



North Carolina Standard Course of Study 3-5 Mathematics

**for
Implementation in 2018-2019
Adopted June 2017**

Third Grade

Standards for Mathematical Practice

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

Operations and Algebraic Thinking

Abbreviation	Standard
Represent and solve problems involving multiplication and division.	
NC.3.OA.1	For products of whole numbers with two factors up to and including 10: <ul style="list-style-type: none"> • Interpret the factors as representing the number of equal groups and the number of objects in each group. • Illustrate and explain strategies including arrays, repeated addition, decomposing a factor, and applying the commutative and associative properties.
NC.3.OA.2	For whole-number quotients of whole numbers with a one-digit divisor and a one-digit quotient: <ul style="list-style-type: none"> • Interpret the divisor and quotient in a division equation as representing the number of equal groups and the number of objects in each group. • Illustrate and explain strategies including arrays, repeated addition or subtraction, and decomposing a factor.
NC.3.OA.3	Represent, interpret, and solve one-step problems involving multiplication and division. <ul style="list-style-type: none"> • Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.
Understand properties of multiplication and the relationship between multiplication and division.	
NC.3.OA.6	Solve an unknown-factor problem, by using division strategies and/or changing it to a multiplication problem.
Multiply and divide within 100.	
NC.3.OA.7	Demonstrate fluency with multiplication and division with factors, quotients and divisors up to and including 10. <ul style="list-style-type: none"> • Know from memory all products with factors up to and including 10. • Illustrate and explain using the relationship between multiplication and division. • Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
Solve two-step problems.	
NC.3.OA.8	Solve two-step word problems using addition, subtraction, and multiplication, representing problems using equations with a symbol for the unknown number.
Explore patterns of numbers.	
NC.3.OA.9	Interpret patterns of multiplication on a hundreds board and/or multiplication table.

Number and Operations in Base Ten

Abbreviation	Standard
Use place value to add and subtract.	
NC.3.NBT.2	Add and subtract whole numbers up to and including 1,000. <ul style="list-style-type: none"> • Use estimation strategies to assess reasonableness of answers. • Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems. • Use expanded form to decompose numbers and then find sums and differences.
Generalize place value understanding for multi-digit numbers.	
NC.3.NBT.3	Use concrete and pictorial models, based on place value and the properties of operations, to find the product of a one-digit whole number by a multiple of 10 in the range 10–90.

Number and Operations – Fractions

Abbreviation	Standard
Understand fractions as numbers.	
NC.3.NF.1	Interpret unit fractions with denominators of 2, 3, 4, 6, and 8 as quantities formed when a whole is partitioned into equal parts; <ul style="list-style-type: none"> • Explain that a unit fraction is one of those parts. • Represent and identify unit fractions using area and length models.
NC.3.NF.2	Interpret fractions with denominators of 2, 3, 4, 6, and 8 using area and length models. <ul style="list-style-type: none"> • Using an area model, explain that the numerator of a fraction represents the number of equal parts of the unit fraction. • Using a number line, explain that the numerator of a fraction represents the number of lengths of the unit fraction from 0.
NC.3.NF.3	Represent equivalent fractions with area and length models by: <ul style="list-style-type: none"> • Composing and decomposing fractions into equivalent fractions using related fractions: halves, fourths and eighths; thirds and sixths. • Explaining that a fraction with the same numerator and denominator equals one whole. • Expressing whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
NC.3.NF.4	Compare two fractions with the same numerator or the same denominator by reasoning about their size, using area and length models, and using the $>$, $<$, and $=$ symbols. Recognize that comparisons are valid only when the two fractions refer to the same whole with denominators: halves, fourths and eighths; thirds and sixths.

Measurement and Data

Abbreviation	Standard
Solve problems involving measurement.	
NC.3.MD.1	Tell and write time to the nearest minute. Solve word problems involving addition and subtraction of time intervals within the same hour.
NC.3.MD.2	Solve problems involving customary measurement. <ul style="list-style-type: none"> Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit. Estimate and measure capacity and weight in customary units to a whole number: cups, pints, quarts, gallons, ounces, and pounds. Add, subtract, multiply, or divide to solve one-step word problems involving whole number measurements of length, weight, and capacity in the same customary units.
Represent and interpret data.	
NC.3.MD.3	Represent and interpret scaled picture and bar graphs: <ul style="list-style-type: none"> Collect data by asking a question that yields data in up to four categories. Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided. Solve one and two-step “how many more” and “how many less” problems using information from these graphs
Understand the concept of area.	
NC.3.MD.5	Find the area of a rectangle with whole-number side lengths by tiling without gaps or overlaps and counting unit squares.
NC.3.MD.7	Relate area to the operations of multiplication and addition. <ul style="list-style-type: none"> Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving problems, and represent whole-number products as rectangular areas in mathematical reasoning. Use tiles and/or arrays to illustrate and explain that the area of a rectangle can be found by partitioning it into two smaller rectangles, and that the area of the large rectangle is the sum of the two smaller rectangles.
Understand the concept of perimeter.	
NC.3.MD.8	Solve problems involving perimeters of polygons, including finding the perimeter given the side lengths, and finding an unknown side length.

Geometry

Abbreviation	Standard
Reason with shapes and their attributes.	
NC.3.G.1	Reason with two-dimensional shapes and their attributes. <ul style="list-style-type: none"> Investigate, describe, and reason about composing triangles and quadrilaterals and decomposing quadrilaterals. Recognize and draw examples and non-examples of types of quadrilaterals including rhombuses, rectangles, squares, parallelograms, and trapezoids.

Fourth Grade

Standards for Mathematical Practice

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

Operations and Algebraic Thinking

Abbreviation	Standard
Represent and solve problems involving multiplication and division.	
NC.4.OA.1	Interpret a multiplication equation as a comparison. Multiply or divide to solve word problems involving multiplicative comparisons using models and equations with a symbol for the unknown number. Distinguish multiplicative comparison from additive comparison.
Use the four operations with whole numbers to solve problems.	
NC.4.OA.3	Solve two-step word problems involving the four operations with whole numbers. <ul style="list-style-type: none"> • Use estimation strategies to assess reasonableness of answers. • Interpret remainders in word problems. • Represent problems using equations with a letter standing for the unknown quantity.
Gain familiarity with factors and multiples.	
NC.4.OA.4	Find all factor pairs for whole numbers up to and including 50 to: <ul style="list-style-type: none"> • Recognize that a whole number is a multiple of each of its factors. • Determine whether a given whole number is a multiple of a given one-digit number. • Determine if the number is prime or composite.
Generate and analyze patterns.	
NC.4.OA.5	Generate and analyze a number or shape pattern that follows a given rule.

Number and Operations in Base Ten	
Abbreviation	Standard
Generalize place value understanding for multi-digit numbers whole numbers.	
NC.4.NBT.1	Explain that in a multi-digit whole number, a digit in one place represents 10 times as much as it represents in the place to its right, up to 100,000.
NC.4.NBT.2	Read and write multi-digit whole numbers up to and including 100,000 using numerals, number names, and expanded form.
NC.4.NBT.7	Compare two multi-digit numbers up to and including 100,000 based on the values of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
Use place value understanding and properties of operations to perform multi-digit arithmetic.	
NC.4.NBT.4	Add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding.
NC.4.NBT.5	Multiply a whole number of up to three digits by a one-digit whole number, and multiply up to two two-digit numbers with place value understanding using area models, partial products, and the properties of operations. Use models to make connections and develop the algorithm.
NC.4.NBT.6	Find whole-number quotients and remainders with up to three-digit dividends and one-digit divisors with place value understanding using rectangular arrays, area models, repeated subtraction, partial quotients, properties of operations, and/or the relationship between multiplication and division.

Number and Operations – Fractions

Abbreviation	Standard
Extend understanding of fractions.	
NC.4.NF.1	Explain why a fraction is equivalent to another fraction by using area and length fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.
NC.4.NF.2	Compare two fractions with different numerators and different denominators, using the denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions by: <ul style="list-style-type: none"> • Reasoning about their size and using area and length models. • Using benchmark fractions 0, $\frac{1}{2}$, and a whole. • Comparing common numerator or common denominators.
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	
NC.4.NF.3	Understand and justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. <ul style="list-style-type: none"> • Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. • Decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way using area models, length models, and equations. • Add and subtract fractions, including mixed numbers with like denominators, by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. • Solve word problems involving addition and subtraction of fractions, including mixed numbers by writing equations from a visual representation of the problem.
Use unit fractions to understand operations of fractions.	
NC.4.NF.4	Apply and extend previous understandings of multiplication to: <ul style="list-style-type: none"> • Model and explain how fractions can be represented by multiplying a whole number by a unit fraction, using this understanding to multiply a whole number by any fraction less than one. • Solve word problems involving multiplication of a fraction by a whole number.
Understand decimal notation for fractions, and compare decimal fractions.	
NC.4.NF.6	Use decimal notation to represent fractions. <ul style="list-style-type: none"> • Express, model and explain the equivalence between fractions with denominators of 10 and 100. • Use equivalent fractions to add two fractions with denominators of 10 or 100. • Represent tenths and hundredths with models, making connections between fractions and decimals.
NC.4.NF.7	Compare two decimals to hundredths by reasoning about their size using area and length models, and recording the results of comparisons with the symbols $>$, $=$, or $<$. Recognize that comparisons are valid only when the two decimals refer to the same whole.

Measurement and Data

Abbreviation	Standard
Solve problems involving measurement.	
NC.4.MD.1	Know relative sizes of measurement units. Solve problems involving metric measurement. <ul style="list-style-type: none"> • Measure to solve problems involving metric units: centimeter, meter, gram, kilogram, Liter, milliliter. • Add, subtract, multiply, and divide to solve one-step word problems involving whole-number measurements of length, mass, and capacity that are given in metric units.
NC.4.MD.2	Use multiplicative reasoning to convert metric measurements from a larger unit to a smaller unit using place value understanding, two-column tables, and length models.
NC.4.MD.8	Solve word problems involving addition and subtraction of time intervals that cross the hour.
Solve problems involving area and perimeter.	
NC.4.MD.3	Solve problems with area and perimeter. <ul style="list-style-type: none"> • Find areas of rectilinear figures with known side lengths. • Solve problems involving a fixed area and varying perimeters and a fixed perimeter and varying areas. • Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
Represent and interpret data.	
NC.4.MD.4	Represent and interpret data using whole numbers. <ul style="list-style-type: none"> • Collect data by asking a question that yields numerical data. • Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
Understand concepts of angle and measure angles.	
NC.4.MD.6	Develop an understanding of angles and angle measurement. <ul style="list-style-type: none"> • Understand angles as geometric shapes that are formed wherever two rays share a common endpoint, and are measured in degrees. • Measure and sketch angles in whole-number degrees using a protractor. • Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.

Geometry

Abbreviation	Standard
Classify shapes based on lines and angles in two-dimensional figures.	
NC.4.G.1	Draw and identify points, lines, line segments, rays, angles, and perpendicular and parallel lines.
NC.4.G.2	Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines.
NC.4.G.3	Recognize symmetry in a two-dimensional figure, and identify and draw lines of symmetry.

Fifth Grade

Standards for Mathematical Practice

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

Operations and Algebraic Thinking

Abbreviation	Standard
Write and interpret numerical expressions.	
NC.5.OA.2	Write, explain, and evaluate numerical expressions involving the four operations to solve up to two-step problems. Include expressions involving: <ul style="list-style-type: none"> • Parentheses, using the order of operations. • Commutative, associative and distributive properties.
Analyze patterns and relationships.	
NC.5.OA.3	Generate two numerical patterns using two given rules. <ul style="list-style-type: none"> • Identify apparent relationships between corresponding terms. • Form ordered pairs consisting of corresponding terms from the two patterns. • Graph the ordered pairs on a coordinate plane.

Number and Operations in Base Ten

Abbreviation	Standard
Understand the place value system.	
NC.5.NBT.1	<p>Explain the patterns in the place value system from one million to the thousandths place.</p> <ul style="list-style-type: none"> • Explain that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left. • Explain patterns in products and quotients when numbers are multiplied by 1,000, 100, 10, 0.1, and 0.01 and/or divided by 10 and 100.
NC.5.NBT.3	<p>Read, write, and compare decimals to thousandths.</p> <ul style="list-style-type: none"> • Write decimals using base-ten numerals, number names, and expanded form. • Compare two decimals to thousandths based on the value of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
Perform operations with multi-digit whole numbers.	
NC.5.NBT.5	Demonstrate fluency with the multiplication of two whole numbers up to a three-digit number by a two-digit number using the standard algorithm.
NC.5.NBT.6	Find quotients with remainders when dividing whole numbers with up to four-digit dividends and two-digit divisors using rectangular arrays, area models, repeated subtraction, partial quotients, and/or the relationship between multiplication and division. Use models to make connections and develop the algorithm.
Perform operations with decimals.	
NC.5.NBT.7	<p>Compute and solve real-world problems with multi-digit whole numbers and decimal numbers.</p> <ul style="list-style-type: none"> • Add and subtract decimals to thousandths using models, drawings or strategies based on place value. • Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. • Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths. • Use estimation strategies to assess reasonableness of answers.

Number and Operations – Fractions

Abbreviation	Standard
Use equivalent fractions as a strategy to add and subtract fractions.	
NC.5.NF.1	<p>Add and subtract fractions, including mixed numbers, with unlike denominators using related fractions: halves, fourths and eighths; thirds, sixths, and twelfths; fifths, tenths, and hundredths.</p> <ul style="list-style-type: none"> • Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. • Solve one- and two-step word problems in context using area and length models to develop the algorithm. Represent the word problem in an equation.
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	
NC.5.NF.3	<p>Use fractions to model and solve division problems.</p> <ul style="list-style-type: none"> • Interpret a fraction as an equal sharing context, where a quantity is divided into equal parts. • Model and interpret a fraction as the division of the numerator by the denominator. • Solve one-step word problems involving division of whole numbers leading to answers in the form of fractions and mixed numbers, with denominators of 2, 3, 4, 5, 6, 8, 10, and 12, using area, length, and set models or equations.
NC.5.NF.4	<p>Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers.</p> <ul style="list-style-type: none"> • Use area and length models to multiply two fractions, with the denominators 2, 3, 4. • Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number. • Solve one-step word problems involving multiplication of fractions using models to develop the algorithm.
NC.5.NF.7	<p>Solve one-step word problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions using area and length models, and equations to represent the problem.</p>

Measurement and Data

Abbreviation	Standard
Convert like measurement units within a given measurement system.	
NC.5.MD.1	Given a conversion chart, use multiplicative reasoning to solve one-step conversion problems within a given measurement system.
Represent and interpret data.	
NC.5.MD.2	Represent and interpret data. <ul style="list-style-type: none"> Collect data by asking a question that yields data that changes over time. Make and interpret a representation of data using a line graph. Determine whether a survey question will yield categorical or numerical data, or data that changes over time.
Understand concepts of volume.	
NC.5.MD.4	Recognize volume as an attribute of solid figures and measure volume by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.
NC.5.MD.5	Relate volume to the operations of multiplication and addition. <ul style="list-style-type: none"> Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths. Build understanding of the volume formula for rectangular prisms with whole-number edge lengths in the context of solving problems. Find volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms.

Geometry

Abbreviation	Standard
Understand the coordinate plane.	
NC.5.G.1	Graph points in the first quadrant of a coordinate plane, and identify and interpret the x and y coordinates to solve problems.
Classify quadrilaterals.	
NC.5.G.3	Classify quadrilaterals into categories based on their properties. <ul style="list-style-type: none"> Explain that attributes belonging to a category of quadrilaterals also belong to all subcategories of that category. Classify quadrilaterals in a hierarchy based on properties.