able to… | | *Use of math journals for differentiation and formative assessment (use link below)* https://www.teachingchannel.org/videos/math-journals<br><br>**Flexible grouping:**<br>13. Content<br>14. Interest<br>15. Project/product<br>16. Level (Heterogeneous/ Homogeneous)<br><br>**Tiered:**<br>• Independent Management Plan (Must Do/May Do)<br>• Grouping<br>○ Content<br>○ Rigor w/in the concept<br>○ Project-based learning<br>○ Homework<br>○ Grouping<br>○ Formative | **CCSS Support:**<br>*CA Mathematics Frameworks "Grade 4"*, pp.23-26, 36-37<br><br>"Instructional Strategies"<br><br>"Supporting High Quality Common Core Instruction"<br><br>*Kansas Association of Teachers of Mathematics (KATM) 4th Flipbook*, pp.32-36, 54-56<br><br>*Progression for the Common Core State Standards in Mathematics: K-5, Number and Operations – Fractions*, pp.6-7<br><br>**Strategies and Tasks:**<br>North Carolina Wikispaces<br><br>**Differentiation:**<br>http://scusd-math.wikispaces.com/home<br><br>Universal Design for Learning |
| • What is a fraction and how can it be represented?<br>• How can we use fair | Explaining Fraction Equivalence with Pictures | 1. Create and reason about equivalent fractions using area models and number lines. Students understand that the visual models represent the same sized wholes. | Give students ample opportunities to use pictures to model and explain fraction equivalence. | | |

| Unit #4: Fractions: Equivalence and Ordering | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.1, 4.NF.2, 4.MD.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| sharing to determine equivalent fractions? | |  <br>1/2 = 2/4 = 6/12<br>4.NF.1 | | Assessment<br><br>**Anchor Activities:**<br>7. Content-related<br>8. Tasks for early finishers<br>13. Game<br>14. Investigation<br>15. Partner Activity<br>16. Stations<br><br>**Depth and Complexity Prompts/Icons:**<br>4. Depth<br>○ Language of the Discipline<br>○ Patterns<br>○ Unanswered Questions<br>○ Rules<br>○ Trends<br>○ Big Ideas<br>○ Complexity | |
| • How can equivalent fractions be identified?<br>• How can we find equivalent fractions? | Fractions and Rectangles | 2. Explain the connections between the models and fractions and generate a rule for writing equivalent fractions.<br>1/2 x 2/2 = 2/4.<br>  <br>$\frac{1}{2}$ $\frac{2}{4} = \frac{2 \times 1}{2 \times 2}$ $\frac{3}{6} = \frac{3 \times 1}{3 \times 2}$ $\frac{4}{8} = \frac{4 \times 1}{4 \times 2}$<br>  <br>Using an area model to show that $\frac{2}{3} = \frac{4 \times 2}{4 \times 3}$<br>*The whole is the square, measured by area. On the left it is divided horizontally into 3 rectangles of equal area, and the shaded region is 2 of these and so represents $\frac{2}{3}$. On the right it is divided into $4 \times 3$ small rectangles of equal area, and the shaded area comprises $4 \times 2$ of these, and so it represents $\frac{4 \times 2}{4 \times 3}$.*<br>4.NF.1 | Be careful of overemphasizing "simplifying," since there is no mathematical reason to do so every time, only if the context of the problem calls for the simplified form of the fraction.<br>Avoid "reducing" fractions as this can lead to a misconception, since the value of the fraction is not actually smaller. Instead, continue to encourage students to find the fraction equivalence or "rename" the fraction (whether the number in the numerator and denominator shrinks or grow). Refer to *Mathematics Framework*, p.24. | | |
| • How can you compare fractions?<br>• How can benchmark fractions be used to compare fractions? | | 3. Extend equivalent fraction understanding to compare benchmark fractions visually using area models and number lines. Explain reasoning and record results using <, >, and = symbols. | Refer to "Equivalent Fractions" (NCTM Illuminations 2013) | | |

| Unit #4: Fractions: Equivalence and Ordering | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.1, 4.NF.2, 4.MD.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| • What are benchmark fractions?<br>• How do we compare fractions using a number line? | | For example, "Comparing to $\frac{1}{2}$ when comparing $\frac{3}{8}$ and $\frac{2}{3}$. Students reason that $\frac{3}{8} < \frac{4}{8} = \frac{1}{2}$, and that since $\frac{2}{3}$<br>4.NF.2 | | | |
| • How can you compare fractions? | | 4. Extend equivalent fraction understanding to compare fractions with common denominators by reasoning about the number of pieces. Explain reasoning and record results using <, >, and = symbols.<br>4.NF.2 | Students do not need to find the smallest common denominator.<br>For example: Compare $\frac{3}{5}$ and $\frac{4}{5}$.<br>Students reason that since all the pieces are the same size, then the numerators tell me which fraction has more pieces. Therefore $\frac{4}{5}$ is greater than $\frac{3}{5}$. | | |
| • How can you compare fractions?<br>• How do I compare fractions with unlike denominator? | | 5. Extend equivalent fraction understanding to compare fractions with common numerators by reasoning about the size of the pieces. Explain reasoning and record results using <, >, and = symbols.<br>4.NF.2 | Supports the meaning of the denominator. May ask students what it means when the numerators are the same: Compare $\frac{3}{6}$ and $\frac{3}{8}$. A sample student response can be: "The numerators tell me that both have 3 pieces. The one that is broken up into 6 equal pieces is larger than the one that is broken up into 8 equal pieces.<br>Students reason about the size of the pieces. | | |
| | "Listing Fractions in Increasing Size" | 6. Prove fraction comparison statements using benchmark fractions, common denominators, or common numerators. Explain reasoning and record results using <, >, and = symbols.<br>4.NF.2 | May ask students to explain, "How do you know $\frac{4}{6}$ is greater than $\frac{1}{2}$?" | | |

| Unit #4: Fractions: Equivalence and Ordering | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.1, 4.NF.2, 4.MD.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| • What happens to the value of a fraction when the numerator and denominator are multiplied or divided by the same number? | "Running Laps" | 7. Solve real world problems to compare fractions using equivalent fraction understanding, benchmark fractions, common denominators, or common numerators. Explain reasoning. 4.NF.2 | | | |
| • How can I use a line plot to display measurement data in fractions of a unit? | "Button Diameters" | 8. Measure objects (for example, objects inside their desks or items around the classroom) to the nearest $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$ inch, and display the measurement data on a line plot. 4.MD.4 | Students will be practicing using line plots, a graphical display of sets of data where each separate piece of data is shown as a mark above a number line. | | |
| • How do I use data from a line plot to solve addition and subtraction problems? | | 9. Solve problems involving addition and subtraction based on data from the line plot. 4.MD.4 | | | |
| | | | | | |

# Unit #5: Fractions: Operations

(Approx. # Days- )

Content Standards: 4.NF.3, 4.NF.4

In this unit students will build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

**Common Core State Standards-Mathematics:**

***Number and Operations – Fractions 4.NF***

**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**

3. Understand a fraction *a/b* with *a>1* as a sum of fractions *1/b*.
   a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole
   b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 +1/8*
   c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
   d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
   a. Understand a fraction *a/b* as a multiple of *1/b*. *For example, use a visual fraction model to represent 5/4 as the product 5 x (1/4), recording the conclusion by the equation 5/4= 5 x (1/4).*
   b. Understand a multiple of *a/b* as a multiple of *1/b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 x (2/5) as 6 x (1/5), recognizing the product as 6/5. (In general, n x (a/b) = (n x a)/b.)*
   c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

**Standards for Mathematical Practice:**

SMP. 1 Make sense of problems and persevere in solving them
SMP. 2 Reason abstractly and quantitatively
SMP. 3 Construct viable argument and critique the reasoning of others
SMP. 4 Model with mathematics
SMP. 5 Use appropriate tools strategically
SMP. 6 Attend to precision
SMP. 7 Look for and make use of structure
SMP. 8 Look for and express regularity in repeated reasoning

**SEL Competencies:**

Self-awareness
Self-management
Social awareness
Relationship skills,
Responsible decision making

**ELD Standards to Support Unit:**

**Part I: Interacting in Meaningful Ways**

A. Collaborative
   1. Exchanging information and ideas with others through oral collaborative conversations on a range of social and academic topics
   2. Interacting with others in written English in various communicative forms (print, communicative technology, and multimedia
   3. Offering and supporting opinions and negotiating with others in communicative exchanges
   4. Adapting language choices to various contexts (based on task, purpose, audience, and text type)

B. Interpretive
   5. Listening actively to spoken English in a range of social and academic contexts
   6. Reading closely literary and informational texts and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language
   8. Analyzing how writers and speakers use vocabulary and other language resources for specific purposes (to explain, persuade, entertain, etc.) depending on modality, text type, purpose, audience, topic, and content area

C. Productive
   9. Expressing information and ideas in formal oral presentations on academic topics
   11. Supporting own opinions and evaluating others' opinions in speaking and writing
   12. Selecting and applying varied and precise vocabulary and language structures to effectively convey ideas

**Part II. Learning About How English Works**

A. Structuring Cohesive Texts
   1. Understanding text structure
   2. Understanding cohesion

B. Expanding and Enriching Ideas
   5. Modifying to add details

C. Connecting and Condensing Ideas
   6. Connecting ideas
   7. Condensing ideas

| Unit #5: Fractions: Operations | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.3, 4.NF.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | Note: These assessments are suggested, not required.<br><br>Assessments/Tasks aligned to learning outcomes: | Students will be able to… | | *Use of math journals for differentiation and formative assessment (use link below)* https://www.teachingchannel.org/videos/math-journals<br><br>**Flexible grouping:**<br>17. Content<br>18. Interest<br>19. Project/product<br>20. Level (Heterogeneous/ Homogeneous)<br><br>**Tiered:**<br>• Independent Management Plan (Must Do/May Do)<br>• Grouping<br>○ Content<br>○ Rigor w/in the concept<br>○ Project-based learning<br>○ Homework<br>○ Grouping | **CCSS Support for the Unit:**<br>*CA Mathematics Frameworks "Grade 4"*, pp.26-31, 36-37<br><br>"Instructional Strategies"<br><br>"Supporting High Quality Common Core Instruction"<br><br>*Kansas Association of Teachers of Mathematics (KATM) 4th Flipbook,* pp.37-41, 54-56<br><br>North Carolina Unpacked Standards 4th Grade, 31-39, 49<br><br>*Progression for the Common Core State Standards in Mathematics: K-5, Number and Operations - Fractions*, pp.6-10<br><br>*Progression for the Common Core State Standards in Mathematics: K-5, Measurement and Data*, pp.2-4, 11-13<br><br>**Strategies and Tasks:**<br>North Carolina Wikispaces<br><br>**Differentiation:**<br>http://scusd-math.wikispaces.com/home<br><br>Universal Design for Learning |

| Unit #5: Fractions: Operations | | | | | |
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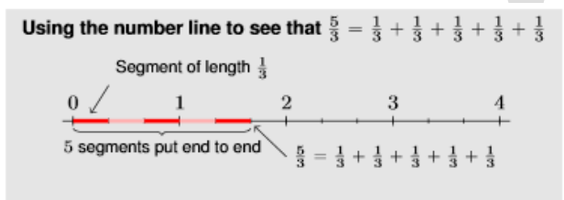
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.3, 4.NF.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| • How can I represent fractions in different ways?<br>• How can fraction represent parts of a set?<br>• How can I add fractions with like denominators? | | 1. Apply the understanding of whole number addition (joining together) to add unit fractions using visual models, such as area models and number lines.<br>4.NF.3a | For additional support: https://www.illustrativemathematics.org/fractions_progression | ○ Formative Assessment<br><br>**Anchor Activities:**<br>9. Content-related<br>10. Tasks for early finishers<br>17. Game<br>18. Investigation<br>19. Partner Activity<br>20. Stations<br><br>**Depth and Complexity Prompts/Icons:**<br>5. Depth<br>○ Language of the Discipline<br>○ Patterns<br>○ Unanswered Questions<br>○ Rules<br>○ Trends<br>○ Big Ideas<br>Complexity | |
| • How can I represent a fraction?<br>• What do the numbers (terms) in a fraction represent? | | 2. Decompose fractions into unit fractions using visual models and record using equations.<br>  <br><br>4.NF.3b | Visual models include area models and number lines.<br>Use context to help make connections. | | |
| • How can I use fractions to solve addition and subtraction problems?<br>• How are addition, subtraction, and fractions related? | | 3. Add and subtraction fractions as series of unit fractions. Students will justify using visual models and record using equations.<br>4.NF.3b | For example,<br>$\frac{7}{5} + \frac{4}{5} = \overbrace{\frac{1}{5} + \cdots \frac{1}{5}}^{7} + \overbrace{\frac{1}{5} + \cdots \frac{1}{5}}^{4}$<br>$= \frac{\overbrace{1+1+\cdots+1}^{7+4}}{5}$<br>$= \frac{7+4}{5}.$ | | |
| | | 4. Decompose fractions in multiple ways (non-unit fractions) using visual models and record using equations.<br>4.NF.3b | For example,<br>$\frac{17}{6} = \frac{12}{6} + \frac{5}{6}$ | | |

| Unit #5: Fractions: Operations | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.3, 4.NF.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| • How are fractions used in problem-solving situations?<br>• How do we apply our understanding of fractions in everyday life? | Assessments/tasks for 4.NF.3 & 4.MD.4<br><br>"Margie Buys Apples" | 5. Apply fraction addition and subtraction understanding to solve word problems. 4.NF.3c,d | In addition, students can also add and subtract fractions from data displayed on line plots.<br>Students can practice using line plots, a graphical display of sets of data where each separate piece of data is shown as a mark above a number line (4.MD.4). | | |
| • How can equivalent fractions be identified? | | 6. Rename whole numbers as equivalent fractions of a given size. Record using equations, such as<br>7/1 = 7 wholes<br>7/7 = 1<br>7 = 49/7, or 14/2, depending on the unit fraction 4.NF.3 | Students can continue to use visual models, such as number lines. | | |
| | "Peaches" | 7. Add and subtract whole numbers and fractions. Justify with visual fraction models and record using equations. 4.NF.3c | Students will also add and subtract whole numbers and fractions from data displayed on line plots. | | |
| • What is a mixed number and how can it be represented? | "Writing a Mixed Number as an Equivalent Fraction" | 8. Rename mixed numbers into fractions using visual fraction models and record using equations. 4.NF.3c | For example,<br>$7\frac{1}{5} = 7 + \frac{1}{5} = \frac{35}{5} + \frac{1}{5} = \frac{36}{5}$ | | |
| • How are addition, subtraction, and fractions related? | "Plastic Building Blocks"<br><br>"Cynthia's Perfect Punch | 9. Reason with addition and subtraction of fractions (referring to the same whole) through word problems. 4.NF.3c | Students solve for the unknown in all positions: result unknown, change unknown, and start unknown (refer to _____). | | |

| Unit #5: Fractions: Operations | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.3, 4.NF.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| • How is multiplication of fractions similar to repeated addition of fractions?<br>• How can I model the multiplication of a whole number by a fraction?<br>• How is multiplication of fractions similar to division of whole numbers? | | 10. Make connections between "groups of" and "multiples" when decomposing a fraction $\frac{a}{b}$ to a unit fraction $\frac{1}{b}$. Students justify using visual fraction models and record using equations. 4.NF.4a | For example: $\frac{4}{5}$ is the same as $\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$ or 4 groups of $\frac{1}{5}$<br><br>For additional support: Fractions Progression | | |
| • How can I model the multiplication of a whole number by a fraction?<br>• How is multiplication of fractions similar to division of whole numbers? | | 11. Recognize a fraction $\frac{a}{b}$ as *a* times $\frac{1}{b}$, where *a* is a whole number. Students justify using visual fraction models and record using equations. 4.NF.4b | For example:<br>$\frac{3}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = 3 \times \frac{1}{5}$<br><br>$\frac{4}{3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 4 \times \frac{1}{3}$ | | |
| • How can I model the multiplication of a whole number by a fraction?<br>• What strategies can be used for finding products when multiplying a whole number by a fraction? | | 12. Reason the meaning of whole number times fractions using visual fraction models and equations. 4.NF.4b | $4 \times \frac{1}{3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{3+1}{3} = \frac{4}{3}$<br><br>For additional support: Multiplying Whole Numbers and Fractions video | | |

| Unit #5: Fractions: Operations | | | | | |
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| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.3, 4.NF.4** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | "Sugar in Six Cans of Soda"—4.NF.4c | 13. Use visual fraction models and equations to represent solutions to word problems involving multiplication of whole numbers and fractions. 4.NF.4c | | | |
| | Mid-point Check and Post Unit assessments-engageNY, Module 5, All Tasks | | | | |

# Unit #6: Fractions and Decimals

(Approx. # Days- )

Content Standards: 4.NF.5, 4.NF.6, 4.NF.7

In this unit students will use decimal notation for fractions and compare decimal fractions to the hundredths by reasoning about their size.

## Common Core State Standards-Mathematics:

***Number and Operations – Fractions 4.NF***

**Understand decimal notation for fractions, and compare decimal fractions.**

5. Express a fraction with a denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*
6. Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*
7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using **the number line or another** visual model. **CA**

## Standards for Mathematical Practice:

SMP. 1 Make sense of problems and persevere in solving them
SMP. 2 Reason abstractly and quantitatively
SMP. 3 Construct viable argument and critique the reasoning of others
SMP. 4 Model with mathematics
SMP. 5 Use appropriate tools strategically
SMP. 6 Attend to precision
SMP. 7 Look for and make use of structure
SMP. 8 Look for and express regularity in repeated reasoning

## SEL Competencies:

Self-awareness
Self-management
Social awareness
Relationship skills
Responsible decision making

## ELD Standards to Support Unit:

**Part I: Interacting in Meaningful Ways**

A. Collaborative
   1. Exchanging information and ideas with others through oral collaborative conversations on a range of social and academic topics
   2. Interacting with others in written English in various communicative forms (print, communicative technology, and multimedia
   3. Offering and supporting opinions and negotiating with others in communicative exchanges
   4. Adapting language choices to various contexts (based on task, purpose, audience, and text type)

B. Interpretive
   5. Listening actively to spoken English in a range of social and academic contexts
   6. Reading closely literary and informational texts and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language
   8. Analyzing how writers and speakers use vocabulary and other language resources for specific purposes (to explain, persuade, entertain, etc.) depending on modality, text type, purpose, audience, topic, and content area

C. Productive
   9. Expressing information and ideas in formal oral presentations on academic topics
   11. Supporting own opinions and evaluating others' opinions in speaking and writing
   12. Selecting and applying varied and precise vocabulary and language structures to effectively convey ideas

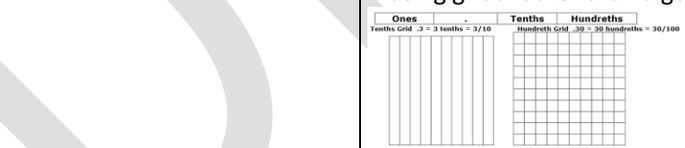
**Part II. Learning About How English Works**

A. Structuring Cohesive Texts
   1. Understanding text structure
   2. Understanding cohesion

B. Expanding and Enriching Ideas
   5. Modifying to add details

C. Connecting and Condensing Ideas
   6. Connecting ideas
   7. Condensing ideas

| Unit #6: Fractions and Decimals | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.5, 4.NF.6, 4.NF.7** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | Note: These assessments are suggested, not required.<br><br>Assessments/Tasks aligned to learning outcomes: | Students will be able to… | | *Use of math journals for differentiation and formative assessment (use link below)* https://www.teachingchannel.org/videos/math-journals<br><br>**Flexible grouping:**<br>21. Content<br>22. Interest<br>23. Project/product<br>24. Level (Heterogeneous/ Homogeneous)<br><br>**Tiered:**<br>• Independent Management Plan (Must Do/May Do)<br>• Grouping<br>○ Content<br>○ Rigor w/in the concept<br>○ Project-based learning<br>○ Homework<br>○ Grouping | **CCSS Support for the Unit:**<br>*CA Mathematics Frameworks "Grade 4"*, pp.31-33<br><br>"Instructional Strategies"<br><br>"Supporting High Quality Common Core Instruction"<br><br>*Kansas Association of Teachers of Mathematics (KATM) 4th Grade Flipbook*, pp.42-47<br><br>North Carolina Unpacked Standards 4th Grade, 39-42<br><br>*Progression for the Common Core State Standards in Mathematics: K-5, Number and Operations - Fractions*, pp.6-10<br><br>**Strategies and Tasks:**<br>North Carolina Wikispaces<br><br>**Differentiation:**<br>http://scusd-math.wikispaces.com/home<br><br>Universal Design for Learning |
| • What are the characteristics of a decimal fraction? | | 1. Visualize and explain the relationship between unit fractions $\frac{1}{10}$ and $\frac{1}{100}$ (decimal fractions). 4.NF.5 | Students understand that each unit is ten times the unit to its right.<br>Use base-ten blocks, graph paper, and other place value models to explore | | |

| Unit #6: Fractions and Decimals | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.5, 4.NF.6, 4.NF.7** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | | | and explain the relationship between fractions with denominators of 10 and 100, also called decimal fractions. | ○ Formative Assessment<br><br>**Anchor Activities:**<br>11. Content-related<br>12. Tasks for early finishers<br>21. Game<br>22. Investigation<br>23. Partner Activity<br>24. Stations<br><br>**Depth and Complexity Prompts/Icons:**<br>6. Depth<br>○ Language of the Discipline<br>○ Patterns<br>○ Unanswered Questions<br>○ Rules<br>○ Trends<br>○ Big Ideas<br>○ Complexity | |
| • What is a decimal fraction and how can it be represented? | | 2. Extend the understanding of unit fractions $\frac{1}{10}$ and $\frac{1}{100}$ to represent any fractions with denominators 10 and 100 and justify with words and visual representations. 4.NF.5 | Make a connection of decimal fractions with dollars and cents, with the dollar representing the whole (dimes and pennies). | | |
| • When can tenths and hundredths be used interchangeably? | "Fraction Equivalence" | 3. Create and reason about fractions with denominator 10 as an equivalent fraction with denominator 100. 4.NF.5 | Students can use a two-column table, double number line, tape diagram, grids, or other visual models to create fraction equivalence. | | |
| • How can we add decimal fractions of different denominators? | "Dimes and Pennies"<br><br>"Adding Tenths and Hundredths" | 4. Use fraction equivalent understanding to add fractions with denominators 10 and 100. $\frac{3}{10} + \frac{27}{100} = \frac{30}{100} + \frac{27}{100} = \frac{57}{100}$ 4.NF.5 | Students can use a two-column table, double number line, tape diagram, grids, or other visual models to create fraction equivalence before adding. Student experiences should focus on using grids rather than algorithms:   (visual from KATM Grade 4, p.42) | | |
| • How are decimal fractions written using the decimal notation? | "Expanded Fractions and Decimals" | 5. Read, write, and represent decimal fractions in decimal notation. 4.NF.6 | For example, 0.43 as "forty-three hundredths" | | |

| Unit #6: Fractions and Decimals | | | | | |
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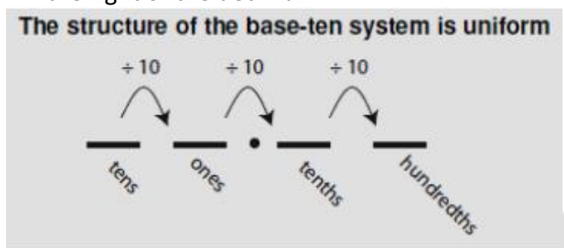
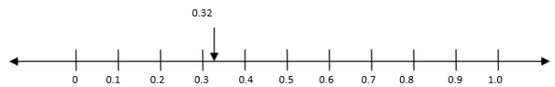
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.NF.5, 4.NF.6, 4.NF.7** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| • What role does the decimal point play in our base-ten system?<br>• Why is the number 10 important in our number system? | | 6. Use visual models to reason and explain that the number of zeroes in decimal fraction denominator indicates the number of digits to the right of the decimal.<br>  <br>4.NF.6 | | | |
| • What patterns occur on a number line made up of decimal fractions? | | 7. Represent and reason about decimal value locations on a number line.<br>  <br>4.NF.6 | | | |
| • When comparing two decimals, how can we determine which one has the greatest value? | "Using Place Value" | 8. Compare two decimals to hundredths by reasoning about their size on a number line and/or other visual models; understand that when comparing two decimals, refer to the same whole. Record the comparisons and justify the results using <, >, and =.<br>4.NF.7 | Visual models include area models, decimal grids, decimal circles, number lines, and meter sticks (refer to *North Carolina Unpack Content*, pp.40-41) | | |
| | Mid-Point Check and Post Unit Assessments-engageNY, Module 6 | | | | |

# Unit #7: Geometry: Lines, Angles, and Shapes

(Approx. # Days- )

Content Standards: 4.G.1, 4.G.2, 4.G.3, 4.MD.5, 4.MD.6, 4.MD.7

In this unit students will draw and identify lines and angles, classify shapes by properties of their lines and angles, and understand concepts of angle and measure angles.

**Common Core State Standards-Mathematics:**

***Geometry 4.G***

**Draw and identify lines and angles, and classify shapes by properties of their lines and angles.**

1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. **(Two dimensional shapes should include special triangles, e.g., equilateral, isosceles, scalene, and special quadrilaterals, e.g., rhombus, square, rectangle, parallelogram, trapezoid.) CA**
3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

***Measurement and Data 4.MD***

**Geometric measurement: understand concepts of angle and measure angles.**

5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
   a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles.
   b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.
6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

**Standards for Mathematical Practice:**

SMP. 1 Make sense of problems and persevere in solving them
SMP. 2 Reason abstractly and quantitatively
SMP. 3 Construct viable argument and critique the reasoning of others
SMP. 4 Model with mathematics
SMP. 5 Use appropriate tools strategically
SMP. 6 Attend to precision
SMP. 7 Look for and make use of structure
SMP. 8 Look for and express regularity in repeated reasoning

**SEL Competencies:**

Self-awareness
Self-management
Social awareness
Relationship skills
Responsible decision making

**ELD Standards to Support Unit:**

**Part I: Interacting in Meaningful Ways**

A. Collaborative
   1. Exchanging information and ideas with others through oral collaborative conversations on a range of social and academic topics
   2. Interacting with others in written English in various communicative forms (print, communicative technology, and multimedia
   3. Offering and supporting opinions and negotiating with others in communicative exchanges
   4. Adapting language choices to various contexts (based on task, purpose, audience, and text type)

B. Interpretive
   5. Listening actively to spoken English in a range of social and academic contexts
   6. Reading closely literary and informational texts and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language
   8. Analyzing how writers and speakers use vocabulary and other language resources for specific purposes (to explain, persuade, entertain, etc.) depending on modality, text type, purpose, audience, topic, and content area

C. Productive
   9. Expressing information and ideas in formal oral presentations on academic topics
   11. Supporting own opinions and evaluating others' opinions in speaking and writing
   12. Selecting and applying varied and precise vocabulary and language structures to effectively convey ideas

**Part II. Learning About How English Works**

A. Structuring Cohesive Texts
   1. Understanding text structure
   2. Understanding cohesion

B. Expanding and Enriching Ideas
   5. Modifying to add details

C. Connecting and Condensing Ideas
   6. Connecting ideas
   7. Condensing ideas

| Unit #7: Geometry: Lines, Angles, and Shapes | | | | | |
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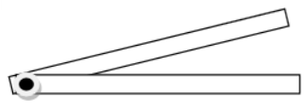
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.G.1-3, 4.MD.5-7** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | Note: These assessments are suggested, not required.<br><br>Assessments/Tasks aligned to learning outcomes: | Students will be able to… | | *Use of math journals for differentiation and formative assessment (use link below)* https://www.teachingchannel.org/videos/math-journals<br><br>**Flexible grouping:**<br>25. Content<br>26. Interest<br>27. Project/product<br>28. Level (Heterogeneous/ Homogeneous)<br><br>**Tiered:**<br>• Independent Management Plan (Must Do/May Do)<br>• Grouping<br>○ Content<br>○ Rigor w/in the concept<br>○ Project-based learning<br>○ Homework<br>○ Grouping | **CCSS Support for the Unit:**<br>*CA Mathematics Frameworks "Grade 4"*, pp.39-41, 37-39<br><br>"Instructional Strategies"<br><br>"Supporting High Quality Common Core Instruction"<br><br>*Kansas Association of Teachers of Mathematics (KATM) 4th Flipbook*, pp.64-70, 57-62<br><br>North Carolina Unpacked Standards 4th Grade, pp.56-62, 50-56<br><br>*Progression for the Common Core State Standards in Mathematics: K-6, Geometry*, pp.6-7<br><br>*Progression for the Common Core State Standards in Mathematics: K-5, Measurement and Data*, pp.20-25<br><br>**Strategies and Tasks:**<br>North Carolina Wikispaces<br><br>**Differentiation:**<br>http://scusd-math.wikispaces.com/home<br><br>Universal Design for Learning |

| Unit #7: Geometry: Lines, Angles, and Shapes | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.G.1-3, 4.MD.5-7** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | "What's the Point?" | 1. Identify points, lines, line segments, rays, and perpendicular and parallel lines from real-world objects (for example, windows, door, chair legs, cabinets hinges, etc.). Point out as many visual examples. 4.G.1 | Grade 4 is the first time students are exposed to rays, angles, and perpendicular and parallel lines. Students need to see all of these in different orientations. | ○ Formative Assessment<br><br>**Anchor Activities:**<br>13. Content-related<br>14. Tasks for early finishers<br>25. Game<br>26. Investigation<br>27. Partner Activity<br>28. Stations<br><br>**Depth and Complexity Prompts/Icons:**<br>7. Depth<br>○ Language of the Discipline<br>○ Patterns<br>○ Unanswered Questions<br>○ Rules<br>○ Trends<br>○ Big Ideas<br>○ Complexity | |
| | "The Geometry of Letters" | 2. Draw lines, line segments, rays, and perpendicular and parallel lines in different orientations and describe their characteristics. 4.G.1 | Students use rulers and protractors to draw these lines. Students should have the opportunity to used varied protractors to differentiate angle measure from length measure. Students understand that lines are infinite to an extent. Students understand that points have locations, but no dimensions. | | |
| • What is an angle?<br>• How are a circle and an angle related?<br>• What do we actually measure when we measure an angle? | | 3. Understand that an angle is the union of two rays with the same point. Students also understand that angles are measured with reference to a circle with its center at the same endpoint of the rays. Understand an angle that turns through $\frac{1}{360}$ of a circle is called a "one-degree angle." 4.MD.5a | Using a circular protractor or create an angle explorer (two strips of paper with a brass fastener as the center of the circle) will help students understand this concept.  (refer to KATM Flipbook, p.58) Students understand a full rotation is thus 360°. | | |
| • How does a turn relate to an angle? | | 4. Understand an angle that turns through *n* one-degree angles equates to *n* degrees angle measure. 4.MD.5b | For example, a clock's minute hand rotates a total of 45˚, it has made 45 one-degree turns. | | |

| Unit #7: Geometry: Lines, Angles, and Shapes | | | | | |
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| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.G.1-3, 4.MD.5-7** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | "Measuring Angles" | *5.* Measure and draw angles using circular protractors to identify angle measures. Measure and draw angles from a set of given angle measures. 4.MD.6 | Have students draw angles in different orientations. | | |
| • What are benchmark angles and how can they be useful in estimating angle measures?<br>• What does half rotation and full rotation mean? | | 6. Explore benchmark angles (30˚, 60˚, 90˚, 180˚, and 360˚) using the protractor. Identify and describe angles in the range from acute to obtuse. 4.G.1 | Students use benchmark angles of 90° to justify whether an angle is acute or obtuse. Have students explore that an angle of 180˚ will form a straight line and 360˚ will form a circle.<br>Continue to show angles in different orientations. | | |
| • How can angles be combined to create other angles? | | 7. Understand angle measures are additive by decomposing angles into non-overlapping parts. 4.MD.7 | Students can decompose for example, "What two angles will form 90˚? How do you know? How can you prove it?" | | |
| • How can we use the relationship of angles measures of a shape to solve problems? | "Finding an Unknown Angle" | 8. Solve addition and subtraction problems to find unknown angles. Students also use the correct symbols when writing the equation to solve for the unknown angle measure. 4.MD.7 | | | |
| • How are the angles of a triangle related?<br>• What do we know about the measurement of | "Measuring Angles" | 9. Draw angles and triangles that are right, acute, and obtuse. Students understand that the rays that formed the angles are also called "sides of angles" (refer to Progressions document *Measurement and Data*, p.22). 4.G.1 | Students use a protractor to draw two rays with the same endpoint to create angles measured as right, acute, and obtuse.<br>Students draw these angles and triangles in different orientations. | | |

| Unit #7: Geometry: Lines, Angles, and Shapes | | | | | |
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| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.G.1-3, 4.MD.5-7** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| angles in a triangle? | | | | | |
| • How are geometric objects different from one another?<br>• How are quadrilaterals alike and different?<br>• How are the types of sides be used to classify quadrilaterals? | MARS2010-04 Anna the Artist.pdf<br><br>"Are These Right"<br><br>"Defining Attributes of Rectangles and Parallelograms"<br><br>"What Is A Trapezoid?" | 10. Classify two-dimensional figures based on their characteristics, such as the presence or absence of parallel or perpendicular lines.<br>  <br>4.G.2 | Use transparencies to extend lines (from lines already printed on textbooks or drawn on paper) to determine if the two lines might intersect at a point or never intersect. | | |
| • How are triangles alike and different? | | 11. Students use side length to classify triangles as equilateral, equiangular, isosceles, or scalene.<br>4.G.2 | | | |
| • How do angle and side measures help us create and classify triangles? | | 12. Classify two-dimensional figures based on specified angle measurements. Students also understand that right triangles can be further classified with subcategories such as isosceles right triangle and a scalene right triangle.<br>4.G.2 | Refer students back to the benchmark angle of 90° and introduce angles of 180° and 360°. | | |
| • How are symmetrical figures created?<br>• How are symmetrical figures used in artwork? | "Lines of Symmetry for Triangles"<br><br>"Lines of Symmetry for Quadrilaterals" | 13. Recognize and explain line of symmetry for two-dimensional figures. Draw lines of symmetry.<br>4.G.3 | Students can identify line of symmetry by practicing folding 2-dimensional figures along the line into matching parts. | | |

| Unit #7: Geometry: Lines, Angles, and Shapes | | | | | |
|---|---|---|---|---|---|
| **Essential Questions** | **Assessments for Learning** | **Sequence of Learning Outcomes 4.G.1-3, 4.MD.5-7** | **Strategies for Teaching and Learning** | **Differentiation e.g. EL, SpEd, GATE** | **Resources** |
| | "Lines of Symmetry for Circles"<br><br>"Finding Lines of Symmetry" | | | | |
| | Mid-Point Check and Post Unit Assessments- engageNY, Module4 | | | | |