Submit comments on the draft NYS Grade 4 Mathematics Learning Standards

NYS Grade 3 to Grade 5 Mathematics Learning Standards					
Grade 4 Operations & Algebraic Thinking					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
Clusters	A. Use the four operations with whole numbers to solve problems.	4.OA.A.1	1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 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.	1. No change.	
		4.OA.A.2	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. See glossary table 2.	2. No change.	
		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. 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.	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. a. Represent these problems using equations or expressions with a letter standing for the unknown quantity. b. When problems include multiplication and addition, understand that multiplication is always done before addition - unless parentheses are included. c. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. Note: Multistep problems need not be represented by a single expression or equation.	**Order of Operations now being introduced in Grade 4. See 3.OA.D.8 and 5.OA.A.1**

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Grade 4 **Operations & Algebraic Thinking**					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
Clusters	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.	4. No change.	
	C. Generate and analyze patterns.	4.OA.C.5	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. 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.	5. No change.	

NYS Grade 3 to Grade 5 Mathematics Learning Standards

Grade 4
Number & Operations in Base Ten

Clusters		Standard Code	Current Standard	Revised Standard Recommendation for 2018-19	Additional Information/Notes
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. For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.)	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. *For example, recognize that 70 × 10 = 700 (and, therefore, 700 ÷ 70 = 10) by applying concepts of place value, multiplication, and division.*	
		4.NBT.A.2	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. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.)	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. Note: Expanded Form in grade 4 should take the form of: (3×100) + (2×10) + (7×1) *with or without parentheses. This representation helps scaffold depth of understanding of the base-ten number system from 2.NBT.A.3 towards that which is required by 5.NBT.A.3a.	
		4.NBT.A.3	3. Use place value understanding to round multi-digit whole numbers to any place. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.)	3. No change.	

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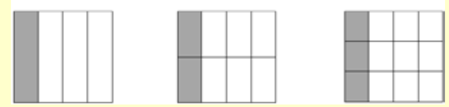
NYS Grade 3 to Grade 5 Mathematics Learning Standards					
Grade 4 Number & Operations in Base Ten					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
Clusters	B. Use place value understanding and properties of operations to perform multi-digit arithmetic.	4.NBT.B.4	4. Fluently add and subtract multi-digit whole numbers using the standard algorithm. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. A range of algorithms may be used.)	4. No change.	
		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. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. A range of algorithms may be used.)	5. No change.	
		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. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. A range of algorithms may be used.)	6. No change.	

NYS Grade 3 to Grade 5 Mathematics Learning Standards

Grade 4
Number & Operations - Fractions (limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, 100)

		Standard Code	Current Standard	Revised Standard Recommendation for 2018-19	Additional Information/Notes
Clusters	A. Extend understanding of fraction equivalence and ordering.	4.NF.A.1	1. Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × 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. Use this principle to recognize and generate equivalent fractions. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)	1. Explain why a fraction *a*/*b* is equivalent to a fraction (*a* × *n*)/(*b* × *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. *For example,* $\frac{1}{4} = \frac{1 \times 2}{4 \times 2} = \frac{1 \times 3}{4 \times 3}$ 	
		4.NF.A.2	2. Compare two fractions with different numerators and different denominators, 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. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)	2. No change.	

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NYS Grade 3 to Grade 5 Mathematics Learning Standards					
Grade 4 **Number & Operations - Fractions (limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, 100)**					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
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 a/b with a > 1 as a sum of fractions 1/b. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)	3. Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b* (the unit fraction for *a*/*b*).	
		4.NF.B.3a	3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	3a. No change.	
		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, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.	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, e.g., by using a visual fraction model. *Examples:* • *3/8 = 1/8 + 1/8 + 1/8* • *3/8 = 1/8 + 2/8* • *2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8*	
		4.NF.B.3c	3c. 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.	3c. No change.	
		4.NF.B.3d	3d. 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.	3d. No change.	

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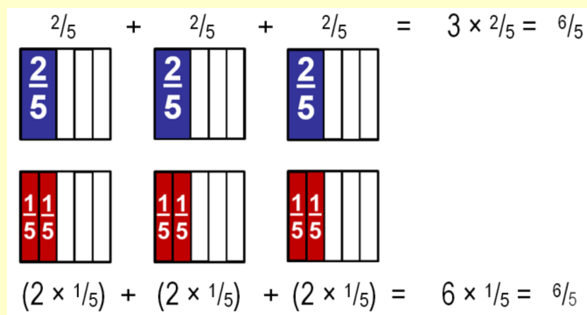
NYS Grade 3 to Grade 5 Mathematics Learning Standards

Grade 4

Number & Operations - Fractions (limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, 100)

		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
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 fraction by a whole number. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)	4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. Note: This standard is limited to *n* groups of a fraction (where *n* is a whole number). For example, 4 groups of 1/3; which lends itself to being thought about as repeated addition.	Fifth grade addresses 1/3 of 4.
		4.NF.B.4a	4a. Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).	4a. No change.	
		4.NF.B.4b	4b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)	4b. Understand a multiple of *a/b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* 	

		4.NF.B.4c	4c. 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. 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?	4c. No change.	

NYS Grade 3 to Grade 5 Mathematics Learning Standards					
Grade 4 **Number & Operations - Fractions (limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, 100)**					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
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. For example, express 3/10 as 30/100 and add 3/10 + 4/100 = 34/100. (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.) (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)	5. No change.	
		4.NF.C.6	6. Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)	6. No change.	

		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, e.g., by using a visual model. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)	7. No change.	

NYS Grade 3 to Grade 5 Mathematics Learning Standards				
Grade 4 Measurement & Data				
	Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
Clusters A. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	4.MD.A.1	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. 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), ….	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.; hr., min., sec. *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.* b. Convert units within one system of units when the conversion factor is given (e.g., km, m, cm; kg, g; lb., oz.; l, ml). c. Record measurement equivalents in a two column table. *For example, generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*	**While this revised standard does not require students to "know" as many conversions, they are still required to know the ones that will not be given on "reference sheets" in future grades. The revised standard still prepares students for the fifth grade standards (5.MD.A.1)**
	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, 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.	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.	
	4.MD.A.3	3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. 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.	3. No change.	

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Grade 4 Measurement & Data					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
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 (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.	4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, given measurement data on a line plot, find and interpret the difference in length between the longest and shortest specimens in an insect collection.*	

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NYS Grade 3 to Grade 5 Mathematics Learning Standards					
Grade 4 Measurement & Data					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
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:	5. No change.	
		4.MD.C.5a	5a. 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 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.	5a. No change.	
		4.MD.C.5b	5b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.	5b. No change.	

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Grade 4 **Measurement & Data**					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
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.	6. No change.	
		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., by using an equation with a symbol for the unknown angle measure.	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. Connection: By using an equation with a symbol for the unknown angle measure, students connect this work with 4.OA.A.3.	

NYS Grade 3 to Grade 5 Mathematics Learning Standards					
Grade 4 **Geometry**					
		Standard Code	**Current Standard**	**Revised Standard Recommendation for 2018-19**	**Additional Information/Notes**
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.	1. No change.	
		4.G.A.2	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.	2. Classify triangles based on angle size. Classify quadrilaterals based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size.	
		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.	3. No change.	