New York City Department of Education
Scope and Sequence Sample– Grade 4
2012-13 School Year

Overview

This document was created after closely examining the Common Core Learning Standards (CCLS) and the previous New York State Standards and updated after examining NYS' recently released scope and sequence supports and testing program guidance. It provides a high-level CCLS-aligned scope and sequence for Mathematics that also takes into account the differences in and transition from the New York State Standards. The scope and sequence is aligned to the Common Core and demonstrates a focus on the major work of the grade[1], which the State has indicated will be the focus of next year's 3-8 State exams. This scope and sequence represents one way that a school may choose to organize and teach the full range of the standards and incorporate the State's pre and post-test standards guidance. This document contains the following components:

- **Year-long Overview:** A one-page view of the year that shows the:
  - **Unit Summary & Benchmark Assessment Moments**: The number of suggested units across the year and the amount of instructional time spent on each unit including suggestions for where schools may choose to administer the new Common Core-aligned benchmark assessments available through the Periodic Assessment program.
  - **Concepts that Should be Omitted:** Concepts that are no longer taught at this grade-level according to the CCLS.
  - **Bridge Guidance:** Concepts that would have been taught in earlier grades, according to the Common Core, but were not part of the New York State Standards. They should be considered and woven into units during transition years since the concepts were not previously addressed/addressed fully in the New York State Standards. We ask that you consider the needs of your students when deciding if it is necessary to teach these concepts. Please note: Bridge concepts are intended for instructional consideration when crafting a coherent sequence of instruction during the transitional years only and are not a part of SED's draft Test Program Guidance.
- **High-level Unit Overviews:** Overviews of each unit that include the:
  - **Unit Description:** A narrative description of the concepts the unit is intended to cover and the amount of instructional time suggested.
  - **Standards:** The group of related standards that should be taught within the unit.

How to Use:

To use this document, teacher teams could:

- Review the year-long and unit overviews to assess whether the scope and sequence makes sense for their school.
- Review the resources available by standard in each high-level unit overview.
- Use the high-level unit overviews and resources available to teach a sequence of instruction that fully addresses the standards represented.

[1] For a listing of content emphases by cluster, refer to http://engageny.org/resource/math-content-emphases. For additional guidance—including key advances by grade, opportunities for in-depth focus, connections between content and practice standards, etc.—refer to http://www.parcconline.org/sites/parcc/files/PARCCMCFMathematics_August%202012rev2_FINAL.pdf.
With questions or feedback on this document, please email commoncorefellows@schools.nyc.gov.

Grade 4 Year-Long Overview:

This table shows an overview of all units that should be taught across the year and the recommended instructional time for each unit[1].

Grade 4: Suggested Distribution of Units in Instructional Days	Time	# of weeks
Unit 1: Place Value, Rounding, Fluency with Addition and Subtraction Algorithms of Whole Numbers	15%	**5 Weeks**
Unit 2: Unit Conversions: Addition and Subtraction of Length, Weight, and Capacity	5%	**2 Weeks**
Benchmark Assessment Moment: Acuity Benchmark 1		
Unit 3: Multiplication and Division of Up to a 4-Digit Number by Up to a 1-Digit Number Using Place Value	25%	**9 Weeks**
Unit 4: Addition and Subtraction of Angle Measurements of Planar Figures	10%	**4 Weeks**
Benchmark Assessment Moment: Acuity Benchmark 2		
Unit 5: Order and Operations with Fractions	25%	**9 Weeks**
State Test		
Unit 6: Decimal Fractions (*Post-Test Unit)*	10%	**4 Weeks**
Unit 7: Exploring Multiplication (*Post-Test Unit)*	10%	**4 weeks**

Concepts that should be Omitted:

- Develop fluency in skip counting by 1,000
- Compare up to 10,000 and decimals to hundredths using the symbol ≠
- Understand fraction as division of whole numbers
- Find the value(s) that will make an open sentence true if it contains < or >
- Define and identify vertices, daces, and edges on three-dimensional shape
- Read and interpret line graphs

Bridge Concepts

- Solving for the unknown, using a symbol, in multiplication and division word problems with equations and in perimeter/ area problems with side lengths.
- Developing the idea of area by recognizing it as an attribute of plane figures and partitioning a rectangle into rows and columns of same-size squares.
- Calculating area of polygons using multiplication, distributive property, and decomposition into rectangles as strategies to solve word problems.
- Recognizing and generating simple equivalent fractions.

[1] Unit overviews and suggested instructional time are based on *Common Core Curriculum Maps in Mathematics A Story of Units Pre-K- 5* developed by Common Core, Inc.

Unit 1: Place Value, Rounding, Fluency with Addition and Subtraction Algorithms of Whole Numbers – (5 Weeks)

DESCRIPTION: Students will learn that algorithms have become the *concrete* knowledge which they will rely upon to understand new ideas. The Mathematical Practices should be evident throughout instruction and connected to the content addressed in this unit. Students should engage in mathematical tasks that provide an opportunity to connect content and practices.

Standards

The standards listed below are **not** intentionally sequenced and should **not** simply be taught consecutively. Strong units weave these standards together in a thoughtful and coherent way. Schools and teacher teams can use this document to compare their current curriculum to and choose high leverage moments to enhance instruction.

Use the four operations with whole numbers to solve problems.

4.OA.3: Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations.

Generalize place value understanding for multi-digit 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. For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.

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.

4.NBT.3: Use place value understanding to round multi-digit whole numbers to any place.

Use place value understanding and properties of operations to perform multi-digit whole numbers.

4.NBT.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Unit 2: Unit Conversations: Addition and Subtraction of Length, Weight, and Capacity - (2 Weeks)

DESCRIPTION: Students will learn to draw similarities between measurement problems which act as the "glue" that binds knowledge of the algorithms, mental math, place value, and real-world applications together into a coherent whole. The Mathematical Practices should be evident throughout instruction and connected to the content addressed in this unit. Students should engage in mathematical tasks that provide an opportunity to connect content and practices.

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

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. 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).

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.

Unit 3: Multiplication and Division of up to a 4-Digit number by Up to a 1-Digit Number Using Place Value – (9 Weeks)

DESCRIPTION: Compound measurement units will provide students the concrete foundation behind the distributive property in the multiplication algorithm: 4 × (1 m 2 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 × (1 ten 2 ones) = 4 tens 8 ones. The Mathematical Practices should be evident throughout instruction and connected to the content addressed in this unit. Students should engage in mathematical tasks that provide an opportunity to connect content and practices.

Standards

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Use the four operations with whole numbers to solve problems.

4.OA.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 comparison as multiplication equations.

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.

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.

Gain familiarity with factors and multiplies.

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.

Use place value understanding and properties of operations to perform multi-digit arithmetic.

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.

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.

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

4.MD.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 and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Bridge Guidance: *Concepts that would have been taught in earlier grades, according to the Common Core, but were not part of the New York State Standards. They should be considered and woven into units during transition years since the concepts were not previously addressed/addressed fully in the New York State Standards. We ask that you consider the needs of your students when deciding if it is necessary to teach these concepts. Please note: Bridge concepts are intended for instructional consideration when crafting a coherent sequence of instruction during the transitional years only and are not a part of SED's draft Test Program Guidance.*
Standards
3.OA.8 Solve two-step word problems using the four operations. 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.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement. *a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.* *b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.*
3.MD.7 Relate area to the operations of multiplication and addition. *a. 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.* *b. Multiply side lengths to find areas of rectangles with whole- number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.* *c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.* *d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non overlapping parts, applying this technique to solve real world problems.*

Unit 4: Addition and Subtraction of Angle Measurements of Planar Figures – (4 Weeks)

DESCRIPTION: Students will learn how to measure angles in degrees using a protractor by solving unknown angle problems. They also learn basic facts about angles. The Mathematical Practices should be evident throughout instruction and connected to the content addressed in this unit. Students should engage in mathematical tasks that provide an opportunity to connect content and practices.

Standards

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Geometric measurements: understand concepts of angle and measure angles.

4.MD.5: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
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 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.

4.MD.6: Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

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.

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

4.G.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two dimensional figures.

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.

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.

Unit 5: Order and Operations with Fractions - (9 Weeks)

DESCRIPTION: Students will learn that decimals start with the realization that decimal place value units are just special fractional units: 1 tenth = 1/10, 1 hundredth =1/100, etc. Fluency plays an important role in both of these topics as students learn to relate 3/10 = 0.3 = 3 tenths. The Mathematical Practices should be evident throughout instruction and connected to the content addressed in this unit. Students should engage in mathematical tasks that provide an opportunity to connect content and practices.

Standards

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Extend understanding of fraction equivalence and ordering.

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. Use this principle to recognize and generate equivalent fractions.

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.

Build fractions from unit fractions by applying and extending previous understanding of operations on whole numbers.

4.NF.3: Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

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. *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.*

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.

4.NF.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

a. 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).*

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. *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.)*

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. *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?*

Represent and interpret data.

4.MD.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.*

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3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.

b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.

c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Unit 6: Decimal Fractions – (4 Weeks)
DESCRIPTION: The Mathematical Practices should be evident throughout instruction and connected to the content addressed in this unit. Students should engage in mathematical tasks that provide an opportunity to connect content and practices.
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Understand decimal notations 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 100.4 For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.
4.NF.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.
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.

Unit 7: Exploring Multiplications – (4 Weeks)

DESCRIPTION: Students will learn that there are many opportunities for them to "discover" ways to multiply 2-digit × 2-digit numbers by using their tools (place value tables, area models, bar models, number disks, the distributive property and equations, etc.).The Mathematical Practices should be evident throughout instruction and connected to the content addressed in this unit. Students should engage in mathematical tasks that provide an opportunity to connect content and practices.

Standards

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Use the four operations with whole numbers to solve problems.

4.OA.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 comparison as multiplication equations.

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.

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 place value understanding and properties of operations to perform multi-digit arithmetic.

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.

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

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. *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), …*

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.