Prep School – 7th Grade Math Curriculum Map

Unit	Modules	Lessons	NYS Next Generation Learning Standard	Vocabulary
1 Proportional Relationships	**1 Identify and Represent Proportional Relationships**	**1.1 - 1.6**	**NY-7.RP.1** Compute unit rates associated with ratios of fractions. e.g., If a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the rate as the complex fraction $\frac{\frac{1}{2}}{\frac{1}{4}}$ miles per hour, equivalently 2 miles per hour **with 2 being the unit rate.** Note: Problems may include ratios of lengths, areas, and other quantities measured in like or different units, including across measurement systems. **NY-7.RP.2** Recognize and represent proportional relationships between quantities. **NY-7.RP.2a** Decide whether two quantities are in a proportional relationship. Note: **Strategies include but are not limited to the following**: testing for equivalent ratios in a table and/or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. **NY-7.RP.2b** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. **NY-7.RP.2c** Represent a proportional relationship **using an** equation. e.g., 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.* **NY-7.RP.2d** 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. **NY-7.RP.3** Use proportional relationships to solve multistep ratio and percent problems. Note: Examples of percent problems include: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error.	• Unit Rate • Equation • Ratio • Constant of Proportionality • Proportional Relationship • Reciprocal • Dimension • Scale • Scale Drawing
	2 Proportional Reasoning with Percents	**2.1 - 2.5**		• Percent Change • Percent Decrease • Percent Increase • Cost • Markdown • Markup • Retail Price • Gratuity • Sales Tax • Tip • Fee • Commission • Commission Rate • Principal • Simple Interest

2 **Rational Number Operations**	**3** **Understand Addition and Subtraction of Rational Numbers**	**3.1 - 3.3**	**NY-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. **NY-7.NS.1a** Describe situations in which opposite quantities combine to make 0. **NY-7.NS.1b** Understand **addition of rational numbers**; $p + q$ is 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.	• Addition Property of Opposites • Additive Inverse
	4 **Add and Subtract Rational Numbers**	**4.1 - 4.4**	**NY-7.NS.1c** 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. **NY-7.NS.1d** Apply properties of operations as strategies to add and subtract rational numbers. **NY-7.NS.2** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers	• Absolute Value • Addend • Mixed Number
	5 **Multiply and Divide Rational Numbers**	**5.1 - 5.4**	**NY-7.NS.2a** 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. **NY-7.NS.2b** 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 $-(\frac{p}{q}) = \frac{-p}{q} = \frac{p}{-q}$. Interpret quotients of rational numbers by describing real-world contexts.	• Dividend • Divisor • Factor • Inverse Operations • Product • Quotient
	6 **Solve Multi-step Problems Using Rational Numbers**	**6.1 - 6.3**	**NY-7.NS.2c** Apply properties of operations as strategies to multiply and divide rational numbers. **NY-7.NS.2d** Convert a fraction to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. **NY-7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers. Note: Computations with rational numbers extend the rules for manipulating fractions to **complex fractions limited to $\frac{\frac{a}{b}}{\frac{c}{d}}$ where a, b, c, and d are integers and b, c, and d ≠ 0**.	• Identity Property of Multiplication • Inverse Property of Multiplication • Order of Operations • Compatible Numbers • Distributive Property
			NY-7.EE.1 Add, subtract, factor, and expand linear expressions with rational coefficients by applying the properties of operations.	

3 **Model with Expressions, Equations, and Inequalities**	**7** **Solve Problems Using Expressions and Equations**	**7.1 - 7.5**	**NY-7.EE.2** Understand that rewriting an expression in different forms in **real-world and mathematical problems can reveal and explain** how the quantities are related. e.g., a + 0.05a and 1.05a are equivalent expressions meaning that "increase by 5%" is the same as "multiply by 1.05." **NY-7.EE.3** Solve multi-step real-**world** 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. Assess the reasonableness of answers using mental computation and estimation strategies. e.g., • If a woman making $25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. • If you want to place a towel bar 9 $\frac{3}{4}$ inches long in the center of a door that is 27 $\frac{1}{2}$ 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. **NY-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. **<u>Note</u>: Solving equations that contain variables on both sides is not an expectation in grade 7.**	• Associative Property of Addition • Commutative Property of Addition • Equilateral Triangle • Greatest Common Factor • Like Terms • Term • Isosceles Triangle • Perimeter • Division Property of Equality • Solution of an Equation • Right Angle • Adjacent Angles • Complementary Angles • Supplementary Angles • Vertical Angles
	8 **Solve Problems Using Inequalities**	**8.1 - 8.3**	**NY-7.EE.4a** Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are 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. e.g., The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? **<u>Notes</u>: The words leading to in the standard may require students to simplify or combine like terms on the same side of the equation before it is in the form stated in the standard.** **This standard is a fluency expectation for grade 7. For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Next Generation Mathematics Learning Standards.** **NY-7.EE.4b** Solve word problems leading to inequalities of the form px + q > r, **px + q ≥ r, px + q ≤ r**, or px + q < r, where *p, q, and r* are rational numbers. Graph the solution set of the inequality ***on the number line*** and interpret it in the context of the problem. e.g., 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.	• Equivalent • Inequality • Solution of an Inequality •

			Note: The words leading to in the standard may require students to simplify or combine like terms on the same side of the equation before it is in the form stated in the standard.	
4 **Geometry**	**10** **Analyze Figures to Find Circumference and Area** Modules 9 & 11 were removed from the pacing guide due to recent data trends. If time permits, add in: 9-2, 9-3, 11-2, 11-3	**10.1 - 10.3**	**NY-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. **NY-7.G.2** Draw **triangles when given measures of angles and/or sides**, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. **Note: Create triangles through the use of freehand drawings, materials (scaffolds may include: pipe cleaners, Legos®, and toothpicks), rulers, protractors, and/or technology** **NY-7.G.3** Describe the two-dimensional shapes that result from slicing three-dimensional **solids parallel or perpendicular to the base**. Note: Focus of standard is on plane sections resulting from the slicing of right rectangular prisms and right rectangular pyramids **NY-7.G.4 Apply** the formulas for the area and circumference of a circle to solve problems. **Note: Students in grade 7 are not expected to calculate the radius of a circle given its area**. **NY-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. **Note: Students in grade 7 are limited to solving equations that involve linear expressions on one side of the equation.** **NY-7.G.6 Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles and trapezoids.** **Solve surface area problems involving right prisms and right pyramids composed of triangles and trapezoids.** **Find the volume of right triangular prisms, and solve volume problems involving three-dimensional objects composed of right rectangular prisms.** **Notes: The inclusive definition of a trapezoid will be utilized, which defines a trapezoid as "A quadrilateral with at least one pair of parallel sides." (This definition includes parallelograms and rectangles.) Right prisms include cubes.**	
5	**12**	**12.1 - 12.2**	**NY-7.SP.1 Construct and interpret box-plots, find the interquartile range, and determine if a data point is an outlier.** **Note: Students in grade 7 are *not* expected to *construct* box-plots that include outliers in the data, but students *are* expected to *interpret* box-plots that may contain outliers.**	

Sampling and Data Analysis	**Proportional Reasoning with Samples** **13** **Use Statistics and Graphs to Compare Data**	**13.1 - 13.2**	**NY-7.SP.3** Informally assess the degree of visual overlap of two **quantitative** data distributions. **NY-7.SP.4** Use measures of center and measures of variability for **quantitative** data from random samples **or populations** to draw informal comparative inferences about the populations. **Note: Measures of center are mean, median, and mode. The measures of variation include range and the interquartile range.**	
6 **Probability**	**14** **Understand and Apply Experimental Probability** **15** **Understand and Apply Theoretical Probability**	**14.1 - 14.4** **15.1 - 15.4**	**NY-7.SP.8** Find probabilities of compound events using organized list, **sample space** tables, tree diagrams, and simulation. **NY-7.SP.8a** 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. **NY-7.SP.8b** Represent sample spaces for compound events using methods such as organized lists, **sample space** tables, and tree diagrams. For an event described in everyday language, identify the outcomes in the sample space which compose the event. e.g., “rolling double sixes” **NY-7.SP.8c** Design and use a simulation to generate frequencies for compound events. e.g., 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?	