

4th Grade

Standards for Mathematical Practice

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

Current Standard Abbreviation	Current Standard	Proposed Standard Abbreviation	Final Draft Proposed Standard
Use the four operations with whole numbers to solve problems.		Represent and solve problems involving multiplication and division.	
4.OA.1	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	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.
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. (Note: See Glossary, Table 2.)		STANDARD INCORPORATED INTO NC.4.OA.1 AND NC.4.OA.3
4.OA.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	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.		Gain familiarity with factors and multiples.	
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 a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	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.		Generate and analyze patterns.	
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. <i>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.</i>	NC.4.OA.5	Generate and analyze a number or shape pattern that follows a given rule.

Number and Operations in Base Ten			
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Generalize place value understanding for multi-digit whole numbers.		Generalize place value understanding for multi-digit numbers whole numbers.	
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. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>	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.
4.NBT.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	NC.4.NBT.2	Read and write multi-digit whole numbers up to and including 100,000 using numerals, number names, and expanded form.
	NEW STANDARD NUMBER, Concept from 4.NBT.2	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.
4.NBT.3	Use place value understanding to round multi-digit whole numbers to any place.		STANDARD INCORPORATED INTO NC.4.OA.3
Use place value understanding and properties of operations to perform multi-digit arithmetic.		Use place value understanding and properties of operations to perform multi-digit arithmetic.	
4.NBT.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.	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.
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.	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.
4.NBT.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	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

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Extend understanding of fraction equivalence and ordering.		Extend understanding of fractions.	
4.NF.1	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.	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.
4.NF.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.	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, $1/2$, 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.		Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	
4.NF.3	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. <ol style="list-style-type: none"> a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. <i>Examples:</i> $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. 	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.
4.NF.4	Apply and extend previous understandings of multiplication to	Use unit fractions to understand operations of fractions.	

Number and Operations – Fractions

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	multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of $1/b$. <i>For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</i> b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. <i>For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)</i> c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. <i>For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?</i>	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.		Understand decimal notation for fractions, and compare decimal fractions.	
4.NF.5	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. <i>For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.</i>		STANDARD INCORPORATED INTO NC.4.NF.6
4.NF.6	Use decimal notation for fractions with denominators 10 or 100. <i>For example, rewrite 0.62 as $62/100$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.</i>	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.
4.NF.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.	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

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



Measurement and Data

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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 measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. <i>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), ...</i>	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.
4.MD.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	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.
	NEW STANDARD NUMBER, Concept from 4.MD.2	NC.4.MD.8	Solve word problems involving addition and subtraction of time intervals that cross the hour.
4.MD.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</i>	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.		Represent and interpret data.	
4.MD.4	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>	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.
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.		Understand concepts of angle and measure angles.	

Measurement and Data

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4.MD.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: <ol style="list-style-type: none"> a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles. b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. c. 		<i>STANDARD INCORPORATED INTO NC.4.MD.6</i>
4.MD.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	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.
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.		<i>STANDARD INCORPORATED INTO NC.4.MD.6</i>

Geometry

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Draw and identify lines and angles, and classify shapes by properties of their lines and angles.		Classify shapes based on lines and angles in two-dimensional figures.	
4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	NC.4.G.1	Draw and identify points, lines, line segments, rays, angles, and perpendicular and parallel lines.

Geometry

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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.	NC.4.G.2	Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines.
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.	NC.4.G.3	Recognize symmetry in a two-dimensional figure, and identify and draw lines of symmetry.