New York City Department of Education
Scope and Sequence Sample– Grade 7
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[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 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.

[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/PARCC%20MCF%20for%20Mathematics_Fall%202011%20Release.pdf.
With questions or feedback on this document, please email commoncorefellows@schools.nyc.gov.

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Scope and Sequence Sample: School Year 2012-13 – Grade 7

This document provides a high-level scope and sequence aligned to the Common Core Learning Standards for Mathematics and demonstrates a focus on the major work of the grade, which the SED 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 shift(s) in next year's tests.

Grade 7 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 7: Suggested Distribution of Units in Instructional Days	Time	# of weeks
Unit 1: Add, Subtract, Multiply & Divide Rational Numbers	25%	**6 Weeks**
Unit 2: Ratios & Proportions	15%	**4 Weeks**
Unit 3: Application of Proportional Relationships	15%	**4 Weeks**
Unit 4: Expressions	20%	**5 Weeks**
Unit 5: Equations	20%	**5 Weeks**
Unit 6: Probability	5%	**2 Weeks**
State Test		
Post-test: After the state test, teachers should consider focusing their instruction on re-visiting the *key advances from the previous grade* and *the grade level fluency expectations and/or culminating standards* identified in the PARCC Content Model Frameworks. Students should continue to solve a wide scope of problems corresponding to the *key advances from the previous grade* and receive sufficient support and opportunities for practice with *the grade level fluency expectations and/or culminating standards.*		

Omitted Concepts:

- Drawing central angles and finding missing angle of a quadrilateral
- Volume
- Calculate radius and diameter of a circle given the circumference and area
- Circle graphs, double line and double bar graphs
- Solve linear equations containing parentheses, variables on both sides of the equal sign and combining like terms
- Laws of exponents, zero and negative exponents
- Write an equation to represent a function from a table of values.
- Predict outcomes, design experiments, compare actual and predicted results
- Pythagorean Theorem
- Real numbers

Bridge Concepts

- Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts as a single entity.
- Apply the properties of operations to generate equivalent expressions including distributive property; identify when two expressions are equivalent.
- Write an inequality of the form $x>c$ or $x< c$ to represent a constraint or condition in a real-world or mathematical problem and recognize that inequalities in these forms have infinitely many solutions; represent solutions of such inequalities on a number line.
- Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true?

[1] 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: Add, Subtract, Multiply & Divide Rational Numbers – (6 Weeks)

DESCRIPTION: Students apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers and use this understanding to solve real world and mathematical problems involving the four operations. 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.

7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

a. Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.

b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

c. Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

d. Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as
(–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real- world contexts.

c. Apply properties of operations as strategies to multiply and divide rational numbers.

d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

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Unit 2: Ratios and Proportions – (4 Weeks)

DESCRIPTION: Students analyze proportional relationships and use them 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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7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.

7.RP.2 Recognize and represent proportional relationships between quantities.

a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t=pn.

d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.

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Unit 3: Application of Proportional Relationships – (4 Weeks)

DESCRIPTION: Students apply the understanding of proportional relationships to different situations including multi-step ratio and percent problems, and scale drawings of geometric shapes. They also use random sampling to draw inferences about a population and draw informal comparative inferences about two populations. 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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7.RP.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

7.SP.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.

7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh grade science book are generally longer than the words in a chapter of a fourth-grade science book.

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Unit 4: Expressions – (5 Weeks)

DESCRIPTION:

Students use properties of operations to generate equivalent expressions. They also draw, construct and describe geometrical figures and describe the relationships between them. 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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7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."

7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

7.G.3 Describe the two-dimensional figures that result from slicing three- dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

Bridge Guidance:

Standards

6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.

a. Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 – y.

b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.

c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole- number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = ½.

6.EE.3 Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.

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Unit 5: Equations – (5 Weeks)

DESCRIPTION: Students solve real-life and mathematical problems using numerical and algebraic equations and inequalities. They also solve real-life and mathematical problems involving angle measure, area, surface area, and volume. 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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7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

7.G.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Bridge Guidance:

Standards

6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

6.EE.8 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

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Unit 6: Probability – (2 Weeks)

DESCRIPTION: Students investigate chance processes and develop, use, and evaluate probability models. 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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7.SP.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

7.SP.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.

7.SP.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.

b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?

7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.

c. Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?