Grade 6 SPED Mathematics Curriculum Guide

Grade Level/Course Title: Grade 6	**Trimester 1**	**Academic Year:** 2014-2015

Grade Level Mathematics Focus:
In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division, and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

Essential Question for this Unit:
1. How can students review multiplication and division of fractions as a basis for work with ratio and rates, and the system of rational numbers?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(Aug.-Oct.) **Unit 1: Fractions** **(35 days)**	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.	• Meaning of numerator and denominator • Equivalent fractions • Equivalent forms of 1 • Multiple representation of fractions (e.g., number line, area model)	**Chapter 1 (25 days)** Lesson 1-1: Parts of a Whole and Parts of a Set Lesson 1-2: Recognize, Name and Compare Unit Fractions Progress Check 1 Lesson 1-3: Mixed Numbers and Improper Fractions Lesson 1-4: Equivalent Fractions and Equivalent forms of 1 Progress Check 2 Lesson 1-5: Compare and Order Fractions Lesson 1-6: Estimate Fractions Progress Check 3 Study Guide Chapter Assessment Test Practice Use throughout unit: Benchmark Fractions Activity [L] Comparing and Ordering Fractions - Benchmark Fractions [CP] Comparing and ordering fractions – Benchmark Fractions [L] Comparing Fractions Using the Complement [L] Converting – Improper Fractions and Mixed Numbers [L]
	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.		

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Essential Question for this Unit:
1. How can students review multiplication and division of fractions as a basis for work with ratio and rates, and the system of rational numbers?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(Aug.-Oct.) **Unit 1: (Continued)** **Fractions** **(35 days)**	6.NS.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).*	• Prime factorization • Bubble Method, LCM, GCF • Common factors • Distributive property • Decomposition of fractions • Equivalent forms of 1 • Bar models to compare, multiply, & divide fractions • Area models to multiply fractions • Generic rectangle to multiply and divide fractions • Review multiplication of a fraction by a fraction, whole number and mixed number • "Invert and multiply" is multiplying the dividend and divisor by the reciprocal of the divisor. • Decomposition and removing the fractional 1's to simplify the problem • Bar model division • Decomposing to share out fractions • Dividing across • Number line division	**Chapter 2 (25 days)** Lesson 2-1: Greatest Common Factor Lesson 2-2: Simplify Fractions Progress Check 1 Lesson 2-3: Multiplying Fractions Lesson 2-4: Dividing Fractions Progress Check 2 Progress Check 3 Study Guide Chapter Assessment Test Practice Use throughout the unit: Prime Factoring to find the LCM and GCF [L] Simplifying Fractions [CP] Simplifying Fractions Activity [L] Multiplying Fractions [CP] Multiplying Fractions [L] Multiplying Mixed Numbers [L] Simplifying and Multiplying Fractions Sort [L] Dividing Fractions [CP] Modeling Division of a Whole Number by a Fraction [L] Modeling Division of a Fraction by a Fraction [L]
	6.NS.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*		

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Essential Question for this Unit:
1. How can students review decimals as a basis for work with larger numbers and operations?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(Oct - Dec.) **Unit 2: Decimals** **(35 days)**	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 1/10 of what it represents to its left.	• Meaning of numerator and denominator • Equivalent fractions • Equivalent forms of 1 • Multiple representation of fractions (e.g., number line, area model) • Multiplication of fractions • Adding fractions • Equivalence between fractions and decimals • Decomposition of numbers • Place value for whole numbers and decimals • Expanded notation • Estimating • Rounding • Comparing values • Multiplying and dividing by powers of 10	**Chapter 3 (25 days)** Lesson 3-1: Introduction to Decimals Lesson 3-2: Decimals and Money Progress Check 1 Lesson 3-3: Round Decimals to Whole Numbers Lesson 3-4: Compare and Order Decimals Lesson 3-5: Compare and Order Fractions and Decimals Progress Check 2 Study Guide Chapter Assessment Test Practice
	5.NBT.2	Explain patterns in the number of zeroes 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 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (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.		

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Essential Question for this Unit:
1. How can students review decimals as a basis for work with larger numbers and operations?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(Oct - Dec.) **Unit 2: (Continued)** **Decimals** **(35 days)**	5.NBT.7	Add, subtract, multiply, & 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 reasoning used.	• Mental Math • Word problems • Decomposition of numbers • Partial sums and differences with whole numbers and decimals • Use open number lines to add and subtract • Multiplying by powers of 10 • Equal-sized groups • Repeated Addition • Arrays • Bar models • Commutative Property • Associative Property • Distributive Property • Number line decimal division • Bar models • Using multiples of 10 to convert decimal divisors to whole numbers to divide • Convert decimals to decimal fractions to add, subtract, and multiply	**Chapter 4 (25 days)** Lesson 4-1: Add Decimals Lesson 4-2: Subtract Decimals Progress Check 1 Lesson 4-3: Multiply Decimals Lesson 4-4: Multiply Decimals Progress Check 2 Study Guide Chapter Assessment Test Practice Use throughout unit: Decimal Operations [CP] Adding Decimals by Decomposition [L] Adding Whole Numbers and Decimals [L] Subtracting Decimals by Decomposition [L] Multiplying Decimals [L]
	6.NS.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.		

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Grade Level Mathematics Focus:
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Essential Question for this Unit:
1. How can students review multiplication as a basis for work with larger numbers?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(Nov. - Dec.) **Unit 3:** **Multiplication** **(35 days)**	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.	• Equal-sized groups • Repeated addition • Arrays • Area Models • Commutative Property • Associative Property • Importance of place value when multiplying • Partial Products • Distributive Property • Using open number lines to represent multiplication • Using bar models to represent multiplication • Using decomposition to multiply (any decomposition and by place value)	**Chapter 5 (25 days)** Lesson 5-1: Multiply by 0, 1, 5, and 10 Lesson 5-2: Multiply by 2, 3, 4, and 6 Progress Check 1 Lesson 5-3: Multiply by 7, 8, and 9 Lesson 5-4: Multiply by 11 and 12 Lesson 5-5: Multiply Greatest Numbers Progress Check 2 Study Guide Chapter Assessment Test Practice Use throughout the unit: Multiplication Fact Mastery Through Multiple Methods [L] Multiplying Multi-Digit Numbers [L] Multiplying Whole Numbers – Generic Rectangle [L]
	5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.		

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Essential Question for this Unit:
1. How can students review division as a basis for work with larger numbers?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(January) **Unit 4:** **Division** **(35 days)**	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.	• Equal-sized groups • Repeated addition • Arrays • Area Models • Commutative Property • Associative Property • Importance of place value when multiplying • Partial Products • Distributive Property • Using open number lines to represent multiplication • Using bar models to represent multiplication • Using decomposition to multiply (any decomposition and by place value)	**Chapter 6 (25 days)** Lesson 6-1: Division with 0, 1, and 10 Lesson 6-2: Division with 2 through 8 Progress Check 1 Lesson 6-3: Division with 7 through 12 Lesson 6-4: Remainders Progress Check 2 Lesson 6-5: Long Division with SIngle-Digit Division Lesson 6-6: Long Division with Two-Digit Division Profess Check 3 Study Guide Chapter Assessment Test Practice Use throughout unit: Division – Multiple Representations [CP] Division Algorithms [L]
	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.		

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Essential Questions for this Unit:
1. How can reasoning about multiplication and division be used to solve ratio and rate problems about quantities?
2. How can viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and analyzing simple drawings that indicate the relative size of quantities, help students connect their understanding of multiplication and division with ratios and rates?
3. How can students expand the scope of problems for which they can use multiplication and division to solve problems, and make connections between concepts of ratios and fractions, in order to solve a wide variety of problems involving ratios and rates?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(Feb.-March) **Unit 5:** **Ratios, Rates, and Unit Rates** **(35 days)**	6.RP.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*	• Express ratios in words,fraction form, and w/colon • Comparing two counts or • measures that have the • same unit • Equivalent ratios • Part to whole • Part to part • Whole to part • Understand unit rate, rate tables, patterns and functions to complete a table • Division of whole numbers by whole numbers • Fractions to percent • Ratio reasoning to convert measurement units • Percent to Decimal Fraction • Create tables	**Chapter 7 (25 days)** Lesson 7-1: Ratios Lesson 7-2: Equivalent Ratios Progress Check 1 Lesson 7-3: Rates Lesson 7-4: Probability as a Ratio Study Guide Chapter Assessment Test Practice Use throughout unit: Rates, Ratios, and Proportions [CP] Ratios – Multiple Representations: From Concrete to Operational [L] Probability [L]
	6.RP.2	Understand the concept of a unit rate a/b associated with a ratio a:b with b 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*		
	6.RP.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		

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Essential Questions for this Unit:
1. How can students develop understanding of the use of variables in mathematical expressions, write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems?
2. How can students understand that expressions in different forms can be equivalent, and use the properties of operations to rewrite expressions in equivalent forms?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(March - April) **Unit 6:** **Properties** **(35 days)**	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.*	• Number Patterns • Expressions • Variables • Decomposition • Order of Operations • Use variable for a specific number or a set of numbers • Translate word problems into algebraic expressions • Bar models • Distributive property • Mathematical vocabulary • Review other Number properties • Distributive property • Equivalent expressions	**Chapter 8 (25 days)** Lesson 8-1: Commutative Property Lesson 8-2: Associative Property Progress Check 1 Lesson 8-3: Distributive Property Lesson 8-4: Order of Operations Progress Check 2 Study Guide Chapter Assessment Test Practice Use throughout unit: Properties of Multiplication [L] Distributive Property - An Introduction [L] Order of Operations [L]
	6.EE.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*		
	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 $V = s^3$ and $A = 6\ s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.*		

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Essential Questions for this Unit:
1. How can students develop understanding of the use of variables in mathematical expressions, write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems?
2. How can students understand that expressions in different forms can be equivalent, and use the properties of operations to rewrite expressions in equivalent forms?
3. How can students know that the solutions of an equation are the values of the variables that make the equation true?
4. How can students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations?
5. How can students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and use equations (such as 3x = y) to describe relationships between quantities?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(April - May) **Unit 6:** **Properties** **(35 days)**	6.NS.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/ below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	• Knowing that a smaller negative number is located to the right of a larger negative number • Review other Number properties • Distributive property • Equivalent expressions • Represent word problems with drawings, diagrams, and algebraic expressions • Bar models • Review repeated addition and multiplication • Review repeated subtraction and division • Writing Inequalities • Representing Inequalities on a number line	**Chapter 9 (25 days)** Lesson 9-1: Integers Lesson 9-2: Algebraic Expressions Progress Check 1 Lesson 9-3: Translate Phrases into Expressions Lesson 9-4: Simplify Expressions Progress Check 2 Lesson 9-5: Evaluate Variable Expressions Lesson 9-6: Introduction to Equations Progress Check 3 Study Guide Chapter Assessment Test Practice Use throughout unit: Adding/Subtracting Integers Worksheet [GMR] Algebra Tiles - Blackline Masters [GMR] Adding [L] Multiplying [L] Subtracting [L] One-Step Equations [L] One-Step Equations – Multiple Methods [L] Solving and Using Literal Equations [L] Solving Equations - Multiple Methods [L] Equations with Algebra Tiels [L] Simplifying Expressions & Solving Equations [CP]
	6.NS.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.		
	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.		

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Essential Questions for this Unit:
1. How can students know that the solutions of an equation are the values of the variables that make the equation true?
2. How can students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations?
3. How can students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and use equations (such as 3x = y) to describe relationships between quantities?
4. How can students build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume?
5. How can students find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles, and by using these methods, discuss, develop, and justify formulas for areas of triangles and parallelograms?
6. How can students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine?
7. How can students reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths?

Unit (Time)	Standard	Standard Description	Content	Triumphs/Resources
(May - June) **Unit 6:** **Formulas** **(35 days)**	6.EE.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.*	• Write an expression involving a variable • Dependent variable • Term • Independent variable • Describe general patterns in words • Use a variable for unknown quantities • Solve for the variable • Translate word problems into equations • Represent the expression or equation in tables and graphs • Names and properties of triangles and quadrilaterals • Decomposing polygons into triangles	**<u>Chapter 10 (25 days)</u>** Lesson 10-1: Distance, Rate and Time Lesson 10-2: Perimeter of Rectangles Progress Check 1 Lesson 10-3: Area of Rectangles Lesson 10-4: Volume of Rectangular Solids Progress Check 2 Progress Check 3 Study Guide Chapter Assessment Test Practice Use throughout unit: Distrance = Rate x Time [L] Volume: A foundation in Unit Cubes [L] Area and Perimeter - Decomposition [L] Area of Complex Figures [L] Discovering Area and Perimeter [L] Same Perimeter - Different Area [L] Same Area - Different Perimeter [L]
	6.G.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.		
	6.G.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas *V = l w h* and *V = b h* to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.		