

# New York City Department of Education

## Scope and Sequence Sample— Grade 5

### 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. 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<sup>1</sup>, 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 before the state test. It is not based on any additional information about the changes in next year’s tests. This document contains the following components:

- **Year-long Overview:** A one-page view of the year that shows the:
  - **Unit Summary:** The number of suggested units across the year and the amount of instructional time spent on each unit. The instructional time is represented as pre-State test and post-State test.
  - **Omitted Concepts:** 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.
- **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. The standards within units are **not** intentionally sequenced. Schools should use the high-level unit overviews and compare them to current curricula to teach a unit that fully represents the standards addressed.

#### 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.
- Use the high-level unit overviews and resources available at the school and forthcoming from the State to teach a sequence of instruction that fully addresses the standards represented.

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<sup>1</sup> 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/PARCC%20MCP%20for%20Mathematics\\_Fall%202011%20Release.pdf](http://www.parcconline.org/sites/parcc/files/PARCC%20MCP%20for%20Mathematics_Fall%202011%20Release.pdf). With questions or feedback on this document, please email [commoncorefellows@schools.nyc.gov](mailto:commoncorefellows@schools.nyc.gov).

## Scope and Sequence Sample: School Year 2012-13 – Grade 5

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### Grade 5 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<sup>1</sup>.

Grade 5: Suggested Distribution of Units in Instructional Days	Time	# of weeks
Unit 1: Adding & Subtracting Fractions and Other Fraction Concepts	20%	5 Weeks
Unit 2: Whole Number and Decimal Place Value	17.5%	5 Weeks
Unit 3: Whole Number and Decimal Operations	17.5%	5 Weeks
Unit 4: Multiplying & Dividing Fractions	20%	5 Weeks
Unit 5: Addition and Multiplication with Volume and Area	15%	4 Weeks
Unit 6: Graph Points on the Coordinate Plane to Solve Problems	10%	2 Weeks
<b>State Test</b>		
Post-test: After the state test, teachers should consider focusing their instruction on re-visiting the <i>key advances from the previous grade</i> and the <i>grade level fluency expectations and/or culminating standards</i> identified in the PARCC Content Model Frameworks. Students should continue to solve a wide scope of problems corresponding to the <i>key advances from the previous grade</i> and receive sufficient support and opportunities for practice with the <i>grade level fluency expectations and/or culminating standards</i> .		

#### Omitted Concepts:

- Ratios
- Define variables, constants,
- Translate verbal expressions to algebraic expressions,
- Evaluate expressions using substitution
- Solve simple one-step equations
- Similar triangles, sum of the interior angles of a triangle, congruent triangles, missing angle of a triangle.
- Percent as part of 100
- Statistics and Probability

#### Bridge Concepts

- Compare fractions using an understanding of fraction equivalence.
- Add and subtract mixed numbers with like denominators using an understanding of fraction equivalence and/or properties of operations and the relationship between addition and subtraction.
- Understand a multiple of  $a/b$  as a multiple of  $1/b$ , and use this understanding to multiply a fraction by a whole number.

<sup>1</sup> Unit overviews and suggested instructional time are based on the *Draft Curriculum Maps in Mathematics: Overview of Grades 5-8 Units* developed by Student Achievement Partners.

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### Unit 1: Adding & Subtracting Fractions & Other Fraction Concepts

- (5 Weeks)

**DESCRIPTION:** Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They also begin to interpret a fraction as division of the numerator by the denominator. 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.

5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example,  $2/3 + 5/4 = 8/12 + 15/12 = 23/12$ . (In general,  $a/b + c/d = (ad + bc)/bd$ .)

5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result  $2/5 + 1/2 = 3/7$ , by observing that  $3/7 < 1/2$ .

5.NF.3 Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret  $3/4$  as the result of dividing 3 by 4, noting that  $3/4$  multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size  $3/4$ . If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?

5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit ( $1/2, 1/4, 1/8$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount.

#### Bridge Guidance:

#### Standards

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 understandings of operations on whole numbers.

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

- Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- 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:  $3/8 = 1/8 + 1/8 + 1/8$ ;  $3/8 = 1/8 + 2/8$ ;  $2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$ .
- 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.
- 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.

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### Unit 2: Whole Number and Decimal Place Value – (5 Weeks)

**DESCRIPTION:** Students continue to extend and apply their understanding of the place value system as they analyze multi-digit numbers and round decimals to any place. They also read, write, and compare decimals to thousandths. 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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5.NBT.1 Recognize 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.

5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole number exponents to denote powers of 10.

5.NBT.3 Read, write, and compare decimals to thousandths.

a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g.,  $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (\frac{1}{10}) + 9 \times (\frac{1}{100}) + 2 \times (\frac{1}{1000})$ .

b. Compare two decimals to thousandths based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.

5.NBT.4: Use place value understanding to round decimals to any place.

5.MD.1: Convert among different-sized standard measurement units within a given measure.

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### Unit 3: Whole Number and Decimal Operations – (5 Weeks)

**DESCRIPTION:** Students apply their understanding of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They will develop fluency with these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole number to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently. 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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5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-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.

5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

5.OA.1: Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

5.OA.2: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as  $2 \times (8 + 7)$ . Recognize that  $3 \times (18932 + 921)$  is three times as large as  $18932 + 921$ , without having to calculate the indicated sum or product.

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### Unit 4: Multiplying and Dividing Fractions – (5 Weeks)

**DESCRIPTION:** Students use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions makes sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by a unit fraction.) 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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5.NF.4: Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

- Interpret the product  $(a/b) \times q$  as a parts of a partition of  $q$  into  $b$  equal parts; equivalently, as the result of a sequence of operations  $a \times q \div b$ . For example, use a visual fraction model to show  $(2/3) \times 4 = 8/3$ , and create a story context for this equation. Do the same with  $(2/3) \times (4/5) = 8/15$ . (In general,  $(a/b) \times (c/d) = ac/bd$ .)
- Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5.NF.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example,  $2/3 + 5/4 = 8/12 + 15/12 = 23/12$ . (In general,  $a/b + c/d = (ad + bc)/bd$ .)

5.NF.5: Interpret multiplication as scaling (resizing), by:

- Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
- Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence  $a/b = (n \times a)/(n \times b)$  to the effect of multiplying  $a/b$  by 1.

5.NF.6: Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

- Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for  $(1/3) \div 4$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that  $(1/3) \div 4 = 1/12$  because  $(1/12) \times 4 = 1/3$ .
- Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for  $4 \div (1/5)$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that  $4 \div (1/5) = 20$  because  $20 \times (1/5) = 4$ .
- Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share  $1/2$  lb of chocolate equally? How many  $1/3$ -cup servings are in 2 cups of raisins?

5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit ( $1/2, 1/4, 1/8$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally. Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.

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### Bridge Guidance:

#### Standards

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  $5 \times (1/4)$ , recording the conclusion by the equation  $5/4 = 5 \times (1/4)$ .
- 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  $3 \times (2/5)$  as  $6 \times (1/5)$ , recognizing this product as  $6/5$ . (In general,  $n \times (a/b) = (n \times a)/b$ .)
- 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?

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### Unit 5: Addition and Multiplication with Volume an Area – (4 Weeks)

**DESCRIPTION:** Students understand concepts of volume and relate volume to multiplication and addition. They recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensions shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real-world and mathematical problems. 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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5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

- a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.
- b. A solid figure which can be packed without gaps or overlaps using  $n$  unit cubes is said to have a volume of  $n$  cubic units.

5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

- a. Find the volume of a right 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, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
- b. Apply the formulas  $V=l \times w \times h$  and  $V=b \times h$  for rectangular prisms to find volumes of right rectangular prisms with whole- number edge lengths in the context of solving real world and mathematical problems.
- c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

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### Unit 6: Graph Points on the Coordinate Plane to Solve Problems – (2 Weeks)

**DESCRIPTION:** Students graph points on the coordinate plane to solve real-world and mathematical problems. 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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5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.

5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

5.G.4 Classify two-dimensional figures in a hierarchy based on properties.