PRESCOTT UNIFIED SCHOOL DISTRICT
District Instructional Guide
Date Revised <u>06/2018</u>

Grade Level: 6th	Subject: Math	Time: Quarter 1	Core Text: EngageNY

Time/Days	Module	Topic	Standards/ Skills	Assessment	Resources
28 days	Module 2	Overview	**Grade 6 Module 2: Arithmetic Operations Including Division of Fractions** In Module 1, students used their existing understanding of multiplication and division as they began their study of ratios and rates. In Module 2, students complete their understanding of the four operations as they study division of whole numbers, division by a fraction and operations on multi-digit decimals. This expanded understanding serves to complete their study of the four operations with positive rational numbers, thereby preparing students for understanding, locating, and ordering negative rational numbers (Module 3) and algebraic expressions (Module 4). 6.NS.1, 6.NS.2, 6.NS.3	Mid-Module Assessment End of Module Assessment	Engage NY
		Topic A: Dividing Fractions by Fractions Lessons 1-8 August 6-15	• extend previous understanding of multiplication and division to divide fractions by fractions. • construct division stories and solve word problems involving division of fractions (6.NS.1). Through the context of word problems, students understand and use partitive division of fractions to determine how much is in each group. • explore real-life situations that require them to ask, "How much is one share?" and "What part of the unit is that share?" • use measurement to determine quotients of fractions.		Engage NY

			They are presented conceptual problems where they determine that the quotient represents how many of the divisor is in the dividend. ● look for and uncover patterns while modeling quotients of fractions to ultimately discover the relationship between multiplication and division. Using this relationship, students create equations and formulas to represent and solve problems.		
		Topic B: Multi-Digit Decimal Operations—Adding, Subtracting, and Multiplying Lessons 9-11 August 16-20	● find that sums and differences of large mixed numbers can sometimes be more efficiently determined by first converting the number to a decimal and then applying the standard algorithms (6.NS.3). ● use estimation to justify their answers. ● begin to practice the distributive property, use arrays and partial products to understand and apply the distributive property as they solve multiplication problems involving decimals. (6.EE.3). ● estimation and place value enable students to determine the placement of the decimal point in products and recognize that the size of a product is relative to each factor. ● use connections between fraction multiplication and decimal multiplication.		Engage NY
		Topic C: Dividing Whole Numbers and Decimals Lessons 12-15 August 21-24	● connect estimation to place value and determine that the standard algorithm is simply a tally system arranged in place value columns (6.NS.2). Students understand that when they "bring down" the next digit in the algorithm, they are essentially distributing, recording, and shifting to the next place value. ● understand that the steps in the algorithm continually provide better approximations to the answer. Students		Engage NY

			further their understanding of division as they develop fluency in the use of the standard algorithm to divide multi-digit decimals (6.NS.3). ● make connections to division of fractions and rely on mental math strategies to implement the division algorithm when finding the quotients of decimals.		
		Topic D: Number Theory—Thinking Logically About Multiplicative Arithmetic Lessons 17-19 August 27-29	● apply odd and even number properties and divisibility rules to find factors and multiples. ● extend this application to consider common factors and multiples and find greatest common factors and least common multiples. ● explore and discover that Euclid's Algorithm is a more efficient way to find the greatest common factor of larger numbers and see that Euclid's Algorithm is based on long division.		Engage NY

Grade Level: 6th	Subject: Math	Time: Quarter 2	Core Text: EngageNY

Time/Days	Module	Topic	Standards/ Skills	Assessment	Resources
35 days	Module 1: Ratios and Unit Rates	Overview	**Grade 6 Mathematics Module 1: Ratios and Unit Rates** Students begin their sixth grade year investigating the concepts of ratio and rate. They use multiple forms of ratio language and ratio notation, and formalize understanding of equivalent ratios. Students apply reasoning when solving collections of ratio problems in real world contexts using various tools (e.g., tape diagrams, double number line diagrams, tables, equations and graphs). Students bridge their understanding of ratios to the	Mid-Module Assessment End of Module Assessment	Engage NY

			value of a ratio, and then to rate and unit rate, discovering that a percent of a quantity is a rate per 100. The 35 day module concludes with students expressing a fraction as a percent and finding a percent of a quantity in real world concepts, supporting their reasoning with familiar representations they used previously in the module.		
		Topic A: Representing and Reasoning About Ratios Lessons 1-8 August 31-September 11	● understanding ratios as a multiplicative comparison of two or more numbers used in quantities or measurements (**6.RP.1**). ● construct viable arguments and communicate reasoning about ratio equivalence as they solve ratio problems in real world contexts (**6.RP.3**). ● students develop a precise definition of the value of a ratio $a:b$, where $b \neq 0$ as the value a/b, applying previous understanding of fraction as division (**5.NF.3**).		Engage NY
		Topic B Collections of Equivalent Ratios Lesson 9-15 September 13-20	● build ratio tables and study their additive and multiplicative structure (**6.RP.3a**). ● apply reasoning to solve ratio problems while they explore representations of collections of equivalent ratios and relate those representations to the ratio table (**6.RP.3**). ● students expand their experience with the coordinate plane (**5.G.1,5.G.2**) as they represent collections of equivalent ratios by plotting the pairs of values on the coordinate plane.		Engage NY
		Topic C Unit Rates Lessons 16-23 September	● solve unit rate problems involving unit pricing, constant speed, and constant rates of work (**6.RP.3b**), ● apply understanding of rates to situations in the real world, determine unit prices and use measurement conversions to comparison shop, and decontextualize constant speed		Engage NY

		21-October 3	and work situations to determine outcomes, combine new understanding of rate to connect and revisit concepts of converting among different-sized standard measurement units (**5.MD.1**). ● expand upon this background as they learn to manipulate and transform units when multiplying and dividing quantities (**6.RP.3d**). ● interpret and model real-world scenarios through the use of unit rates and conversions.		
		Topic D Percent Lessons 24-26 ==Can omit lessons 27-29== October 4-October 18	● understand that *N* percent of a quantity has the same value as *N/100* of that quantity ● express a fraction as a percent, and find a percent of a quantity in real-world contexts. ● express a ratio using the language of percent and to solve percent problems by selecting from familiar representations, such as tape diagrams and double number lines, or a combination of both (**6.RP.3c**).		Engage NY

			Grade 6 Module 3: Rational Numbers	Assessments	Resources
25 days	Module 3	Overview	Students are familiar with the number line and determining the location of positive fractions, decimals, and whole numbers from previous grades. Students extend the number line (both horizontally and vertically) in Module 3 to include the opposites of whole numbers. The number line serves as a model to relate integers and other rational numbers to statements of order in real-world contexts. In this module's final topic, the number line model is extended to two-dimensions, as students use the		

				coordinate plane to model and solve real-world problems involving rational numbers.		
			Topic A: Understanding Positive and Negative Numbers on the Number Line Lessons 1-6 October 17-October 24	- use positive integers to locate negative integers, understanding that a number and its opposite will be on opposite sides of zero and that both lie the same distance from zero. - represent the opposite of a positive number as a negative number and vice-versa. Students realize that zero is its own opposite and that the opposite of the opposite of a number is actually the number itself (6.NS.C.6a). - use positive and negative numbers to represent real-world quantities such as -50 to represent a $50 debt or 50 to represent a $50 deposit into a savings account (6.NS.C.5). - recognize that finding the opposite of any rational number is the same as finding an integer's opposite (6.NS.C.6c) and that two rational numbers that lie on the same side of zero will have the same sign, while those that lie on opposites sides of zero will have opposite signs.	https://www.engageny.org/resource/grade-6-mathematics-module-3-topic-overview/file/65016	
			Topic B: Order and Absolute Value Lessons 7, 9-13 ==Can omit lesson 8== October	- understand that when using a conventional horizontal number line, the numbers increase as you move along the line to the right and decrease as you move to the left. - recognize that if a and b are rational numbers and $a < b$, then it must be true that $-a > -b$. - compare rational numbers using inequality symbols and words to state the relationship between two or more rational numbers. - describe the relationship between rational numbers in real-world situations and with respect to numbers' positions on the number line (**6.NS.C.7a**, **6.NS.C.7b**). - use the concept of absolute value and its notation to show a number's distance from zero on the number line and	Mid-Module Assessment	Engage NY

		25-November 1	recognize that opposite numbers have the same absolute value (**6.NS.C.7c**). In a real-world scenario, students interpret absolute value as magnitude for a positive or negative quantity. They apply their understanding of order and absolute value to determine that, for instance, a checking account balance that is less than -25 dollars represents a debt of more than $25 (**6.NS.C.7d**).		
		Topic C: Rational Numbers and the Coordinate Plane Lessons 14-19 November 2-November 9	- construct the plane's vertical and horizontal axes, discovering the relationship between the four quadrants and the signs of the coordinates of points that lie in each quadrant (**6.NS.C.6b**, **6.NS.C.6c**). - apply the concept of absolute value to find the distance between points located on vertical or horizontal lines and solve real-world problems related to distance, segments, and shapes (**6.NS.C.8**).		Engage NY
				End of Module Assessment	Engage NY

Grade Level: 6th	Subject: Math	Time: Quarter 3	Core Text: EngageNY

Time/Days	Module	Topic	Standards/ Skills	Assessment	Resources
40 days	Module 4	Overview	**Grade 6 Module 4: Expressions and Equations** In Module 4, Expressions and Equations, students extend their arithmetic work to include using letters to represent numbers in order to understand that letters are simply "stand-ins" for numbers and that arithmetic is carried out exactly as it is with numbers. Students explore operations in terms of verbal expressions and determine that arithmetic properties hold true with expressions because nothing has changed—they are still doing arithmetic with numbers. Students determine that letters are used to represent specific but unknown numbers and are used to make statements or identities that are true for all numbers or a range of numbers. They understand the relationships of operations and use them to generate equivalent expressions, ultimately extending arithmetic properties from manipulating numbers to manipulating expressions. Students read, write and evaluate expressions in order to develop and evaluate formulas. From there, they move to the study of true and false number sentences, where students conclude that solving an equation is the process of determining the number(s) that, when substituted for the variable, result in a true sentence. They conclude the module using arithmetic properties, identities, bar models, and finally algebra to solve one-step, two-step, and multi-step equations.	Mid-Module Assessment End of Module Assessment	Engage NY
		Topic A:	• build and evaluate identities that are important for solving		Engage NY

		Relationships of the Operations Lessons 1-4 November 13-16	equations. ● work with the following identities: $w - x + x = w$, $w + x - x = w$, a divided by b times $b = a$, a times b divided by $b = a$ (when $b \neq 0$), and $3x = x + x + x$. Students will also discover that if 12 divided $x = 4$, then $12 - x - x - x - x = 0$.		
		Topic B: Special Notations of Operations Lessons 5-6 November 19-20	● determine that $3x = x + x + x$ is not the same as $x3$, which is x times x times x. ● examine exponents and carry out the order of operations, including exponents. ● demonstrate the meaning of exponents to write and evaluate numerical expressions with whole number exponents (6.EE.A.1).		Engage NY
		Topic C: Replacing Letters and Numbers Lessons 7-8	● represent letters with numbers and numbers with letters in Topic C. ● use letters to represent numbers in order to write the properties precisely. ● extend arithmetic properties from manipulating numbers to manipulating expressions. In particular, develop the following identities: a times $b = b$ times a, $a + b = b + a$, g		Engage NY

		November 20-November 27 (Thanksgiving)	times 1 = g, $g + 0 = g$, g divided by 1 = g, g divided by g = 1, and 1 divided by g = $1/g$. ● understand that a letter in an expression represents a number. When that number replaces that letter, the expression can be evaluated to one number. ● understand that a letter in an expression can represent a number. When that number is replaced by a letter, an expression is stated (6.EE.A.2).		
		Topic D: Expanding, Factoring, and Distributing Expressions Lessons 9-<mark>13/14 (same day)</mark> November 28-December 2	● extend knowledge of GCF and the distributive property from Module 2 to expand, factor, and distribute expressions using new notation (**6.NS.B.4**). In particular, students are introduced to factoring and distributing as algebraic identities. These include: $a + a = 2 \cdot a = 2a$, $(a + b) + (a + b) = 2 \cdot (a + b) = 2(a + b) = 2a + 2b$, and $a \div b = a/b$.		Engage NY
		Topic E: Expressing Operations in Algebraic Form Lessons 16 <mark>Can omit</mark>	● xpress operations in algebraic form. ● read and write expressions in which letters stand for and represent numbers (6.EE.A.2). ● use the correct terminology for operation symbols when reading expressions. For example, the expression $3/(2x - 4)$ is read as "the quotient of three and the difference of twice a number and four." ● students write algebraic expressions that record operations with numbers and letters that stand for numbers. Students		Engage NY

		lesson 17 also may be combined with 16 December 5	determine that $3a + b$ can represent the story "Martina tripled her money and added it to her sister's money" (**6.EE.A.2b**).		
		Topic F: Writing and Evaluating Expressions and Formulas Lessons 18-22 December 7-13	Students write and evaluate expressions and formulas in Topic F. ● use variables to write expressions and evaluate those expressions when given the value of the variable (**6.EE.A.2**). ● create formulas by setting expressions equal to another variable. ● evaluate given formulas such as the volume of a cube, $V = s3$ given the side length, or the volume of a rectangular prism, $V = lwh$ given those dimensions (**6.EE.A.2c**).		Engage NY
		Topic G: Solving Equations Lessons Combine 23/24-29 Can Combine lessons 23 and 24	● conclude that solving an equation is the process of determining the number(s) that, when substituted for the variable, result in a true sentence (6.EE.B.5). ● use identities and properties of equality that were introduced earlier in the module to solve one-step, two-step, and multistep equations. ● solve problems finding the measurements of missing angles represented by letters		Engage NY

		December 10-20 January 7-8			
		Topic H: Applications of Equations Lessons 30-34 January 9-16	• Irepresent equations by plotting the values from the table on a coordinate grid (**5.G.A.1**, **5.G.A.2**, **6.RP.A.3a**,**6.RP.A.3b**, **6.EE.C.9**). • move from solving equations to writing inequalities that represent a constraint or condition in real-life or mathematical problems (6.EE.B.5, 6.EE.B.8). • understand that inequalities have infinitely many solutions and represent those solutions on number line diagrams.		Engage NY

Grade Level: 6th	**Subject: Math**	**Time: Quarter 4**	**Core Text: EngageNY**

Time/Days	Module	Topic	Standards/ Skills	Assessment	Resources
29 days	Module 5	Overview	**Grade 6 Module 5: Area, Surface Area, and Volume Problems** In this module, students utilize their previous experiences in order to understand and develop formulas for area, volume, and surface area. Students use composition and decomposition to	Mid-Module Assessment End of Module Assessment	Engage NY

			determine the area of triangles, quadrilaterals, and other polygons. Extending skills from Module 3 where they used coordinates and absolute value to find distances between points on a coordinate plane, students determine distance, perimeter, and area on the coordinate plane in real-world contexts. Next in the module comes real-life application of the volume formula where students extend the notion that volume is additive and find the volume of composite solid figures. They apply volume formulas and use their previous experience with solving equations to find missing volumes and missing dimensions. The final topic includes deconstructing the faces of solid figures to determine surface area. To wrap up the module, students apply the surface area formula to real-life contexts and distinguish between the need to find surface area or volume within contextual situations. 6.G.1, 6.G.2, 6.G.3		
		Topic A: Area of Triangles, Quadrilaterals, and Polygons Lessons 1-6 January 16-25	- use composition and decomposition to determine the area of triangles, quadrilaterals, and other polygons. - determine that area is additive. Students learn through exploration that the area of a triangle is exactly half of the area of its corresponding rectangle. - discover through composition that the area of a parallelogram is the same as a rectangle. - compose rectangles using two copies of a right triangle. - extend their previous knowledge about the		Engage NY

area formula for rectangles (4.MD.A.3) to evaluate the area of the rectangle using $A = bh$ and discover through manipulation that the area of a right triangle is exactly half that of its corresponding rectangle.

- discover that any triangle may be decomposed into right triangles
- explore all triangles and discover through manipulation that the area of all triangles is exactly half the area of its corresponding rectangle.
- students become aware that triangles have altitude, which is the length of the height of the triangle. The altitude is the perpendicular segment from a vertex of a triangle to the line containing the opposite side. The opposite side is called the base.
- understand that any side of the triangle can be a base, but the altitude always determines the base.
- determine that right triangles are constructed when altitudes are perpendicular and meet the base at one side. Acute triangles are constructed when the altitude is perpendicular and meets within the length of the base, and obtuse triangles are constructed when the altitude is perpendicular and lies outside the length of the base. Students determine that the area formula for any triangle can be determined using $A = 1/2(bh)$.
- deconstruct parallelograms, trapezoids, and other quadrilaterals and polygons into triangles or rectangles in order to determine area.

			- decompose rectangles to determine the area of polygons. - apply learning from the topic to find areas of composite figures in real-life contexts, as well as determine the area of missing regions (6.G.A.1).		
		Topic B: Polygons on the Coordinate Plane Lessons 7-10 January 25-30	- find edge lengths of polygons (the distance between two vertices using absolute value) and draw polygons given coordinates (**6.G.A.3**). - determine the area of polygons on the coordinate plane by composing and decomposing into polygons with known area formulas. - investigate and calculate the area of polygons on the coordinate plane and also calculate the perimeter. They note that finding perimeter is simply finding the sum of the polygon's edge lengths (or finding the sum of the distances between vertices). - determine distance, perimeter, and area on the coordinate plane in real-world contexts.		
		Topic C: Volume of Right Rectangular Prisms Lessons 11-12 January 31-February 1	- decompose a one cubic unit prism in order to conceptualize finding the volume of a right rectangular prism with fractional edge lengths using unit cubes, connect those findings to apply the formula $V = lwh$ and multiply fractional edge lengths - extend and apply the volume formula to $V = $ *The area of the base* times *height* or simply $V = bh$, where b represents the area of the		

			base. ● explore the bases of right rectangular prisms and find the area of the base first, then multiply by the height. ● determine that two formulas can be used to find the volume of a right rectangular prism. ● apply both formulas to application problems. ● real-life application of the volume formula where students extend the notion that volume is additive (**5.MD.C.5c**) and find the volume of composite solid figures, apply volume formulas and use their previous experience with solving equations (**6.EE.B.7**) to find missing volumes and missing dimensions.		
		Topic D: Nets and Surface Area Lessons 13-19a February 4-12	● deconstruct the faces of solid figures to determine surface area. Students note the difference between finding the volume of right rectangular prisms and finding the surface area of such prisms. ● build solid figures using nets, note which nets compose specific solid figures and also understand when nets cannot compose a solid figure. ● deconstruct solid figures into nets to identify the measurement of the solids' face edges. ● use nets to determine the surface area of solid figures. ● find that adding the areas of each face of the solid will result in a combined surface area. ● find that each right rectangular prism has a front, a back, a top, a bottom, and two sides. ● determine that surface area is obtained by adding the areas of all the faces.		

			- understand that the front and back of the prism have the same surface area, the top and bottom have the same surface area, and the sides have the same surface area. Thus, students develop the formula *SA* = 2*lw* + 2*lh* + 2*wh* (**6.G.A.4**). - apply the surface area formula to real-life contexts and distinguish between the need to find surface area or volume within contextual situations.		
14 days allotted in Math; more Science time needed	Module 6	Overview	**Grade 6 Module 6: Statistics** In this module, students move from simply representing data into analysis of data. Students begin to think and reason statistically, first by recognizing a statistical question as one that can be answered by collecting data. Students learn that the data collected to answer a statistical question has a distribution that is often summarized in terms of center, variability, and shape. Throughout the module, students see and represent data distributions using dot plots and histograms. They study quantitative ways to summarize numerical data sets in relation to their context and to the shape of the distribution. As the module ends, students synthesize what they have learned as they connect the graphical, verbal, and numerical summaries to each other within situational contexts, culminating with a major project.	Mid-Module Assessment End of Module Assessment	

		Topic A: Understanding Distributions Lessons 1-5	- think and reason statistically, first by recognizing a statistical question as one that can be answered by collecting data (**6.SP.A.1**). - earn that the data collected to answer a statistical question has a distribution that is often summarized in terms of center, variability, and shape (**6.SP.A.2**). - represent data distributions using dot plots and histograms (**6.SP.B.4**).		
		Topic B: Summarizing a Distribution that is Approximately Symmetric Using the Mean and Mean Absolute Deviation Lesson 6-11	- study quantitative ways to summarize numerical data sets in relation to their context and to the shape of the distribution. The mean and mean absolute deviation (MAD) are used for data distributions that are approximately symmetric, and the median and interquartile range (IQR) are used for distributions that are skewed. - apply experience in writing, reading, and evaluating expressions in which letters stand for numbers (**6.EE.A.2**) - learn to compute and interpret two pairs of statistical measures for center and spread (**6.SP.A.5**). In Topic B, students study *mean* as a measure of center and *mean absolute deviation* as a measure of variability. Students learn that these measures are preferred when the shape of the distribution is roughly symmetric.		
		Topic C: Summarizing a	study quantitative ways to summarize numerical data sets in relation to their context		

		Distribution that is Skewed Using the Median and the Interquartile Range Lessons 12-16 (can omit lesson 15)	and to the shape of the distribution. The mean and mean absolute deviation (MAD) are used for data distributions that are approximately symmetric, and the median and interquartile range (IQR) are used for distributions that are skewed. ● apply experience in writing, reading, and evaluating expressions in which letters stand for numbers (**6.EE.A.2**). ● learn to compute and interpret two pairs of statistical measures for center and spread (**6.SP.A.5**). ● study *median* as a measure of center and *interquartile range* as a measure of variability. Students learn that these measures are preferred when the shape of the distribution is skewed. ● reinforce the idea that a measure of center provides a summary of all its values in a single number, while a measure of variation describes how values vary, also with a single number (**6.SP.A.3**).		
		Topic D: Summarizing and Describing Distributions Lessons 17-21 Can omit lesson 22	● synthesize learning by connecting the graphical, verbal, and numerical summaries to each other within situational contexts, culminating with a major project (**6.SP.B.4**, **6.SP.B.5**). ● implement the four-step investigative process with their projects by stating statistical questions, explaining the plan used to collect data, analyzing data numerically and with graphs, and interpreting their results as related to their questions.		

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