Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
Unit 1 **Operations and Reasoning about Ratios**	● 6.NS.A.1 ● 6.NS.B.2 ● 6.RP.A.1 ● 6.RP.A.2 ● 6.RP.A.3* ● 6.NS.B.3 ● 6.NS.B.4	● Apply and extend previous understandings of multiplication and division to divide fractions by fractions ● Compute fluently with multi-digit numbers and find common factors and multiples ● Understand ratio concepts and use ratio reasoning to solve problems	
Unit 1: *Suggested Open Educational Resources*	6.NS.A.1 Traffic Jam 6.RP.A.1 Games at Recess 6.RP.A.2 Price per pound and pounds per dollar 6.RP.A.3 Voting for Three, Variation 1 6.RP.A.3c Shirt Sale 6.NS.B.3 Reasoning about Multiplication and Division and Place Value, Part 1 6.NS.B.4 Factors and Common Factors 6.NS.B.4 Multiples and Common Multiples		MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics.

Key: Major Clusters | Supporting | Additional Clusters | * Benchmarked Standard

Unit 2	• 6.EE.A.1 • 6.EE.A.2 • 6.EE.A.3 • 6.EE.A.4 • 6.EE.B.6 • 6.G.A.2 • 6.G.A.4	• Apply and extend previous understandings of arithmetic to algebraic expressions • Reason about and solve one-variable equations and inequalities • Solve real-world and mathematical problems involving area, surface area, and volume	MP.5 Use appropriate tools strategically.
Expressions and 3-D Geometry			
Unit 2: *Suggested Open Educational Resources*	6.EE.A.1 The Djinni's Offer 6.EE.A.2 Rectangle Perimeter 1 6.EE.A.4 Rectangle Perimeter 2 6.EE.A.4 Equivalent Expressions 6.G.A.2 Volumes with Fractional Edge Lengths 6.G.A.4 Nets for Pyramids and Prisms		MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.
Unit 3 **Equations, The Rational**	• 6.EE.B.5 • 6.EE.B.7 • 6.NS.C.5 • 6.NS.C.6 • 6.NS.C.7 • 6.EE.B.8	• Reason about and solve one-variable equations and inequalities • Apply and extend previous understandings of numbers to the system of rational numbers • Solve real-world and mathematical problems involving area, surface area, and volume	

Number System and **2-D Geometry**	• 6.NS.C.8* • 6.G.A.3 • 6.G.A.1		MP.1 Make sense of problems and persevere in solving them.
Unit 3: *Suggested Open Educational Resources*	6.EE.B.5 Make Use of Structure 6.EE.B.7 Morning Walk 6.NS.C.5 Warmer in Miami 6.NS.C.6 Mile High 6.NS.C.7 Jumping Flea 6.NS.C.7a Fractions on the Number Line 6.NS.C.7b Comparing Temperatures 6.EE.B.8 Fishing Adventures 1 6.NS.C.8 Nome, Alaska 6.G.A.1, 6.G.A.3 Polygons in the Coordinate Plane		MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics.
Unit 4 Variability, Distributions, and Relationships between Quantities	• 6.EE.C.9 • 6.SP.A.1 • 6.SP.A.2 • 6.SP.A.3 • 6.SP.B.4 • 6.SP.B.5 • 6.RP.A.3* • 6.NS.C.8*	• Represent and analyze quantitative relationships between dependent and independent variables • Develop understanding of statistical variability • Summarize and describe distributions • Understand ratio concepts and use ratio reasoning to solve problems • Apply and extend previous understandings of numbers to the system of rational numbers	MP.5 Use appropriate tools strategically. MP.6 Attend to precision.

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| Unit 4:

Suggested Open Educational Resources | 6.EE.C.9 Families of Triangles

6.SP.A.1 Identifying Statistical Questions

6.SP.A.2, 6.SP.B.4 Puppy Weights

6.SP.A.3 Is It Center or Is It Variability?

6.SP.B.5c Number of Siblings

6.SP.B.5d Mean or Median? | MP.7 Look for and make use of structure.

MP.8 Look for and express regularity in repeated reasoning. |

| 21st Century Life and Careers Career Awareness, Exploration, and Preparation | 9.2.12.C.1 Review career goals and determine steps necessary for attainment.
9.2.12.C.2 Modify Personalized Student Learning Plans to support declared career goals
9.2.12.C.3 Identify transferable career skills and design alternate career plans.
9.2.12.C.6 Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.
 9.2.12.C.9 Analyze the correlation between personal and financial behavior and employability. |
| **CRP Standards** | CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. |

	CRP10. Plan education and CRP8. Utilize critical thinking to make sense of problems CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.
ELA Standards	RI.6.1. Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text. RI.6.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. W.6.5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. SL.6.2. Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study
Technology Standards	8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory 8.1.8.C.1 Collaborate to develop and publish work that provides perspectives on a global problem for discussions with learners from other countries. 8.1.8.D.5 Understand appropriate uses for social media and the negative consequences of misuse. 8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem. 8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.

Unit 1 Grade 6 – Operations and Reasoning about ratios		
Content Standards	**Suggested Standards for Mathematical Practice**	**Transfer**
● 6.NS.A.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	MP.4 Model with mathematics.	Concept(s): No new concept(s) introduced Students are able to: ● divide a fraction by a fraction.

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?*		● represent division of fractions using visual models. ● interpret quotients of fractions in the context of the problem. ● compute quotients of fractions in order to solve word problems. ● write equations to solve word problems involving division of fraction by a fraction. ● use the relationship between multiplication and division to explain division of fractions. Learning Goal 1: Compute quotients of fractions. Learning Goal 2: Construct visual fraction models to represent quotients of fractions and use the relationship between multiplication and division to explain division of fractions. Learning Goal 3: Solve real-world problems involving quotients of fractions and interpret the solutions in the context given.
● 6.NS.B.2. Fluently divide multi-digit numbers using the standard algorithm.		Concept(s): No new concept(s) introduced Students are able to: ● use the standard algorithm to divide multi-digit numbers with speed and accuracy. Learning Goal 4: Fluently divide multi-digit numbers using the standard algorithms.
● 6.RP.A.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *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."*	MP.2 Reason abstractly and quantitatively.	Concept(s): ● A ratio shows relative sizes or values of two quantities. Students are able to: ● describe a ratio relationship between two quantities using ratio language. Learning Goal 5: Explain the relationship of two quantities in given ratio using ratio

		language.
● 6.RP.A.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. *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."*	MP.2 Reason abstractly and quantitatively.	Concept(s): ● A rate is a ratio comparing two different types of quantities. Students will be able to: ● determine the unit rate given a ratio relationship. ● describe a unit rate relationship between two quantities using rate language. Learning Goal 6: Use rate language, in the context of the ratio relationship, to describe a unit rate.

● 6.RP.A.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. *(benchmarked)
  6.RP.A.3a. 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.
  6.RP.A.3b. 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?
  6.RP.A.3c. Find a percent of a quantity as a rate per 100 (e.g.,
	MP.2 Reason abstractly and quantitatively.
	
	MP.4 Model with mathematics.
	
	MP.5 Use appropriate tools strategically
	
	MP.6 Attend to precision.
	
	MP.7 Look for and make use of structure.
	
	MP.8 Look for and express regularity in repeated reasoning
		Concept(s): No new concept(s) introduced
		
		Students are able to:
		
		● use ratio and rate reasoning to create tables of equivalent ratios relating quantities with *whole number* measurements, find missing values in tables and plot pairs of values.
		● compare ratios using tables of equivalent ratios.
		● solve real world and mathematical problems involving unit rate (including unit price and constant speed).
		● calculate a percent of a quantity and solve problems by finding the whole when given the part and the percent.
		● convert measurement units using ratio reasoning.
		● transform units appropriately when multiplying and dividing quantities.
		
		Learning Goal 7*:* Create and complete tables of equivalent ratios to sole real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.
		
		Learning Goal 8: Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities.

30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. 6.RP.A.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		
● 6.NS.B.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.		Concept(s): No new concept(s) introduced Students are able to: ● add and subtract multi-digit decimals with accuracy and efficiency. ● multiply and divide multi-digit decimals with accuracy and efficiency. Learning Goal 9: Fluently add, subtract, multiply and divide multi-digit decimals.
● 6.NS.B.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.	MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: ● create lists of factors for two whole numbers less than or equal to 100; find the largest factor common to both lists. ● create lists of multiples for two whole numbers less than or equal to 12; find the smallest multiple common to both lists. Learning Goal 10: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12.

District/School Formative Assessment Plan	District/School Summative Assessment Plan
● Teacher-Created Assessments ● Homework ● Classwork	● Chapter Tests ● Unit Tests ● EdConnect Assessments

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● UDL's ● whiteboard activities ● IXL ● Problem of the Day ● Exit Ticket	

Focus Mathematical Concepts		

Vocabulary	Instruction and Pacing	
	Pretest	1 day
Quotient Ratio	Dividing Multi-digit numbers	1 week
	Dividing fractions	1 week
rate	Ratios	1 week
	Rates	1 week
Factor Terminating decimal	Adding decimals	1 week
Repeating Decimal	Subtracting decimals	1 week
Integer Improper Fraction	Multiplying decimals	1 week
Mixed Number Divisor	Dividing decimals	1 week
Greatest common factor Least common multiple		
	GCF & LCM	1 week

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
● The product of a fraction, x/y, and a whole can be interpreted as dividing the whole into y parts and then taking x of those parts. ● The product of two fractions can be found by writing the product of the numerators over the product of the denominators ● In order to perform calculations involving mixed numbers, you must transform them into improper fractions ● A division expression containing fractions can be changed to an equivalent multiplication expression to solve ● Rewrite division of mixed numbers as multiplication problems using improper fractions and the reciprocal of the divisor.	● How do I find the reciprocal of a fraction? ● What is the process for dividing fractions? ● When are ratios and proportions used and why are they important? ● When and why do I use proportional comparisons? ● How can I use rates in real life situations? ● Why is it important to be able to fluently add, subtract, multiply and divide decimals? ● What is the difference between a GCF and an LCM?

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● When adding and subtracting decimals, you must line up the decimal point ● A ratio shows relative sizes or values of 2 quantities, while a rate is a ratio comparing 2 different types of quantities.	

Differentiation and Accommodations	District/School Primary and Supplementary Resources
● Provide graphic organizers ● Provide additional examples and opportunities for additional problems for repetition ● Provide tutoring opportunities ● Provide retesting opportunities after remediation (up to teacher and district discretion) ● Teach for mastery not test ● Teaching concepts in different modalities ● Adjust pace and homework assignments	● Go Math!! ● IXL ● Teacher created materials

Instructional Strategies
Fairfield Township School recognizes the importance of the varying methodologies that may be successfully employed by teachers within the classroom and, as a result, identifies a wide variety of possible instructional strategies that may be used effectively to support student achievement. These may include, but not be limited to, strategies that fall into categories identified by the Framework for Teaching by Charlotte Danielson: ● Communicating with students ● Using questioning and discussion techniques ● Engaging students in learning ● Using assessment in instruction ● Demonstrating Flexibility and Responsiveness

Common Misconceptions	Proper Conceptions
Using the reciprocal of the wrong fraction when dividing fractions.	Only the 2nd fraction (the divisor) gets reciprocated when dividing fractions.
Multiplying proper fractions create larger numbers.	Multiplying proper fractions create smaller numbers.
When multiplying decimals, they must line up the decimal.	When multiplying decimals, they needn't must line up the decimal.

Performance Task

A farmer receives a shipment of 121 ½ pounds of animal food. The animal food comes in bags weighing 40 ½ pounds each.

Part A: How many bags of food did the farmer receive?

Part B: If each bag of food costs $31.50, how much does the farmer need to pay?

Part C: If the farmer paid with a $100 bill, what was his change?

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Rubric: 1 point for each correct part.

Unit 2 Grade 6 – Expressions and 3-D geometry		
Content Standards	**Suggested Standards for Mathematical Practice**	**Transfer**
● 6.EE.A.1. Write and evaluate numerical expressions involving whole-number exponents	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: ● write numerical expressions (involving whole number exponents) from verbal descriptions.

		● evaluate numerical expressions involving whole number exponents. Learning Goal 1: Write and evaluate numerical expressions involving whole number exponents.

● 6.EE.A.2. Write, read, and evaluate expressions in which letters stand for numbers
  6.EE.A.2a. 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.*
  6.EE.A.2b. 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*
  6.EE.A.2c. 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 $A = 6s^2$ to find the volume and surface area of a cube with sides of length s = ½*
	MP.2 Reason abstractly and quantitatively.
	
	MP.7 Look for and make use of structure.
		Concept(s): No new concept(s) introduced
		
		Students are able to:
		
		● write algebraic expressions from verbal descriptions.
		● use mathematical terms (sum, term, product, factor, quotient, coefficient) to identify the parts of an expression.
		● evaluate algebraic expressions and formulas, including those involving exponents.
		
		Learning Goal 2: Use mathematical language to identify parts of an expression.
		
		Learning Goal 3: Write and evaluate algebraic expressions involving exponents (include evaluating formulas).

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● 6.EE.A.3. Apply the properties of operations to generate equivalent expressions. *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* ● 6.EE.A.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). *example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for*	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.	Concept(s): ● Properties of operations: distributive property, combining like terms Students are able to: ● combine like terms to generate an equivalent expression. ● factor to generate an equivalent expression. ● multiply (apply the distributive property) to generate an equivalent expression. Learning Goal 4: Apply properties of operations (factor, distribute, and combine like terms) to generate equivalent expressions and to identify when two expressions are equivalent.
● 6.EE.B.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): ● A variable can represent an unknown number or any number in a set of numbers. Students are able to: ● write expressions for solving real-world problems. Learning Goal 5: Use variables to represent numbers and write expressions when solving real world or mathematical problems.
● 6.G.A.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	MP. 2 Reason abstractly and quantitatively.	Concept(s): No new concept(s) introduced Students are able to: ● pack a right rectangular prism with fractional edge lengths with unit fraction cubes.

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.		● show that the volume found by packing is the same as would be found by multiplying the edge lengths of the prism. ● apply volume formulas, $V = l\,w\,h$ and $V = b\,h,$ to right rectangular prisms with fractional edge lengths. Learning Goal 6: Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes and show that the volume is the same as it would be if found by multiplying the edge lengths; apply volume formulas to right rectangular prisms with fractional edge lengths.
● 6.G.A.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	MP.1 Make sense of problems and persevere in solving them. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically	Concept(s): No new concept(s) introduced Students are able to: ● represent three dimensional objects with nets made up of rectangles and triangles. ● find surface area of three-dimensional objects using nets. ● solve real world and mathematical problems involving surface area using nets. Learning Goal 7: Represent three dimensional figures objects with nets made of rectangles and triangles, and use the nets to find the surface area of the figures in order to solve real world and mathematical problems.

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Focus Mathematical Concepts		

Vocabulary	Instruction and Pacing	
Associative property	Pretest	1 day
Commutative property	Exponents	1 week
Distributive property	Expressions containing exponents	1 week
Standard form	Expressions containing variables	1 week
Expanded form	Expressions using distributive property	1 week
Exponent form	Expressions combining like terms	1 week
Variable	Writing Expressions for real world problems	1 week
Algebraic expression	Volume of right rectangular prism	1 week
Expression	Nets & Surface area of 3 –d figures	1 week
Like terms		
Equivalent expression		
Volume		
Prism		
Net		
3-D figure		
Surface area		

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
- Patterns, models, and functions can be expressed mathematically. - Create a visual table (ie. Input/output) to evaluate the expression. - Use variables and open number sentences to represent problem situations. - Different properties are used to simplify an expression. - Evaluate exponents by multiplying the base times itself according to the nth power. - Volume represents the amount of space inside a 3-d figure - Surface are represents the amount of area covering the outside of a 3-d figure	- How can a pattern, a model, or a function be used to solve everyday problems? - How do you determine a rule, write an expression, and identify the values? - How can variables help represent an unknown value? - What are the properties of operations and how are they used? - How do you evaluate exponents? - When would you need to know the volume of a figure vs the surface area of a figure?

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Differentiation and Accommodations	District/School Primary and Supplementary Resources
- Provide graphic organizers - Provide additional examples and opportunities for additional problems for repetition - Provide tutoring opportunities - Provide retesting opportunities after remediation (up to teacher and district discretion) - Teach for mastery not test - Teaching concepts in different modalities - Adjust pace and homework assignments	- Go Math!! - IXL - Teacher created materials

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Common Misconceptions	Proper Conceptions
With exponents, multiplying the base and the power	You need to multiply the base by itself the number of times of the power
Different variables can be combined	You can only combine terms that have LIKE variables
Formulas for Finding volume and surface area get mixed up or used interchangeably	There are specific different formulas for finding volume and surface area of 3-d figures

Performance Task

Joey gets a base pay of $100 per week plus $20 for every hour he works.

a.) Write an algebraic expression to model how much money Joey makes in a week.
b.) If Joey works 40 hours in a week, how much will he get paid? Show your work.
c.) How many hours did he work if his paycheck was $700?

Rubric

1 point for each correct answer

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Unit 3 Grade 6 – Equations, Rational numbers, 2-D geometry		
Content Standards	**Suggested Standards for Mathematical Practice**	**Transfer**
● 6.EE.B.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.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): ● Solving an equation or inequality is a process of answering the question: determine which values from a specified set, if any, make the equation or inequality true. Students are able to: ● substitute a number into an equation to determine whether it makes an equation true. ● substitute a number into an inequality to determine whether it makes the inequality true.

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		Learning Goal 1: Use substitution to determine whether a given number makes an equation or inequality true.
● 6.EE.B.7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): ● An equation is defined by two expressions that are equivalent to one another. Students will be able to: ● solve real world problems by writing and solving equations of the form $x + p = q$ (p, q, and x are non-negative and rational). ● solve real world problems by writing and solving equations of the form $px = q$ (p, q, and x are non-negative and rational). Learning Goal 2: Solve real world problems by writing and solving equations of the form $x + p = q$ and $px = q$ (p, q, and x are non-negative rational numbers).
● 6.NS.C.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.	MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically	Concept(s): ● Positive and negative numbers, used together, describe quantities having opposite directions or opposite values. Students are able to: ● represent quantities with positive and negative numbers in real-world contexts. ● interpret positive and negative numbers in real-world contexts. ● explain the meaning of zero, in context, in each real-world situation. Learning Goal 3: Use positive and negative numbers to represent quantities in real-world situations, explaining the meaning of zero in the context of the real-world situation.
● 6.NS.C.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	MP.5 Use appropriate tools strategically. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): ● Opposite signs of numbers indicate locations on opposite sides of 0 on the number line.

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on the line and in the plane with negative number coordinates. 6.NS.C.6a. 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.C.6b. 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. 6.NS.C.6c. 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.		● The opposite of the opposite of a number is the number itself (e.g. the opposite of three is -3. The opposite of the opposite of three, -(-3), is equal to the original number, 3). ● Signs of numbers in ordered pairs indicate their locations in quadrants of the coordinate plane. ● When two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. Students are able to: ● position rational numbers on horizontal and vertical number lines. ● position pairs of rational numbers on a coordinate plane. ● explain the conditions for which pairs of points are reflections across an axes in the coordinate plane. ● locate numbers and their opposites on the number line and explain their relation to 0. Learning Goal 4: Locate rational numbers and their opposites on horizontal and vertical number line; explain their relation of the opposites to zero. Learning Goal 5: Plot pairs of positive and negative rational numbers in the coordinate plane; describe two ordered pairs that differ only by signs as reflections across one or both axes.
● 6.NS.C.7. Understand ordering and absolute value of rational numbers. 6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.* 6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world	MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.5 Use appropriate tools strategically	Concept(s): ● The absolute value of a rational number is its distance from 0 on the number line. Students are able to: ● given an inequality, determine the position of one rational number relative to another. ● write a inequality and explain statements of order for rational numbers in real world situations. Learning Goal 6: Use statements of inequality to determine relative positions of two rational numbers on a number line; write and explain statements of

contexts. *For example, write –3 $^oC > –7 ^oC$ to express the fact that –3 ^oC is warmer than –7 ^oC.* 6.NS.C.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.* 6.NS.C.7d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.*		order for rational numbers in real-world contexts. Learning Goal 7*:* Explain the meaning of absolute value of a rational number as distance from zero on the number line and as magnitude for a positive or negative quantity in a real-world situation.
● 6.EE.B.8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams	MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): ● An inequality may represent a constraint (or a condition) in a real-world problem. ● Infinity ($x > c$ and $x < c$ have an infinite number of solutions). Students are able to: ● represent real-world constraint or condition by writing an inequality of the form $x > c$ or $x < c$. ● graph inequalities of the form $x > c$ or $x < c$ on number lines. Learning Goal 8: Write an inequality of the form x > c or x < c to represent a constraint or condition in a real world or mathematical problem and represent them on a number line.
● 6.NS.C.8. Solve real-world and mathematical problems by graphing points in all four	MP.1 Make sense of problems and persevere in solving them.	Concept(s): No new concept(s) introduced

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quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. *(benchmarked)* ● 6.G.A.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 in the context of solving real-world and mathematical problems.	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Students are able to: ● graph points in all four quadrants of the coordinate plane in order to solve real-world and mathematical problems. ● draw polygons in the coordinate plane. ● use absolute value to find distances between points with the same first coordinate or the same second coordinate. ● use coordinates to solve real-world distance, perimeter, and area problems. Learning Goal 9: Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate.
● 6.G.A.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.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: ● compose rectangles in order to find the area of triangles, special quadrilaterals and polygons. ● decompose triangles, special quadrilaterals, and polygons into triangles and other shapes in order to find their area. ● compose rectangles and decompose into triangles in order to solve real-world problems. Learning Goal 10: Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles and other shapes to solve real world or mathematical problems.

District/School Formative Assessment Plan	District/School Summative Assessment Plan

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- Teacher-Created Assessments
- Homework
- Classwork
- UDL's
- whiteboard activities
- IXL
- Problem of the Day
- Exit Ticket

- Chapter Tests
- Unit Tests
- EdConnect Assessments

Focus Mathematical Concepts	

Vocabulary	Instruction and Pacing	
Equation	Pretest	1 day
Variable	Adding/subtracting equations	1 week
Coefficient	Multiplying equations	1 week
Inverse function/operation	Dividing equations	1 week
Inequality	inequalities	1 week
Positive	Rational numbers	1 week
Negative	Absolute value	1 week
Rational number	Graphing on coordinate plane	1 week
Quadrant	Draw polygons	1 week
Coordinate plane	Find area of 2-D figures	1 week
Ordered pair		
Axes		
Horizontal		
Vertical		
Absolute value		
polygons		

Key: Major Clusters | Supporting | Additional Clusters | * Benchmarked Standard

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
- Recognize that inequalities have an infinite number of solutions where as an equation has a set value. - Be able to use the properties of equality effectively. - Use variables and open number sentences to represent problem situations.	- How many possible solutions can an equation or an inequality have and how can they be represented? - How can variables help represent an unknown value?

Differentiation and Accommodations	District/School Primary and Supplementary Resources
- Provide graphic organizers - Provide additional examples and opportunities for additional problems for repetition - Provide tutoring opportunities - Provide retesting opportunities after remediation (up to teacher and district discretion) - Teach for mastery not test - Teaching concepts in different modalities - Adjust pace and homework assignments	- Go Math!! - IXL - Teacher created materials

Instructional Strategies

Fairfield Township School recognizes the importance of the varying methodologies that may be successfully employed by teachers within the classroom and, as a result, identifies a wide variety of possible instructional strategies that may be used effectively to support student achievement. These may include, but not be limited to, strategies that fall into categories identified by the Framework for Teaching by Charlotte Danielson:
- Communicating with students
- Using questioning and discussion techniques
- Engaging students in learning
- Using assessment in instruction
- Demonstrating Flexibility and Responsiveness

Common Misconceptions	Proper Conceptions
Absolute value and opposite are the same thing	Absolute value is the distance a number is away from zero (it cannot be a negative number) where opposite is the opposite of a given number
Students use equal sign when solving an inequality.	When solving an inequality, a greater than or less than symbol is used instead of an equal sign.
Students forget to flip the inequality symbol when multiplying or dividing by a negative.	When you multiply or divide by a negative, you must rever

Performance Task

Key: Major Clusters | Supporting | Additional Clusters | * Benchmarked Standard

Jessica was the only winner of a 400-meter race. She finished the race in 1.75 minutes. Let "T" represent the finishing times, in minutes, of the other participants who ran the race.

Part 1) Using the variable defined above, write an inequality that represents all the possible finishing times, in minutes, of the other participants who ran the race.

Part 2) Create a number line that can be used to accurately graph the solution to Part 1;

Part 3) Graph the solution to the inequality from Part 1 on the number line you created in Part 2.

Rubric

 One point for every correct Part (1, 2, 3)

Unit 4 Grade 6 – Variability and Distributions and relationships between quantities		
Content Standards	**Suggested Standards for Mathematical Practice**	**Transfer**
● 6.EE.C.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. *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.*	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision.	Concept(s): ● Two quantities that change in relationship to one another may be represented with an equation in two variables, with a graph, and with a table of values. Students are able to: ● represent two quantities that related to one another, with variables. ● write an equation in two variables. ● distinguish the dependent variable from the independent variable. ● analyze a given graph and table of values, and relate them to the equation. Learning Goal 1: Write an equation using two variables (independent and dependent) to represent two quantities that change in relationship to one another in a real world problem. Learning Goal 2: Analyze the relationship between the dependent and independent variables and relate the equation to a given graph and to its table of values.
● 6.SP.A.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.	MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision	Concept(s): ● Variability/Variation ● A statistical question is one that anticipates variability in the data that is related to the question.

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example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.		Students are able to: ● distinguish questions that are statistical (anticipate variability in data) from those that are not. Learning Goal 3: Distinguish questions that are statistical (anticipate variability in data) from those that are not.
● 6.SP.A.2. 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.SP.A.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. ● 6.SP.B.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	MP.4 Model with mathematics.	Concept(s): ● A data set has a distribution which can be described by its center, spread, and overall shape. ● A measure of center summarizes, with a single number, the values of an entire data set. ● A measure of variation describes, with a single number, how the values of a data set vary. Students are able to: ● distinguish center from variation. ● display numerical data in dot plots on a number line. ● display numerical data in histograms on a number line. ● display numerical data in box plots on a number line. Learning Goal 4: Display numerical data in plots on the number line (including dot plots, histograms, and box plots) and summarize in relation to their context.

● 6.SP.B.5. Summarize numerical data sets in relation to their context, such as by:
  6.SP.B.5a. Reporting the number of observations.
  6.SP.B.5b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
  6.SP.B.5c. Giving quantitative
	MP.2 Reason abstractly and quantitatively.
	
	MP.4 Model with mathematics.
	
	MP.5 Use appropriate tools strategically.
		Concept(s): No new concept(s) introduced
		
		Students are able to:
		
		● determine the number of observations of a data set.
		● describe the data in context, including how it was measured and the units of measurement.
		● calculate measures of center, mean and median.
		● calculate measures of spread, interquartile range and mean absolute deviation.

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measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. 6.SP.B.5d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.		● describe the overall shape of a distribution (skewed left, skewed right, etc). ● identify striking deviations (outliers). ● choose measures of center and variability appropriate to the shape of the distribution and context. Learning Goal 5: Summarize numerical data in relation to their context by identifying the number of observations and describing how the data was measured. Learning Goal 6: Calculate, and interpret measures of center (mean and median) and variability (interquartile range and mean absolute deviation); report measures of center and variability appropriate to the shape of the distribution and context.
● 6.RP.A.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. *(benchmarked) 6.RP.A.3a. 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. 6.RP.A.3b. 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*	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning	Concept(s): No new concept(s) introduced Students are able to: ● use ratio and rate reasoning to create tables of equivalent ratios relating quantities with *whole number* measurements, find missing values in tables and plot pairs of values. ● compare ratios using tables of equivalent ratios. ● solve real world and mathematical problems involving unit rate (including unit price and constant speed). ● calculate a percent of a quantity and solve problems by finding the whole when given the part and the percent. ● convert measurement units using ratio reasoning. ● transform units appropriately when multiplying and dividing quantities. Learning Goal 7: Create and complete tables of equivalent ratios to sole real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100. Learning Goal 8: Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing

being mowed? 6.RP.A.3c. 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. 6.RP.A.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		quantities.
• 6.NS.C.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically.	Concept(s): No new concept(s) introduced Students are able to: • graph points in all four quadrants of the coordinate plane in order to solve real-world and mathematical problems. • draw polygons in the coordinate plane. • use absolute value to find distances between points with the same first coordinate or the same second coordinate. • use coordinates to solve real-world distance, perimeter, and area problems. Learning Goal 9: Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane; use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate.

District/School Formative Assessment Plan	District/School Summative Assessment Plan
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- whiteboard activities
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- Problem of the Day
- Exit Ticket

Focus Mathematical Concepts	

Vocabulary	Instruction and Pacing	
Equation Variable Statistic Data Mean Median Mode Range MAD Line/dot plots Histograms Box and whisker plots	Pretest	1 day
	Equations in 2 variables (d=65t)	2 weeks
	Statistical questions	1 week
	Collecting data and finding mean median mode range	1 week
	Mean absolute deviation	1 week
	Line plots	1 week
	histograms	1 week
	Box-and-whisker plots	1 week
	Review ratios Review graphing in the coordinate plane	1 week 1 week

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
• Calculate, compare, and interpret measures of center and variability in a data set to answer a statistical questions. • Calculate mean, median, interquartile range, and mean absolute deviation	• Why is it important to be able to find measures of central tendency?

Differentiation and Accommodations	District/School Primary and Supplementary Resources
• Provide graphic organizers • Provide additional examples and opportunities for additional problems for repetition	• Go Math!! • IXL • Teacher created materials

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- Engaging students in learning
- Using assessment in instruction
- Demonstrating Flexibility and Responsiveness

Common Misconceptions	Proper Conceptions
The median is simply the "middle number"	The data must be put in order first, then the median is the "middle number"
There can only be one mode	There may be up to 4 modes

Performance Task

You took 9 math tests this marking period. Your scores were: 98, 78, 87, 88, 81, 92, 95, 86, 87

Find the mean, median, mode and range of your math scores.

Make a box-and –whisker plot of your math scores.