New York State P-12 Learning Standards for Mathematics (Revised 2017)

Grade 4
Operations & Algebraic Thinking

		Standard Code	Standard	Additional Clarification/Examples
Clusters	**A. Use the four operations with whole numbers to solve problems.**	4.OA.A.1	1. Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.	e.g., • interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 or 7 times as many as 5. • Represent "Four times as many as eight is thirty two" as an equation, 4 x 8 = 32.
		4.OA.A.2	2. Multiply or divide to solve word problems involving multiplicative comparison. Use drawings and equations with a symbol for the unknown number to represent the problem; distinguish multiplicative comparison from additive comparison.	
		4.OA.A.3	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.	<u>Note</u>: Multistep problems need not be represented by a single expression or equation.
		4.OA.A.3a	3a. Represent these problems using equations or expressions with a letter standing for the unknown quantity.	
		4.OA.A.3b	3b. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	

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Grade 4 **Operations & Algebraic Thinking**				
Clusters		**Standard Code**	**Standard**	**Additional Clarification/Examples**
	B. Gain familiarity with factors and multiples.	4.OA.B.4	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.	
	C. Generate and analyze patterns.	4.OA.C.5	5. Generate a number or shape pattern that follows a given rule. Identify and informally explain apparent features of the pattern that were not explicit in the rule itself.	e.g., 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."

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Grade 4
Number & Operations in Base Ten

		Standard Code	Standard	Additional Clarification/Examples
Clusters	A. Generalize place value understanding for multi-digit whole numbers.	4.NBT. A.1	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.	e.g. recognize that 70 × 10 = 700 (and, therefore, 700 ÷ 10 = 70) by applying concepts of place value, multiplication, and division. Note: Grade 4 expectations are limited to whole numbers less than or equal to 1,000,000.
		4.NBT. A.2	2a. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. 2b. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	e.g., 50,327 = 50,000 + 300 + 20 + 7 Note: Grade 4 expectations are limited to whole numbers less than or equal to 1,000,000.
		4.NBT. A.3	3. Use place value understanding to round multi-digit whole numbers to any place.	Note: Grade 4 expectations are limited to whole numbers less than or equal to 1,000,000.

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Grade 4
Number & Operations in Base Ten

Clusters		Standard Code	Standard	Additional Clarification/Examples
Clusters	B. Use place value understanding and properties of operations to perform multi-digit arithmetic.	4.NBT. B.4	4. Fluently add and subtract multi-digit whole numbers using a standard algorithm.	<u>Note</u>: Grade 4 expectations are limited to whole numbers less than or equal to 1,000,000.
		4.NBT. B.5	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.	<u>Note</u>: Grade 4 expectations are limited to whole numbers less than or equal to 1,000,000.
		4.NBT. B.6	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.	<u>Note</u>: Grade 4 expectations are limited to whole numbers less than or equal to 1,000,000.

Grade 4
Number & Operations - Fractions

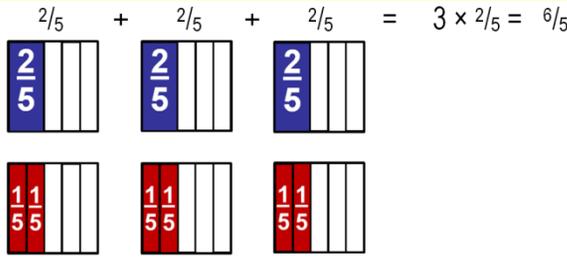| Clusters		Standard Code	Standard	Additional Clarification/Examples
Clusters	**A. Extend understanding of fraction equivalence and ordering.**	4.NF.A.1	1. Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(a \times n)}{(b \times n)}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	<u>Note</u>: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., $$\frac{1}{4} = \frac{1 \times 2}{4 \times 2} = \frac{1 \times 3}{4 \times 3}$$
		4.NF.A.2	2. Compare two fractions with different numerators and different denominators. 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 creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. e.g., justify by using a visual fraction model. <u>Note</u>: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.
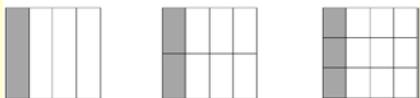
Grade 4
Number & Operations - Fractions

		Standard Code	Standard	Additional Clarification/Examples
Clusters	B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	4.NF.B.3	3. Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. Note: $\frac{1}{b}$ refers to the unit fraction for $\frac{a}{b}$.
		4.NF.B.3a	3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.
		4.NF.B.3b	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.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., by using a visual fraction model such as, but not limited to: • $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ • $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$ • $2\frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$
		4.NF.B.3c	3c. Add and subtract mixed numbers with like denominators.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
		4.NF.B.3d	3d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., using visual fraction models and equations to represent the problem.

Grade 4
Number & Operations - Fractions

		Standard Code	Standard	Additional Clarification/Examples
Clusters	**B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**	4.NF.B.4	4. Apply and extend previous understandings of multiplication to multiply a whole number by a fraction.	Notes: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. This standard refers to *n* groups of a fraction (where *n* is a whole number). e.g., 4 groups of $\frac{1}{3}$; which lends itself to being thought about as repeated addition. In grade 5 (5. NF.B.4) students will be multiplying a fraction by a whole number, such as $\frac{1}{3}$ of 4.
		4.NF.B.4a	4a. Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., use a visual fraction model to represent $\frac{5}{4}$ as the product $5 \times \frac{1}{4}$, recording the conclusion by the equation $\frac{5}{4} = 5 \times \left(\frac{1}{4}\right)$.
		4.NF.B.4b	4b. Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$, and use this understanding to multiply a whole number by a fraction.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., use a visual fraction model to express $3 \times \left(\frac{2}{5}\right)$ as $6 \times \left(\frac{1}{5}\right)$, recognizing this product as $\frac{6}{5}$. Such as: In general, $n \times \left(\frac{a}{b}\right) = \frac{(n \times a)}{b}$

4.NF.B.4c	4c. Solve word problems involving multiplication of a whole number by a fraction.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., using visual fraction models and equations to represent the problem. 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?

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Grade 4
Number & Operations - Fractions

		Standard Code	Standard	Additional Clarification/Examples
Clusters	C. Understand decimal notation for fractions, and compare decimal fractions.	4.NF.C.5	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.	Notes: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade. e.g., express $\frac{3}{10}$ as $\frac{30}{100}$ and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$.
		4.NF.C.6	6. Use decimal notation for fractions with denominators 10 or 100.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., • Rewrite 0.62 as $\frac{62}{100}$ or $\frac{62}{100}$ as 0.62 • Describe a length as 0.62 meters • Locate 0.62 on a number line

		4.NF.C.7	7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. e.g., using a visual model. **Seeing that $0.2 > 0.09$ using a visual fraction model** *The shaded region on the left shows 0.2 of the unit square, since it is two parts when the square is divided int 10 parts of equal area. The shaded region on the right shows 0.09 of the unit square, since it is 9 parts when the unit is divided into 100 parts of equal area.* nator. For example, to compare 0.2 and 0.09, students think of them as 0.20 and 0.09 and see that $0.20 > 0.09$ because[4.NF7] $$\frac{20}{100} > \frac{9}{100}.$$ The argument using the meaning of a decimal as a fraction generalizes to work with decimals in Grade 5 that have more than two digits, whereas the argument using a visual fraction model, shown in the margin, does not. So it is useful for Grade 4 students to see such reasoning.
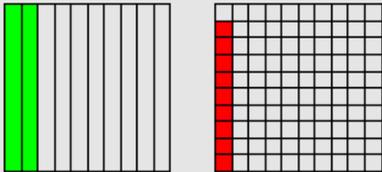
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Grade 4
Measurement & Data

		Standard Code	Standard	Additional Clarification/Examples
Clusters	A. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	4.MD.A.1	1. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. a. Know relative sizes of units: ft., in.; km, m, cm; hr., min., sec. b. Convert units within one system of units when the conversion factor is given. c. Record measurement equivalents in a two-column table.	<u>Note</u>: It is important to note that conversions are made from a larger to a smaller unit. a. e.g., kg, g; lb., oz.; l, ml b. e.g., knowing that 1 ft. is 12 times as long as 1 in., express the length of a 4-ft. snake as 48 in. c. e.g., generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), …
		4.MD.A.2	2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money. a. Solve problems involving fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. b. Represent measurement quantities using diagrams that feature a measurement scale, such as number lines.	Note: Grade 4 expectations are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.
		4.MD.A.3	3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.	e.g., 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.

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	Grade 4 Measurement & Data			
		Standard Code	**Standard**	**Additional Clarification/Examples**
Clusters	**B. Represent and interpret data.**	4.MD.B.4	4. Make a line plot to display a data set of measurements in fractions of a unit $\left(\frac{1}{2}, \frac{1}{4}, \frac{1}{8}\right)$. Solve problems involving addition and subtraction of fractions by using information presented in line plots.	e.g., given measurement data on a line plot, find and interpret the difference in length between the longest and shortest specimens in an insect collection.

		Standard Code	Standard	Additional Clarification/Examples
Clusters	C. Geometric measurement: understand concepts of angle and measure angles.	4.MD.C.5	5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.	
		4.MD.C.5a	5a. Recognize 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.	
		4.MD.C.5b	5b. Recognize an angle that turns through n one-degree angles is said to have an angle measure of n degrees.	

		Standard Code	Standard	Additional Clarification/Examples
Clusters	C. Geometric measurement: understand concepts of angle and measure angles.	4.MD.C.6	6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	
		4.MD.C.7	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., Using an equation with a symbol for the unknown angle measure.

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Grade 4
Measurement & Data

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Grade 4 Geometry			
	Standard Code	Standard	Additional Clarification/Examples
Clusters / A. Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	4.G.A.1	1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	
	4.G.A.2	2a. Identify and name triangles based on angle size (right, obtuse, acute). 2b. Identify and name all quadrilaterals with four right angles as rectangles. 2c. Identify and name all quadrilaterals with 2 pairs of parallel sides as parallelograms.	
	4.G.A.3	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.	