

Fourth Grade Math Curriculum

Fourth grade mathematics is about (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; and (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.

Module 1: Place Value, Rounding, and Algorithms for Addition and Subtraction

In Grade 4, students extend their work with whole numbers. They begin with large numbers using familiar units (tens and hundreds) and develop their understanding of thousands by building knowledge of the pattern of times ten in the base ten system on the place value chart (4.NBT.1). In Grades 2 and 3 students focused on developing the concept of composing and decomposing place value units within the addition and subtraction algorithms. Now, in Grade 4, those (de)compositions are seen through the lens of multiplicative comparison, e.g. 1 thousand is 10 times as much as 1 hundred. They next apply their broadened understanding of patterns on the place value chart to compare, round, add and subtract. The module culminates with solving multi-step word problems involving addition and subtraction modeled with tape diagrams that focus on numerical relationships.

Module 2: Unit Conversions and Problem Solving with Metric Measurement

The algorithms continue to play a part in Module 2 as students relate place value to metric units. This module helps students draw similarities between:

1 ten = 10 ones

1 hundred = 10 tens

1 hundred = 100 ones

1 meter = 100 centimeters

1 thousand = 1,000 ones

1 kilometer = 1,000 meters

1 kilogram = 1,000 grams

1 liter = 1,000 milliliters

Students work with metric measurement in the context of the addition and subtraction algorithms, mental math, place value, and word problems. Customary units are used as a context for fractions in Module 5.

Module 3: Multi-Digit Multiplication and Division

In Module 3, measurements provide the concrete foundation behind the distributive property in the multiplication algorithm: $4 \times (1 \text{ m } 2 \text{ cm})$ can be made physical using ribbon, where it is

easy to see the 4 copies of 1 m and the 4 copies of 2 cm. Likewise, $4 \times (1 \text{ ten } 2 \text{ ones}) = 4 \text{ tens } 8 \text{ ones}$. Students then turn to the place value table with number disks to develop efficient procedures for multiplying and dividing one-digit whole numbers and use the table with number disks to understand and explain why the procedures work. Students also solve word problems throughout the module where they select and accurately apply appropriate methods to estimate, mentally calculate, or use the procedures they are learning to compute products and quotients.

Module 4: Angle Measure and Plane Figures

Module 4 focuses on solving unknown angle equations, as well as, building, drawing, and analyzing two dimensional shapes in geometry. Students learn the definition of degree and learn how to measure angles in degrees using a circular protractor.

Module 5: Fraction Equivalence, Ordering, and Operations

Module 5 centers on equivalent fractions and operations with fractions. We use fractions when there is a given unit, the whole unit, but we want to measure using a smaller unit, called the fractional unit. The beauty of fractional units, once defined and understood, is that they behave just as all other units do:

- “3 fourths + 5 fourths = 8 fourths” just as “3 meters + 5 meters = 8 meters”
- “4 x 3 fourths = 12 fourths” just as “4 x 3 meters = 12 meters”

Students add and subtract fractions with like units using the area model and the number line. They multiply a fraction by a whole number where the interpretation is as repeated addition e.g. $3 \text{ fourths} + 3 \text{ fourths} = 2 \times 3 \text{ fourths}$. Through this introduction to fraction arithmetic they gradually come to understand fractions as units they can manipulate, just like whole numbers. Throughout the module, customary units of measurement provide a relevant context for the arithmetic.

Module 6: Decimal Fractions

Module 6, on decimal fractions, starts with the realization that decimal place value units are simply special fractional units: 1 tenth = $1/10$, 1 hundredth = $1/100$, etc. Fluency plays an important role in this topic as students learn to relate $3/10 = 0.3 = 3 \text{ tenths}$. They also recognize that 3 tenths is equal to 30 hundredths and subsequently have their first experience adding and subtracting fractions with unlike units e.g., $3 \text{ tenths} + 4 \text{ hundredths} = 30 \text{ hundredths} + 4 \text{ hundredths}$.

Module 7: Exploring Multiplication

The year ends with a module focused on multiplication and measurement as they solve multi-step word problems. Exploratory lessons support conceptual understanding of the relative sizes of measurement units. Students explore conversion in hands-on settings and subsequently

apply those conversions to solve multi-step word problems involving all operations and multiplicative comparison.