Introduction to the Document:
Welcome to the Los Angeles Unified School District’s Elementary Mathematics CCSS Curriculum Map for Fourth Grade. The Map is intended to be a one-stop tool for teachers, administrators, parents, and other school support personnel. It blends Common Core State Standards in Mathematics, textbook topics that address those standards, additional resources and Instructional Blocks into one easy-to-read resource.

The Map is a living document—it is neither set in stone for all time nor is it perfect. Teachers and other users are encouraged to provide on-going feedback as to its accuracy, usability, and content.

Organization of the Document:
This Curriculum Map for Mathematics has been organized in several ways to provide flexibility to teachers in planning instruction. Teachers and other users are encouraged to review the various versions and to choose the one that best fits their instructional planning needs.

Under the section Curriculum Maps and Graphic Organizers by Domain, the Mathematical Content and Practice standards are listed as they are found in the Common Core State Standards. In this section, teachers and other users will be able to see at a glance the mathematics domains, clusters, and standards for the grade level, and in which textbook chapters the standards can be found.

Under the section Scope and Sequence in the Alignment Document, the standards are listed in the developmental sequence outlined in the various textbook series.

Symbols and Footnotes:
Additional key information has been embedded into this guide to assist teachers and others in instructional decision-making.
General Calendar for Instruction and Assessment:
Working with your grade level at your school site, your goal is to ensure full instruction and assessment of the grade level standards by the end of the school year.

Using the Mathematics Curriculum Map:
The guide can be thought of as a menu. It cannot be expected that one would do every lesson and activity from the instructional resources provided. To try to teach every lesson or use every activity would be like ordering everything on a menu for a single meal. It is not a logical option. Nor is it possible given the number of instructional days and the quantity of resources. And, like a menu, teachers select, based on instructional data, which lessons best fit the needs of their students – sometimes students need more time with a concept and at other times, less.

Look at the Scope and Sequence listings. From there, teachers would map out how much time they feel is needed to teach the concepts within the block based on the data of their students’ needs. For example, some classes may need more time devoted to developing addition concepts, while another class at the same grade level may need more focused time on Operations and Algebraic Thinking.

Then look at the Curriculum Maps and Graphic Organizers by Domain. Match the standards and the recommended Resources.

Look at the assessment options. Discuss with your grade level and administration at your school site what assessments you will use, following the guidance of Reference Guide REF-6507.

The starting point for instructional planning is the standards. The textbook resources are just the first tools for teachers in helping to build mathematical understanding. Like going to a restaurant specializing in customer service, there may be times one wishes to order “off-the-menu”. There are hundreds of resources available, both publisher- and teacher-created, that may be used to best teach a concept or skill. Collaborative planning, both within and among grade levels, is strongly encouraged in order to design effective instructional
programs for students.

**A Guide to the Column Headings:**

The **Domains** are the larger groups of related standards and clusters.

The **Clusters** are groups of related standards.

The **Standards for Mathematical Content** define what students should know and be able to do.

The **Standards for Mathematical Practice** describe the varieties of expertise that mathematics educators at all levels should seek to develop in their students. They are the habits of mind to be developed, along with the content, in effective mathematics instruction. In any math task, all eight standards may be present, but some practice standards are more naturally paired with some content standards, and those matches are called out here.

The **Resources** are meant to be teacher-guided, whole class activities or are independent of the teacher, and can take place in small groups, pairs, or individually.

The **Assessments** are intended to assist the teacher in providing data to guide instruction. Assessments are considered to be formative throughout the year, if remediation is provided.

The **Domain Legend** explains the key that sorts the clusters into Major (▲), and Supporting or Additional (s/a), as used by the testing services Smarter Balanced and PARCC. The standards will be assessed with 75% of the assessment on the major clusters and 25% on the supporting and additional clusters. There may be a temptation to minimize instruction of the additional clusters, but it is important to teach all the standards, as this may be the only grade level where the standard is taught.

**Additional Support** contains:
• **Language Objectives** to assist with English Learners and Standard English Learners
• **Enduring Understandings** which are the Big Ideas in Mathematics
• **Essential Questions** which engage the students with interacting with the Big Ideas
• **Key Vocabulary**

**Daily Routines** call out the classroom practices within the particular Domain. They may last through the whole year, or only through that Instructional Block or Domain.

**Differentiation** falls into three categories:
• **Front Loading:** strategies to make the content more accessible to all students, including EL, SEL and students with special needs.
• **Enrichment:** activities to extend the content for all learners, as all learners can have their thinking advanced, and to support the needs of GATE students.
• **Intervention:** alternative methods of teaching the standards, in which all students can have a second opportunity to connect to the learning, based on their own learning style.

**Additional Documents:**
• **Mathematics Framework for California Public Schools** provides guidance for implementing the standards, including instructional strategies, technology for instruction and criteria for evaluating instructional materials. It can be found at: [http://www.cde.ca.gov/ci/ma/cf/draft2mathfwchapters.asp](http://www.cde.ca.gov/ci/ma/cf/draft2mathfwchapters.asp)
• **Progressions Document for the Common Core State Standards** from the University of Arizona describes the progressions of a topic across grade levels. It can be found at: [http://ime.math.arizona.edu/progressions/](http://ime.math.arizona.edu/progressions/)
• **Table 1 of the Common Core State Standards for Mathematics** gives specific examples of the common addition and subtraction situations, which may be helpful for kindergarten. It can be found on page 88 of the Glossary: [http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf](http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf)

An **Appendix** to the Curriculum Maps includes:
• **First Ten Days of School** to introduce classroom management and new learning opportunities, including problem-solving strategies and daily routines.

**Critical Areas:**

In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

• Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

• Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., $15/9 = 5/3$), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and
using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

• Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

Special Thanks: The CCSS-aligned Curriculum Maps were updated under the auspices of Dr. Frances Gipson, Chief Academic Officer, and Katie McGrath, Director of Elementary Instruction. There are many individuals who participated in the creation of this document, including reviewing and field-testing. We wish to thank everyone, especially: Gerardo Loera, Susan Tandberg, Mark Duncan, Charity Weber, Charles Cho, Barbara Goodwin, Norma Cantu, Karen Grigsby, Jose Dorado, Laura Acosta, Carina Tsuneta, Daniel Kim, Dr. Jared Dupree, Dina Williams, Michael Blount, Beverly Nichols, Caroline Piangerelli, Shirley Guzman, Dr. Philip Ogbuehi, Ricardo Romero, Erin Cuenca, Christie Caric, Anna Arredondo-Kim, Dena Teach-Saumers, Lara Cohen, Barbara Avilez, Diana Inouye, Rachel Sawyer, Evelyn Samos, Sherrie Dunbridge-Ryan, Michelle Staine, Steve Allen, Monica Esparza, Lisa Melton, Lisa Saldivar, and Lisa Ward.
DOMAIN: Operations and Algebraic Thinking

CLUSTER: Use the four operations with whole numbers to solve problems.

**Big Idea:** There are multiple interpretations of addition, subtraction, multiplication, and division of rational numbers, and each operation is related to other operations.

**Enduring Understandings:** Some real-world problems involving joining or separating equal groups or comparison can be solved using multiplication. Repeated addition and arrays involve joining equal groups are two ways to think about multiplication. Multiplication and division have an inverse relationship that can be used to find division facts; every division fact has a related multiplication fact. Some real-world problems involving joining or separating equal groups or comparisons can be solved using division. Sharing and repeated-subtraction involve separating equal groups and are two ways to think about division.

**Big Idea:** For a given sent of numbers, there are relationships that are always true called properties, and these are the rules that govern arithmetic and algebra.

**Enduring Understanding:** Two numbers can be multiplied in any order. The product of any number and 0 is zero. The product of any number and 1 is that number. Any number (except 0) divided by itself is equal to 1. Any number divided by 1 is that number. Zero divided by any number is zero. Zero cannot be a divisor.

**Big Idea:** Mathematical situations and structure can be translated and represented abstractly using variable, expressions, and equations.

**Enduring Understanding:** Information in a problem can often be shown using a picture or diagram and used to understand and solve the problem. Some problems can be solved by writing and completing a number sentence or equation.

**Big Idea:** Any number, measure, numerical expression, algebraic expression, or equation can be represented in an infinite number of ways with the same value.

**Enduring Understanding:** Representing numbers and numerical expression in equivalent forms can make some calculations easy to do mentally.

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<tr>
<th>STANDARDS FOR MATHEMATICAL CONTENT</th>
<th>STANDARDS FOR MATHEMATICAL PRACTICE</th>
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<tbody>
<tr>
<td>4.OA.1 Interpret a multiplication equation as a comparison</td>
<td>MP1 Make sense of problems and persevere in solving them</td>
<td>engageNY <a href="https://www.engageny.org/ccis-math/4oa1">https://www.engageny.org/ccis-math/4oa1</a></td>
<td>My Math Assessment Masters  • Ch. 3, pp. 58-78</td>
</tr>
<tr>
<td>4.OA.1 Interpret a multiplication equation as a comparison</td>
<td>MP2 Reason abstractly and quantitatively</td>
<td>NC Department of Public Instruction • 4.OA.1 Task 1.doc, Donut Shop</td>
<td>My Math Think Smart for the SBAC  • Chapter 3 Test, p. 65</td>
</tr>
<tr>
<td>4.OA.1 Interpret a multiplication equation as a comparison</td>
<td>MP3 Construct viable arguments and critique the reasoning of others</td>
<td>4.OA.1 Task 2.doc, Three Times as Much</td>
<td></td>
</tr>
<tr>
<td>4.OA.1 Interpret a multiplication equation as a comparison</td>
<td>MP4 Model with mathematics</td>
<td><a href="http://3-5cctask.ncdpi.wikispaces.net/4.OA.1-4.OA.3">http://3-5cctask.ncdpi.wikispaces.net/4.OA.1-4.OA.3</a></td>
<td></td>
</tr>
<tr>
<td>4.OA.1 Interpret a multiplication equation as a comparison</td>
<td>MP5 Use appropriate tools strategically</td>
<td>My Math • 3-3 Multiplication as Comparison</td>
<td>My Math eAssessment</td>
</tr>
<tr>
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</table>
| **4.OA.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. | engageNY [https://www.engageny.org/ccls-math/4oa2](https://www.engageny.org/ccls-math/4oa2) | **My Math** Assessment Masters  
- Ch. 3, pp. 58-78  
My Math Think Smart for the SBAC  
- Chapter 3 Test, p. 65  
- Chapter 3 Performance Tasks, p. 141  
My Math eAssessment |
| **MP1** Make sense of problems and persevere in solving them. | | Illustrative Mathematics  
- Comparing Money Raised [http://www.illustrativemathematics.org/illustrations/263](http://www.illustrativemathematics.org/illustrations/263) | **My Math** Assessment Masters  
- Ch. 3, pp. 58-78  
My Math Think Smart for the SBAC  
- Chapter 3 Test, p. 65  
- Chapter 3 Performance Tasks, p. 141  
My Math eAssessment |
| **MP2** Reason abstractly and quantitatively. | | NC Department of Public Instruction  
- 4.OA.2 Task 1.doc, Selling Candy [http://3-5cctask.ncdpi.wikispaces.net/4.OA.1-4.OA.3](http://3-5cctask.ncdpi.wikispaces.net/4.OA.1-4.OA.3) | **My Math** Assessment Masters  
- Ch. 3, pp. 58-78  
My Math Think Smart for the SBAC  
- Chapter 3 Test, p. 65  
- Chapter 3 Performance Tasks, p. 141  
My Math eAssessment |
| **MP3** Construct viable arguments and critique the reasoning of others. | | **My Math**  
- 3-4 Compare to Solve Problems  
- 3-8 Problem-Solving Investigation: Reasonable Answers  
- Expanding the United States, Real-World Problem Solving Readers Teacher Guide, p. 5 | **My Math** Assessment Masters  
- Ch. 3, pp. 58-78  
My Math Think Smart for the SBAC  
- Chapter 3 Test, p. 65  
- Chapter 3 Performance Tasks, p. 141  
My Math eAssessment |
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</table>
**CLUSTER:** Gain familiarity with factors and multiples.

**Big Idea:** Numbers can be used for different purposes, and numbers can be classified and represented in different ways.

**Enduring Understandings:** Every counting number is divisible by 1 and itself, and some counting numbers are also divisible by other numbers. Some counting numbers have exactly two factors; others have more than two. The product of any nonzero number and any other nonzero number is divisible by each number and is called a multiple of each number.

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<tbody>
<tr>
<td>4.OA.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 prime or composite.</td>
<td>MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.</td>
<td>engageny <a href="https://www.engageny.org/ccls-math/4oa4">https://www.engageny.org/ccls-math/4oa4</a> Illustrative Mathematics • Identifying Multiples <a href="http://www.illustrativemathematics.org/illustrations/959">http://www.illustrativemathematics.org/illustrations/959</a> • Multiples of 3, 6, and 7 <a href="http://www.illustrativemathematics.org/illustrations/1484">http://www.illustrativemathematics.org/illustrations/1484</a> NC Department of Public Instruction • 4.OA.4 Task 1.doc, A Ride on the Bus • 4.OA.4 Task 2.doc, Arranging Chairs • 4.OA.4 Task 3.doc, Tiling the Patio <a href="http://3-5cctask.ncdpi.wikispaces.net/4.OA.4">http://3-5cctask.ncdpi.wikispaces.net/4.OA.4</a> NCTM Illuminations • Number Line Journeys <a href="http://illuminations.nctm.org/Lesson.aspx?id=2602">http://illuminations.nctm.org/Lesson.aspx?id=2602</a> My Math • 3-7 Factors and Multiples • 8-1 Factors and Multiples • 8-2 Prime and Composite Numbers</td>
<td>Sample SBAC Item • 4.OA.4 (ER) <a href="http://www.ode.state.or.us/wma/teachlearn/commoncore/mat.04.er.3.000oa.a.512.final.v1.pdf">http://www.ode.state.or.us/wma/teachlearn/commoncore/mat.04.er.3.000oa.a.512.final.v1.pdf</a> Kentucky Department of Education • Number Puzzles <a href="http://education.ky.gov/curriculum/conpro/Math/Pages/ElemFormAssessLessons.aspx">http://education.ky.gov/curriculum/conpro/Math/Pages/ElemFormAssessLessons.aspx</a> My Math Assessment Masters • Ch. 3, pp. 58-78 • Ch. 8, pp. 186-207 My Math Think Smart for the SBAC • Chapter 3 Test, p. 65 • Chapter 8 Test, p. 95 • Chapter 3 Performance Tasks, p. 141 • Chapter 8 Performance Tasks, p. 151 My Math eAssessment</td>
</tr>
</tbody>
</table>
**CLUSTER: Generate and analyze patterns.**

**Big Idea:** Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. For some relationships, mathematical expressions and equations can be used to describe how members of one set are related to members of a second set.

**Enduring Understandings:** There are patterns in the products for multiplication facts with factors of 2, 5, and 9. Some patterns consist of shapes or numbers arranged in a unit that repeats. Some numerical sequences have rules that tell how to generate more numbers in the sequence. Some real-world quantities have a mathematical relationship; the value of one quantity can be found if you know the value of the other quantity. Patterns can be used to identify some relationships.

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</thead>
</table>
| 4.OA.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. | MP1 Make sense of problems and persevere in solving them. | engageNY <https://www.engageny.org/ccls-math/4oa5> | My Math Assessment Masters  
- Ch. 7, pp. 160-181 |
| | MP2 Reason abstractly and quantitatively. | Illustrative Mathematics  
- Double Plus One <http://www.illustrativemathematics.org/illustrations/487>  
- Multiples of Nine <http://www.illustrativemathematics.org/illustrations/1481> | My Math Think Smart for the SBAC  
- Chapter 7 Test, p. 89  
- Chapter 7 Performance Tasks, p. 149 |
| | MP3 Construct viable arguments and critique the reasoning of others. | NC Department of Public Instruction  
- 4.OA.5 Task 1.doc, Table Dilemma  
- 4.OA.5 Task 2.doc, Arranging Tables  
- 4.OA.5 Task 3.doc, Lawn Mowing Business <http://3-5cctask.ncdpi.wikispaces.net/4.OA.5> | My Math eAssessment |
| | MP4 Model with mathematics. | My Math  
- 7-1 Nonnumeric Patterns  
- 7-2 Numeric Patterns  
- 7-3 Sequences  
- 7-4 Problem Solving Investigation: Look for a a Pattern  
- 7-5 Addition and Subtraction Rules  
- 7-6 Multiplication and Division Rules  
- 7-8 Hands On: Equations with Two Operations  
- 7-9 Equations with Multiple Operations  
- Trapped in Tar, Real-World Problem Solving Readers Teacher Guide, p. 14 | |
| | MP5 Use appropriate tools strategically. | | |
| | MP6 Attend to precision. | | |
| | MP7 Look for and make use of structure. | | |
| | MP8 Look for and express regularity in repeated reasoning. | | |

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Grade 4 Curriculum Map 3.14.16  
Operations and Algebraic Thinking
## ADDITIONAL SUPPORT

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<th>ESSENTIAL QUESTIONS</th>
<th>LANGUAGE OBJECTIVES AND SUPPORTS</th>
<th>KEY VOCABULARY</th>
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</thead>
<tbody>
<tr>
<td>1. How can all of the factors of a number be found?</td>
<td>1. Students will orally articulate how to use multiplication to find all the factors of a number by using noun phrases. <em>(Teachers may have student visually represent targeted mathematical vocabulary to add to the math word wall to be used as a reference throughout the unit.)</em></td>
<td>Array</td>
</tr>
<tr>
<td>2. How can unknown multiplication relationships be found by breaking them into known facts?</td>
<td>2. Students will orally justify to peers how unknown multiplication relationships can be found by stating their argument using a variety of verb phrases. <em>(Teachers may allow students to create a visual representation, illustrating the process in finding unknown multiplication facts.)</em></td>
<td>Associative Property of Addition</td>
</tr>
<tr>
<td>3. How can arrays be used to understand 2-digit multiplication?</td>
<td>3. Students will evaluate other peer’s claims about arrays by using elaborate sentences with correlative conjunctions (not only, but also, either). <em>(Throughout the unit, teachers may model through think alouds how to evaluate a person’s claim and formulate an evaluative statement.)</em></td>
<td>Commutative Property of Addition</td>
</tr>
<tr>
<td>4. What happens when you multiply two numbers and switch the order of the factors? What happens when you multiply by 0? If you multiply by 1?</td>
<td>4. Students will explain in writing how switching factors affects the product by using indicative verbs in declarative sentences. <em>(Teachers may allow students time to orally rehearse their answer with a partner before engaging in writing.)</em></td>
<td>Commutative Property of Multiplication</td>
</tr>
</tbody>
</table>
## Grade 4 Curriculum Map 3.14.16

### Operations and Algebraic Thinking

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<td>Repeating pattern</td>
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<td>Subtrahend</td>
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<td>Variable</td>
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<td>Zero Property of Multiplication</td>
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</tbody>
</table>

### DAILY/Weekly Routines

- **Number Talks**
  - Head Problems
- **Daily Oral Language and CGI Problems**
  - [http://achieve.lausd.net/Page/7028](http://achieve.lausd.net/Page/7028)
- **SuDoku helps develop logical reasoning and provides a sense of achievement**

### Literature Connections

- **Amanda Bean’s Amazing Dream** by Cindy Neuschwander
- **Among the Odds and Evens** by Priscilla Turner
- **Minnie’s Diner: A Multiplying Meal** by Dayle Ann Dodds
- **Multiplying Menace: The Revenge of Rumpelstiltskin** by Pam Calvert
- **Once Upon a Dime** by Nancy Kelly Allen
- **Pattern Fish** by Trudy Harris
- **Rabbits, Rabbits Everywhere: A Fibonacci Tale** by Ann McCallum
- **Safari Park** by Stuart J. Murphy
- **Smoky Night** by Eve Bunting
- **Spaghetti and Meatballs for All** by Marilyn Burns
- **The Doorbell Rang** by Pat Hutchins
- **The Man Who Counted: A Collection of Mathematical Adventures** by Malba Tahan
- **The Rajah’s Rice** by David Barry
- **Two of Everything** by Lily Toy Hong
## Grade 4 Curriculum Map  
3.14.16  
Operations and Algebraic Thinking

### Organized by Standards  
Los Angeles Unified School District • Grade 4  
2016-2017

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### DIFFERENTIATION

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<th>FRONT LOADING¹</th>
<th>ENRICHMENT²</th>
<th>INTERVENTION³</th>
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</thead>
</table>
| **My Math**  
Each chapter includes: (at beginning of chapter)  
• My Math Words  
• My Vocabulary Cards  
• My Foldables  
Each lesson includes: (at beginning of lesson)  
• ELL Instructional Strategy  | **My Math**  
Each lesson includes:  
• a beyond level hands-on activity under differentiated instruction (found after Practice & Apply)  | **My Math**  
Each lesson includes:  
• an approaching level hands-on activity (found after Practice & Apply)  
Each formative assessment includes  
• Tier 2 Strategic Intervention, Ch. 3, p. 160A  
• Tier 2 Strategic Intervention, Ch. 7, p. 438A  
• Tier 2 Strategic Intervention, Ch. 8, p. 498A |

**Key:**

¹ Front Loading refers to materials that can be used before the lesson begins to prepare students for success, which may be helpful for English learners, standard English learners, students with disabilities or low achieving students.

² Enrichment refers to materials that can be used with students who are ready to have their thinking extended, which may be helpful for gifted and talented and high achieving students, or any students who are ready for more depth and complexity.

³ Intervention refers to materials that can be used after the lessons with students who are needing additional positive experiences with the mathematics, low achieving students who would benefit from another approach, or students who have gaps in their knowledge.

## Domain: Number and Operations in Base Ten

### Cluster: Generalize place value understanding for multi-digit whole numbers.

**Grade 4 expectations are limited to numbers less than or equal to 1,000,000.**

**Big Idea:** The base-ten numeration system is a scheme for recording numbers using digits 0-9, groups of ten, and place value.

**Enduring Understandings:** Our number system is based on groups of ten. Whenever we get 10 in one place value, we move to the next greater place value. In a multi-digit whole number, a digit in one place represents ten times what it would represent in the place immediately to its right.

**Big Idea:** Numbers, expressions, measures, and objects can be compared and related to other numbers, expressions, measures, and objects in different ways.

**Enduring Understandings:** Place value can be used to compare and order numbers.

**Big Idea:** Numbers can be approximated by numbers that are close.

**Enduring Understandings:** Rounding whole numbers is a process for finding the multiple of 10, 100, and so on closest to a given number.

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<tr>
<th>Standards for Mathematical Content</th>
<th>Standards for Mathematical Practice</th>
<th>Resources</th>
<th>Assessments</th>
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</thead>
</table>
| 4.NBT.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. | MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. | About Teaching Mathematics, 2nd Ed. (Burns, 2000)  
- Multiplying by 10 and Powers of 10, p. 213  
 [engageNY](https://www.engageny.org/ccls-math/4nbt1)  
 NC Department of Public Instruction  
- 4.NBT.1 Task 1.doc, Coin Collection  
- 4.NBT.1 Task 2.doc, Adding Zeros  
- 4.NBT.1 Task 3.doc, Packaging Soup Cans  
- 4.NBT.1 Task 4.doc, Value of the Bills  
 [http://3-5cctask.ncdpi.wikispaces.net/4.NBT.1-4.NBT.3](http://3-5cctask.ncdpi.wikispaces.net/4.NBT.1-4.NBT.3)  
 My Math  
- 1-1 Place Value  
- 4-1 Multiples of 10, 100, 1,000  
- 6-1 Divide Multiples of 10, 100, and 1,000 | My Math Assessment Masters  
- Ch. 1, pp. 7-27  
- Ch. 4, pp. 83-104  
- Ch. 6, pp. 134-155  
 My Math Think Smart for the SBAC  
- Chapter 1 Test, p. 53  
- Chapter 4 Test, p. 71  
- Chapter 6 Test, p. 83  
- Chapter 1 Performance Tasks, p. 137  
- Chapter 4 Performance Tasks, p. 143  
- Chapter 6 Performance Tasks, p. 147  
 My Math eAssessment |
### STANDARDS FOR MATHEMATICAL CONTENT

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.NBT.2</td>
<td>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 &gt;, =, &lt; symbols to record the results of comparisons.</td>
</tr>
</tbody>
</table>

### STANDARDS FOR MATHEMATICAL PRACTICE

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP1</td>
<td>Make sense of problems and persevere in solving them.</td>
</tr>
<tr>
<td>MP2</td>
<td>Reason abstractly and quantitatively.</td>
</tr>
<tr>
<td>MP3</td>
<td>Construct viable arguments and critique the reasoning of others.</td>
</tr>
<tr>
<td>MP4</td>
<td>Model with mathematics.</td>
</tr>
<tr>
<td>MP5</td>
<td>Use appropriate tools strategically.</td>
</tr>
<tr>
<td>MP6</td>
<td>Attend to precision.</td>
</tr>
<tr>
<td>MP7</td>
<td>Look for and make use of structure.</td>
</tr>
<tr>
<td>MP8</td>
<td>Look for and express regularity in repeated reasoning.</td>
</tr>
</tbody>
</table>

### RESOURCES

- **50 Problem Solving Lessons**, (Burns, 2000)
  - The Place Value Game, pp. 65-67
- **engageNY**
  - [https://www.engageny.org/ccls-math/4nbt2](https://www.engageny.org/ccls-math/4nbt2)
- **Illustrative Mathematics**
  - Ordering 4-Digit Numbers
    - [http://www.illustrativemathematics.org/illustrations/459](http://www.illustrativemathematics.org/illustrations/459)
- **NC Department of Public Instruction**
  - 4.NBT.2 Task 2.doc, Juice Pouches
  - 4.NBT.2 Task 3.doc, Arranging Students
    - [http://3-5cctask.ncdpi.wikispaces.net/4.NBT.1-4.NBT.3](http://3-5cctask.ncdpi.wikispaces.net/4.NBT.1-4.NBT.3)
- **My Math**
  - 1-2 Read and Write Multi-Digit Numbers
  - 1-3 Compare Numbers
  - 1-4 Order Numbers
  - 1-6 Problem Solving Investigation: Use the Four-Step Plan
  - Rivers and Mountains of the United States, Real-World Problem Solving Readers Teacher Guide, p. 10

### ASSESSMENTS

- **My Math Assessment Masters**
  - Ch. 1, pp. 58-78
- **My Math Think Smart for the SBAC**
  - Chapter 1 Test, p. 53
- **My Math eAssessment**
### STANDARDS FOR MATHEMATICAL CONTENT

| MP1 | Make sense of problems and persevere in solving them. |
| MP2 | Reason abstractly and quantitatively. |
| MP3 | Construct viable arguments and critique the reasoning of others. |
| MP4 | Model with mathematics. |
| MP5 | Use appropriate tools strategically. |
| MP6 | Attend to precision. |
| MP7 | Look for and make use of structure. |
| MP8 | Look for and express regularity in repeated reasoning. |

### RESOURCES

**engageNY**
- [https://www.engageny.org/ccls-math/4nbt3](https://www.engageny.org/ccls-math/4nbt3)

**NC Department of Public Instruction**
- 4.NBT.3 Task 1.doc, Open Number Line
- 4.NBT.3 Task 2.doc, Planning a Pizza Party
- [http://3-5cctask.ncdpi.wikispaces.net/4.NBT.1-4.NBT.3](http://3-5cctask.ncdpi.wikispaces.net/4.NBT.1-4.NBT.3)

**My Math**
- 1-5 Use Place Value to Round
- 2-4 Estimate Sums and Differences
- 4-2 Round to Estimate Products
- 5-2 Estimate Products
- 6-2 Estimate Quotients

### ASSESSMENTS

**engageNY**
- Module 1, Mid-Module Assessment Task (4.NBT.1-3)
  [https://www.engageny.org/resource/grade-4-mathematics-module-1](https://www.engageny.org/resource/grade-4-mathematics-module-1)

**My Math**
- Assessment Masters
  - Ch. 1, pp. 7-27
  - Ch. 2, pp. 32-53
  - Ch. 4, pp. 83-104
  - Ch. 5, pp. 109-129
  - Ch. 6, pp. 134-155

**My Math**
- Think Smart for the SBAC
  - Chapter 1 Test, p. 53
  - Chapter 2 Test, p. 59
  - Chapter 4 Test, p. 71
  - Chapter 5 Test, p. 77
  - Chapter 6 Test, p. 83
  - Chapter 1 Performance Tasks, p. 137
  - Chapter 2 Performance Tasks, p. 139
  - Chapter 4 Performance Tasks, p. 143
  - Chapter 5 Performance Tasks, p. 145
  - Chapter 6 Performance Tasks, p. 147

**My Math**
- eAssessment
CLUSTER: Use place value understanding and properties of operations to perform multi-digit arithmetic.

**Big Idea:** There is more than one algorithm for each of the operations with rational numbers. Some strategies for basic facts, and most algorithms for operations with rational numbers, both mental math and paper and pencil, use equivalence to transform calculations into simpler ones.

**Enduring Understandings:** There is more than one way to do a mental calculation. The standard addition and subtraction algorithms for multi-digit numbers break the calculation into simpler calculations using place value, starting with the ones, then the tens, and so on. The standard algorithm for multiplying three-digit by one-digit numbers is just an extension of the hundreds place of the algorithm for multiplying two-digit by one-digit numbers. The standard division algorithm breaks the calculation into simpler calculations using basic facts, place value, the relationship between multiplication and division, and estimation.

**Big Idea:** Any number, measure, numerical expression, algebraic expression, or equation can be represented in an infinite number of ways that have the same value.

**Enduring Understandings:** Representing numbers and numerical expressions in equivalent forms can make some calculations easy to do mentally. Different numerical expressions can have the same value. Or, the value of one expression can be less than or greater than the value of the other expression.

**Big Idea:** Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. For some relationships, mathematical expressions and equations can be used to describe how members of one set are related to members of a second set.

**Enduring Understandings:** Basic facts and place-value patterns can be used to divide multiples of 10 and 100 by one-digit numbers.

**Big Idea:** Numbers can be approximated by numbers that are close. Numerical calculations can be approximated by replacing numbers with other numbers that are close and easy to compute with mentally.

**Enduring Understandings:** Rounding is one way to estimate products. There is more than one way to estimate a sum or difference. Mentally multiplying by different powers of ten will help you arrive at an estimate for a quotient of a multi-digit division problem. The relationship between multiplication, division, and estimation can help determine the place value of the largest digit in a quotient.
<table>
<thead>
<tr>
<th>STANDARDS FOR MATHEMATICAL CONTENT</th>
<th>STANDARDS FOR MATHEMATICAL PRACTICE</th>
<th>RESOURCES</th>
<th>ASSESSMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STANDARDS FOR MATHEMATICAL CONTENT</td>
<td>STANDARDS FOR MATHEMATICAL PRACTICE</td>
<td>RESOURCES</td>
<td>ASSESSMENTS</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| **4 NBT.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. | **MP1** Make sense of problems and persevere in solving them. **MP2** Reason abstractly and quantitatively. **MP3** Construct viable arguments and critique the reasoning of others. **MP4** Model with mathematics. **MP5** Use appropriate tools strategically. **MP6** Attend to precision. **MP7** Look for and make use of structure. **MP8** Look for and express regularity in repeated reasoning. | **About Teaching Mathematics, 2nd Ed.** (Burns, 2000)  
- Using the Distributive Property, pp. 214-215  
- Hit the Target, pp. 217-218, 221  
- The Largest Product, p. 219  
- Factor Fiddling, p. 221  
  
**engageNY**  
https://www.engageny.org/ccls-math/4nbt5  
  
**NC Department of Public Instruction**  
- 4.NBT.5 Task 1.doc, Multiplication Strategies  
- 4.NBT.5 Task 2.doc, Who Has a Bigger Garden?  
- 4.NBT.5 Task 3.doc, College Basketball Attendance  
  
http://3-5cctask.ncdpi.wikispaces.net/4.NBT.4-4.NBT.6  
  
**My Math**  
- 3-1 Relate Multiplication and Division  
- 3-5 Multiplication Properties and Division Rules  
- 3-6 The Associative Property of Multiplication  
- 3-3 Hands On: Use Place Value to Multiply  
- 3-4 Hands On: Use Models to Multiply  
- 3-5 Multiply by a Two-Digit Number  
- 3-6 Hands On: Model Regrouping  
- 3-7 The Distributive Property  
- 3-8 Multiply with Regrouping  
- 3-9 Multiply by a Multi-Digit Number  
- 3-10 Problem-Solving Investigation: Estimate or Exact Answer  
- 3-11 Multiply Across Zeros  
- 3-1 Multiply by 10s  
- 3-3 Hands On: Use the Distributive Property to Multiply  
- 3-4 Multiply by a Two-Digit Number  
- 3-5 Multiply by a Two-Digit Number  
- 3-6 Problem-Solving Investigation: Make a Table  
  
**My Math** Assessment Masters  
- Ch. 3, pp. 58-88  
- Ch. 4, pp. 83-104  
- Ch. 5, pp. 109-129  
  
**My Math** Think Smart for the SBAC  
- Chapter 3 Test, p. 59  
- Chapter 4 Test, p. 71  
- Chapter 5 Test, p. 77  
- Chapter 3 Performance Tasks, p. 141  
- Chapter 4 Performance Tasks, p. 143  
- Chapter 5 Performance Tasks, p. 145  
  
**My Math** eAssessment  
  
**My Math** Assessment Masters  
- Ch. 3, pp. 58-88  
- Ch. 4, pp. 83-104  
- Ch. 5, pp. 109-129  
  
**My Math** Think Smart for the SBAC  
- Chapter 3 Test, p. 59  
- Chapter 4 Test, p. 71  
- Chapter 5 Test, p. 77  
- Chapter 3 Performance Tasks, p. 141  
- Chapter 4 Performance Tasks, p. 143  
- Chapter 5 Performance Tasks, p. 145  
  
**My Math** eAssessment
### Standards for Mathematical Content

<table>
<thead>
<tr>
<th>4.NBT.6</th>
<th>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.</th>
</tr>
</thead>
</table>

### Standards for Mathematical Practice

| MP1 | Make sense of problems and persevere in solving them. |
| MP2 | Reason abstractly and quantitatively. |
| MP3 | Construct viable arguments and critique the reasoning of others. |
| MP4 | Model with mathematics. |
| MP5 | Use appropriate tools strategically. |
| MP6 | Attend to precision. |
| MP7 | Look for and make use of structure. |
| MP8 | Look for and express regularity in repeated reasoning. |

### Resources

- **About Teaching Mathematics, 2nd Ed.** (Burns, 2000)
  - Leftovers from 100, pp. 218-219 (modify to larger numbers)
  - Remainders of Zero, p. 220
- **engageNY**
  - [https://www.engageny.org/ccls-math/4nbt6](https://www.engageny.org/ccls-math/4nbt6)
- **Inside Mathematics**
  - Grade 4 MARS Tasks: The Baker
- **Math Matters Grades K-6: Understanding the Math You Teach** (Chapin & Johnson, 2000)
  - Analyzing Students’ Thinking, Division, pp. 37-39
  - Interpreting Remainders, pp. 68-69
- **NC Department of Public Instruction**
  - 4.NBT.6 Task 1.doc, Dividing by Multiples of Ten
  - 4.NBT.6 Task 2.doc, Packaging Cupcakes
  - 4.NBT.6 Task 3.doc, Dividing Resources
  - [http://3-5cctask.ncdpi.wikispaces.net/4.NBT.4-4.NBT.6](http://3-5cctask.ncdpi.wikispaces.net/4.NBT.4-4.NBT.6)
- **My Math**
  - Assessing Understanding of Multiplication and division with Large Numbers, p. 222
- **My Math Assessment Masters**
  - Ch. 3, pp. 58-78
  - Ch. 6, pp. 134-155
- **My Math Think Smart for the SBAC**
  - Chapter 3 Test, p. 59
  - Chapter 6 Test, p. 83
  - Chapter 3 Performance Tasks, p. 141
  - Chapter 3 Performance Tasks, p. 147
- **My Math eAssessment**

### Assessments

- **About Teaching Mathematics, 2nd Ed.** (Burns, 2000)
- **My Math Assessment Masters**
- **My Math Think Smart for the SBAC**
- **My Math eAssessment**

### Domain Legend

- **▲ Major Cluster:** Areas of intensive focus, where students need fluent understanding and application of the core concepts (approximately 75%)
- **s/a Supporting Cluster:** Rethinking & linking; some material is being covered, but in a way that applies core understandings (s/a approximately 25%)
- **Additional Cluster:** Expose students to other subjects, may not connect explicitly to the major work of the grade
### ADDITIONAL SUPPORT

<table>
<thead>
<tr>
<th>ESSENTIAL QUESTIONS</th>
<th>LANGUAGE OBJECTIVES AND SUPPORTS</th>
<th>KEY VOCABULARY</th>
</tr>
</thead>
</table>
| 1. How are large numbers read and written?                                                                                                                                                                         | 1. Students will orally read and write numbers less than or equal to 1,000,000 using place value vocabulary. *(Teacher may provide opportunities for pair-share and place value charts for support.)*                                         | Associative Property of Addition  
Associative Property of Multiplication  
Breaking apart  
Commutative Property of Addition  
Commutative Property of Multiplication  
Compare  
Compatible numbers  
Compensation  
Counting on  
Decompose  
Digits  
Distributive Property  
Dividend  
Divisor  
Equal  
Equation  
Expanded form  
Fact family  
Factor  
Greater than  
Identity Property of Addition  
Identity Property of Multiplication  
Inverse operations  
Less than  
Minuend  
Multiple  
Number line  
Operation  
Partial products  
Partial quotients  
Patterns |
<p>| 2. How can whole numbers be compared and ordered?                                                                                                                                                                | 2. Students will orally support their knowledge of comparing and ordering whole numbers by using comparatives and superlatives. <em>(Teachers may construct open-ended questions that promote critical thinking and classroom discourse.)</em>                                       |                                                                                                                                              |
| 3. How can sums and differences of whole numbers be estimated?                                                                                                                                                   | 3. Students will describe how they estimated the sums and differences of whole numbers by using academic vocabulary. <em>(Teacher may refer students to math word wall for support.)</em>                                          |                                                                                                                                              |
| 4. What are standard procedures for adding and subtracting whole numbers?                                                                                                                                          | 4. Students will explain orally and in writing their strategies for adding and subtracting whole numbers using transitional phrases. <em>(ex: first ____, then ____ , and finally ____).</em> <em>(Teacher may provide sentence frames for support.)</em>       |                                                                                                                                              |
| 5. How can mental math and estimation be used to multiply?                                                                                                                                                      | 5. Students will orally support their thinking during mental math by using modal verbs *(could, may, might). <em>(Teachers may construct open-ended questions that promote critical thinking and classroom discourse.)</em>         |                                                                                                                                              |
| 6. What is a standard procedure for multiplying multi-digit numbers?                                                                                                                                             | 6. Students will sequentially explain how to multiply multi-digit numbers, using targeted mathematical language and complex sentences. <em>(Teacher may refer students to math word wall for support.)</em>                      |                                                                                                                                              |
| 7. What are the different meanings of division?                                                                                                                                                                  | 7. Students will orally share with their group different models of division utilizing academic vocabulary. <em>(Teacher circulates the classroom, recasting the student output.)</em>                                      |                                                                                                                                              |</p>
<table>
<thead>
<tr>
<th>ESSENTIAL QUESTIONS</th>
<th>LANGUAGE OBJECTIVES AND SUPPORTS</th>
<th>KEY VOCABULARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. How can mental math and estimation be used to divide?</td>
<td>8. Students will ask clarifying questions of their peers as to how they used mental math and estimation to divide, using present and past tense verbs. <em>(Teachers may provide a variety of grouping structures to allow for various opportunities for language use.)</em></td>
<td>Period</td>
</tr>
<tr>
<td>9. What is a standard procedure for dividing multi-digit numbers?</td>
<td>9. Students will listen to a partner’s explanation of the strategies of multiplying in an efficient manner and ask clarifying questions to ascertain the reasonableness of the product using present and past tense verbs. <em>(Teacher will circulate, recasting student responses.)</em></td>
<td>Place value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Product</td>
</tr>
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<td></td>
<td></td>
<td>Quotient</td>
</tr>
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<td></td>
<td></td>
<td>Regroup</td>
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<td></td>
<td></td>
<td>Remainder</td>
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<tr>
<td></td>
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<td>Repeated subtraction</td>
</tr>
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<td>Subtrahend</td>
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<tr>
<td></td>
<td></td>
<td>Standard form</td>
</tr>
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<td></td>
<td></td>
<td>Unknown</td>
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<tr>
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<td></td>
<td>Variable</td>
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<tr>
<td></td>
<td></td>
<td>Word form</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Zero Property of Multiplication</td>
</tr>
</tbody>
</table>

**DAILY/WEEKLY ROUTINES**

- Head Problems
- Number Talks
- Daily Oral Language with CGI problems [http://achieve.lausd.net/Page/7028](http://achieve.lausd.net/Page/7028)
- Math Journals

**LITERATURE CONNECTIONS**

- A Cache of Jewels by Ruth Heller
- A Great Divide: A Mathematical Marathon by Dayle Ann Dodds
- A Place for Zero; A Math Adventure by Angeline Sparagna LoPresti
- Alexander Who Used to Be Rich Last Sunday by Judith Viorst
- A Remainder of One by Elinor J. Pinczes
- Addition and Subtraction Relationships by Lily Toy Hong
- Amanda Bean’s Amazing Dream by Cindy Neuschwander
- Bats on Parade by Kathi Appelt
- Betcha! By Stuart J. Murphy
- Centipede’s 100 Shoes by Tony Ross
- Counting Jennie by Helena Clare Pittman
- Coyotes All Around by Stuart J. Murphy
- Divide and Ride by Stuart J. Murphy
- Each Orange Had Eight Slices by Paul Giganti, Jr.
- Earth Day---Hooray! By Stuart J. Murphy
- Elevator Magic by Stuart J. Murphy
- Hoffest, Coldest, Highest, Deepest by Steve Jenkins
- How Many Jelly Beans? By Andrea Monetti
- Marvelous Multiplication by Lynette Long
- Math for All Seasons by Greg Tang
- Mathterpieces by Greg Tang
- Math Curse by Jon Scieszka
- Melisande by Elizabeth Nesbit
- Olympics by Chris Oxlade and David Ballheimer
- One Hundred Hungry Ants by Elinor J. Pinczes
- Place Value: The Next Stage by Claire Piddock
- Sea Squares by Joy N. Hulme
- 17 Kings and 42 Elephants by Margaret Mahy
- Shark Swimathon by Stuart J. Murphy
- The Great Divide by Dayle Ann Dodds
- The Twelve Circus Rings by Seymour Chwast
- Too Many Kangaroo Things to Do by Stuart J. Murphy
- Whales by Gail Gibbons
# Grade 4 Curriculum Map

## Number and Operations in Base Ten

### DIFFERENTIATION

<table>
<thead>
<tr>
<th>FRONT LOADING¹</th>
<th>ENRICHMENT²</th>
<th>INTERVENTION³</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My Math</strong> Each chapter includes: (at beginning of chapter)</td>
<td><strong>My Math</strong> Each lesson includes:</td>
<td><strong>My Math</strong> Each lesson includes:</td>
</tr>
<tr>
<td>- My Math Words</td>
<td>- a beyond level hands-on activity under differentiated instruction (found after Practice &amp; Apply)</td>
<td>- an approaching level hands-on activity (found after Practice &amp; Apply)</td>
</tr>
<tr>
<td>- My Vocabulary Cards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- My Foldables</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each lesson includes: (at beginning of lesson)
- ELL Instructional Strategy

Each formative assessment includes
- Tier 2 Strategic Intervention, Ch. 1, p. 36A
- Tier 2 Strategic Intervention, Ch. 2, p. 86A
- Tier 2 Strategic Intervention, Ch. 3, p. 151A
- Tier 2 Strategic Intervention, Ch. 3, p. 160A
- Tier 2 Strategic Intervention, Ch. 4, p. 222A
- Tier 2 Strategic Intervention, Ch. 4, p. 254A
- Tier 2 Strategic Intervention, Ch. 5, p. 292A
- Tier 2 Strategic Intervention, Ch. 6, p. 366A
- Tier 2 Strategic Intervention, Ch. 6, p. 386A

Key:

1. Front Loading refers to materials that can be used before the lesson begins to prepare students for success, which may be helpful for English learners, students with disabilities or low achieving students.
2. Enrichment refers to materials that can be used with students who are ready to have their thinking extended, which may be helpful for gifted and talented and high achieving students, or any students who are ready for more depth and complexity.
3. Intervention refers to materials that can be used after the lessons with students who are needing additional positive experiences with the mathematics, low achieving students who would benefit from another approach, or students who have gaps in their knowledge.

For more information on Differentiation, please refer to: The California Framework, Universal Access section:
DOMAINE: Number and Operations – Fractions

CLUSTER: Extend understanding of fraction equivalence and ordering. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

Big Idea: The set of real numbers is infinite and ordered. Whole numbers, integers, and fractions are real numbers. Each real number can be associated with a unique point on the number line.

Enduring Understandings: A fraction describes the division of a whole (region, set, segment) into equal parts. The bottom number in a fraction tells how many equal parts the whole is divided into. The top number tells how many equal parts are indicated. A fraction is relative to the size of the whole. Finding a unit-fractional part of a whole is the same as dividing the whole by the denominator of the fraction. Points between whole numbers on a number line can be labeled with fractions or mixed numbers. The denominator of the fraction can be determined by counting the number of equal parts between two consecutive whole numbers.

<table>
<thead>
<tr>
<th>STANDARDS FOR MATHEMATICAL CONTENT</th>
<th>STANDARDS FOR MATHEMATICAL PRACTICE</th>
<th>RESOURCES</th>
<th>ASSESSMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.NF.1</strong> Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{n \times a}{n \times b}$ by using visual fraction models, with attention to how the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.</td>
<td><strong>MP1</strong> Make sense of problems and persevere in solving them. <strong>MP2</strong> Reason abstractly and quantitatively. <strong>MP3</strong> Construct viable arguments and critique the reasoning of others. <strong>MP4</strong> Model with mathematics. <strong>MP5</strong> Use appropriate tools strategically. <strong>MP6</strong> Attend to precision. <strong>MP7</strong> Look for and make use of structure. <strong>MP8</strong> Look for and express regularity in repeated reasoning.</td>
<td>enagemy • <a href="https://www.engageny.org/ccls-math/4nf1">https://www.engageny.org/ccls-math/4nf1</a></td>
<td>engageNY • End-of-Module Assessment <a href="http://www.engageny.org/resource/grade-4-mathematics-module-2">http://www.engageny.org/resource/grade-4-mathematics-module-2</a></td>
</tr>
<tr>
<td><strong>My Math</strong></td>
<td>My Math Assessment Masters • Ch. 8, pp. 186-207</td>
<td><strong>My Math</strong></td>
<td>My Math Think Smart for the SBAC • Chapter 8 Test, p. 95 • Chapter 8 Performance Tasks, p. 151</td>
</tr>
<tr>
<td><strong>My Math eAssessment</strong></td>
<td>• 8-3 Hands On: Model Equivalent Fractions • 8-4 Equivalent Fractions • 8-5 Simplest Form</td>
<td><strong>My Math</strong></td>
<td>• 8-3 Hands On: Model Equivalent Fractions • 8-4 Equivalent Fractions • 8-5 Simplest Form</td>
</tr>
<tr>
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<tr>
<td>------------------------------------</td>
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<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>4.NF.2 Compare two fractions with different numerators and denominators, e.g., by creating common denominators 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 &gt;, =, &lt;, and justify the conclusions, e.g., by using a visual fraction model.</td>
<td>MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.</td>
<td>About Teaching Mathematics, 2nd Ed. (Burns, 2000) • The Fraction Kit: Fraction Sentences, p. 228 • Using Graphs to Build Understanding of Fractions, p. 229 • Closest to 0, 1/2, or 1?, p. 232 • Fractions Closest to 1/2, p. 233 engageNY • <a href="https://www.engageny.org/ccls-math/4nf2">https://www.engageny.org/ccls-math/4nf2</a></td>
<td>engageNY • End-of-Module Assessment <a href="http://www.engageny.org/resource/grade-4-mathematics-module-2">http://www.engageny.org/resource/grade-4-mathematics-module-2</a> My Math Assessment Masters • Ch. 8, pp. 186-207 My Math Think Smart for the SBAC • Chapter 8 Test, p. 95 • Chapter 8 Performance Tasks, p. 151 My Math eAssessment</td>
</tr>
</tbody>
</table>
**CLUSTER:** Build fractions from unit fractions by applying and extending previous understandings of operations or whole numbers.

**Big Idea:** There is more than one algorithm for each of the operations with rational numbers. Most algorithms for operations with rational numbers, both mental math and paper and pencil, use equivalence to transform calculations into simpler ones.

**Enduring Understandings:** Repeated subtraction situations can be solved using a division algorithm different from the standard algorithm.

<table>
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<th>STANDARDS FOR MATHEMATICAL CONTENT</th>
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</thead>
<tbody>
<tr>
<td><strong>4.NF.3a</strong> Understand a fraction a/b with a &gt; 1 as a sum of fractions 1/b, understanding addition and subtraction of fractions as joining and separating parts referring to the same whole.</td>
<td><strong>MP1</strong> Make sense of problems and persevere in solving them. <strong>MP2</strong> Reason abstractly and quantitatively. <strong>MP3</strong> Construct viable arguments and critique the reasoning of others. <strong>MP5</strong> Use appropriate tools strategically. <strong>MP6</strong> Attend to precision. <strong>MP7</strong> Look for and make use of structure. <strong>MP8</strong> Look for and express regularity in repeated reasoning.</td>
<td>engageNY <a href="https://www.engageny.org/ccls-math/4nf3a">https://www.engageny.org/ccls-math/4nf3a</a></td>
<td><strong>My Math</strong> <a href="http://3-5cctask.ncdpi.wikispaces.net/4.NF.3-4.NF.4">http://3-5cctask.ncdpi.wikispaces.net/4.NF.3-4.NF.4</a></td>
</tr>
<tr>
<td><strong>4.NF.3</strong> Understand a fraction a/b with a &gt; 1 as a sum of fractions 1/b, understanding addition and subtraction of fractions as joining and separating parts referring to the same whole.</td>
<td></td>
<td></td>
<td><strong>My Math Assessment Masters</strong>&lt;br&gt;• Ch. 8, pp. 186-207&lt;br&gt;• Ch. 9, pp. 212-233</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>My Math Think Smart for the SBAC</strong>&lt;br&gt;• Chapter 8 Test, p. 95&lt;br&gt;• Chapter 9 Test, p. 101&lt;br&gt;• Chapter 8 Performance Task, p. 151&lt;br&gt;• Chapter 9 Performance Task, p. 153</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>My Math eAssessment</strong></td>
</tr>
</tbody>
</table>

**NC Department of Public Instruction**

- 4.NF.3 Task 1.doc, Sharing Cake
- 4.NF.3 Task 2.doc, Candy Bucket
- 4.NF.3 Task 4.doc, Pattern Blocks and Unit Fractions
- 4.NF.3 Task 6.doc, How Much Punch is Left?
  
  http://3-5cctask.ncdpi.wikispaces.net/4.NF.3-4.NF.4
### Standards for Mathematical Content

- **4.NF.3b** 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: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

### Standards for Mathematical Practice

- **MP1** Make sense of problems and persevere in solving them.
- **MP2** Reason abstractly and quantitatively.
- **MP3** Construct viable arguments and critique the reasoning of others.
- **MP4** Model with mathematics.
- **MP5** Use appropriate tools strategically.
- **MP6** Attend to precision.
- **MP7** Look for and make use of structure.
- **MP8** Look for and express regularity in repeated reasoning.

### Resources

- **About Teaching Mathematics, 2nd Ed.** (Burns, 2000)
  - Build the Yellow Hexagon, p.235
  - Building Rectangles, p. 234
  - Fraction Riddles, p. 234
  - Wipeout, p. 236

- **engageNY**
  - https://www.engageny.org/ccls-math/4nf3b

- **NC Department of Public Instruction**
  - 4.NF.3 Task 1.doc, Sharing Cake
  - 4.NF.3 Task 2.doc, Candy Bucket
  - 4.NF.3 Task 5.doc, Dividing Up the Land

- **My Math**
  - Assessment Masters
    - Ch. 8, pp. 186-207
    - Ch. 9, pp. 212-233
  - Think Smart for the SBAC
    - Chapter 8 Test, p. 95
    - Chapter 9 Test, p. 101
    - Chapter 8 Performance Task, p. 151
    - Chapter 9 Performance Task, p. 153

- **My Math eAssessment**

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**Grade 4 Curriculum Map 6.9.16**

**Number and Operations - Fractions**
### Standards for Mathematical Content

**4.NF.3c** 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.

### Standards for Mathematical Practice

- **MP1** Make sense of problems and persevere in solving them.
- **MP2** Reason abstractly and quantitatively.
- **MP3** Construct viable arguments and critique the reasoning of others.
- **MP4** Model with mathematics.
- **MP5** Use appropriate tools strategically.
- **MP6** Attend to precision.
- **MP7** Look for and make use of structure.
- **MP8** Look for and express regularity in repeated reasoning.

### Resources

- **engageNY**
  - [https://www.engageny.org/cCLS-math/4nf3c](https://www.engageny.org/cCLS-math/4nf3c)

- **NC Department of Public Instruction**
  - 4.NF.3 Task 3.doc, Square Tiles
  - [http://3-5ctask.ncdpi.wikispaces.net/4.NF.3-4.NF.4](http://3-5ctask.ncdpi.wikispaces.net/4.NF.3-4.NF.4)

- **My Math**
  - End-of-Module Assessment
  - [http://www.engageny.org/resource/grade-4-mathematics-module-2](http://www.engageny.org/resource/grade-4-mathematics-module-2)
  - Assessment Masters
    - Ch. 9, pp. 212-233
  - Think Smart for the SBAC
    - Chapter 9 Test, p. 101
    - Chapter 9 Performance Task, p. 153

### Assessments

- **engageNY**
  - End-of-Module Assessment
  - [http://www.engageny.org/resource/grade-4-mathematics-module-2](http://www.engageny.org/resource/grade-4-mathematics-module-2)

- **My Math**
  - Assessment Masters
    - Ch. 9, pp. 212-233
  - Think Smart for the SBAC
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</table>
| 4.NF.3d 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. | MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. | engageNY
- https://www.engageny.org/ccls-math/4nf3d | engageNY
- End-of-Module Assessment
http://www.engageny.org/resource/grade-4-mathematics-module-2 |
| My Math
- 9-5 Problem-Solving Investigation: Work Backwards
- Ch. 9, pp. 212-233 |
| My Math
- Chapter 9 Test, p. 101
- Chapter 9 Performance Task, p. 153 |
<p>| My Math eAssessment |</p>
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</table>
| 4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. | MP1 Make sense of problems and persevere in solving them. | **engage** [https://www.engageny.org/ccls-math/4nf4a](https://www.engageny.org/ccls-math/4nf4a) | **engage**<sup>NY</sup>  
- End-of-Module Assessment  
**http://www.engageny.org/resource/grade-4-mathematics-module-2** |
| 4.NF.4a Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$. For example, use a visual fraction model to represent $\frac{5}{4}$ as the product $5 \times \frac{1}{4}$, recording the conclusion by the equation $\frac{5}{4} = 5 \times \frac{1}{4}$. | MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. | **NC Department of Public Instruction**  
- 4.NF.4 Task 1.doc, Pasta Party  
- 4.NF.4 Task 2.doc, Drawing a Model  
- 4.NF.4 Task 3.doc, Chris’s Cookies  
- 4.NF.4 Task 4.doc, Going the Distance  
- 4.NF.4 Task 5.doc, Serving Ice Cream  
**http://3-5cctask.ncdpi.wikispaces.net/4.NF.3-4.NF.4** | **My Math** Assessment Masters  
- Ch. 9, pp. 212-233 |
|  | **My Math**  
- 9-8 Hands On: Model Fractions and Multiplication |  | **My Math** eAssessment  
- Chapter 9 Test, p. 101  
- Chapter 9 Performance Task, p. 153 |

**SBAC Sample Summative Item**  
- Art Project Fractions (PT) (4.NF.1, 4.NF.2, 4.NF.3, 4.NF.4)**
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</thead>
</table>
| 4.NF.4b 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 this product as 6/5. (In general, n x (a/b) = (n x a)/b.) | MP1 Make sense of problems and persevere in solving them. | engageNY  
  - [https://www.engageny.org/ccls-math/4nf4b](https://www.engageny.org/ccls-math/4nf4b)  
  My Math  
  - 9-9 Multiply Fractions by Whole Numbers | engageNY  
  - End-of-Module Assessment  
  [http://www.engageny.org/resource/grade-4-mathematics-module-2](http://www.engageny.org/resource/grade-4-mathematics-module-2)  
  My Math Assessment Masters  
  - Ch. 9, pp. 212-233  
  My Math Think Smart for the SBAC  
  - Chapter 9 Test, p. 101  
  - Chapter 9 Performance Task, p. 153  
  My Math eAssessment |
### STANDARDS FOR MATHEMATICAL CONTENT

#### 4.NF.4c
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 $\frac{3}{8}$ 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

- **MP1** Make sense of problems and persevere in solving them.
- **MP2** Reason abstractly and quantitatively.
- **MP3** Construct viable arguments and critique the reasoning of others.
- **MP4** Model with mathematics.
- **MP5** Use appropriate tools strategically.
- **MP6** Attend to precision.
- **MP7** Look for and make use of structure.
- **MP8** Look for and express regularity in repeated reasoning.

### RESOURCES

- **engageNY**
  - https://www.engageny.org/ccls-math/4nf4c

- **My Math**
  - Supported by 9-8 Model Fractions and Multiplication
  - Supported by 9-9 Multiply Fractions by Whole Numbers

### ASSESSMENTS

- **engageNY**
  - End-of-Module x Assessment

- **My Math**
  - Assessment Masters
    - Ch. 9, pp. 212-233

- **My Math**
  - Think Smart for the SBAC
    - Chapter 9 Test, p. 101
    - Chapter 9 Performance Task, p. 153

- **My Math**
  - eAssessment
### CLUSTER: Understand decimal notation for fractions, and compare decimal fractions.

**Big Idea:** Numbers can be used for different purposes, and numbers can be classified and represented in different ways.

**Enduring Understandings:** Every counting number is divisible by 1 and itself, and some counting numbers are also divisible by other numbers. Some counting numbers have exactly two factors; others have more than two. The product of any nonzero number and any other nonzero number is divisible by each number and is called a multiple of each number.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>4.NF.5</td>
<td>MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8</td>
<td>engageNY</td>
<td>engageNY</td>
</tr>
<tr>
<td>Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.</td>
<td>Make sense of problems and persevere in solving them. Reason abstractly and quantitatively. Construct viable arguments and critique the reasoning of others. Use appropriate tools strategically. Look for and express regularity in repeated reasoning.</td>
<td><a href="https://www.engageny.org/ccls-math/4nf5">https://www.engageny.org/ccls-math/4nf5</a></td>
<td><a href="https://www.engageny.org/resource/grade-4-mathematics-module-2">https://www.engageny.org/resource/grade-4-mathematics-module-2</a></td>
</tr>
</tbody>
</table>

**LAUSD Concept Lesson**
- Grade 4: The Amazing Race: Fractions and Decimals [http://tinyurl.com/Grade4AmazingRace](http://tinyurl.com/Grade4AmazingRace)

**NC Department of Public Instruction**
- 4.NF.5 Task 1.doc, Karen’s Garden
- 4.NF.5 Task 2.doc, Filling the Jar

**My Math**
- 10-4 Hands On: Model Decimals and Fractions
- 10-5 Decimals and Fractions
- 10-6 Use Place Value and Model to Add
- 10-8 Problem-Solving Investigation: Extra or Missing Information

**My Math Assessment Masters**
- Ch. 10, pp. 238-258

**My Math Think Smart for the SBAC**
- Chapter 10 Test, p. 107
- Chapter 10 Performance Task, p. 155

**My Math eAssessment**
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<tr>
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<th>RESOURCES</th>
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</thead>
</table>
| 4.NF.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. | MP1 Make sense of problems and persevere in solving them. | engage ny [https://www.engageny.org/ccls-math/4nf6](https://www.engageny.org/ccls-math/4nf6) | **engage ny**  
• End-of-Module Assessment  
  [http://www.engageny.org/resource/grade-4-mathematics-module-2](http://www.engageny.org/resource/grade-4-mathematics-module-2) |
| **LAUSD Concept Lesson** | MP2 Reason abstractly and quantitatively. |  | **My Math**  
Assessment Masters  
• Ch. 10, pp. 238-258 |
| • Grade 4: The Amazing Race: Fractions and Decimals  
  [http://tinyurl.com/Grade4AmazingRace](http://tinyurl.com/Grade4AmazingRace) | MP3 Construct viable arguments and critique the reasoning of others. |  | **My Math**  
Think Smart for the SBAC  
• Chapter 10 Test, p. 107  
• Chapter 10 Performance Task, p. 155 |
| **NC Department of Public Instruction** | MP4 Model with mathematics. |  | **My Math** eAssessment |
| • 4.NF.6 Task 1.doc, Where Am I Now? How Much Farther?  
• 4.NF.6 Task 2.doc, Is the Tire Full Yet?  
  [http://3-5cctask.ncdpi.wikispaces.net/4.NF.5-4.NF.7](http://3-5cctask.ncdpi.wikispaces.net/4.NF.5-4.NF.7) | MP5 Use appropriate tools strategically. |  |  |
| **My Math** | MP6 Attend to precision. |  |  |
| • 10-1 Hand On: Place Value Through Tenths and Hundredths  
• 10-2 Tenths  
• 10-3 Hundredths | MP7 Look for and make use of structure. |  |  |
|  | MP8 Look for and express regularity in repeated reasoning. |  |  |
### Standards for Mathematical Content

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.NF.7</td>
<td>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 &gt;, =, &lt;, and justify the conclusions, e.g., by using a visual model.</td>
</tr>
</tbody>
</table>

### Standards for Mathematical Practice

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP1</td>
<td>Make sense of problems and persevere in solving them.</td>
</tr>
<tr>
<td>MP2</td>
<td>Reason abstractly and quantitatively.</td>
</tr>
<tr>
<td>MP3</td>
<td>Construct viable arguments and critique the reasoning of others.</td>
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<tr>
<td>MP4</td>
<td>Model with mathematics.</td>
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<td>MP5</td>
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<td>MP6</td>
<td>Attend to precision.</td>
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<tr>
<td>MP8</td>
<td>Look for and express regularity in repeated reasoning.</td>
</tr>
</tbody>
</table>

### Resources

- **engageNY**
  - https://www.engageny.org/ccls-math/4nf7
- **LAUSD Concept Lesson**
  - Grade 4: The Amazing Race: Fractions and Decimals
    - http://tinyurl.com/Grade4AmazingRace
- **NC Department of Public Instruction**
  - 4.NF.7 Task 1.doc, Who Jumped Farther?
  - 4.NF.7 Task 2.doc, Making Punch
    - http://3-5cctask.ncdpi.wikispaces.net/4.NF.5-4.NF.7
- **My Math**
  - Ch. 10, pp. 238-258
  - Chapter 10 Test, p. 107
  - Chapter 10 Performance Task, p. 155
- **My Math eAssessment**

### Assessments

- **engageNY**
  - End-of-Module Assessment
- **My Math Assessment Masters**
  - Ch. 10, pp. 238-258
- **My Math Think Smart for the SBAC**
  - Chapter 10 Test, p. 107
  - Chapter 10 Performance Task, p. 155
- **My Math eAssessment**

### Domain Legend

- ▲ Major Cluster: Areas of intensive focus, where students need fluent understanding and application of the core concepts (approximately 75%)
- s Supporting Cluster: Rethinking & linking; some material is being covered, but in a way that applies core understandings (s/a approximately 25%)
- a Additional Cluster: Expose students to other subjects, may not connect explicitly to the major work of the grade

- CA California Additions to the content standards appear in **bold.**
## ADDITIONAL SUPPORT

<table>
<thead>
<tr>
<th>ESSENTIAL QUESTIONS</th>
<th>LANGUAGE OBJECTIVES AND SUPPORTS</th>
<th>KEY VOCABULARY</th>
</tr>
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</table>
| 1. How can the same fractional amount be named in different ways?                  | 1. Students will explain orally and in writing their strategies for naming fractions in different ways using transitional phrases, (ex: first ___, then ___, and finally ___).  
(Teacher may provide sentence frames for support.)                                                                 | Benchmark Fractions  
Compare  
Decimal  
Denominator  
Equal to  
Equivalent Fractions  
Fraction  
Greater than  
Greatest Common Factor  
Hundredth  
Improper Fraction  
Least Common Multiple  
Less than  
Mixed Number  
Numerator  
Order  
Remainder  
Simplest Form  
Tenth |
| 2. How can fractions be compared and ordered?                                       | 2. Students will sequentially explain different ways to compare fractions using targeted mathematical language and complex sentences. (Teacher may refer students to math word wall for support.) |
| 3. What does it mean to add and subtract fractions and mixed numbers with like denominators? | 3. Students will orally discuss the strategies they use to add and subtract fractions and mixed numbers with like denominators utilizing appropriate mathematical vocabulary and past-tense citation verbs: determined, concluded. (Teacher circulates the classroom, recasting the student output.) |
| 4. What is the standard procedure for adding and subtracting fractions and mixed numbers with like denominators? | 4. Students will ask clarifying questions of their peers as to how they used the standard procedure for adding and subtracting fractions and mixed numbers with like denominators using present and past tense verbs. (Teachers may provide a variety of grouping structures to allow for various opportunities for language use.) |
| 5. How are fractions and decimals related?                                          | 5. Students will listen to a partner’s explanation of modeling the relationship between fractions and decimals and ask clarifying questions using present and past tense verbs. (Teacher will circulate, recasting student responses.) |
| 6. How can decimals be compared and ordered?                                        | 6. Students will orally read, compare and order decimals, explaining their strategy to a partner, using place value and comparative vocabulary. (Teacher may provide place value charts and manipulatives for support.) |
## DAILY/ WEEKLY ROUTINES

- Head Problems
- Number Talks
- Look for articles in which decimals are used. Choose several to present to the class. In your presentation, explain the meaning of decimals. About Teaching Mathematics (Burns, 2000), p. 242
- Students play the Place Value game (including a decimal). They will need a partner or small group and a die. The goal of the game is to make the largest number possible. About Teaching Mathematics (Burns, 2000), p. 244
- Math Journals

## LITERATURE CONNECTIONS

- Calculator Mania by Planet Dexter
- Follow the Money by Loreen Leedy
- Fraction Fun by David A. Adler
- Go, Fractions! By Judith Bauer Stamper
- Henry Hikes to Fitchburg by D.B Johnson
- Inchworm and a Half by Elinor J. Pinczes
- Math Curse by Jon Scieszka
- Math Man by Teri Daniels
- Picture Pie by Ed Emberley
- Pizza Counting by Christina Dobson
- Polar Bear Math by Ann Whitehead Nagda
- Spaghetti and Meatballs by Marilyn Burns
- The Toothpaste Millionaire by Jean Merrill

## DIFFERENTIATION

### FRONT LOADING

**My Math**
- Each chapter includes: (at beginning of chapter)
  - My Math Words
  - My Vocabulary Cards
  - My Foldables

**Each lesson includes:** (at beginning of lesson)
- ELL Instructional Strategy

### ENRICHMENT

**My Math**
- Each lesson includes:
  - a beyond level hands-on activity under differentiated instruction (found after Practice & Apply)

### INTERVENTION

**My Math**
- Each lesson includes:
  - an approaching level hands-on activity (found after Practice & Apply)

**Each formative assessment includes**
- Tier 2 Strategic Intervention, Ch. 8, p. 498A
- Tier 2 Strategic Intervention, Ch. 9, p. 585A
- Tier 2 Strategic Intervention, Ch. 9, p. 606A
- Tier 2 Strategic Intervention, Ch. 10, p. 650A

**Key:**

1. Front Loading refers to materials that can be used before the lesson begins to prepare students for success, which may be helpful for English learners, standard English learners, students with disabilities or low achieving students.
2. Enrichment refers to materials that can be used with students who are ready to have their thinking extended, which may be helpful for gifted and talented and high achieving students, or any students who are ready for more depth and complexity.
3. Intervention refers to materials that can be used after the lessons with students who are needing additional positive experiences with the mathematics, low achieving students who would benefit from another approach, or students who have gaps in their knowledge.

DOMAIN: Measurement and Data

CLUSTER: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. s/a

**Big Idea:** Some attributes of objects are measurable and can be quantified using unit amounts.

**Enduring Understandings:** Length can be estimated and measured in different systems (customary, metric) and using different units in each system that are related to each other. Capacity is a measure of the amount of liquid a container can hold. Capacity can be measured in different systems (customary, metric) and using different units in each system that are related to each other. The weight of an object is a measure of how heavy an object is. Mass is a measure of the quantity of matter in an object. Weight and mass are different measures. Time can be expressed using different units that are related to each other.

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<td>4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g, lb, oz., l, ml; hr, min, sec. Within a single system of units, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example: know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36)…</td>
<td>MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.</td>
<td>engageNY Module 2: Unit Conversions and Problem Solving with Metric Measurement and Module 7: Exploring Measurement with Multiplication <a href="https://www.engageny.org/ccls-math/4md1">https://www.engageny.org/ccls-math/4md1</a></td>
<td><strong>My Math</strong> Assessment Masters  • Ch. 11, pp. 263-284  • Ch. 12, pp. 289-309 <strong>My Math</strong> Think Smart for the SBAC  • Ch. 11 &amp; 12 Tests, p. 113, 119  • Ch. 11 &amp; 12 Performance Tasks, pp. 157, 159 <strong>My Math</strong> eAssessment</td>
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<td>STANDARDS FOR MATHEMATICAL CONTENT</td>
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<td>MP1 Make sense of problems and persevere in solving them.</td>
<td>(continued from previous page)</td>
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<tr>
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<td>MP2 Reason abstractly and quantitatively.</td>
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<td>MP3 Construct viable arguments and critique the reasoning of others.</td>
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<td>MP4 Model with mathematics.</td>
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<td>My Math</td>
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<td>• 11-1 Customary Units of Length</td>
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<td>• 11-2 Convert Customary Units of Length</td>
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<td>• 11-3 Customary Units of Capacity</td>
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<td>• 11-4 Convert Customary Units of Capacity</td>
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<td>• 11-5 Customary Units of Weight</td>
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<td>• 11-6 Convert Customary Units of Weight</td>
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<td>• 11-7 Convert Units of Time</td>
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<td>• 12-1 Metric units of Length</td>
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<td>• 12-3 Metric Units of Mass</td>
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<td>• 12-5 Convert Metric Units</td>
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<td>Ancient Giants of the Forest: Real-World Problem Solving Teacher Guide, pp. 3 and 21-22</td>
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</table>
**CLUSTER: Represent and interpret data**

**Big Idea:** Some questions can be answered by collecting and analyzing data, and the question to be answered determines the data that needs to be collected and how best to collect it. Data can be represented visually using tables, charts, and graphs. The type of data determines the best choice of visual representation.

**Enduring Understandings:** Line plots can be used to organize and represent data generated by measuring lengths, and the line plot can be used to answer certain questions about the data.

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<tr>
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</tr>
</thead>
</table>
| **4.MD.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. | **MP1** Make sense of problems and persevere in solving them. **MP2** Reason abstractly and quantitatively. **MP3** Construct viable arguments and critique the reasoning of others. **MP4** Model with mathematics. **MP5** Use appropriate tools strategically. **MP6** Attend to precision. **MP7** Look for and make use of structure. **MP8** Look for and express regularity in repeated reasoning. | **engageNY**  
- Module 5: Fraction Equivalence, Ordering, and Operations  
  https://www.engageny.org/ccls-math/4md4  
**Illustrative Mathematics**  
- Button Diameters  
  http://www.illustrativemathematics.org/illustrations/1039  
**NC Department of Public Instruction**  
- 4.MD.4 Task 1.doc, Reading Survey  
- 4.MD.4 Task 2.doc, How High Did It Bounce?  
- 4.MD.4 Task 3.doc, Measuring Strings  
  http://3-5cctask.ncdpi.wikispaces.net/4.MD.4 | **My Math** Assessment Masters  
- Ch. 11, pp. 263-284  
**My Math** Think Smart for the SBAC  
- Ch. 11 Test, p. 113  
- Ch. 11 Performance Tasks, p. 157  
**My Math** eAssessment  
- 11-8 Display Measurement Data in a Line Plot |
**CLUSTER: Geometric measurement:** understand concepts of angle and measure angles.  

**Big Idea:** Some attributes of objects are measurable and can be quantified using unit amounts.

**Enduring Understandings:** The measure of an angle depends upon the fraction of the circle cut off by its rays. The unit for measuring the size of the opening of an angle is 1 degree. Angle measure can be added or subtracted.

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</thead>
</table>
| 4.MD.5 Recognize angles as geometric shapes that are formed whenever two rays share a common endpoint. | **MP1** Make sense of problems and persevere in solving them.  
**MP2** Reason abstractly and quantitatively.  
**MP3** Construct viable arguments and critique the reasoning of others.  
**MP4** Model with mathematics.  
**MP5** Use appropriate tools strategically.  
**MP6** Attend to precision.  
**MP7** Look for and make use of structure.  
**MP8** Look for and express regularity in repeated reasoning. | **engageNY**  
- Module 4: Angle Measure and Plane Figures  
[https://www.engageny.org/ccls-math/4md5](https://www.engageny.org/ccls-math/4md5)  
**NC Department of Public Instruction**  
- 4.MD.5 Task 2.doc, Intersecting Roads  
[http://3-5cctask.ncdpi.wikispaces.net/4.MD.5-4.MD.7](http://3-5cctask.ncdpi.wikispaces.net/4.MD.5-4.MD.7)  
**My Math**  
- 14-3 Hands On: Model Angles | **My Math Assessment Masters**  
- Ch. 14, pp. 339-360  
**My Math Think Smart for the SBAC**  
- Ch. 14 Test, p. 131  
- Ch. 14 Performance Tasks, p. 163  
**My Math eAssessment** |
<table>
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<th>RESOURCES</th>
<th>ASSESSMENTS</th>
</tr>
</thead>
</table>
| 4.MD.5b An angle that turns through n one-degree angles is said to have an angle measure of 1\(\pi\) degrees. | MP1 Make sense of problems and persevere in solving them.  
MP2 Reason abstractly and quantitatively.  
MP3 Construct viable arguments and critique the reasoning of others.  
MP4 Model with mathematics.  
MP5 Use appropriate tools strategically.  
MP6 Attend to precision.  
MP7 Look for and make use of structure.  
MP8 Look for and express regularity in repeated reasoning. | engage™  
• Module 4: Angle Measure and Plane Figures  
https://www.engageny.org/ccls-math/4md5  
My Math  
• 14-4 Classify Angles | My Math Assessment Masters  
• Ch. 14, pp. 339-360  
My Math Think Smart for the SBAC  
• Ch. 14 Test, p. 131  
• Ch. 14 Performance Tasks, p. 163  
My Math eAssessment |
<table>
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<tr>
<td>4.MD.6 Measure angles in whole-number degrees using a protractor.</td>
<td>SP1 Engage NY: Module 4: Angle Measure and Plane Figures</td>
<td><strong>engageNY</strong>&lt;br&gt;• Module 4: Angle Measure and Plane Figures <a href="https://www.engageny.org/ccls-math/4md6">https://www.engageny.org/ccls-math/4md6</a></td>
<td><strong>My Math</strong> Assessment Masters&lt;br&gt;• Ch. 14, pp. 339-360</td>
</tr>
<tr>
<td>NC Department of Public Instruction</td>
<td><strong>My Math</strong>&lt;br&gt;• 4.MD.5 Task 2.doc, Intersecting Roads &lt;br&gt;• 4.MD.6 Task 2.doc, Making Shapes <a href="http://3-5cctask.ncdpi.wikispaces.net/4.MD.5-4.MD.7">http://3-5cctask.ncdpi.wikispaces.net/4.MD.5-4.MD.7</a></td>
<td><strong>My Math</strong></td>
<td><strong>My Math</strong> Think Smart for the SBAC&lt;br&gt;• Ch. 14 Test, p. 131 &lt;br&gt;• Ch. 14 Performance Tasks, p. 163</td>
</tr>
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<td><strong>My Math</strong></td>
<td><strong>My Math</strong> eAssessment</td>
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<tr>
<td>4.MD.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.</td>
<td>Make sense of problems and persevere in solving them. Reason abstractly and quantitatively. Construct viable arguments and critique the reasoning of others. Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and express regularity in repeated reasoning.</td>
<td>engageNY • Module 4: Angle Measure and Plane Figures <a href="https://www.engageny.org/ccls-math/4md7">https://www.engageny.org/ccls-math/4md7</a> Illustrative Mathematics • Finding an Unknown Angle <a href="http://www.illustrativemathematics.org/illustrations/1168">http://www.illustrativemathematics.org/illustrations/1168</a> NC Department of Public Instruction • 4.MD.7 Task 1.doc, Adding Up Angles • 4.MD.7 Task 2.doc, How Can We Split Angles? <a href="http://3-5cctask.ncdpi.wikispaces.net/4.MD.5-4.MD.7">http://3-5cctask.ncdpi.wikispaces.net/4.MD.5-4.MD.7</a> My Math • 14-7 Solve Problems with Angles</td>
<td><strong>My Math</strong> Assessment Masters • Ch. 14, pp. 339-360 <strong>My Math</strong> Think Smart for the SBAC • Ch. 14 Test, p. 131 • Ch. 14 Performance Tasks, p. 163 <strong>My Math</strong> eAssessment</td>
</tr>
</tbody>
</table>

**Domain Legend**

- ▲ **Major Cluster**: Areas of intensive focus, where students need fluent understanding and application of the core concepts (approximately 75%)
- ◊ **Supporting Cluster**: Rethinking & linking; some material is being covered, but in a way that applies core understandings (s/a approximately 25%)
- ◎ **Additional Cluster**: Expose students to other subjects, may not connect explicitly to the major work of the grade
<table>
<thead>
<tr>
<th><strong>ESSENTIAL QUESTIONS</strong></th>
<th><strong>LANGUAGE OBJECTIVES AND SUPPORTS</strong></th>
<th><strong>KEY VOCABULARY</strong></th>
</tr>
</thead>
</table>
| 1. How do I change one customary unit to another, one metric unit to another? | 1. Students will explain the patterns in converting from one customary unit of length to another, and one metric unit to another, by using subordinate conjunctions (when you change, whenever...). *(Teacher provides manipulatives and tools to support the exploration.)* | Area  
Capacity  
Centimeter  
(cm)  
Conversion  
Convert  
Cup (c)  
Customary system  
Decimals  
Decimeter  
Distance  
Fluid ounce (fl oz)  
Foot (ft)  
Fractions  
Gallon (gal)  
Gram (g)  
Hour  
Inch  
Kilogram (kg)  
Kilometer (km)  
Length  
Line plot  
Liquid volume  
Liter (L)  
Mass  
Measure  
Meter (m) |
| 2. How do I compare units of time? | 2. Students orally explain using targeted mathematical language and complex sentences how they read and compare time in different units. *(Teacher may refer students to math word wall for support.)* | Mile (mi)  
Milliliter (mL)  
Millimeter (mm)  
Minute  
Operations  
Ounce (oz)  
Perimeter  
Pint  
Pound (lb.)  
Protractor  
Quart (qt)  
Relative size  
Second (s)  
Straightedge  
Ton (T)  
Weight  
Yard (yd) |
| 3. How can I draw an angle and how are angles measured? | 3. Students orally explain their work in cooperative groups to draw and measure a range of angles. Students will ask clarifying questions of their peers as to how they represented measurement data using present and past tense verbs. *(Teachers may provide a variety of grouping structures to allow for various opportunities for language use.)* |  |
| 4. How can I add and subtract to find unknown angle measures? | 4. Students will restate a partner’s response to how they chose to find unknown angle measures using addition and subtraction by using paraphrasing expressions. *(Teachers may employ the talk moves during student discussions, allowing for wait time, restating, and recasting.)* |  |
| 5. How are decimals related to money? | 5. Students discuss the connection of the base ten system with money by using subordinate conjunctions (when you change, whenever...). *(Teacher provides manipulatives and tools to support the exploration.)* |  |
| 6. How can I make line plots to organize and represent data I have collected? | 6. Students will sequentially explain how to make a lie plot using targeted mathematical language and complex sentences. *(Teacher may refer students to math word wall for support.)* |  |
## DAILY/WEEKLY ROUTINES

- Linking body measures to units is one way of internalizing the units. Measure out the distance of at least ten meters. How many paces fit in a meter? Estimate and then pace out distances at school. How far is it from the classroom door to the auditorium? The cafeteria? The playground? *Math Matters*, (Chapin, Johnson, 2000), p. 184
- Many classroom routines involve collecting data and making graphs, e.g., In what month is your birthday?. Highlight the line plot during this domain. Ask students questions, and record the data on a line plot for discussion. *Math Matters*, (Chapin, Johnson, 2000), pp. 203-4

## LITERATURE CONNECTIONS

- Americans On the Move: Real-World Problem Solving Reader
- Ancient Giants of the Forest: Real-World Problem Solving Reader
- Solving the Pyramid Puzzle: Real-World Problem Solving Reader
- What is Recycling?: Real-World Problem Solving Reader

## DIFFERENTIATION

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<thead>
<tr>
<th>FRONT LOADING¹</th>
<th>ENRICHMENT²</th>
<th>INTERVENTION³</th>
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</thead>
<tbody>
<tr>
<td><strong>My Math</strong></td>
<td>About <em>Teaching Mathematics, 2nd Ed.</em> (Burns, 2000)</td>
<td>My Math</td>
</tr>
<tr>
<td>Each chapter includes: (at beginning of chapter)</td>
<td>• Pick's Theorem, p. 98</td>
<td>Each lesson includes:</td>
</tr>
<tr>
<td>- My Math Words</td>
<td>Inside <em>Mathematics</em></td>
<td>Approaching Level Hands-On Activity</td>
</tr>
<tr>
<td>- My Vocabulary Cards</td>
<td>• Surrounded and Covered, Level D</td>
<td>(found after Practice &amp; Apply)</td>
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<tr>
<td><strong>Each lesson includes: (at beginning of lesson)</strong></td>
<td>NC Department of Public Instruction</td>
<td>• Tier 2 Strategic Intervention, Ch. 11, p. 722A</td>
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<tr>
<td>- ELL Instructional Strategy</td>
<td>• 4.MD.3 Task 4.doc</td>
<td>• Tier 2 Strategic Intervention, Ch. 12, p. 794A</td>
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<td><a href="http://3-5ctask.ncdpi.wikispaces.net/4.MD.1-4.MD.3">http://3-5ctask.ncdpi.wikispaces.net/4.MD.1-4.MD.3</a></td>
<td>• Tier 2 Strategic Intervention, Ch. 13, p. 838A</td>
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<tr>
<td></td>
<td>My Math</td>
<td>• Tier 2 Strategic Intervention, Ch. 14, p. 918A</td>
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<tr>
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<td>Each lesson includes:</td>
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<td>• Beyond Level Hands-On Activity (found after Practice &amp; Apply)</td>
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Key:

¹ Front Loading refers to materials that can be used before the lesson begins to prepare students for success, which may be helpful for English learners, standard English learners, students with disabilities or low achieving students.

² Enrichment refers to materials that can be used with students who are ready to have their thinking extended, which may be helpful for gifted and talented and high achieving students, or any students who are ready for more depth and complexity.
Intervention refers to materials that can be used after the lessons with students who are needing additional positive experiences with the mathematics, low achieving students who would benefit from another approach, or students who have gaps in their knowledge.

DOMAIN: Geometry

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

Big Idea: Two-dimensional objects can be described, classified, and analyzed by their attributes.

Enduring Understandings: Point, line, and plane are the core attributes of space objects, and real-world situations can be used to think about these attributes. Line segments and rays are sets of points that describe parts of lines, shapes and solids. Angles are formed by two intersecting lines or by rays with a common endpoint and are classified by size. Two-dimensional or plane shapes have many properties that make them different from one another. Polygons can be described and classified by their sides and angles. Some shapes can be reflected across one or more lines passing through the shape so the shape folds onto itself exactly.

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<th>FORMATIVE ASSESSMENT</th>
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<td><strong>4.G.1</strong></td>
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<td>Read, draw, and identify points, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.</td>
<td>MP1 Make sense of problems and persevere in solving them.</td>
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<td><strong>MP1</strong></td>
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<tr>
<td>Reason abstractly and quantitatively.</td>
<td>MP2 Reason abstractly and quantitatively.</td>
<td><strong>50 Problem Solving Lessons</strong> (Burns, 1996)</td>
<td><strong>My Math</strong> Assessment Masters&lt;br&gt;• Ch. 14, pp. 339-360</td>
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<tr>
<td>MP3 Construct viable arguments and critique the reasoning of others.</td>
<td>MP4 Model with mathematics.</td>
<td><strong>About Teaching Mathematics, 2nd Ed.</strong> (Burns, 2000)</td>
<td><strong>My Math</strong> Think Smart for the SBAC&lt;br&gt;• Ch. 14 Test, p. 131&lt;br&gt;• Ch. 14 Performance Task, p. 163</td>
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<td><strong>MP5</strong></td>
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<td>Use appropriate tools strategically.</td>
<td><strong>MP6</strong></td>
<td><strong>Common Core Georgia Performance Standards</strong></td>
<td><strong>My Math</strong> eAssessment&lt;br&gt;<a href="http://connectED.mcgraw-hill.com">http://connectED.mcgraw-hill.com</a></td>
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<td><strong>MP7</strong></td>
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<td>Look for and make use of structure.</td>
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<td><strong>50 Problem Solving Lessons</strong> (Burns, 1996)</td>
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<td>• The Largest Square Problem, p. 105</td>
<td><strong>Common Core Georgia Performance Standards</strong></td>
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<td>• Explorations Using the Geoboard, p. 95 (#1-6)</td>
<td><strong>Common Core Georgia Performance Standards</strong></td>
<td><strong>About Teaching Mathematics, 2nd Ed.</strong> (Burns, 2000)</td>
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<td>• <a href="http://ccgpsmathematicsck-5.wikispaces.com/K-5+Formative+Assessment+Lessons+%28FALs%29">http://ccgpsmathematicsck-5.wikispaces.com/K-5+Formative+Assessment+Lessons+%28FALs%29</a></td>
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<td>• Module 4: Angle Measure and Plane Figures</td>
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<td>• The Geometry of Letters</td>
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<td><strong>Math Matters K-6: Understanding the Math You Teach</strong> (Chapin &amp; Johnson, 2000)</td>
<td><strong>Common Core Georgia Performance Standards</strong></td>
<td><strong>Common Core Georgia Performance Standards</strong></td>
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<tr>
<td>• Points of Intersection, pp.149-151</td>
<td><strong>Common Core Georgia Performance Standards</strong></td>
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<td>• 14-1 Draw Points, Lines, and Rays</td>
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<td><strong>Common Core Georgia Performance Standards</strong></td>
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<td>• 14-2 Draw Parallel and Perpendicular Lines</td>
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<td>• 14-11 Problem-Solving Investigation: Make a Model</td>
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<tr>
<td>STANDARDS FOR MATHEMATICAL CONTENT</td>
<td>STANDARDS FOR MATHEMATICAL PRACTICE</td>
<td>RESOURCES</td>
<td>FORMATIVE ASSESSMENT</td>
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</tbody>
</table>
| 4.G.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 | MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. | About Teaching Mathematics, 2nd Ed. (Burns, 2000)  
- Explorations Using the Geoboard, p. 95 | My Math Assessment Masters  
- Ch. 14, pp. 339-360 |
| Common Core Georgia Performance Standards | | | My Math Think Smart for the SBAC  
- Ch. 14 Test, p. 131  
- Ch. 14 Performance Task, p. 163 |
|  | | Common Core Georgia Performance Standards  
- Angle Sort (Unit 6)  
- [http://ccgpsmathematics-k-5.wikispaces.com/K-5+Formative+Assessment+Lessons+%28FALs%29](http://ccgpsmathematics-k-5.wikispaces.com/K-5+Formative+Assessment+Lessons+%28FALs%29) | My Math eAssessment  
[http://connectED.mcgraw-hill.com](http://connectED.mcgraw-hill.com) |
| | | | [http://www.engageNY.org/ccss-math/4g2](http://www.engageNY.org/ccss-math/4g2) |
| | | | [http://www.illustrativemathematics.org/illustrations/1273](http://www.illustrativemathematics.org/illustrations/1273) |
| | | | Math Matters K-6: Understanding the Math You Teach (Chapin & Johnson, 2000)  
- Properties of Quadrilaterals, p. 156-159 |
| | | | My Math  
- 14-8 Triangles  
- 14-9 Quadrilaterals |
<table>
<thead>
<tr>
<th>STANDARDS FOR MATHEMATICAL CONTENT</th>
<th>STANDARDS FOR MATHEMATICAL PRACTICE</th>
<th>RESOURCES</th>
<th>FORMATIVE ASSESSMENT</th>
</tr>
</thead>
</table>
| 4.G.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. | MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. | **Common Core Georgia Performance Standards**  
- Angle Sort (Unit 6)  
- [http://ccgpsmathematicsk-5.wikispaces.com/K-5+Formative+Assessment+Lessons+%28FALs%29](http://ccgpsmathematicsk-5.wikispaces.com/K-5+Formative+Assessment+Lessons+%28FALs%29)  
**Illustrative Mathematics**  
- Lines of Symmetry for Triangles  
- [http://www.illustrativemathematics.org/illustrations/1058](http://www.illustrativemathematics.org/illustrations/1058)  
- Lines of Symmetry for Quadrilaterals  
- Lines of Symmetry for Circles  
- [http://www.illustrativemathematics.org/illustrations/1060](http://www.illustrativemathematics.org/illustrations/1060)  
- Finding Lines of Symmetry  
- [http://www.illustrativemathematics.org/illustrations/676](http://www.illustrativemathematics.org/illustrations/676)  
**engageNY**  
- Module 4: Angle Measure and Plane Figures  
- [https://www.engageny.org/ccls-math/4g3](https://www.engageny.org/ccls-math/4g3)  
**Inside Mathematics**  
- Symmetrical Patterns  
- Problem of the Month: The Shape of Things (Level B)  
**Math Matters K-6: Understanding the Math You Teach** (Chapin & Johnson, 2000)  
- Alphabet Symmetry, p.166  
**My Math**  
- 14-10 Draw Lines of Symmetry | My Math Assessment Masters  
- Ch. 14, pp. 339-360  
My Math Think Smart for the SBAC  
- Ch. 14 Test, p. 131  
- Ch. 14 Performance Task, p. 163  
My Math eAssessment  
- [http://connectED.mcgraw-hill.com](http://connectED.mcgraw-hill.com) |
## ADDITIONAL SUPPORT

<table>
<thead>
<tr>
<th>ESSENTIAL QUESTIONS</th>
<th>LANGUAGE SUPPORTS AND OBJECTIVES</th>
<th>KEY VOCABULARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How can lines, angles, and shapes be described, analyzed, and classified?</td>
<td>Students will orally explain using transitional phrases and domain specific vocabulary the steps in describing, analyzing and classifying lines, angles and shapes. <em>(Teacher may provide sentence stems to support explanation.)</em></td>
<td>Acute angle, Polygon</td>
</tr>
<tr>
<td>2. How can I draw an angle?</td>
<td>Students will explain how to draw an angle by using subordinate conjunctions (when you change, whenever...). <em>(Teacher provides manipulatives and tools to support the exploration.)</em></td>
<td>Acute triangle, Quadrilateral</td>
</tr>
<tr>
<td>3. How can I classify triangles?</td>
<td>Students will orally explain how they classified triangles by using conjunctions (because) and auxiliary verbs (may, might, should, could, would). <em>(Teacher encourages multiple representations.)</em></td>
<td>Angle, Ray</td>
</tr>
<tr>
<td>4. What is a line of symmetry?</td>
<td>Students will define lines of symmetry by using complex sentences, comparatives, and superlatives. <em>(Teacher provides manipulatives and time for exploration.)</em></td>
<td>Degree, Rectangle</td>
</tr>
<tr>
<td>5. How can I create symmetrical figures?</td>
<td>Students will restate a partner’s response to how they created a symmetrical figure by using paraphrasing expressions. <em>(Teachers may employ the talk moves during student discussions, allowing for wait time, restating, and recasting.)</em></td>
<td>End point, Rhombus</td>
</tr>
</tbody>
</table>

California Additions to the content standards appear in **bold.**
### DAILY/WEEKLY ROUTINES

- Many new vocabulary words are introduced in this topic. Give students repeated oral language practice to ensure that the terms are understood, such as card games. “I have, Who has?” Geometry Card Activity.  
  

- Spatial sense is the recognition and interpretation of two- and three-dimensional figures in space, and has two components, special visualization and spatial orientation. Looking at artwork is one way to improve this sense. The artist M.C. Escher is known for tessellations, repeating a single pattern. Consider using artwork in the classroom as an opportunity for discussion of the geometric figures and how they are related. *Math Matters K-6: Understanding the Math You Teach* (Chapin & Johnson, 2000), pp. 161-3

### LITERATURE CONNECTIONS

- Grandfather Tang’s Story by Ann Tompert
- The Greedy Triangle by Marilyn Burns

### DIFFERENTIATION

#### FRONT LOADING

<table>
<thead>
<tr>
<th>My Math</th>
<th>Each chapter includes: (at beginning of chapter)</th>
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<tbody>
<tr>
<td></td>
<td>• My Math Words</td>
</tr>
<tr>
<td></td>
<td>• My Vocabulary Cards</td>
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<td></td>
<td>• My Foldables</td>
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</table>

<table>
<thead>
<tr>
<th>My Math</th>
<th>Each lesson includes: (at beginning of lesson)</th>
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<tbody>
<tr>
<td></td>
<td>• ELL Instructional Strategy</td>
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#### ENRICHMENT

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<th>My Math</th>
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<td>• Beyond Level Hands-On Activity (found after Practice &amp; Apply)</td>
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#### INTERVENTION

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<th>My Math</th>
<th>Each lesson includes:</th>
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<td>• Approaching Level Hands-On Activity (found after Practice &amp; Apply)</td>
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</tbody>
</table>

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<tr>
<th>Each formative assessment includes:</th>
</tr>
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<tr>
<td>• Tier 2 Strategic Intervention, Ch. 14, p. 918A</td>
</tr>
</tbody>
</table>

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1. Front Loading refers to materials that can be used before the lesson begins to prepare students for success, which may be helpful for English learners, standard English learners, students with disabilities or low achieving students.

2. Enrichment refers to materials that can be used with students who are ready to have their thinking extended, which may be helpful for gifted and talented and high achieving students, or any students who are ready for more depth and complexity.

3. Intervention refers to materials that can be used after the lessons with students who are needing additional positive experiences with the mathematics, low achieving students who would benefit from another approach, or students who have gaps in their knowledge.

For more information on Differentiation, please refer to: The California Framework, Universal Access section:

The purpose of the First 10 Days is to establish math routines and expectations that will prepare students for the Common Core classroom. As students transition into CCSS, time is needed to establish these mathematical practices. This document includes classroom routines, expectations, and math tools that encourage the Standards for Mathematical Practice. It also provides lessons that allow students to develop number sense concepts within the structure of the CCSS Math Practices. Included in this document are the following:

- Fluency: Number Talks *(Days 2-10)*
- Three Phase Problem-Solving Structure: Daily Task (Days 1-10)
- Non-Verbal Signals (Days 2-10)
- Listening and Speaking Expectations (Days 1-10)
- Talk Moves for Mathematical Discussions (Days 1-10)
- Expectations for Partner Games, Small Groups & Rotations and Independent Work Time

*In this document, the Three-Phase Problem-Solving Structure and Number Talks develop the routine of classroom conversations. Authors/researchers, Fosnot and Dolk (2002), state that the purpose of the class conversation is to support and direct the development of mathematicians in the classroom learning community, rather than fixing mistakes in the children’s work. This conversation enables the teacher to focus the students on reasoning about a few big mathematical ideas derived from the mathematical thinking present in students’ solutions. It focuses whole class discussion on two or three, strategically selected, student solutions in order to develop every student’s mathematical learning.

The goals of the classroom conversations are to provide opportunities for students to (Smith, 2011):
- Share ideas and clarify misunderstandings
- Develop convincing arguments regarding why and how things work
- Develop a language for expressing mathematical ideas
- Learn to see things from other people’s perspective

“…the power of Number Talks comes from inspiring each child to think and make sense of the mathematics they are presented. They are never trying to figure out what the teacher wants. Rather they are totally engaged in their own sense making process…Number Talk is an opportunity for children to learn that they can figure things out for themselves in a way that makes sense to them… children can begin to apply what they are learning in lessons and try out ideas they may be pondering.”

Source: “What is the distinction between a Lesson and a Number Talk,” by Kathy Richardson
Establishing the Daily Math Routine

Number Talk. Problem-Solving. Independent Work Time. Establishing a daily math routine that is flexible and can be adapted to a wide range of tasks is essential for efficient mathematics teaching. It is important for students to understand each phase of the daily routine and expectations for work and behavior.

The daily math routine begins with a Number Talk to help students develop and discuss strategies to build computational fluency and number sense, leading to accuracy, efficiency and flexibility. Accuracy is the ability to produce an accurate answer. Efficiency is the ability to choose an appropriate, expedient strategy for a specific computation problem. And flexibility is the ability to use number relationships with ease in computation.

The three-phase Problem Solving structure (Before, During, and After, see Appendix) outlined in this document can serve two purposes: it can be utilized for both direct instruction and an inquiry lesson model. The three phase Problem Solving structure supports the introduction of a new skill/concept or clarifies and practices an emerging skill, through a rigorous math task. Teaching mathematics with problem-based tasks is student centered rather than teacher centered. It begins with and builds on the ideas that children have available. It is a process that requires faith in children, a belief that all children can create meaningful ideas about mathematics.

In the Before Phase, the teacher sets up the task with the whole group and makes sure that the students understand the problem or task. The teacher also sets up expectations, such as requiring students to explain their thinking in more than one way, rather than simply giving an answer. Behind the scenes, the teacher has solved the task in a variety of ways to anticipate student misconceptions, and has scripted questions to clarify, assess and advance learning.

The During Phase is independent/partner/small group work time to solve the task. As students complete the tasks they can use various resources and manipulatives of their choosing. Students will benefit from completing tasks that are open ended or where there is more than one solution path. It is important to allow students to use a variety of strategies to complete the task. The teacher may monitor group work by asking questions and actively listening to what students say as they reveal how they think, what they know, and how they are approaching the task.

In the After Phase, also called “Share, Discuss and Analyze,” students debrief their work and learning collaboratively. Student work samples are strategically shared and the teacher facilitates a discussion that ties student learning to the big mathematical ideas. The teacher asks students preplanned questions that require students to extend their understanding of the concept. A useful routine in this phase begins with the teacher displaying a student work sample on the document reader while inviting the class to make sense of the work displayed. Students are provided a minute of private think time and then an additional two minutes to discuss with an elbow partner. The teacher may ask students to explain the strategies they believe the student used to solve the problem. The teacher may display a second sample.
and ask students to think about how this work sample is the same, yet different from the prior sample. Again one minute of private think time is provided followed by an additional 2 minutes of partner or small group talk. This routine addresses Math Practice Standard 3, “Construct viable arguments and critique the reasoning of others.”

Also important is the need to address misconceptions and errors that students may have about a skill or concept. The teacher may choose to display a work sample with a misconception or error without commenting on the validity of the response. Establishing a safe environment where all students learn from each other’s mistakes is a key component. Students are asked to examine the work sample. Students think individually and then discuss with a partner. As they ask questions of each other, misconceptions or errors are surfaced. Wrong answers can be very useful as students make their own determinations of what is incorrect, and collectively determine how to correct the work.

It is often difficult for students to put their thoughts into words, because this requires metacognition and vocabulary development. Understanding and communicating HOW a problem was solved is often challenging but enormously worthwhile. The use of multiple representations helps students communicate their thinking visually (MP4), quantitatively (MP2) and with precision (MP6). It is also helps incorporate various learning styles into the daily math routine.

On the first day this routine is discussed, outlined and charted for the students in a whole group discussion.

<table>
<thead>
<tr>
<th>Before: Set Up</th>
<th>During: Explore</th>
<th>After: Share, Discuss and Analyze</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole group</td>
<td>Students work individually, with partners or with small groups</td>
<td>Whole group</td>
</tr>
<tr>
<td>Teacher led (rigorous task selected, misconceptions noted, questions written)</td>
<td>Teacher works with small groups or facilitates a task</td>
<td>Student led / Teacher facilitated Teacher strategically selects 3-4 solutions to be shared</td>
</tr>
<tr>
<td>Pose a question to explore a new concept or practice a skill</td>
<td>Students work on a math task or problem</td>
<td>Students and teacher ask questions to make sense of other’s work</td>
</tr>
</tbody>
</table>
Independent Work Time is the third component of the daily math routine, providing opportunity for students to practice their emerging math skills while the teacher differentiates instruction in small groups. Establishing independent and group work norms is a critical component of a successful Independent Work Time. Different factors will contribute to how well a class can work together in groups. It can be beneficial to assign each group member a specific role (materials getter, recorder, parliamentarian, etc.). Assigning roles helps to hold all students accountable. Groups should be flexible and reorganized regularly in an effort to meet the changing needs of students as they develop.

The First 10 Days does not stop at the end of the ten days. Using the First 10 Days to establish these routines will create a Common Core Classroom to last all year long. The following is a day-by-day guide.
Grades 3-5: The First 10 Days  
Launching Mathematics in the Common Core Classroom

**Day 1 Objectives:** Set the stage for problem-solving, including introducing: problem-solving notebook, listening and speaking expectations, a math talk move, and the Share, Discuss and Analyze phase.

<table>
<thead>
<tr>
<th>Introduce Problem-Solving:</th>
<th>To establish expectations for behaviors in a problem solving math classroom</th>
</tr>
</thead>
</table>
| • Present a problem to students from any source, for example: Suppose you pick three number cards, 5, 7, 8. You use the cards to make the greatest 3-digit number. What number is it? Give an explanation of how you found your answer.  
• Allow the children to discuss  
• Say: “Let’s think about what we have to do to solve this problem. Let’s share out.” | Materials:  
* Chart paper  
* Markers |

Together as a classroom, create a Problem-Solving Chart before distributing the problem-solving notebook and manipulatives. Discuss and write expectations and behaviors for problem-solving on the chart (here are some possible suggestions):
- Have a positive attitude (I can do this!)
- Keep trying and don’t give up!
- Use good problem-solving strategies
- Work together, but do your own thinking
- Explain your thinking
- Safe environment (what does that look like, sound like, feel like?)

<table>
<thead>
<tr>
<th>Introduce Problem-Solving Notebook:</th>
<th>To set expectations for drawing/writing in the problem solving math notebook</th>
</tr>
</thead>
</table>
| • Give each student a problem-solving notebook.  
• Have manipulatives readily available to use for counting (number lines, base ten blocks, snap cubes, pattern blocks, color tiles, etc.) For classroom management purposes you may want manipulatives in bins in an assigned area of your classroom. Discuss appropriate manipulatives use with your students.  
• Decide how to record the problem in the problem-solving notebook before solving it. Ideas include: copying the question on mailing stickers that can be peeled off and placed in the notebook, copying the question on half-sheets and gluing, students write question. Allow students time to draw and write their responses to the math problem in their problem-solving notebook.  
• Students will share their responses in Share, Discuss and Analyze (see next page.) | To establish appropriate manipulatives use and to allow students to strategically choose them for problem solving |
|-------------------------------------|--------------------------------------------------------------------------|
|Materials:  
* Problem Solving Notebook  
* Manipulatives |
Grades 3-5: The First 10 Days
Launching Mathematics in the Common Core Classroom

<table>
<thead>
<tr>
<th>Day 1</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Introduce the Speaking and Listening Expectations:</strong></td>
<td></td>
</tr>
<tr>
<td>• Talk with the students about the actions of a good listener. Say: “What does a good listener do?” (A good listener listens with the intent to understand. They look at the person talking and visualize or picture in their head what the speaker said.)</td>
<td>To set expectations for shared thinking when engaged in academic conversations around mathematics</td>
</tr>
<tr>
<td><strong>Talk Moves for Teacher Background Only:</strong></td>
<td>Materials:</td>
</tr>
</tbody>
</table>
| In order to orchestrate productive discussions in the classroom, teachers need a set of moves that will help them lead whole-class discussions in which students share their thinking with one another in respectful and academically productive ways. Although there are many moves that teachers can use to lead productive classroom discussions, this document will only focus on five: (1) **revoicing** (2) asking students to restate someone else’s reasoning, (3) asking students to apply their own reasoning to someone else’s reasoning, (4) prompting students for further participation, and (5) using wait time. | * Problem Solving Notebook  
* Manipulatives  
* Optional book, Classroom Discussions, by Chapin and O’Connor, for reference |
| **Talk Move #1: Revoicing** | Revoicing: |
| Model revocing (Teacher repeats all or part of exactly what a student has said, as students share; the teacher can also prompt a student to revoice.) | Student contributions are often difficult to hear and sometimes difficult to understand. Yet, all students need to have access to what a student has said if they are expected to think about and comment on it. For this reason, repeating part or all of a student’s response is often a worthwhile move for teachers. |
|   |   |
|   |   |
|   |   |
| **Share, Discuss and Analyze Teacher Background Only** |   |
| Classroom conversations support learning from each other. Students share their strategies, and listen to the strategies of others. They reinforce their own skills by explaining how they solved a problem and they learn new ways of problem solving by listening to other students explain their thinking. They can safely work through mistakes and misconceptions by talking with their peers. At the beginning of the year, this sharing may take place in a big circle or with students at their seats and one student sharing at the document camera just so everyone can see each other and their student work. The idea is to build a community of learners, where the thoughts of students are shared and honored. In Kindergarten through grade 2, this is called “Mathematician’s Turn” in the First 10 Days of School. The teacher will lead the sharing by strategically picking the work to be shared. |   |
| **Introduce the Share, Discuss and Analyze Phase:** |   |
| The purpose of the Share, Discuss and Analyze Phase is to provide a public forum where students will share, discuss, and provide feedback to one another. Students will share their solutions from the problem. Strategically select 3-4 student samples with different solutions (i.e. a drawing, an equation, or using manipulatives). Have students share their solutions one at a time while the other students listen, or anonymously share. |   |
### Day 2 Objectives
To introduce Number Talks and non-verbal signals, continue setting up listening and speaking expectations, problem-solving and the Share, Discuss and Analyze phase.

<table>
<thead>
<tr>
<th><strong>Number Talks-for Teacher Background only:</strong></th>
<th><strong>A number talk is a powerful tool for helping students develop computational fluency and number sense because the expectation is that they will use number relationships and the structures of numbers to add, subtract, multiply, and divide.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A Number Talk is a short, ongoing daily routine that provides students with meaningful practice with computation. Classroom conversations and discussions around purposefully crafted computation problems are at the very core of number talks. These are opportunities for the class to come together to share their mathematical thinking and develop efficient, flexible, and accurate computation strategies that build upon the key foundational ideas of mathematics such as composition and decomposition of numbers, our base ten system, and the application of properties of operations.</td>
<td><strong>Number Talks allow students to make connections and find relationships and patterns.</strong></td>
</tr>
<tr>
<td><strong>Introduce Number Talks:</strong></td>
<td><strong>The conversation is the focus of the Number Talks, and the teacher takes on the role of facilitator.</strong></td>
</tr>
<tr>
<td>Tell the students that we are going to be doing a Number Talk. They are to be thinking in their heads, and trying to figure out the answer to a problem. Tell them that they should be ready to share how they figured out the number. All number talks follow a basic six-step format.</td>
<td>The teacher is not the ultimate authority in Number Talks. Students are clarifying their thinking with each other.</td>
</tr>
<tr>
<td>1. <strong>Teacher presents the problem:</strong> Problems are presented in many different ways: a word problem, number lines, dot cards, models. You can show problems on a document camera or write on the board. Present today’s problems on the board: <strong>Insert problems, see Appendix for examples</strong></td>
<td>Mental computation is a key component of number talks, encouraging students to build on number relationships to solve problems instead of only relying on memorized procedures.</td>
</tr>
<tr>
<td>2. <strong>Students figure out the answer.</strong> Give time to figure out the answer. To make sure the students have the time they need, ask them to give a “thumbs-up in front of chest” when they have determined their answer.</td>
<td></td>
</tr>
<tr>
<td>3. <strong>Students share their answers. Teacher:</strong> &quot;At the count of three, whisper your answer.&quot; Or some students share individually with the teacher recording the answers without judgment.</td>
<td></td>
</tr>
<tr>
<td>4. <strong>Students share their thinking.</strong> Have students think-pair-share before they share out their thinking. Have three or four students explain their thinking to the class.</td>
<td></td>
</tr>
<tr>
<td>5. <strong>The class agrees on the “real” answer for the problem.</strong> The answer that the class together determined is the right answer is presented as one would the results of an experiment. The answer a student comes up with initially is considered a conjecture. Models and explanations may help students see where their thinking went wrong, identify a step they left out, or clarify a point of confusion.</td>
<td></td>
</tr>
<tr>
<td>6. <strong>The steps are repeated for additional problems.</strong> Thank the students for their participation in the Number Talk.</td>
<td></td>
</tr>
</tbody>
</table>
**Introduce Non-Verbal Signals:**
Establish non-verbal signals that will support productive math discussions. These signals also support effective classroom management. Teach students the following signals:
- **Agree:** Thumbs up held away from body
- **Disagree:** “Safe” sign in baseball: palms flat and down, in a crossing motion in front of the chest
- **I don’t know:** hand over head, palm flat and facing floor, moves back and forth
- **Thinking:** fist in front of chest
- **I have an answer:** thumbs up in front of chest
- **I have another way of getting the answer:** finger up in front of chest (can show additional finger for each way)

**Listening and Speaking Expectations:**
Make a poster (chart paper) of a Good Listener and Not a Good Listener. Use student suggestions.

**Problem Solving:**
- Review the behaviors/expectations from the Problem-Solving Chart (from Day 1.)
- Present and discuss today’s math problem, selected from any resource
- Allow children time to draw and write their responses to the problem in their problem-solving notebook.
- The focus should be on “How can you show your answer?”
- Have manipulatives available and encourage students to use them to solve the problem.
- (Students can share during Share, Discuss and Analyze.)

**Share, Discuss and Analyze Phase:**
- During Share, Discuss and Analyze, ask the students how they found their answer. It’s important to point out the variety of solutions, especially students that used multiple methods.
- Ask students which manipulatives they used and how they used them to solve the problem.
- Model Talk Move #1: Revoicing

---

**Materials:**
- * Chart Paper
- * Markers
- * Problem-Solving Chart
- * Problem Solving Notebook

**To set expectations for:**
- classroom management during mathematics discussions
- shared thinking when engaged in academic conversations around mathematics
- to encourage students to learn to share and discuss during math
- to continue to set expectations for writing in the problem solving math notebook
**Grades 3-5: The First 10 Days**  
Launching Mathematics in the Common Core Classroom

<table>
<thead>
<tr>
<th>Day 3 Objectives: Review non-verbal signals, listening and speaking expectations, and do a Number Talk. Introduce a new talk move, continue with daily problem-solving, practice sharing solutions and introduce partner math games.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review Non-Verbal Signals:</strong> ([see Day 2])</td>
</tr>
</tbody>
</table>
| **Listening and Speaking Expectations:**  
Review the Good Listener and Not a Good Listener poster from Day 2. |
| **Number Talk:** ([Model Talk Move #1, Revoicing, & Non-verbal Signals])  
Follow the same 6 steps as outlined in Day 2 (Math Talks). Write today’s problem on the board: |
| **Teacher:** Think about how to solve this problem. Put your fist on your chest like this (show). When you have one way of getting the answer, put up your thumb, like this (model). When you have a second way of getting the answer, put up a finger, like this (model). I’ll ask you to tell me the answer when most people are ready. Now I’m giving you think time.  
Based on the problem, a variety of strategies might be used, including:  
* Adding by place value  
* Incremental adding (by tens and ones)  
* Composing and decomposing (making a “friendly” number) |
| **Introduce Talk Move #2: Restating**  
Model asking students to restate someone else’s reasoning. Instead of revoicing a student’s idea in the exact same words, you can ask another student to restate in his or her own words, what the first student has just said. |
| **Problem-Solving:**  
Review Problem-Solving Chart for behaviors/expectations. Present and discuss today’s math problem, selected from enVision MATH 1-3:  
**Insert Problem**  
- Allow students time to draw and write their responses to the problem in their problem-solving notebook.  
- The focus should be on “How can you show your answer?”  
- Have manipulatives available and encourage students to use them to solve the problem.  
This is an open-ended problem with multiple solutions. Ask students to show different ways to solve the problem. Students might use visual representations, equations, models, etc. (Students share responses during Share, Discuss and Analyze.) |

**Materials:**  
*Listener/Not a Good Listener poster  
To continue to understand the concept and encourage the use of Number Talks  
Number Talks can take many forms. During a Number Talk, the teacher writes a problem on the board, horizontally, and gives the students time to solve the problem mentally. The focus is “How did you get your answer?”  
Restating: A student’s restating of another student’s contribution marks the contribution as being especially important and worth emphasizing. It signals to the author that his or her idea is being taken seriously.  
To continue drawing and writing about math using precise vocabulary and establish shared expectations for math problem-solving notebooks

Los Angeles Unified • Grades 3-5: First 10 Days of School • Adapted from Carroll County, MD
### Day 3

**Share, Discuss and Analyze:** (Model Talk Move #2, Restating, & Non-Verbal Signals)
- During Share, Discuss and Analyze, ask the students how they found their answer to the problem. Encourage them to explain their thinking process and reasoning. Ask several students to share their solutions. Remember to strategically select a variety of problem solving methods.

**Introduce a Partner Math Game:**
Show how to play a math game and model appropriate vs. inappropriate use of the math tools involved. Begin a class chart titled “Independent Work Time (IWT) Expectations” to record responsibilities and expectations for partner math games and work time.
- What will the games look like?
- What will the game sound like?
- Where will the games take place?
- What will be the role of each partner during the game?
- What are the expectations for clean up?

Possible math games:
- Textbook center games
- Exploration with manipulatives
- Additional resources materials from the Curriculum Map

After game is played for about 5 minutes, stop and facilitate a class self-assessment of expectations. What went well? What do we need to work on? What were the tools used during the game? What tools were appropriate to use and/or not appropriate to use? Game play should continue after self-assessment in order for pairs to work toward meeting classroom expectations.

**Materials:**
- Problem-Solving Chart
- Problem-Solving Notebook
- Manipulatives

Mistakes play a part in developing math thinking, as they call for questioning and discussion. Help the students realize that mistakes are important for our learning, and celebrate the opportunities!

To begin to establish expectations for independent games and activities

**Materials:**
- Math Games
- Manipulatives
- Chart Paper

Possible norms for charting:
- Be Your Own Problem-Solver
- Ask 3 Before Me
- Use a 6-inch Voice
- Take Turns
- Clean Up
- Make Wise Choices
## Day 4 Objectives
To review non-verbal signals, listening and speaking expectations, practice a Number Talk, introduce a new talk move, continue with daily problem solving and sharing solutions and a new partner math game.

### Number Talk: (Model Talk Move #2, Restating, & Non-Verbal Signals)
Follow the same 6 steps as outlined in Day 2 (Number Talk). Introduce today’s problems on board:
- Insert problem

Based on the problem, a variety of strategies may include:
- Adding up (from smaller number to larger number
- Incremental subtracting
- Subtracting by place value, tens/ones:

Remind the students that they should be ready to share their strategies with the class. Model Non-Verbal Signals. Give think time.

When most students indicate that they are ready through their hand signal, then call on four or five students to share their sum. Teacher neutrally records responses on the board.

Ask for students to share their strategies and justifications with the class. Encourage the class to use hand signals to agree/disagree, and explain why. Thank the children for participating.

### Problem-Solving: (Model Talk Move #2, Restating, & Non-Verbal Signals)
Tell the students: “Today we are going to introduce a tool to help us with problem-solving. It’s called a bar diagram. This is a tool we can use throughout the school year. One of our jobs as mathematicians is to build a toolbox of tools, or strategies, that we can use to help ourselves. When we share our tools or strategies that we use for problem-solving, we help each other understand math. And that’s one of the most important things about math, that it makes sense! And that it’s fun!”

Bar diagrams help students understand relationships between the quantities in the problem, and this helps students choose a correct operation to solve the problem. Present and discuss today’s math problem:
- Insert Problem that can be represented with a bar diagram
- Ask the students, “How might we use this bar diagram to help us solve this problem?”
- Discuss strategies and then have the students solve the problem in their problem-solving notebooks. (Students discuss solutions during Share, Discuss and Analyze.)

To continue to understand the concept and encourage the use of Number Talks

To establish the concept of a tool box for problem-solving throughout the year

Difficulty getting started?
Ask questions: What is the problem asking us to find out? What do you know? Without giving away the answer, how are you thinking about solving the problem?

Materials:
- Problem-Solving Notebook
- Bar Diagram
### Review Listening and Speaking Expectations

**Share, Discuss and Analyze:** *(Model Talk Move #2, Restating, & Non-Verbal Signals)*

During Share, Discuss and Analyze, ask the students how they found their answer to the problem. Encourage them to explain their thinking process and reasoning. Ask several students to share their solutions. Reminder to strategically select a variety of problem solving methods.

**Practice New Partner Math Game:**

Revisit the math game from Day 3. Remind students about the game procedures and expectations. Review “IWT Expectations Chart” on expectations for partner math games.

- Debrief “what is going well” vs. “what needs to be better” in relation to math games expectations. What were the tools used during the game? What tools were appropriate to use and/or not appropriate to use?

Add to the IWT Chart:

**Independent Work Time Expectations**

- Do not take the work to your teacher
- Do not interrupt the teacher if she is working with a small group

Explain to the class that during work time the teacher may be doing several different things: listening to the different groups discuss their math thinking, asking questions to prompt further work or explanation, meeting with small groups on a specific skill, or meeting with individual students.

To establish expectations for independent games and activities

**Materials:**

*IWT Expectations Chart*  
*games*
### Grades 3-5: The First 10 Days
#### Launching Mathematics in the Common Core Classroom

**Day 5 Objectives:** Review non-verbal signals, listening and speaking expectations, introduce a talk move, continue problem-solving and sharing solutions, and introduce small groups and independent work time.

<table>
<thead>
<tr>
<th>Review Non-Verbal Signals: (see Day 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review Listening and Speaking Expectations</strong></td>
</tr>
<tr>
<td><strong>Introduce Talk Move #3: Applying own reasoning...</strong></td>
</tr>
<tr>
<td>Introduce the Math Talk move of “applying reasoning to someone else's reasoning.” Ask a child if they agree or disagree with someone and why. You can also encourage students to add on to what someone else has just said. Reminder to praise student math talk and applaud volunteers. (Model this talk move during Share, Discuss and Analyze and Number Talk.)</td>
</tr>
<tr>
<td><strong>Number Talk:</strong> (Model Talk Move #3, Applying own reasoning, and use Non-Verbal Signals)</td>
</tr>
<tr>
<td>Follow the same 6 steps as outlined in Day 2 (Number Talk). Introduce today’s problems: Insert problems</td>
</tr>
<tr>
<td><strong>Problem-Solving:</strong></td>
</tr>
<tr>
<td>Present and discuss today’s math problem. Insert a task with a bar model</td>
</tr>
<tr>
<td>Tell students that they will once again practice using a tool from their toolbox of tools/strategies for math. They will use a bar diagram. Draw a bar diagram on the board and ask students to problem solve using the bar diagram. (Students can discuss solutions during Share, Discuss and Analyze.)</td>
</tr>
<tr>
<td><strong>Share Discuss and Analyze:</strong> (Model Talk Move #3, Applying own reasoning and use Non-Verbal Signals)</td>
</tr>
<tr>
<td>• During Share Discuss and Analyze, ask the students how they found their answer to the problem. Encourage them to explain their thinking process and reasoning. Ask several students to share their solutions. Reminder to strategically select a variety of problem solving methods.</td>
</tr>
</tbody>
</table>

This Talk Move gives another student the opportunity to restate, in his/her own words, what the first student just said. A student’s restating of another student’s contribution marks the contribution as being especially important and worth emphasizing. 
To continue to encourage the use of Number Talk.

Continue to establish the concept of a tool box for problem-solving throughout the year.

**Materials:**
- Problem-Solving Notebook
Day 5

Introduce Small Group and Independent Work Time:
(It’s important to set up expectations for small group rotations and independent work time. There will be times when the teacher will need to work with a small group of students to meet their needs. It’s important that the other students know how to work independently and in small groups. They will also need to know how to rotate from location to location or activity to activity.)

Break the class into 3-4 heterogenous groups. Assign groups to their own location within the classroom. Provide instructions on behavior expectations, rotation procedures, and clean up signal. Give each group a bin with one type of manipulative and allow groups to explore the items for 5 minutes. At the end of the time, signal for clean up time. Have students rotate to each station so that each group will have an opportunity to explore each type of manipulative.

Establish clear expectations for small group activity rotations:
- When will we rotate and what is the signal?
- How do I know what to do first, then next?
- Where will activities be located and who will get them?
- What is the expectation for clean up between activities?

To establish expectations for small groups and independent work time

Materials:
- Bins
- Manipulatives
- Games
- IWT Expectation Chart
### Day 6 Objectives:
Review non-verbal signals (optional), review speaking and listening expectations (optional), continue a Number Talk, problem-solving and sharing solutions, and establishing small group rotation and independent work time expectations.

**Review Non-Verbal Signals:** (see Day 2, optional)

**Review Listening and Speaking Expectations** (optional)

**Number Talk:** (Model Talk Move #3, Applying own reasoning, and use Non-Verbal Signals)
Follow the same 6 steps as outlined in Day 2 (Number Talk).

Introduce today's problem on the board:

**Insert Problem**

Ask students to make sense of student strategies. (For example, ask, “Why did Jose take away ten instead of nine? Why did he add one at the end?”) Encourage students to explain other students’ strategies, for example, ask, “Why did Jenny break the number apart? Why did she select those numbers?”

If there are a limited number of participants, after a quiet think time suggest, “Turn to one other person and share your answer and how you thought about it.”

Then prompt, “Let’s list our solution strategies. Who thought the same way/differently? Who has the same answer, but a different way to explain it?”

**Problem-Solving:**
Revisit the Problem-Solving Chart to review expectations for problem-solving.

Present and discuss today’s math problem.

**Insert Problem**

Discuss strategies and then have the students solve the problem in their problem-solving notebook. (Students can discuss solutions during Share, Discuss and Analyze.)

**Materials:**
* Bins
* Manipulatives

Continue to establish the concept of a tool box for problem-solving throughout the year.
## Grades 3-5: The First 10 Days
### Launching Mathematics in the Common Core Classroom

#### Day 6

**Share, Discuss and Analyze:** (Model Talk Move #3, Applying own reasoning, and use Non-Verbal Signals)
Share some of the entries in their problem-solving notebooks, celebrate efforts and establish pride in written work. Allow students to practice Talk Moves #1, Revoicing, #2, Restating, and #3, Applying own reasoning.

**Continue with Small Group and Independent Work Time:**
Extend the time at each station (5-10 minutes). While all other groups will continue with the manipulative exploration, one group will play the partner game previously introduced. Continue to monitor and set expectations for stopping, cleaning up, and rotating. Select a team captain responsible for bringing the bins to and from the designated area. Continue to praise those groups following agreed upon procedures.

To express their opinions, critique the reasoning of others, agree/disagree, etc.

**Materials:**
- Problem-solving chart
- Problem-solving notebook

To continue to establish expectations for small groups and independent work time

**Materials:**
- Games
- IWT Chart
**Day 7 Objectives:** Review listening and speaking expectations/non verbal signals (optional), introduce a talk move, continue Number Talks, problem-solving and sharing solutions, and introduce a new partner game or small group activity.

<table>
<thead>
<tr>
<th>Review Non-Verbal Signals: (see Day 2, optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review Listening and Speaking Expectations (optional)</strong></td>
</tr>
<tr>
<td><strong>Introduce Talk Move #4: Prompting students for further participation</strong></td>
</tr>
<tr>
<td>After students have shared some initial ideas, more students can be asked to join in—prompt students for further participation. Examples:</td>
</tr>
</tbody>
</table>
| • “Does anyone have any other thoughts or comments on what we’ve been talking about?”  
• “Does anyone want to add to that?” |
| **Number Talk:** (Model Talk Move #4, Prompting students for further participation, and use Non-Verbal Signals)  
Follow the same 6 steps as outlined in Day 2 (Number Talk). |
| Introduce today’s problems: |
| **Insert Problem** |
| Have students share their solutions. |
| **Problem Solving Notebook:**  
Present and discuss today’s math problem: |
| **Insert Problem** |
| Discuss strategies and then have the students solve the problem in their problem-solving notebook. (Students can share solutions during Share, Discuss and Analyze.) |
| **Share, Discuss and Analyze:** (Model Talk Move #4, Prompting students for further participation, and use Non-Verbal Signals)  
Share some of the entries in their problem-solving notebooks, celebrate efforts, and establish pride in written work. Encourage them to explain their thinking process and reasoning. Allow students to practice Talk Moves #1, Revoicing, #2, Restating, #3, Applying own reasoning, and #4, Prompting students for further participation. |
| To continue building independence and appropriate communication with partners  
Prompting a wider range of students to weigh in adds more ideas to the discussion |
| To practice drawing and writing about math  
To express their opinions, critique the reasoning of others, agree/disagree, etc. |
| **Materials:**  
*Problem-solving notebook* |
<table>
<thead>
<tr>
<th>Day 7</th>
<th></th>
</tr>
</thead>
</table>

**Introduce New Partner Game or Small Group Activity:**
As a whole group, revisit “IWT Expectations Chart” for expectations. Introduce a new game and review the game rules. Model the new game/activity and have all the students play. Inform students that the new game will be added to the group rotation. Break the class into groups and have the students play today’s games plus the previously taught games/activities. Have them play 5-10 minutes and then rotate to a different game/activity.

Game ideas can come from the textbook materials, the additional resources in the curriculum maps, and from your own bank of materials.

To continue building independence and appropriate communication with partners.
### Grades 3-5: The First 10 Days
Launching Mathematics in the Common Core Classroom

**Day 8 Objectives:** To continue Number Talks, problem-solving, practicing talk moves, establishing small group rotation/independent work time expectations.

<table>
<thead>
<tr>
<th>Review Non-Verbal Signals: (see Day 2, optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review Listening and Speaking Expectations (optional)</strong></td>
</tr>
<tr>
<td><strong>Number Talk:</strong> (Model Talk Move #4, Prompting for participation, and use Non-Verbal Signals)</td>
</tr>
<tr>
<td>Introduce today’s problem:</td>
</tr>
<tr>
<td>Insert Problem</td>
</tr>
<tr>
<td>Have students discuss their strategies and solutions.</td>
</tr>
<tr>
<td><strong>Review Listening and Speaking Expectations (optional)</strong></td>
</tr>
<tr>
<td><strong>Review Non-Verbal Signals:</strong> (optional)</td>
</tr>
<tr>
<td><strong>Problem-Solving:</strong></td>
</tr>
<tr>
<td>Revisit the Problem-Solving Chart to review expectations for problem-solving.</td>
</tr>
<tr>
<td>Present and discuss today’s math problem:</td>
</tr>
<tr>
<td>Insert problem</td>
</tr>
<tr>
<td>- Allow students to discuss how they might solve the math problem.</td>
</tr>
<tr>
<td>- If “Turn and Talk” or “Think-Pair-Share” is used, ask students what it looks like and model the procedures if necessary.</td>
</tr>
<tr>
<td>- Have students solve the problem in their problem-solving notebook.</td>
</tr>
<tr>
<td>- Have manipulatives readily available for students to use.</td>
</tr>
<tr>
<td>- Students can share solutions during Share, Discuss and Analyze.</td>
</tr>
</tbody>
</table>

A student who is unconvinced of an answer should be encouraged to keep thinking, and keep trying to understand. If it doesn’t make sense yet, keep thinking!

**Materials:**
* Math Game/Activity
* Problem-solving Chart
* Manipulatives
<table>
<thead>
<tr>
<th>Day 8</th>
<th><strong>Share, Discuss and Analyze:</strong> (Model Talk Move #4, Prompting for participation, and use Non-Verbal Signals)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Select a few students to share their solutions to the problem.</td>
</tr>
<tr>
<td></td>
<td>• Sharing student is prompted to ask the class if there are questions or comments.</td>
</tr>
<tr>
<td></td>
<td>• Encourage them to explain their thinking process and reasoning.</td>
</tr>
<tr>
<td></td>
<td>• Allow students to practice Talk Moves #1, Revoicing, #2, Restating, #3, Applying own reasoning, and #4, Prompting for participation.</td>
</tr>
</tbody>
</table>

|       | **Introduce New Partner Game or Small Group Activity:** |
|       | As a whole group, revisit the “IWT Expectations Chart” to review expectations. Introduce a new game and review the games rules. Model the new game/activity and have all the students play. Inform students that the new game will be added to the group rotation. Break the class into groups and have the students play today’s games plus the previously taught games/activities. Have them play 5-10 minutes and then rotate to a different game/activity. |

|       | To set expectations for shared thinking and to respond to classmates in a reasonable manner |
|       | **Materials:** |
|       | * Problem Solving Notebook * Hundred Chart |

|       | To continue to establish expectations for small groups and independent work time |
|       | **Materials:** |
|       | * Math game/activity * IWT chart * Manipulatives |
### Day 9 Objectives
Introduce a new Talk Move, continue Number Talks, problem-solving and solution sharing, introduce a new partner game or small group activity.

**Introduce Talk Move #5: Wait Time**
Give students time to compose their responses. A teacher may tap his/her leg for ten seconds between posing a problem, and calling on a student to respond. Or point your finger at your temple, showing that you’re thinking and hold it for ten seconds.

**Number Talk:** (Model Talk Move #5, Wait time, and use Non-Verbal Signals)
Follow the same 6 steps as outlined in Day 2 (Number Talk).

**Insert Problem**
Debrief the Number Talk.

**Problem Solving:**
Present and discuss today’s math problem. Have students model a real-life mathematical situation with an equation. Students can use manipulatives and/or math drawings to explain the equation.

**Insert problem**
Have students share their real-life mathematical situation with a partner. Students can then write their equation and solution in their problem-solving notebook.

**Share, Discuss and Analyze:** (Model Talk Move #5, Wait time, and use Non-Verbal Signals)
- Have students share their responses to the problem.
- Ask students how they solved the problem.
- Share explanation, thinking process and reasoning.
- Allow students to practice Talk Moves

**Introduce New Partner Game or Small Group Activity:**
As a whole group, revisit the “IWT Expectations Chart” to review expectations. Introduce a new game and review the game rules. Model the new game/activity and have all the students play. The new game will be added to the group rotation. Break the class into groups, have the students play today’s games plus the previously taught games/activities. Have them play 5 -10 minutes and then rotate.

Wait time signals the value of deliberative thinking, recognizes that deep thinking takes time, and creates a normative environment that respects and rewards both taking time to respond oneself and being patient as others take the time to formulate their thoughts.

More students are able and willing to join in if time is provided for them to create something that they feel comfortable about sharing.

**Materials:**
* Problem-Solving Notebook
* Manipulatives
* Games

When the class is ready, the teacher begins working directly with small groups of students, pre-teaching, reteaching, and remediating.
# Grades 3-5: The First 10 Days
Launching Mathematics in the Common Core Classroom

<table>
<thead>
<tr>
<th>Day 10 Objectives: To continue establishing expectations for the Common Core Math Classroom.</th>
</tr>
</thead>
</table>
| **Number Talk:** (Model Talk Move #5, Wait time, and use Non-Verbal Signals)  
Follow the same 6 steps as outlined in Day 2 (Number Talk).  
Introduce problems. |

Insert problem

**Problem-Solving:**  
Revisit the Problem-Solving Chart to review expectations for problem-solving.  
Present and discuss today’s math problem.  

Insert problem

Discuss strategies and then have the students solve the problem in their problem-solving notebook. (Have students share their solutions during “Share, Discuss and Analyze.”)

**Share, Discuss and Analyze:** (Model Talk Move #5, Wait time, and use Non-Verbal Signals)  
- Have students share their responses to the problem about students (above).  
- Ask students how they solved the problem.  
- Encourage them to explain their thinking process and reasoning.

Allow students to practice Talk Moves #1, Revoicing, #2, Restating, #3, Applying own reasoning, and #4, Prompting for participation.

**Introduce a Partner Math Game or Small Group Activity:**  
As a whole group, revisit the “IWT Expectations Chart” to review expectations. Introduce a new game and review the games rules. Model the new game/activity and have all the students play. Inform students that the new game will be added to the group rotation. Break the class into groups and have the students play today’s games plus the previously taught games/activities. Have them play 5-10 minutes and then rotate to a different game/activity.

Now that the class has experienced problem solving daily, they should be able to do this daily. Make sure students have opportunities to use the tools presented.

**Materials:**  
* Problem-solving chart  
* Problem-solving notebook

Now that the class has experienced different games/activities and rotations, they should be able to work independently while the teacher works with a small group.
Grades 3-5: The First 10 Days
Launching Mathematics in the Common Core Classroom

CONGRATULATIONS!

You have worked hard to establish the following important routines and expectations with your students during the first ten days of school:

• Number Talks
• Daily Problem-Solving
• Listening and Speaking Expectations
• Talk Moves for Mathematical Discussions
• Non-Verbal Signals
• Expectations for Partner Games, Small Groups & Rotations, and Independent Work Time

By establishing and continuing to build these routines, your classroom is now a place where the Standards for Mathematical Practice can grow and thrive all year long!

References and Resources:


Mental Math, Prince Edward Island Grade 3, 2008. 

Mental Math, Prince Edward Island, Grade 4, 2008. 
http://www.gov.pe.ca/photos/original/eecd_gr4math.pdf

Mental Math, Prince Edward Island, Grade 5, 2008. 
http://www.gov.pe.ca/photos/original/eecd_gr5math.pdf

A community for number string design, http://numberstrings.com/

Teaching Channel videos:
• Third Grade Mental Math. https://www.teachingchannel.org/videos/third-grade-mental-math
• Improving Participation with Talk Moves. https://www.teachingchannel.org/videos/student-participation-strategy
• Three Phase Lesson, Grade 4, Multiplying Whole Numbers & Fractions. https://www.teachingchannel.org/videos/multiplying-fractions-by-whole-numbers-lesson
• Talk Moves. https://www.teachingchannel.org/videos/developing-communication-skills
Appendix

**Number Talks** are short, daily classroom conversations around purposefully crafted computation problems that are solved mentally. Sample Number Talk problems can be found from a variety of sources.

**Resources:**
Inside Mathematics:  

Math Perspectives:  

Math Solutions:  

Number Strings:  

**Three Phase Problem-Solving:**
Sample Problems/Tasks may be selected from the resources on the curriculum maps.
# Three-Phase Structure for Problem Solving

## BEFORE (5 minutes)

<table>
<thead>
<tr>
<th>Role of the Teacher</th>
<th>Student Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Activate prior knowledge</td>
<td>• What am I trying to find?</td>
</tr>
<tr>
<td>• Review vocabulary</td>
<td></td>
</tr>
<tr>
<td>• Pose the problem</td>
<td></td>
</tr>
<tr>
<td>• Ensure that students understand the task</td>
<td></td>
</tr>
</tbody>
</table>

## DURING (20 minutes)

<table>
<thead>
<tr>
<th>Role of the Teacher</th>
<th>Student Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Let students independently work in pairs or groups</td>
<td>□ I solved the problem in more than one way.</td>
</tr>
<tr>
<td>• Observe and facilitate as students work</td>
<td>□ I explained my solution to my partner.</td>
</tr>
<tr>
<td>• Ask questions to focus, assess, and advance student thinking</td>
<td>□ I asked my partner questions so that I understand his/her solution.</td>
</tr>
<tr>
<td>• Decide which solutions will be selected for sharing</td>
<td>□ I made my solution or answer to the problem clear so that others will understand it.</td>
</tr>
</tbody>
</table>

## AFTER (15 minutes)

<table>
<thead>
<tr>
<th>Role of the Teacher</th>
<th>Student Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have two to three students share their thinking and work with the whole group</td>
<td>• What questions do you have for the mathematician?</td>
</tr>
<tr>
<td>• Orders selected solutions to help generate mathematically productive discussion</td>
<td></td>
</tr>
<tr>
<td>• Asks specific questions so that students will:</td>
<td>• Who can restate how ____ solved the problem?</td>
</tr>
<tr>
<td>o Develop understanding of the concept</td>
<td></td>
</tr>
<tr>
<td>o Add on to and question the solutions shared</td>
<td>• What is the same about the solutions shared? What is different?</td>
</tr>
<tr>
<td>o Make connections between the solutions presented</td>
<td></td>
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<tr>
<td>o Identify patterns</td>
<td></td>
</tr>
<tr>
<td>o Find generalized characteristics within the problem</td>
<td></td>
</tr>
<tr>
<td>• Listen actively without evaluation</td>
<td></td>
</tr>
<tr>
<td>• Summarize the main idea and identify next steps, future problems</td>
<td></td>
</tr>
</tbody>
</table>
5 Talk Moves

*Increasing Rigor in Classroom Discussion*

1. **Revoicing** – Paraphrasing some or all of what the student has said and asking them to verify if your statement was correct. Can be done by teacher-listener or student-listener.

   “So you’re saying...”

   This talk move helps bring clarity to the student’s response for both the speaker and the listener.

2. **Restating** – Asking students to restate someone else’s reasoning.

   “Can you repeat what Philip just said in your own words?”

   This move validates the speaker, helps the listeners follow the speaker’s reasoning, and gives English learners and those who need more thinking time a chance to process the information.

3. **Applying Own Reasoning** – Asking students to apply their own reasoning to someone else’s statement.

   “Do you agree or disagree with that statement? Why?”

   Explaining thinking is critical to mathematical learning. This move also highlights the speaker’s thought processes.

4. **Prompting for Participation** – Inviting students to join the discussion.

   “Would someone like to add on?”

   This move can be used alone to invite students into the conversation or in conjunction with the other moves to keep the discussion active.

5. **Wait Time** – Allowing for a few moments of silence after a student has been asked a question.

   “Take your time....we’ll wait”

   At least 10 seconds is a good amount of time to be given between asking a question and choosing a student to respond. The same amount of time is also necessary to give the chosen student time to organize their response after being called upon. This gives English learners and those who need
more time a chance to think the question through and contribute to the discussion. More points of view are added to the discussion.
<table>
<thead>
<tr>
<th>Number Talks Item</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher Presents the Problem</strong> (~3 minutes)</td>
<td>The teacher:   • presents a problem with dot cards (K-1) or computation problems. • provides wait time for the majority of students to access the problem. • prompts the students to use a “thumbs-up” as the signal that they have an answer.</td>
<td>The teacher:   • All criteria in the previous level, PLUS… • selects a problem/dot card designed to elicit a particular approach. • notices the types of mental computation strategies students use especially those that are inefficient, i.e., use of fingers or writing the problem on the floor. • anticipates how students will respond by thinking through possible strategies for each problem beforehand. • asks students to think on their own and to estimate before they compute. • removes pencil and paper from students access.</td>
<td>The teacher:   • All criteria in the previous level, PLUS… • selects a well-crafted series of problems/dot cards that align with the teacher’s purpose. • notices the types of mental computation strategies students use and provides further instruction with alternative strategies at another time. • <strong>periodically</strong> encourages students to keep thinking about the number of <strong>additional</strong> strategies that will work and indicate the number of strategies on their fingers. • uses a real-life context to help students access the math.</td>
<td>The teacher:   • All criteria in the previous level, PLUS… • increases the rigor of the problems over time. • <strong>consistently</strong> has students think of more than one strategy that will work and indicate the number of strategies on their fingers. • provides targeted small group instruction to those students needing additional instruction/practice.</td>
</tr>
<tr>
<td><strong>Teacher Records Answers</strong> (~1 minute)</td>
<td>The teacher:   • records all answers to be considered.</td>
<td>The teacher:   • All criteria in the previous level, PLUS… • records all answers to be considered without giving any verbal or physical expressions of agreement. • has students share answers.</td>
<td>The teacher:   • All criteria in the previous level, PLUS… • periodically uses overt methods such as number cards (K/1) or whiteboards etc. to elicit the answers of all students. • has students discuss which answers are reasonable and which answers could be ruled out</td>
<td>The teacher:   • All criteria in the previous level, PLUS… • keeps records such as checklists, anecdotal notes of students’ answers and/or participation. • strategically chooses when students will use overt methods to reveal answers • discusses reasonableness of answers based on logic and number sense.</td>
</tr>
</tbody>
</table>
## Number Talks Innovation Configuration Map

<table>
<thead>
<tr>
<th>Number Talks Item</th>
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<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
</table>
| Teacher Records Student Thinking (~8 minutes) | The teacher:  
- provides opportunities for several students to share their strategies.  
- records student thinking.  
- resources are displayed such as ten frames, hundreds charts and number lines. | The teacher:  
- All criteria in the previous level, PLUS...  
- occasionally uses Talk Moves to help students explain their thinking and/or orient their thinking to others with little student engagement or discussion.  
- records student thinking in a mathematically correct manner by using proper notation.  
- displays sentence and question starters to help students frame their questions and comments.  
- periodically references resources that are displayed such as ten frames, hundreds charts, number lines and strategy posters.  
- regularly provides opportunities for students to orally practice using displayed sentence/question starters to help frame their questions and comments. | The teacher:  
- All criteria in the previous level, PLUS...  
- regularly uses Talk Moves  
- records student thinking using numbers as well as pictures, open number lines, area models, etc. as appropriate.  
- regularly references tools that are displayed such as ten frames, hundreds charts, number lines and class created strategy posters. | The teacher:  
- All criteria in the previous level, PLUS...  
- invites students to explain thinking to the class by drawing pictures, open number lines and area models when appropriate.  
- strategically uses a variety of Talk Moves to further classroom discussion and understanding of the mathematics.  
- strategically references tools that are displayed such as ten frames, hundreds charts, number lines and class created strategy posters and asks students to reference those tools during their explanation. |
| Further Discussion (~3 minutes) | The teacher:  
- may or may not provide opportunities for further discussion.  
- limits the number talks to 10 to fifteen minutes. | The teacher:  
- provides opportunities for further discussion.  
- leads a discussion that identifies the correct answer.  
- calls out new strategies used. | The teacher:  
- All criteria in the previous level, PLUS...  
- leads a discussion on the most efficient strategy rather than asking for the correct answer to a problem. | The teacher:  
- All criteria in the previous level, PLUS...  
- using Talk Moves, facilitates class discussion in which students explain which strategy they believe is most efficient and why.  
- asks students if other problems presented during the session can be solved using the new strategy and if it would be the most efficient for that particular problem. |

### Materials/Resources
- Number Talks; Helping Children Build Mental Math and Computation Strategies Grades K-5, Sherry Parrish - available at all school sites in the principal’s office
- Dot Cards and Problem Set packets were distributed in K - 1 math content training in 2013-2014 and are posted on the math intranet – instructional tools – Elementary – Number Talks
- Rekenreks will be introduced in Grade 1 during the 2014-2015 school years. Rekenreks are composed of two rows of stringed beads, each with 5 beads of one color and 5 beads of another color. They are used to help students build fluency with numbers 0 – 20, and compute using number relationships.
Math Constructive Conversation Skills Poster

Clarify Problem and Ideas for Solving It

Prompt starters:
What are we trying to do?
What is the problem asking?
How does the problem begin?
What happens in the problem?
What do we need to know?
How can we break this down?
What type of problem is this?
What patterns do we notice?
What’s a possible plan for solving it?
What is your estimate for the answer?
Why are you doing that?
Where did that number come from?

Response starters:
In order to ____, we need to …
In other words,
More specifically, it is … because…
Let’s see, it is similar to the problem about … that we did because…
It is important to ____ because
Let’s stay focused on …
Let’s get back to the idea of…
In future problems like this one we need to remember to…

Generate & Try Multiple Methods & Representations

Prompt starters:
How else can we show this?
How can we draw or graph this?
What symbols can we use?
How can we explain this to others?
How can we write what we are thinking/doing?
How can we translate this into symbols?
Let’s back up and try a different way.
Which method is most useful? Why?

Response starters:
Maybe we can use...
Another way to show this is…
In math symbols we could write…
We can draw it like this because it says…
Let’s try to… and see what happens.

Build Math Solutions, Ideas, & Understandings

Prompt starters:
Can you explain why you…?
What does that mean?
What are you doing?
What math rule are you using?
Can you give an example?
How does the sample problem help us?
What are examples of this problem from real life?
Can you clarify where you…?
How did you get this answer?

Response starters:
If we ____ , then we need to ___
because…
A key mathematical principle is making sure that you…
In real life this is similar to when you want to…
An example from my life is
One case that illustrates this is...
In math, we always need to…
Let me show you what I mean.
We can’t do that because it…

Negotiate Ideas

Prompt starters:
That reminds me of...
I want to add on to your idea of…
That idea connects to…
I see it a different way,
On the other hand, …
That makes me think of…
We can agree that…

Response starters:
Maybe we can use...
Another way to show this is…
In math symbols we could write…
We can draw it like this because it says…
Let’s try to… and see what happens.