Purpose Statement The purpose of this scope and sequence document is to ensure that MSD of Pike Township has a viable and guaranteed Mathematics curriculum. It is meant to provide the foundational skills, strategies, and concepts necessary for our students to leave Pike Township college and career ready. Please remember that this scope and sequence is based on the Indiana Academic Standards and the typical progress of students. Use your professional judgment when addressing the individual needs of your students. If you need to shorten or lengthen a unit, then do so based on mastery of standards, evidence from your classroom assessments and professional observations. Always consider the students' need and interest as well as other content area topics to guide your units of study. Collaborate with your instructional coach and school librarian to plan and implement the units of study, mini-lesson ideas, and instructional resources. Components Included in the Scope and Sequence Mathematics Content **Process Standards for Mathematics** As you work with your students, please remember the following: As you work with your students, please remember the following: • Students are expected to **apply** the math they previously learned as they progress through the year and to the next level. • The Process Standards for Mathematics are the "how" when delivering mathematics instruction. They rely on students Math content builds on previous lessons and years, but students learn in many different ways and take many different paths communicating with each other about mathematics in order to learn mathematics. to learn concepts. Provide students with many opportunities throughout the year to tackle and master math content in their The Process Standards for Mathematics are expected student behaviors. world. 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. All students are mathematicians. Find ways to allow our students to make true connections with math content. 3. Construct viable arguments and critique the reasoning of others. • Math instruction should incorporate reading and writing. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. Each Component Includes: **Essential Goals Priority Standards** Strategies/Skills Academic Vocabulary Instructional Resources Differentiation These goals define the necessary habits, The Indiana Academic Standards listed The strategy and skill focus gives Academic vocabulary includes the words This is where you will find your Ideas for scaffolding support for striving skills, and dispositions we want students represent the priority standards for the guidance for lesson topics and ideas. It that are needed to understand the connection to possible instructional mathematicians, English learners and to know and be able to do when the unit unit. Other standards may be taught also gives ideas for teaching strategies content. Assessment vocabulary should resources. Ask your school librarian special education is provided. Please use is completed. explicitly or implicitly. you might rely upon for instruction. The be integrated throughout the year and/or instructional coach for your available resources to differentiate goal is for students to understand these before. They should be explicitly taught assistance in this area also! for students. Ask your building resource skills/strategies by the end of the unit. teachers for assistance if needed. and used regularly. Testing Vocabulary to be Taught Throughout the Year Best: "Which statement BEST describes the two shapes?" Although more than one option might make sense, students will need to choose one that is better than all the others. Choose: "Choose TWO fractions that are greater than 0.50." Students will be asked to choose one or more items that fit the criteria. Complete: "Complete the table by filling in the missing numbers." Students may be asked to complete tables, graphs, and/or statements. Define the Variable: Students should be able to provide a precise description of a variable used in an equation. Enter: "Enter the product. 214 x 12". Students will be asked to enter items. This means they type the answer in the appropriate place. Greatest: "What is the GREATEST number of hats Sarah can buy?" Identify: "Identify all errors in Jenna's work." Students will need to choose one or more items that fit the criteria. In ALL: "How much money does Amy spend IN ALL?" Students will need to give a total. This does not mean to simply apply an operation, though. Students will need to read critically to determine the operation(s) that make(s) sense. More/Fewer: "How many MORE stickers does Jimmy need to complete his collection?" Students will need to compare two guantities and determine how much more or less one guantity is than another. Plot: "Plot an X on the line plot to represent Eric's data." Students will need to place data points on a coordinate grid, data display, or number line. Represent: "Represent 0.20 as a fraction." Students will need to be able to translate between different forms of the same concept (i.e. fractions and decimals, equivalent fractions, equivalent expressions). Select: "Select the shape(s) that match the given attributes." Students will need to choose one or more items that fit the criteria. Shade: "Shade squares in the grid that represent the given fraction." Students will need to fill in the appropriate amount Show All Work: Students will need to show all work needed to solve problems in order to receive full credit. Solve/Evaluate: "Solve. 145 + 82" or "Evaluate. 145 + 82" Students will need to give an answer for the test item. Use Word, Numbers and/or Symbols: "Use words, numbers, and/or symbols to support your answer." Students will need to explain their ideas clearly using math words, numbers or symbols. It should include evidence from the problem and student work.

6th Grade MSD of Pike Township – SCIENCE FAIR

	Essential Goals	Priority Standards	Strategies/Skills	Academic Vocabulary	Instructional Resources	Differentiation
SCIENCE FAIR Data Analysis and Statistics This is to be taught in combination with the Science Fair during the first semester. This does not replace your math instruction.	 Mathematicians represent, analyze and interpret numeric data in a variety of ways. Mathematicians represent, analyze and interpret categorical data in a variety of ways. Mathematicians solve real-world problems by displaying, analyzing and summarizing data in relation to the context, in a variety of ways. 	6.DS.4 Support Standards 6.DS.1 6.DS.2 6.DS.3	 Understand that statistical questions anticipate variability in the data collected related to the question asked. The set of data had a distribution which can be described by its center, spread and overall shape. Represent numeric data graphically, including dot plots, histograms, and box plots. Use graphical representations of numeric data to describe the center, spread, and shape of a data distribution. Summarize numeric data in relation to their context a variety of ways (see standard below). Interpret numeric data summarized in dot plots, histograms, and box plots. Summarize categorical data with numerical and graphical summaries, including mode and relative frequency tables. Create and interpret graphical representations of numerical data. Summarize data using measures of center and spread. 	average box plot categorical data data dot plot histogram interquartile range lower quartile mean mean absolute deviation (MAD) measure of center measure of spread median mode range statistical question	Curriculum Support Document Includes links to different tasks related to the critical standards Go Math: • • Unit 7: Module 16 • • Additional IN lessons: A6 • Connected Mathematics: • • Data About Us (G6) • • Additional skills and practice (G6) (g6) • CC additional investigations (G6) (pg. 47 – 54) Laying The Foundation (NMSI) Module 1: Pgs. 9 – 34	 *Spiral review: use critical standards from previous units Prerequisite Skills: How to find the mean, median, and mode of a set of data How to represent data in frequency tables, bar graphs, dot plots Scaffolding Support: (ELL; SPED; Striving Learners) Go Math: differentiation materials Open ended problems with
Process Standards for Mathematics Problem Solving	 Mathematicians create and use representations to organize, record, and communicate mathematical ideas. Mathematicians display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication. Mathematicians apply mathematics to problems arising in everyday life, society, and the workplace. 	PS. 2 PS. 3 PS. 4	 Create and use data displays to organize and record numeric and categorical data in meaningful ways. Read and interpret dot plots and other data displays to identifying the value with the greatest frequency, outliers and any clustering of values; find mean, median and range; and describe what these measures of center and spread mean for each given situation. Apply mean and median to real-world situations found in everyday life or society using models. 	upper quartile	Good Questions for Math <u>Teaching</u> Pg. 115 – 131 <u>Illustrative Mathematics Tasks:</u> http://www.illustrativemathematics.org	 multiple entry points Written instructions Small group instruction Graphic Organizers Manipulatives Encourage multiple ways to solve problems Models of finished products Picture Support Ask all students to show their strategies while explaining Games for practicing at home

• 6.DS.4: Summarize numerical data sets in relation to their context in multiple ways, such as: report the number of observations; describe the nature of the attribute under investigation, including how it was measured and its units of measurement; determine quantitative measures of center (mean and/or median) and spread (range and interquartile range), describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered; relate the choice of measures of center and spread to the shape of the data distribution and the context in which the data were gathered.

• 6.DS.1: Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for the variability in the answers. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

• 6.DS.2: Select, create, and interpret graphical representations of numerical data, including line plots, histograms, and box plots.

• 6.DS.3: Formulate statistical questions; collect and organize the data (e.g., using technology); display and interpret the data with graphical representations (e.g., using technology).

Math Content: • Mathematicians write and thinking. Unit 1: • Mathematicians show thei Introducing Middle • Mathematicians ask quest themselves, others, and themselves the the the the the the the the themselves the	talk about their 6.NS.1 6.NS.5 r work. ions of	 Introduce procedures and routines. Help students to see they are mathematicians. Get students writing and talking about math. 	absolute value area	Curriculum Support Document	*Spiral review: use critical
Numbers Mathematicians find math world. • Mathematicians relate nur world. • Mathematicians relate nur world. • Mathematicians understar rational number systems. • Mathematicians understar factors and multiples.	e world around ideas in their Support Standards 6.NS.2 6.NS.3 6.NS.4 6.NS.7 ad and work with	 Reinforce there are multiple strategies and solution pathways when solving problems. Identify a number and its opposite; apply this to real-world situations. Compare and order various integers and other rational numbers using a number line (positive and negative). Find the absolute value of a number. Find the greatest common factor of two whole numbers. Use the Distributive Property to express a sum of two whole numbers. Use a visual model to classify rational numbers. Know commonly used fractions and their decimal and percent equivalents. Compare rational numbers. Solve problems involving absolute value. Convert among fractions, decimals, and percents. 	distributive property equal estimation explain factor greater than greatest common factor (gcf) inequality integers least common multiple (lcm) less than multiple negative numbers negative sign number line opposites	Interest contrelent cases related to the critical standards Weeks of Inspirational Math https://www.youcubed.org/wee k-inspirational-math/ Go Math: • Unit 1: Modules 1, 2 and 3 • IN Success Lessons: A1 • SKIP: Lesson 1.3 Connected Mathematics: • Accentuate the Negative (G7) • Additional Practice and Skills (G7) (G7) (pg.58 – 82) • CC Additional Investigations (G6) (pg. 31 – 40)	 standards from previous units <u>Prerequisite Skills:</u> Understand whole numbers, fractions and decimals Compare and order whole numbers, fractions and decimals. Relate fractions to decimals. Scaffolding Support: (ELL; SPED; Striving Learners) Go Math: differentiation materials Open ended problems with multiple entry points Written instructions Small group instruction
Process Standards for Mathematics: Mathematicians choose to solve problems. Mathematicians explain wi specific tools. Mathematicians look close Mathematicians make con knowledge and apply the k situations. Mathematicians use numb patterns. 6.NS.1: Understand that positive and negative numb	ols that help them PS. 5 PS. 7 PS. 7	 Explore and explain integers in terms of their relationship to zero, to each other, and to create qualitative and quantitative statements about real world contexts. Use horizontal and vertical number lines to make sense of the structure of positive and negative numbers. 	perseverance plus sign positive numbers product reasonable symbol whole number below zero, elevation abox	Good Questions for Math Teaching Pg. 24 – 29 Illustrative Mathematics Tasks: http://www.illustrativemathematics.org re/below sea level, credits/debits, p	 Graphic Organizers Manipulatives Concrete models Encourage multiple ways to solve problems Provide models of finished products Provide picture support Ask all students to show their strategies while explaining Send home games to practice specific skills ositive/negative electric charge).

6.NS.5: Know commonly used fractions (halves, thirds, fourths, fifths, eighths, tenths) and their decimal and percent equivalents. Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the
use of a calculator.

• 6.NS.2: 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.

• 6.NS.3: Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts.

• 6.NS.4: Understand that the absolute value of a number is the distance from zero on a number line. Find the absolute value of real numbers and know that the distance between two numbers on the number line is the absolute value of their difference. Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.

• 6.NS.7: 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 from 1 to 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.

Quarter 1/2 Weeks 8 – 12	Essential Goals	Priority Standards	Strategies/Skills	Academic Vocabulary	Instructional Resources	Differentiation
Weeks 8 – 12 Math Content: Unit 2: <u>Number Operations</u>	 Mathematicians understand multiplication and division. Mathematicians relate multiplication and division of whole numbers to multiplication and division of rational numbers. Mathematicians solve problems that require using one or more of the arithmetic operations with fractions and decimals and judge the reasonableness of their answers 	Standards 6.C.1 6.C.3 Support Standards 6.C.2 6.C.4 6.C.6 6.GM.5 6.NS.5	 Multiply and divide multi-digit whole numbers. Multiply and divide fractions and decimals. Multiply and divide mixed numbers. Find the reciprocal of fractions and mixed numbers. Know commonly used fractions and their decimal and percent equivalents. Use the order of operations and properties of operations with expressions that contain more than one operation. Find volume of rectangular prisms with fractional edge lengths. Divide multi-digit whole numbers fluently. 	Vocabulary area denominator fraction greatest common factor (GCF) least common multiple (LCM) length mixed number numerator order of operations product	Curriculum Support Document Includes links to different tasks related to the critical standards Go Math: • Unit 2: Modules 4 and 5 • Unit 2: Modules 4 and 5 Connected Mathematics: • Prime Time (G6) • Bits and Pieces II (G6) • Bits and Pieces III (G6)	*Spiral review: use critical standards from previous units <u>Prerequisite Skills:</u> • Multiply whole numbers. • Divide whole numbers. <u>Scaffolding Support:</u> (<u>ELL: SPED; Striving Learners)</u> • Go Math: differentiation materials
			 Compare rational numbers. Convert among fractions, decimals and percents. Compute with positive fractions and decimals fluently. Solve real-world problems involving positive fractions and decimals. Apply the order of operations and properties of operations to evaluate numerical expressions. 	reciprocals width	 Additional Practice and Skills (G6) (pg.1 - 30, 43 - 58, 80 - 98) <u>Good Questions for Math</u> <u>Teaching</u> Pg. 47 - 64, 67 - 72 	 Open ended problems with multiple entry points Written instructions Small group instruction Graphic Organizers Manipulatives Concrete models
Process Standards for Mathematics Problem Solving:	 Mathematicians choose tools that help them solve problems. Mathematicians explain why they chose specific tools. Mathematicians look closely for patterns. Mathematicians make connections to prior knowledge and apply the knowledge to new situations. Mathematicians use number lines and coordinate planes to see patterns. 	PS. 5 PS. 7	 Explore multiplication and division of fractions using visual models. Find and explain patterns in the process of multiplying and dividing fractions. Use the patterns of multiplying and dividing fractions to explain the algorithm frequently used when performing the computation. 		Inside Mathematics: Baseball Players (6.C.1, PS.1) http://www.insidemathematics.or g/assets/common-core-math- tasks/baseball%20players.pdf Illustrative Mathematics Tasks: http://www.illustrativemathematics.org	 Encourage multiple ways to solve problems Provide models of finished products Provide picture support Ask all students to show their strategies while explaining Send home games to practice specific skills

• 6.C.1: Divide multi-digit whole numbers fluently using a standard algorithmic approach.

• 6.C.3: Solve real-world problems with positive fractions and decimals by using one or two operations.

• 6.C.2: Compute with positive fractions and positive decimals fluently using a standard algorithmic approach.

• 6.C.4: Compute quotients of positive fractions and solve real-world problems involving division of fractions by fractions. Use a visual fraction model and/or equation to represent these calculations.

• 6.C.6: Apply the order of operations and properties of operations (identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents.

6.GM.5: Find the volume of a right rectangular prism with fractional edge lengths using unit cubes of the appropriate unit fraction edge lengths (e.g., using technology or concrete materials), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = lwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths to solve real-world and other mathematical problems.

• 6.NS.5: Know commonly used fractions (halves, thirds, fourths, fifths, eighths, tenths) and their decimal and percent equivalents. Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the use of a calculator.

6 th Grade Mathematics – Sco	pe and Sequence	- MSD of Pike Township
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Quarter 2 Weeks 13 – 18	Essential Goals	Priority Standards	Strategies/Skills	Academic Vocabulary	Instructional Resources	Differentiation
Math Content: Unit 3: <u>Proportionality: Ratio</u> <u>and Rates</u>	 Mathematicians understand and evaluate proportional relationships. Mathematicians apply ratios and rates to everyday situations. Mathematicians use percents to solve real-world problems. Mathematicians apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates. Mathematicians use variables to represent unknown quantities. 	6.NS.10 6.AF.10 Support Standards 6.NS.8 6.NS.9 6.AF.9 6.GM.1	 Represent ratios and percents with concrete models and fractions. Write ratios and find equivalent ratios. Use rates and unit rates to compare quantities. Solve prediction and comparison real-world problems involving ratios, rates, and proportions. Compare additive and multiplicative relationships. Represent and solve mathematical and real-world problems involving ratios and rate using tables, tape diagrams, double number lines and equations. Convert units within a measurement system. Generate equivalent forms of fractions, decimals, and percents using real-world problems. Solve real-world problems involving fractions, decimals, and percents. Solve problems involving ratios and rates. Convert among fractions, decimals, and percents. Solve real-world problems involving positive fractions and decimals. 	conversion decimal denominator divide equivalent equivalent fractions equivalent ratios factor fraction bar graph mixed number model multiply numerator pattern percent point product proportion proportional reasoning quantity	Curriculum Support Document Includes links to different tasks related to the critical standards Go Math: • Unit 3: Modules 6, 7 and 8 • IN Success Lessons: A2 • SKIP: Lesson 6.1 Connected Mathematics: • CC Additional Investigations (G6) (pg. 1 – 16) Laying The Foundation (NMSI) • Module 1: Pgs. 3 – 15 Good Questions for Math Teaching (pg. 133 – 137, 146 – 148) Illustrative Mathematics Tasks: http://www.illustrativemathematics.org	*Spiral review: use critical standards from previous units Prerequisite Skills: • Write a ratio as a fraction • Write equivalent ratios • Relate fractions to percents and percents to decimals. Scaffolding Support: (ELL; SPED; Striving Learners) • Go Math: differentiation materials • Open ended problems with multiple entry points • Written instructions • Small group instruction • Graphic Organizers • Manipulatives • Concrete models • Encourage multiple ways to
Process Standards for Mathematics Problem Solving:	 Mathematicians apply math skills and understandings to solve real-world problems. Mathematicians use a variety of tools to aid them in solving mathematical and real- world problems. 	PS. 4 PS. 5	 Model and solve problems arising in everyday situations using a variety of representations (verbal, numerical, graphical, algebraic, concrete, etc.) Choose appropriate tools/representations to solve problems. Explain the choice of the specific tool/representation. 	quotient rate ratio scale scale drawing simplest form term unit unit rate	Inside Mathematics: Candies (6.NS.8, 6.NS.9, 6.NS.10) Truffles (6.NS.8, 6.NS.9, PS.6) http://www.insidemathematics. org/performance-assessment- tasks	 Models of finished products Picture Support Ask all students to show their strategies while explaining Games for practicing at home

• 6.NS.10: Use reasoning involving rates and ratios to model real-world and other mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).

• 6.AF.10: Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

• 6.NS.8: Interpret, model, and use ratios to show the relative sizes of two quantities. Describe how a ratio shows the relationship between two quantities. Use the following notations: a/b, a to b, a:b.

• 6.NS.9: Understand the concept of a unit rate and use terms related to rate in the context of a ratio relationship.

• 6.AF.9: 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.

• 6.GM.1: Convert between measurement systems (English to metric and metric to English) given conversion factors, and use these conversions in solving real-world problems.

Quarter 3 Weeks 19 - 22	Essential Goals	Priority Standards	Strategies/Skills	Academic Vocabulary	Instructional Resources	Differentiation
Math Content: Unit 4: Equivalent Expressions	 Mathematicians generate equivalent numerical expressions and use them to solve real-world problems. Mathematicians generate equivalent algebraic expressions and use them to solve real-world problems. Mathematicians use variables to represent unknown or changing numeric values. Mathematicians solve problems that require using one or more of the arithmetic operations with fractions and decimals and judge the reasonableness of their answers 	6.AF.1 6.AF.2 6.AF.3 Support Standards 6.NS.6 6.C.5 6.C.6	 Identify and explain prime and composite numbers. Generate equivalent numerical expressions using exponents and prime factorization. Simplify numerical expressions using the order of operations. Determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations. Define and use multiple variables to create algebraic expressions and equations. Evaluate algebraic expressions for the given value of a variable. Generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties. Compute with positive fractions and decimals fluently. Solve real-world problems involving positive fractions and decimals. Evaluate rational numbers with whole number exponents. Apply the order of operations and properties of operations to evaluate numerical expressions. 	algebraic expression base coefficient constant equivalent expression evaluating exponent factor factor tree integers like terms numerical expression operations order of operations prime factorization repeated multiplication simplified expression term variable	Curriculum Support Document Includes links to different tasks related to the critical standards Go Math: • • Unit 4: Modules 9 and 10 • IN Success Lessons: A3 • SKIP: Lesson 9.2 Connected Mathematics: • • Variables and Patterns (G7) • Additional Practice and Skills (G7) (pg. 1 – 20) Good Questions for Math Teaching (pg. 91 – 114) Illustrative Mathematics Tasks: http://www.illustrativemathematics.org	 *Spiral review: use critical standards from previous units Prerequisite Skills: operations with whole numbers, decimals, and fractions prime numbers order of operations Scaffolding Support: (ELL; SPED; Striving Learners) Go Math: differentiation materials Open ended problems with multiple entry points Written instructions Small group instruction Graphic Organizers Manipulatives Concrete models Encourage multiple ways to solve problems
Process Standards for Mathematics Problem Solving:	 Mathematicians use models, pictures, or tables to represent problems. Mathematicians use variables, equations, and expressions to represent problem situations. Mathematicians can justify their conclusions, communicate them with others, and respond to the arguments of others. 	PS. 2 PS. 3 PS. 4	 Use tables, graphs, equations, language, and concrete models to represent and solve problems. Explain and justify thinking using mathematical ideas and language. Apply previous understandings to new situations to solve problems. 			 Picture Support Ask all students to show their strategies while explaining Games for practicing at home

• 6.AF.1: Evaluate expressions for specific values of their variables, including expressions with whole-number exponents and those that arise from formulas used in geometry and other real-world problems.

• 6.AF.2: Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions and to justify whether two linear expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them.

• 6.AF.3: Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values.

• 6.NS.6: Identify and explain prime and composite numbers.

• 6.C.5: Evaluate positive rational numbers with whole number exponents.

• 6.C.6: Apply the order of operations and properties of operations (identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents.

Quarter 3 Weeks 23 – 26	Essential Goals	Priority Standards	Strategies/Skills	Academic Vocabulary	Instructional Resources	Differentiation
Unit 5: <u>Equations and</u> <u>Inequalities</u>	 Mathematicians triace to the properties of equality and inequality. Mathematicians use equations and relationships to solve real-world problems. Mathematicians converties than one variable and use them to solve real-world problems. Mathematicians use coordinate planes to solve real-world problems. Mathematicians solve problems that require using one or more of the arithmetic operations with fractions and decimals and judge the reasonableness of their answers 	6.AF.8 6.AF.10 Support Standards 6.AF.4 6.AF.7 6.AF.7 6.AF.9 6.C.3 6.NS.3	 Index, interest and energy performance proposed in the problems of the problems. Write corresponding real-world problems given equations. Identify independent and dependent quantities from tables, graphs, and verbal descriptions. Write an equation that represents the relationship between independent and dependent quantities from a table. Represent a given situation using concrete models, verbal descriptions, tables, graphs, and equations Graph points in all four quadrants using ordered pairs of rational numbers, connecting the sign of the numbers in an ordered pair with the quadrant containing the point. Find the distance between two points on a coordinate plane with the same first second coordinate. Solve problems involving polygons in the coordinate plane. Use positive fractions and decimals to solve problems. Solve 1-step linear equations fluently. Evaluate expressions for specific values of their variables. Apply the properties of operations to create equivalent linear expressions. Represent real-world problems using linear equations and solving such problems (involving fractions and decimals). 	axes coefficient constant coordinate plane coordinates dependent variable equation equivalent expression evaluating independent variable like terms negative number ordered pair ordered pair ordered pair origin positive number properties of operations quadrants scale solution term variable x-axis	Includes links to different tasks related to the critical standards Go Math: • Unit 5: Modules 11 and 12 Connected Mathematics: • Variables and Patterns (G7) • Additional Practice and Skills (G7) (pg. 1 – 20) • CC Additional Investigations (G6) (pg. 17 – 30) Good Questions for Math Teaching (pg. 91 – 114) Inside Mathematics: Boxes (6.AF.4, PS.3, PS.7) http://www.insidemathematics. org/assets/common-core-	standards from previous units Prerequisite Skills: operations with whole numbers, decimals, and fractions prime numbers order of operations exponents Scaffolding Support: (ELL; SPED; Striving Learners) Go Math: differentiation materials Open ended problems with multiple entry points Written instructions Small group instruction Graphic Organizers Manipulatives Concrete models
Process Standards for Mathematics Problem Solving:	 Mathematicians create and use representations to organize, record, and communicate mathematical ideas. Mathematicians display, explain, and justify their ideas and arguments using precise language in written or oral communication. Mathematicians apply the math they know to solve problems arising in everyday life. 	PS. 2 PS. 3 PS. 4	 Use tables, graphs, equations, language, and concrete models to represent and solve problems. Explain and justify thinking using mathematical ideas and language. Apply previous understandings to new situations to solve problems. 	v-coordinate y-axis y-coordinate	<u>math-tasks/boxes.pdf</u> Gym (6.AF.4, PS.1, PS.4) <u>http://www.insidemathematics.org/assets/common-core-math-tasks/gym.pdf</u> <u>Illustrative Mathematics Tasks:</u> <u>http://www.illustrativemathematics.org</u>	 Encourage multiple ways to solve problems Models of finished products Picture Support Ask all students to show their strategies while explaining Games for practicing at home

• 6.AF.5: Solve equations of the form x + p = q, x - p = q, x - p = q, and x/p = q fluently for cases in which p, q and x are all nonnegative rational numbers. Represent real world problems using equations of these forms and solve such problems.

• 6.AF.8: Solve real-world and other mathematical problems by graphing points with rational number coordinates on a coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

• 6.AF.10: Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

• 6.AF.4: Understand that solving an equation or inequality is the process of answering the following 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.AF.6: Write an inequality of the form x > c, x > c, x < c, or x ≤ c, where c is a rational number, to represent a constraint or condition in a real world or other mathematical problem. Recognize inequalities have infinitely many solutions and represent solutions on a number line diagram.

• 6.AF.7: Understand that signs of numbers in ordered pairs indicate the quadrant containing the point. Identify rules or patterns in the signs as they relate to the quadrants. Graph points with rational number coordinates on a coordinate plane.

• 6.AF.9: 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.

• 6.GM.3: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; apply these techniques to solve real-world and other mathematical problems.

• 6.C.3: Solve real-world problems with positive fractions and decimals by using one or two operations.

Quarter 3/4 Weeks 27 – 33	Essential Goals	Priority Standards	Strategies/Skills	Academic Vocabulary	Instructional Resources	Differentiation
Math Content: Unit 6: <u>Geometry</u>	 Mathematicians apply their previous understandings of regular shapes to help them understand and solve problems involving irregular and complex shapes. Mathematicians use the coordinate plane to solve real-world and other geometric problems. Mathematicians use concrete objects and diagrams to help them solve problems. Mathematicians solve problems that require using one or more of the arithmetic operations with fractions and decimals and judge the reasonableness of their answers 	6.AF.1 6.AF.8 6.GM.4 6.GM.5 Support Standards 6.C.3 6.GM.2 6.GM.3 6.GM.6	 Model area formulas for triangles, parallelograms, trapezoids, rhombuses, and complex shapes by decomposing and rearranging parts of these shapes. Write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles where dimensions are positive rational numbers. Model and write equations that represent problems related to the volume of right rectangular prisms where dimensions are positive rational numbers. Use absolute value to find distances between points in the coordinate plane. Solve problems by drawing polygons in the coordinate plane and finding the length of the sides and areas. Construct and use nets to find the surface area of prisms. Understand the sum of the interior angles of triangles (180 degrees) and quadrilaterals (360 degrees). Solve problems involving the sum of the interior angles of triangles and quadrilaterals. Solve problems involving area of two-dimensional complex shapes. Solve problems involving volume and surface area of right rectangular prims. 	absolute value area axis base complex shape coordinate plane height hexagon irregular polygon net parallelogram perimeter polygon pyramid quadrilateral rectangular prism reflection regular polygon rhombus right triangle surface area trapezoid triangle	Curriculum Support Document Includes links to different tasks related to the critical standards Unit 6: Modules 13, 14 and 15 IN Success Lessons: A4 & A5 SKIP: Lesson 15.1 Connected Mathematics: Covering and Surrounding (G6) Additional Practice and Skills (G6) (pg. 59 - 79) CC Additional Investigations (G6) (pg. 41 – 46) Filling and Wrapping (G7) Additional Practice and Skills (G7) (pg. 114 – 138) Laying The Foundation (NMSI) Module 2: Pgs. 8 – 11 Good Questions for Math	 *Spiral review: use critical standards from previous units Prerequisite Skills: properties of triangles and quadrilaterals use concrete or pictorial models to solve problems graphing ordered pairs of integers and rational numbers on a coordinate plane classify polygons understand concepts of volume measurement measure volumes by counting unit cubes Scaffolding Support: (ELL; SPED; Striving Learners) Go Math: differentiation materials Open ended problems with multiple entry points
Process Standards for Mathematics Problem Solving:	 Mathematicians can justify their conclusions, communicate them with others, and respond to the arguments of others. Mathematicians use correct vocabulary to express ideas. Mathematicians check their work and are careful with calculations and units. Mathematicians look for repeated calculations to develop formulas. 	PS. 3 PS. 6 PS. 8	 Determine if solutions are reasonable for given problem situations. Draw and cut out shapes on grid paper to derive area formulas. Use symbols, geometric labels, definitions, and consistent and precise language to determine and describe the areas of parallelograms, trapezoids, and rhombuses. Use repeated reasoning to develop and test formulas for geometric shapes. 	vertex/vertices volume	Teaching (pg. 142 – 146, 153 – 155) Illustrative Mathematics Tasks: http://www.illustrativemathematics.org Inside Mathematics: Building Blocks (6.GM.5, PS.4, PS.6) http://www.insidemathematics. org/assets/common-core-math- tasks/building%20blocks.pdf	 Written instructions Small group instruction Graphic Organizers Manipulatives Encourage multiple ways to solve problems Models of finished products Picture Support Ask all students to show their strategies while explaining Games for practicing at home

• 6.GM.4: Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems.

• 6.GM.5: Find the volume of a right rectangular prism with fractional edge lengths using unit cubes of the appropriate unit fraction edge lengths (e.g., using technology or concrete materials), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = Iwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths to solve real-world and other mathematical problems.

• 6.C.3: Solve real-world problems with positive fractions and decimals by using one or two operations.

• 6.GM.2: Know that the sum of the interior angles of any triangle is 180° and that the sum of the interior angles of any quadrilateral is 360°. Use this information to solve real-world and mathematical problems.

• 6.GM.3: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; apply these techniques to solve real-world and other mathematical problems.

• 6.GM.6: Construct right rectangular prisms from nets and use the nets to compute the surface area of prisms; apply this technique to solve real-world and other mathematical problems.

Quarter 4 Weeks 34 – 36	Essential Goals	Priority Standards	Strategies/Skills	Academic Vocabulary	Instructional Resources	Differentiation
Math Content: Unit 7: <u>Reinforce and Extend</u> <u>Mathematical</u> <u>Understandings</u>	 Mathematicians practice critical grade level skills, in a variety of formats, to prepare them for more complex mathematical understandings. Mathematicians make sense of a variety of problems and persevere in solving them. Mathematicians reason abstractly and quantitatively to solve problems. Mathematicians construct viable arguments and critique the reasoning of others. Mathematicians apply math skills and understandings to solve real-world problems. Mathematicians use a variety of tools to aid them in solving mathematical and real-world problems. Mathematicians use structures and patterns to solve problems efficiently. 	6.NS.1 6.NS.5 6.NS.10 6.C.1 6.C.2 6.AF.1 6.AF.3 6.AF.5 6.AF.8 6.AF.10 6.DS.4 Support Standards 6.NS.3 6.C.3 6.C.3 6.C.6	 Use pre and post assessments to determine reinforcement or extension of skills and understandings. Use multiple representations to solve problems. Connect mathematics to students' daily lives. Use correct mathematical vocabulary. Use accurate labels, symbols, and calculations. Work in teams to solve problems and justify solutions. Select an appropriate tool to solve a problem and explain why the tool makes sense to use. Explain whether or not a solution or process is reasonable for the problem situation. 	abstract reasoning argument construct critique efficient mathematical models persevere precision proficient quantitative reasoning reasonable reasoning strategically structure	Curriculum Support Document Includes links to different tasks related to the critical standards Go Math: • Unit 8 – Review Projects • Unit 8 GR Modules 1, 2, 3 and 4 Good Questions for Math Teaching Connected Mathematics Laying The Foundation (NMSI) Illustrative Mathematics Tasks: http://www.illustrativemathematics.org Inside Mathematics: http://www.insidemathematics.org/performance-assessment- tasks	 *Spiral review: use critical standards from previous units Scaffolding Support: (ELL; SPED; Striving Learners) Go Math: differentiation materials Open ended problems with multiple entry points Written instructions Small group instruction Graphic Organizers Manipulatives Concrete models Encourage multiple ways to solve problems Models of finished products Picture Support Ask all students to show their strategies while explaining Games for practicing at home

• 6.NS.1: Understand that positive and negative numbers are used 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 and compare quantities in real-world contexts, explaining the meaning of 0 in each situation.

• 6.NS.5: Know commonly used fractions (halves, thirds, fourths, fifths, eighths, tenths) and their decimal and percent equivalents. Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the use of a calculator.

• 6.NS.10: Use reasoning involving rates and ratios to model real-world and other mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).

• 6.C.1: Divide multi-digit whole numbers fluently using a standard algorithmic approach.

• 6.C.2: Compute with positive fractions and positive decimals fluently using a standard algorithmic approach.

• 6.AF.1: Evaluate expressions for specific values of their variables, including expressions with whole-number exponents and those that arise from formulas used in geometry and other real-world problems.

6.AF.3: Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values.

• 6.AF.5: Solve equations of the form x + p = q, x - p = q, px = q, and x/p = q fluently for cases in which p, q and x are all nonnegative rational numbers. Represent real world problems using equations of these forms and solve such problems.

• 6.AF.10: Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

6.DS.4: Summarize numerical data sets in relation to their context in multiple ways, such as: report the number of observations; describe the nature of the attribute under investigation, including how it was measured and its units of measurement; determine quantitative measures of center (mean and/or median) and spread (range and interquartile range), describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered; relate the choice of measures of center and spread to the shape of the data distribution and the context in which the data were gathered.

• 6.NS.3: Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts.

• 6.C.3: Solve real-world problems with positive fractions and decimals by using one or two operations.

• 6.C.6: Apply the order of operations and properties of operations (identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical

expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents.

Process Standards for Mathematics

The Process Standards dem	ionstrate the ways in which students should develop conceptual understanding of mathematical content, and the ways in which students should synthesize and apply mathematical skills.
PS.1: Make sense of	Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals.
problems and persevere	They make conjectures about the form and meaning of the solution and plan a solution pathway, rather than simply jumping into a solution attempt. They consider analogous problems and try
in solving them.	special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Mathematically proficient
	students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" and "Is my answer reasonable?" They understand the approaches
	of others to solving complex problems and identify correspondences between different approaches. Mathematically proficient students understand how mathematical ideas interconnect and build
	on one another to produce a coherent whole.
PS.2: Reason abstractly	Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative
and quantitatively.	relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily
	attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative
	reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and
	knowing and flexibly using different properties of operations and objects.
PS.3: Construct viable	Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical
arguments and critique	progression of statements to explore the truth of their conjectures. They analyze situations by breaking them into cases and recognize and use counterexamples. They organize their mathematical
the reasoning of others.	thinking, justify their conclusions and communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account
	the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that
	which is flawed, and—if there is a flaw in an argument—explain what it is. They justify whether a given statement is true always, sometimes, or never. Mathematically proficient students participate
	and collaborate in a mathematics community. They listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.
PS.4: Model with	Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace using a variety of appropriate strategies. They create and
mathematics.	use a variety of representations to solve problems and to organize and communicate mathematical ideas. Mathematically proficient students apply what they know and are comfortable making
	assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their
	relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They analyze those relationships mathematically to draw conclusions. They routinely interpret their
	mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
PS.5: Use appropriate	Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, models, a ruler, a protractor, a calculator, a
tools strategically.	spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Mathematically proficient students are sufficiently familiar with tools appropriate for their grade or
	course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. Mathematically proficient students identify relevant
	external mathematical resources, such as digital content, and use them to pose or solve problems. They use technological tools to explore and deepen their understanding of concepts and to support
	the development of learning mathematics. They use technology to contribute to concept development, simulation, representation, reasoning, communication and problem solving.
PS.6: Attend to precision.	Mathematically proficient students communicate precisely to others. They use clear definitions, including correct mathematical language, in discussion with others and in their own reasoning. They
	state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They express solutions clearly and logically by using the appropriate mathematical terms
	and notation. They specify units of measure and label axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently and check the validity of their results in
	the context of the problem. They express numerical answers with a degree of precision appropriate for the problem context.
PS.7: Look for and make	Mathematically proficient students look closely to discern a pattern or structure. They step back for an overview and shift perspective. They recognize and use properties of operations and equality.
use of structure.	They organize and classify geometric shapes based on their attributes. They see expressions, equations, and geometric figures as single objects or as being composed of several objects.
PS.8: Look for and	Mathematically proficient students notice if calculations are repeated and look for general methods and shortcuts. They notice regularity in mathematical problems and their work to create a rule or
express regularity in	formula. Mathematically proficient students maintain oversight of the process, while attending to the details as they solve a problem. They continually evaluate the reasonableness of their
repeated reasoning.	intermediate results.

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	NUMBER SENSE
6.NS.1	Understand that positive and negative numbers are used 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 and compare quantities in real-world contexts, explaining the meaning of 0 in each situation.
6.NS.2	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.
6.NS.3	Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
6.NS.4	Understand that the absolute value of a number is the distance from zero on a number line. Find the absolute value of real numbers and know that the distance between two numbers on the number line is the absolute value of their difference. Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
6.NS.5	Know commonly used fractions (halves, thirds, fourths, fifths, eighths, tenths) and their decimal and percent equivalents. Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the use of a calculator.
6.NS.6	Identify and explain prime and composite numbers.
6.NS.7	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 from 1 to 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.
6.NS.8	Interpret, model, and use ratios to show the relative sizes of two quantities. Describe how a ratio shows the relationship between two quantities. Use the following notations: a/b, a to b, a:b.
6.NS.9	Understand the concept of a unit rate and use terms related to rate in the context of a ratio relationship.
6.NS.10	Use reasoning involving rates and ratios to model real-world and other mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).

	COMPUTATION
6.C.1	Divide multi-digit whole numbers fluently using a standard algorithmic approach.
6.C.2	Compute with positive fractions and positive decimals fluently using a standard algorithmic approach.
6.C.3	Solve real-world problems with positive fractions and decimals by using one or two operations.
6.C.4	Compute quotients of positive fractions and solve real-world problems involving division of fractions by fractions. Use a visual fraction model and/or equation to represent these calculations.
6.C.5	Evaluate positive rational numbers with whole number exponents.
6.C.6	Apply the order of operations and properties of operations (identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents.

ALGEBRA AND FUNCTIONS		
6.AF.1	Evaluate expressions for specific values of their variables, including expressions with whole-number exponents and those that arise from formulas used in geometry and other real-world problems.	
6.AF.2	Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions and to justify whether two linear expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them.	
6.AF.3	Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values.	
6.AF.4	Understand that solving an equation or inequality is the process of answering the following 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.AF.5	Solve equations of the form $x + p = q$, $x - p = q$, $px = q$, and $x/p = q$ fluently for cases in which p, q and x are all nonnegative rational numbers. Represent real-world problems using equations of these forms and solve such problems.		
	Write an inequality of the form $x > c$, $x \ge c$, $x < c$, or $x \le c$, where c is a rational number, to represent a constraint or condition in a		
6.AF.6	real-world or other mathematical problem. Recognize inequalities have infinitely many solutions and represent solutions on a		
	number line diagram.		
6.AF.7	Understand that signs of numbers in ordered pairs indicate the quadrant containing the point. Identify rules or patterns in the signs as they relate to the quadrantsGraph points with rational number coordinates on a coordinate plane.		
6.AF.8	Solve real-world and other mathematical problems by graphing points with rational number coordinates on a coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.		
6.AF.9	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.		
6.AF.10	Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.		

GEOMETRY AND MEASUREMENT			
6.GM.1	Convert between measurement systems (English to metric and metric to English) given conversion factors, and use these conversions in solving real-world problems.		
6.GM.2	Know that the sum of the interior angles of any triangle is 180° and that the sum of the interior angles of any quadrilateral is 360°. Use this information to solve real-world and mathematical problems.		
6.GM.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; apply these techniques to solve real-world and other mathematical problems.		
6.GM.4	Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems.		

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6.GM.5	Find the volume of a right rectangular prism with fractional edge lengths using unit cubes of the appropriate unit fraction edge lengths (e.g., using technology or concrete materials), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = lwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths to solve real-world and other mathematical problems.
6.GM.6	Construct right rectangular prisms from nets and use the nets to compute the surface area of prisms; apply this technique to solve real-world and other mathematical problems.

DATA ANALYSIS AND STATISTICS				
6.DS.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for the variability in the answers. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.			
6.DS.2	Select, create, and interpret graphical representations of numerical data, including line plots, histograms, and box plots.			
6.DS.3	Formulate statistical questions; collect and organize the data (e.g., using technology); display and interpret the data with graphical representations (e.g., using technology).			
	Summarize numerical data sets in relation to their context in multiple ways, such as:			
	report the number of observations			
	describe the nature of the attribute under investigation, including how it was measured and its units of measurement			
6.DS.4	• determine quantitative measures of center (mean and/or median) and spread (range and interquartile range)			
	 describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered 			
	 relate the choice of measures of center and spread to the shape of the data distribution and the context in which the data were gathered 			

Number Sense			
Grade 6	Grade 7	Grade 8	
6.NS.1: Understand that positive and negative numbers are used 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 and compare quantities in real-world contexts, explaining the meaning of 0 in each situation.	e 7.NS.3: Know there are rational and irrational numbers. Identify, compare, and order rational and common irrational numbers (V2, V3, V5, ∏) and plot them on a number line. If	8.NS.1: Give examples of rational and irrational numbers and explain the difference between them. Understand that every number has a decimal expansion; for rational numbers, show that the decimal expansion terminates or repeats, and convert a decimal expansion that repeats into a rational number.	
6.NS.2: Understand the integer number system. 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.			
6.NS.3: Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts.	-	8.NS.2: Use rational approximations of irrational numbers to compare the size of irrational numbers, plot them approximately on a number line, and estimate the value of expressions involving irrational numbers.	
6.NS.4: Understand that the absolute value of a number is the distance from zero on a number line. Find the absolute value of real numbers and know that the distance between two numbers on the number line is the absolute value of their difference. Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.			
6.NS.5: Know commonly used fractions (halves, thirds, fourths, fifths, eighths, tenths) and their decimal and percent equivalents. Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the use of a calculator.	-		
6.NS.6: Identify and explain prime and composite numbers.			
6.NS.7: 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 from 1 to 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.	7.NS.1: Find the prime factorization of whole numbers and write the results using exponents.	8.NS.3: Given a numeric expression with common rational number bases and integer exponents, apply the properties of exponents to generate equivalent expressions.	
6.NS.8: Interpret, model, and use ratios to show the relative sizes of two quantities. Describe how a ratio shows the relationship between two quantities. Use the following notations: a/b, a to b, a:b.			
6.NS.9: Understand the concept of a unit rate and use terms related to rate in the context of a ratio relationship.			
6.NS.10: Use reasoning involving rates and ratios to model real-world and other mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).			
	7.NS.2: Understand the inverse relationship between squaring and finding the square root of a perfect square integer. Find square roots of perfect square integers.	8.NS.4: Use square root symbols to represent solutions to equations of the form $x^2 = p$, where p is a positive rational number.	

Computation		
Grade 6	Grade 7	Grade 8
6.C.1: Divide multi-digit whole numbers fluently using a standard algorithmic approach.		
	7.C.1: 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.	
	7.C.2: 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.	
6.C.2: Compute with positive fractions and positive decimals fluently using a standard algorithmic approach.	7.C.3: 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.	
	7.C.4: Understand that integers can be divided, provided that the divisor is not zero, and that every quotient of integers (with non-zero divisor) is a rational number. Understand that if p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$.	
	7.C.7: Compute with rational numbers fluently using a standard algorithmic approach.	-
6.C.3: Solve real-world problems with positive fractions and decimals by using one or two operations.	7.C.6: Use proportional relationships to solve ratio and percent problems with multiple operations, such as the following: simple interest, tax, markups, markdowns, gratuities, commissions, fees, conversions within and across measurement systems, percent increase and decrease, and percent error.	8.C.1: Solve real-world problems with rational numbers by using multiple operations.
	7.C.8: Solve real-world problems with rational numbers by using one or two operations.	
6.C.4: Compute quotients of positive fractions and solve real-world problems involving division of fractions by fractions. Use a visual fraction model and/or equation to represent these calculations.	7.C.5: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	
6.C.5: Evaluate positive rational numbers with whole number exponents.		
6.C.6: Apply the order of operations and properties of operations (identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents. Justify each step in the process.		8.C.2: Solve real-world and other mathematical problems involving numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Interpret scientific notation that has been generated by technology, such as a scientific calculator, graphing calculator, or excel spreadsheet.

Algebra and Functions			
Grade 6	Grade 7	Grade 8	
6.AF.1: Evaluate expressions for specific values of their variables, including expressions with whole-number exponents and those that arise from formulas used in real-world problems.			
6.AF.2: Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions and to justify whether two linear expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them.	7.AF.1: Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions, including situations that involve factoring (e.g., given 2x - 10, create an equivalent expression 2(x - 5)). Justify each step in the process.		
6.AF.3: Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values.			
6.AF.4: Understand that solving an equation or inequality is the process of answering the following 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.		8.AF.2: Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by transforming a given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).	
6.AF.5: Solve equations of the form $x + p = q$, $x - p = q$, $px = q$, and $x/p = q$ fluently for cases in which p, q and x are all nonnegative rational numbers. Represent real world problems using equations of these forms and solve such problems.	7.AF.2: Solve equations of the form px + q= r and p(x + q) = r fluently, where p, q, and r are specific rational numbers. Represent real-world problems using equations of these forms and solve such problems.	8.AF.1: Solve linear equations with rational number coefficients fluently, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations and inequalities in one variable and solve such problems.	
6.AF.6: Write an inequality of the form $x > c$, $x \ge c$, $x < c$, or $x \le c$, where c is a rational number, to represent a constraint or condition in a real-world or other mathematical problem. Recognize inequalities have infinitely many solutions and represent solutions on a number line diagram.	7.AF.3: Solve inequalities of the form $px + q (> or \ge) r$ or $px + q (< or \le) r$, where p , q , and r are specific rational numbers. Represent real-world problems using inequalities of these forms and solve such problems. Graph the solution set of the inequality and interpret it in the context of the problem.		
6.AF.7: Understand that signs of numbers in ordered pairs indicate the quadrant containing the point; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. Graph points with rational number coordinates on a coordinate plane.			
6.AF.8: Solve real-world and other mathematical problems by graphing points with rational number coordinates on a coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.			

Algebra and Functions			
Grade 6	Grade 7	Grade 8	
	 7.AF.4: Define slope as vertical change for each unit of horizontal change and recognize that a constant rate of change or constant slope describes a linear function. Identify and describe situations with constant or varying rates of change. 7.AF.5: Graph a line given its slope and a point on the line. Find the slope of a line given its graph. 		
6.AF.9: 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.	7.AF.6: 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).		
	7.AF.7: Identify the unit rate or constant of proportionality in tables, graphs, equations, and verbal descriptions of proportional relationships.		
	7.AF.8: Explain what the coordinates of a point on the graph of a proportional relationship mean in terms of the situation, with special attention to the points (0, 0) and (1,r), where r is the unit rate.		
6.AF.10: Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and	7.AF.9: Identify real-world and other mathematical situations that involve proportional relationships. Write equations and draw graphs to represent proportional relationships and recognize that these situations are described by a linear function in the form y = mx, where the unit rate, m, is the slope of the line.	8.AF.6: Construct a function to model a linear relationship between two quantities given a verbal description, table of values, or graph. Recognize in $y = mx + b$ that m is the slope (rate of change) and b is the y-intercept of the graph, and describe the meaning of each in the context of a problem.	
independent variables using graphs and tables, and relate these to the equation.		8.AF.7: Compare properties of two linear functions given in different forms, such as a table of values, equation, verbal description, and graph (e.g., compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed).	
		8.AF.3: Understand that a function assigns to each x-value (independent variable) exactly one y-value (dependent variable), and that the graph of a function is the set of ordered pairs (x,y).	
		8.AF.4: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described.	
		8.AF.5: Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. Describe similarities and differences between linear and nonlinear functions from tables, graphs, verbal descriptions, and equations.	
		8.AF.8: Understand that solutions to a system of two linear equations correspond to points of intersection of their graphs because points of intersection satisfy both equations simultaneously. Approximate the solution of a system of equations by graphing and interpreting the reasonableness of the approximation.	

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Geometry and Measurement		
Grade 6	Grade 7	Grade 8
6.GM.1: Convert between measurement systems (English to metric and metric to English) given conversion factors, and use these conversions in solving real-world problems.		
6.GM.2: Know that the sum of the interior angles of any triangle is 180° and that the sum of the interior angles of any quadrilateral is 360°. Use this information to solve real-world and mathematical problems.		
6.GM.3: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate; apply these techniques to solve real-world and other mathematical problems.	7.GM.1: Draw triangles (freehand, with ruler and protractor, and using technology) with given conditions from three measures of angles or sides, and notice when the conditions determine a unique triangle, more than one triangle, or no triangle.	
6.GM.4: Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems.	7.GM.5: Understand the formulas for area and circumference of a circle and use them to solve real-world and other mathematical problems; give an informal derivation of the relationship between circumference and area of a circle.	
6.GM.5: Find the volume of a right rectangular prism with fractional edge lengths using unit cubes of the appropriate unit fraction edge lengths (e.g., using technology or concrete materials), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = lwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths to solve real-world and other mathematical problems.	7.GM.6: Solve real-world and other mathematical problems involving volume of cylinders and three-dimensional objects composed of right rectangular prisms.	8.GM.2: Solve real-world and other mathematical problems involving volume of cones, spheres, and pyramids and surface area of spheres.
6.GM.6: Construct right rectangular prisms from nets and use the nets to compute the surface area of prisms; apply this technique to solve real-world and other mathematical problems.	7.GM.7: Construct nets for right rectangular prisms and cylinders and use the nets to compute the surface area; apply this technique to solve real-world and other mathematical problems.	8.GM.1: Identify, define and describe attributes of three-dimensional geometric objects (right rectangular prisms, cylinders, cones, spheres, and pyramids). Explore the effects of slicing these objects using appropriate technology and describe the two-dimensional figure that results.
	7.GM.3: Solve real-world and other mathematical problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing. Create a scale drawing by using proportional reasoning.	
	7.GM.4: Solve real-world and other mathematical problems that involve vertical, adjacent, complementary, and supplementary angles.	*
		8.GM.3: Verify experimentally the properties of rotations, reflections, and translations, including: lines are mapped to lines, and line segments to line segments of the same length; angles are mapped to angles of the same measure; and parallel lines are mapped to parallel lines.
		8.GM.4: Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations. Describe a sequence that exhibits the congruence between two given congruent figures.
	7.GM.2: Identify and describe similarity relationships of polygons including the angle-angle criterion for similar triangles, and solve problems involving similarity.	8.GM.5: Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations. Describe a sequence that exhibits the similarity between two given similar figures.
		8.GM.6: Describe the effect of dilations, translations, rotations, and reflections on two- dimensional figures using coordinates.
		8.GM.7: Use inductive reasoning to explain the Pythagorean relationship.
		8.GM.8: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and other mathematical problems in two dimensions.
		8.6WI.9: Apply the Pythagorean Theorem to find the distance between two points in a coordinate plane.

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Data Analysis, Statistics (and Probability for Gr.7-8)		
Grade 6	Grade 7	Grade 8
6.DS.1: Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for the variability in the answers. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	7.DSP.1: Understand that statistics can be used to gain information about a population by examining a sample of the population and 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.DSP.2: Use data from a random sample to draw inferences about a population. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.	
6.DS.2: Select, create, and interpret graphical representations of numerical data, including line plots, histograms, and box plots.	7.DSP.4: Make observations about the degree of visual overlap of two numerical data distributions represented in line plots or box plots. Describe how data, particularly outliers, added to a data set may affect the mean and/or median.	
6.DS.3: Formulate statistical questions; collect and organize the data (e.g., using technology); display and interpret the data with graphical representations (e.g., using technology).		
6.DS.4: Summarize numerical data sets in relation to their context in multiple ways, such as: report the number of observations; describe the nature of the attribute under investigation, including how it was measured and its units of measurement; determine quantitative measures of center (mean and/or median) and spread (range and interquartile range), as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered; and relate the choice of measures of center and spread to the shape of the data distribution and the context in which the data were gathered.	7.DSP.3: Find, use, and interpret measures of center (mean and median) and measures of spread (range, interquartile range, and mean absolute deviation) for numerical data from random samples to draw comparative inferences about two populations.	
	7.DSP.5: Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Understand that 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. Understand that a probability of 1 indicates an event certain to occur and a probability of 0 indicates an event impossible to occur.	8.DSP.4: 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. Understand and use appropriate terminology to describe independent, dependent, complementary, and mutually exclusive events.
	7.DSP.6: Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its relative frequency from a large sample.	8.DSP.5: Represent sample spaces and find probabilities of compound events (independent and dependent) using methods, such as organized lists, tables, and tree diagrams.
	7.DSP.7: Develop probability models that include the sample space and probabilities of outcomes to represent simple events with equally likely outcomes. Predict the approximate relative frequency of the event based on the model. Compare probabilities from the model to observed frequencies; evaluate the level of agreement and explain possible sources of discrepancy.	8.DSP.6: For events with a large number of outcomes, understand the use of the multiplication counting principle. Develop the multiplication counting principle and apply it to situations with a large number of outcomes.
		8.DSP.1: Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantitative variables. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
		8.DSP.2: Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and describe the model fit by judging the closeness of the data points to the line.
		8.DSP.3: Write and use equations that model linear relationships to make predictions, including interpolation and extrapolation, in real-world situations involving bivariate measurement data; interpret the slope and y-intercept.