

Reading Public Schools

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Mathematics Curriculum Guide

Grade 4

Fourth Grade Priority Areas

Developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends (OA, NBT)

Students generalize their understanding of place value to 1,000,000. They apply their understanding of models for multiplication/division, place value, properties of operations, and the relationship between multiplication and division as they develop, use efficient, and accurate methods to compute products of multi-digit whole numbers and quotients involving multi-digit dividends. 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. They apply appropriate methods to estimate and mentally calculate products and quotients, and interpret remainders based upon the context.

Developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers (NF)

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.

Understanding that geometric figures can be analyzed and classified based on their properties, [i.e. parallel sides, perpendicular sides, angle measures, and symmetry] (G)

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.

Mathematical Practice Standards

- Making sense of problems and persevering in solving them
- Reasoning abstractly and quantitatively
- Constructing viable arguments and critiquing the reasoning of others
- Modeling with mathematics
- Using appropriate tools strategically
- Attending to precision
- Looking for and making use of structure
- Looking for and expressing regularity in repeated reasoning

Content Standards

Operations and Algebraic Thinking (OA)

- Use the four operations with whole numbers to solve problems
- Gain familiarity with factors and multiples
- Generate and analyze patterns

Number and Operations in Base Ten (NBT)

- Generalize place value understanding for multi-digit whole numbers less than or equal to 1,000,000
- Use place value understanding and properties of operations to perform multi-digit arithmetic on whole numbers less than or equal to 1,000,000

Geometry (G)

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

Number and Operations—Fractions (NF)

- Extend understanding of fraction equivalence and ordering for fractions ordering for fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100
- Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers for fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100
- Understand decimal notation for fractions, and compare decimal fractions

Measurement and Data (MD)

- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit
- Represent and interpret data
- Geometric measurement: Understand concepts of angle and measure angles



Concepts	Essential Questions	Resources
<p><i>Operations and Algebraic Thinking (OA): Use the four operations with whole numbers to solve problems</i></p>	<ul style="list-style-type: none"> • What models can be used to show problems using multiplicative comparisons? • How can the inverse relationships between addition and subtraction, and multiplication and division be helpful in solving problems? • What are strategies for assessing the reasonableness of answers? • What are ways to represent problems using equations with letters standing for the unknown in any place? 	<p>Math in Focus (ch 2, 3, 11, 12) Understanding Numbers; Addition & Subtraction</p>
<p><i>Operations and Algebraic Thinking (OA): Gain familiarity with factors and multiples</i></p>	<ul style="list-style-type: none"> • How can patterns and properties be used in finding factor pairs for whole numbers in the range of 1-100? • What is the difference between factors and multiples? • How can you determine whether a number is prime or composite? 	<p>Math in Focus (ch 2, 3)</p>
<p><i>Operations and Algebraic Thinking (OA): Generate and analyze patterns</i></p>	<ul style="list-style-type: none"> • How can relationships between numbers or objects that repeat in predictable ways be described and generalized? • How can patterns be used to describe how quantities or shapes are related? • How can a relationship between two quantities be shown using a table? • How can clear explanations be stated or written that describe the relationships between numbers or objects that repeat in predictable ways? 	<p>Math in Focus (ch 1, 7) Understanding Numbers; Place Value, Decimals, Addition & Subtraction</p>
<p><i>Number and Operations in Base Ten (NBT): Generalize place value understanding for multi-digit whole numbers less than or equal to 1,000,000</i></p>	<ul style="list-style-type: none"> • How does a digit in any place value relate to the one to its right? • How are big numbers (up to 1,000,000) read and written in different forms? • How can whole numbers be compared and ordered? • How can whole numbers be rounded to any position? 	<p>Math in Focus (ch 1, 2, 3, 7) Understanding Numbers; Place Value, Addition & Subtraction</p>
<p><i>Number and Operations in Base Ten (NBT): Use place value understanding and properties of operations to perform multi-digit arithmetic</i></p>	<ul style="list-style-type: none"> • What are standard procedures for adding and subtracting multi-digit numbers? • How can multiplication and/or division situations be modeled using rectangular arrays and/or area models • How can place value strategies, properties of operations and/or the relationship between multiplication and division be used to find whole-number quotients and remainders? 	<p>Math in Focus (ch 1, 3) Understanding Numbers; Place Value, Decimals, Addition & Subtraction</p>



Concepts	Essential Questions	Resources
<p><i>Number and Operations – Fractions (NF):</i> Extend understanding of fraction equivalence and ordering for fractions ordering for fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100</p>	<ul style="list-style-type: none"> • How can the same fractional amounts be renamed using equivalent fractions? • How can fractions be compared and ordered? • How can benchmark fractions such as $\frac{1}{2}$ be helpful when comparing fractions? • What visual models are most useful when determining fraction equivalence? 	<p>Math in Focus (ch 6)</p>
<p><i>Number and Operations – Fractions (NF):</i> Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers for fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100</p>	<ul style="list-style-type: none"> • How can fractions be represented as the sum of unit fractions? • What does it mean to add and subtract fractions and mixed numbers? • What is a standard procedure for adding and subtracting fractions and mixed numbers with like denominators? • How can fractions and mixed numbers be added and subtracted using visual models? • How can visual models be used to help with multiplying a whole number by a fraction? • How can understanding multiplication be helpful in multiplying fractions by whole numbers? 	<p>Math in Focus (ch 6, 7)</p>
<p><i>Number and Operations – Fractions (NF):</i> Understand decimal notation for fractions, and compare decimal fractions</p>	<ul style="list-style-type: none"> • How are fractions with denominators of 10 and 100 related? • How can decimals be written as fractions? • What steps do you take to compare decimals? What can you tell about a decimals size? • How do you compare two decimals to each other? 	<p>Math in Focus (ch 7) Understanding Numbers; Decimals</p>
<p><i>Measurement and Data (MD):</i> Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit</p>	<ul style="list-style-type: none"> • What are customary and metric units for measuring length, capacity and weight/mass, and how are they related? • What do area and perimeter mean and how can each be found? 	<p>Math in Focus (ch 7, 11, 12) Understanding Numbers; Place Value, Decimals</p>
<p><i>Measurement and Data (MD):</i> Represent and interpret data</p>	<ul style="list-style-type: none"> • How can line plots with fractional measurements help to solve measurement problems? 	<p>Math in Focus (ch 6) Understanding Numbers; Decimals</p>
<p><i>Measurement and Data (MD):</i> Geometric measurement: Understand concepts of angle and measure angles</p>	<ul style="list-style-type: none"> • How can lines, angles and shapes be described, analyzed and classified? • How are angles measured, added and subtracted? 	<p>Math in Focus (ch 9, 11)</p>
<p><i>Geometry (G):</i> Draw and identify lines and angles, and classify shapes by properties of their lines and angles</p>	<ul style="list-style-type: none"> • How can lines, angles and shapes be described, analyzed and classified? • How can lines of symmetry be recognized and drawn in two-dimensional figures? 	<p>Math in Focus (ch 9, 10, 11, 13) Understanding Numbers; Place Value, Decimals</p>

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Curriculum Guide Overview

Curriculum Guide

Curriculum guides are public documents that are aligned with the Massachusetts Department of Education Curriculum Frameworks. They focus on the set of standards that students will learn within certain disciplines at appropriate grade levels. Curriculum Guides are intended for teachers, parents, and the wider school community as an overview document of the course of study for the year.

Curriculum Map

Curriculum maps are internal documents utilized as planning tools for teachers. Curriculum maps keep a focus on the end-of-year standards and chart a course for the teaching and learning over the year. They are typically organized in a grade-level overview organized by month or marking period. Curriculum maps typically include; standards and expectations for the grade/content, essential skills/concepts, methods of assessment, and major content resources. Maps are never “done” as ongoing work of educators include revisions, additions, and revisits to the maps. They provide an overview for the year while also allowing educators to see a vertical picture of how the content develops as students progress through each grade.

Standards

The standards used as the foundation of our curriculum come directly from the Massachusetts Department of Education Curriculum Frameworks. State standards may be viewed here: <http://www.doe.mass.edu/frameworks/>

Priority Areas

The state of Massachusetts identifies critical areas that should be the priority focus of that grade’s instructional time.

Practice Standards

Practice Standards are a set of skills/behaviors that are replicated in grades preK-12 and are currently found in Mathematics, Social Studies, and Science standards. These standards describe ways in which students engage with the content and the level of application grows increasingly complex as students progress vertically throughout their education.

Content Standards

The Content Standards describe what students should know and be able to do within each grade-level.

Essential Questions

Essential questions are questions that are not answerable with an easy answer or a simple instruction. The purpose of essential questions is to provide opportunities for inquiry into the learning and act as an umbrella to anchor the unit/lesson.

Resources

Resources identified in Curriculum Guides are not intended to be exhaustive, nor are they intended to be prescriptive. The resources identified may function as a menu of curriculum resources from which educators identify the most appropriate tools to utilized in their classrooms. More specifics about identified resources are identified within the curriculum map documents.