Fairfield Township School – Year-Long Curricular Framework Mathematics - Grade 7

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice (MP)
Unit 1 **Operations on Rational Numbers & Expressions**	• 7.NS.A.1 • 7.NS.A.2 • 7.NS.A.3 • 7.EE.A.1 • 7.EE.A.2	• Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers • Use properties of operations to generate equivalent expressions	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. 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.
Unit 1: Suggested Open Educational Resources	7.NS.A.1 Comparing Freezing Points 7.NS.A.1b-c Differences of Integers 7.NS.A.2 Why is a Negative Times a Negative Always Positive 7.NS.A.2d Equivalent fractions approach to non-repeating decimals 7.NS.A.2d Repeating decimal as approximation 7.EE.A.1 Writing Expressions 7.EE.A.2 Ticket to Ride		
Unit 2 **Equations and Ratio & Proportion**	• 7.EE.B.3 • 7.EE.B.4* • 7.RP.A.1 • 7.RP.A.2 • 7.RP.A.3* • 7.G.A.1	• Solve real-life and mathematical problems using numerical and algebraic expressions and equations • Analyze proportional relationships and use them to solve real-world and mathematical problems • Draw, construct, and describe geometrical figures and describe the relationships between them	
Unit 2: Suggested Open Educational Resources	7.EE.B.3 Discounted Books 7.EE.B.3 Shrinking 7.EE.B.4 Fishing Adventures 2 7.EE.B.4, 7.NS.A.1 Bookstore Account 7.EE.B.4b Sports Equipment Set 7.RP.A.1 Cooking with the Whole Cup 7.RP.A.2 Sore Throats, Variation 1 7.RP.A.2 Buying Coffee 7.RP.A.2c Gym Membership Plans 7.G.A.1 Floor Plan 7.G.A.1 Map distance		

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

Unit 3 **Drawing Inferences about Populations & Probability Models**	• 7.SP.A.1 • 7.SP.A.2 • 7.SP.B.3 • 7.SP.B.4 • 7.SP.C.5 • 7.SP.C.6 • 7.SP.C.7 • 7.SP.C.8	• Use random sampling to draw inferences about a population • Draw informal comparative inferences about two populations • Investigate chance processes and develop, use, and evaluate probability models	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. 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.
Unit 3: ***Suggested Open Educational Resources***	7.SP.A.1 Mr. Briggs Class Likes Math 7.SP.A.2 Valentine Marbles 7.SP.B.3,4 College Athletes 7.SP.B.3,4 Offensive Linemen 7.SP.C.6 Heads or Tails 7.SP.C.7, 6 Rolling Dice 7.SP.C.7a How Many Buttons 7.SP.C.8 Tetrahedral Dice 7.SP.C.8 Waiting Times		
Unit 4 **Problem Solving with Geometry**	• 7.G.B.4 • 7.G.B.5 • 7.G.B.6 • 7.G.A.2 • 7.G.A.3 • 7.EE.B.4* • 7.RP.A.3*	• Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. • Draw, construct, and describe geometrical figures and describe the relationships between them. • Solve real-life and mathematical problems using numerical and algebraic expressions and equations	
Unit 4: ***Sample Open Educational Resources***	7.G.B.4 Wedges of a Circle 7.G.B.4 Eight Circles 7.G.B.6, 7.RP.A.3 Sand under the Swing Set 7.G.A.2 A task related to 7.G.A.2 7.G.A.3 Cube Ninjas! 7.RP, 7.EE, 7.NS Drill Rig 7.RP.A.3, 7.EE.B.3,4 Gotham City Taxis		

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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 career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence
ELA Standards	RI.7.1. Cite several pieces of textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text. RI.7.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone. W.7.4. Produce clear and coherent writing in which the development, organization, voice and style are appropriate to task, purpose, and audience. SL.7.4. Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.
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 7 – Rational Numbers and Algebraic Expressions		
Content Standards	**Suggested Standards for Mathematical Practice**	**Transfer**
● 7.NS.A.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line. 7.NS.A.1a. Describe situations in which opposite quantities combine to make 0. *For example, In the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?* 7.NS.A.1b. 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.NS.A.1c. Understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (–q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world	MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure.	Concept(s): ● Opposite quantities combine to make 0 (additive inverses). ● $p + q$ is the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. ● Subtraction of rational numbers as adding the additive inverse, $p – q = p + (–q)$ ● The product of two whole numbers is the total number of objects in a number of equal groups. Students are able to: ● represent addition and subtraction on a horizontal number line. ● represent addition and subtraction on a vertical number line. ● interpret sums of rational numbers in real-world situations. ● show that the distance between two rational numbers on the number line is the absolute value of their difference. Learning Goal 1: Describe real-world situations in which (positive and negative) rational numbers are combined, emphasizing rational numbers that combine to make 0. Represent sums of rational numbers $(p + q)$ on horizontal and vertical number lines, showing that the distance along the number line is $\|q\|$ and including situations in which q is negative and positive. Learning Goal 2: Add and subtract (positive and negative) rational numbers, showing that the distance between two points on a number line is the absolute value of their difference and representing subtraction using an additive inverse.

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contexts. 7.NS.A.1d. Apply properties of operations as strategies to add and subtract rational numbers.		
● 7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. 7.NS.A.2a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 7.NS.A.2b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. 2c. Interpret quotients of rational numbers by describing real world contexts. 7.NS.A.2d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. ook for and make use of structure.	Concept(s): ● Every quotient of integers (with non-zero divisor) is a rational number. ● Decimal form of a rational number terminates in 0s or eventually repeats. ● Integers can be divided, provided that the divisor is not zero. ● If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Students are able to: ● multiply and divide signed numbers. ● use long division to convert a rational number to a decimal. Learning Goal 3: Multiply and divide signed numbers, including rational numbers, and interpret the products and quotients using real-world contexts. Learning Goal 4: Convert a rational number to a decimal using long division and explain why the decimal is either a terminating or repeating decimal.

● 7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers. ● 7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. 7.NS.A.2c. Apply properties of operations as strategies to multiply and divide rational numbers.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): ● The process for multiplying and dividing fractions extends to multiplying and dividing rational numbers. Students are able to: ● add and subtract rational numbers. ● multiply and divide rational numbers using the properties of operations. ● apply the convention of order of operations to add, subtract, multiply and divide rational numbers. ● solve real world problems involving the four operations with rational numbers. Learning Goal 5: Apply properties of operations as strategies to add, subtract, multiply, and divide rational numbers. Learning Goal 6: Solve mathematical and real-world problems involving addition, subtraction, multiplication, and division of signed rational numbers

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● 7.EE.A.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. ● 7.EE.A.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*.	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.	Concept(s): ● Rewriting an expression in different forms in a problem context can shed light on the problem. Students are able to: ● add and subtract linear expressions having rational coefficients, using properties of operations. ● factor and expand linear expressions having rational coefficients, using properties of operations. ● write expressions in equivalent forms to shed light on the problem and interpret the relationship between the quantities in the context of the problem. Learning Goal 7: Apply the properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. Learning Goal 8: Rewrite algebraic expressions in equivalent forms to highlight how the quantities in it are related.

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

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Vocabulary		Instruction and Pacing	
Rational Number	Additive Inverse	Pretest	1 day
Irrational number	Linear Expression	Adding and subtracting decimals	1 week
Absolute Value	Factor	Multiplying decimals	1 week
Terminating decimal	Coefficient	Dividing decimals	1 week
Repeating Decimal	Variable	Understanding integers	1 week
Integer	Substitute	Adding and subtracting integers	1 week
Improper Fraction		Multiplying and dividing integers	1 week
Mixed Number		Adding and subtracting fractions and mixed numbers	1 week
Divisor		Multiplying and dividing fractions and mixed numbers	1 week
Opposite			
		Expressions	1 week

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
● Negative numbers are used to represent quantities that are less than zero such as temperatures, scores in games or sports, and loss of income in business. ● Absolute value is useful in ordering and graphing positive and negative numbers. ● Computation with positive and negative numbers is often necessary to determine relationships between quantities. ● Models, diagrams, manipulatives and patterns are useful in developing and remembering algorithms for computing with positive and negative numbers. ● Properties of real numbers hold for all rational numbers. ● Positive and negative numbers are often used to solve problems in everyday life. ● Variables are used to represent quantities in real-world or mathematical problems ● Equivalent expressions demonstrate a relationship between quantities	● When are negative numbers used and why are they important? ● What strategies are most useful in helping me develop algorithms (steps) for computing with rational numbers? ● What properties will help me simplify and evaluate rational numbers? ● How can rational numbers be applied to solve real-world situations? ● Why would negative numbers be used in expressions? ● Why would a variable represent a rational number?

Differentiation and Accommodations	District/School Primary and Supplementary Resources

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• 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	• Prentice Hall Course 2 Mathematics Common Core Textbook • 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
Multiplying 2 negatives make a negative.	Multiplying 2 negatives make a positive.
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

The following 5 candidates ran for class president; the table shows what fraction of the votes each candidate received;

Name	Fraction of votes	Number of votes
mike	**1/5**	
Lamont	**2/15**	
Natalia	**1/3**	
Dina	**1/4**	

Tanya	**?**	

- **Of the students who voted, what fraction did NOT vote for Lamont?**
- **What is the sum of the 4 fractions shown in the table?**
- **What will the five fractions for the five candidates add up to? Why?**
- **What fraction of the voters voted for Tanya?**
    - **Suppose 600 students voted. Fill in the last column of the table to show how many votes each candidate received.Rubric: When used as a quiz grade (based on 100%) each bullet would be worth 20 points for a correct answer, with the last bullet being worth 4 points for each correct number of votes.**

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Unit 2 Grade 7 – Equations and Ratios and Proportions		
Content Standards	**Suggested Standards for Mathematical Practice**	**Transfer**
● 7.EE.B.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*	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. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): ● Rational numbers can take different forms. Students are able to: ● solve multi-step real-life problems using rational numbers in any form. ● solve multi-step mathematical problems using rational numbers in any form. ● convert between decimals and fractions and apply properties of operations when calculating with rational numbers. ● estimate to determine the reasonableness of answers. Learning Goal 1: Solve multi-step real life and mathematical problems with rational numbers in any form (fractions, decimals) by applying properties of operations and converting rational numbers between forms as needed. Assess the reasonableness of answers using mental computation and estimation strategies.
● 7.EE.B.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities . 7.EE.B.4a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms	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. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: ● compare an arithmetic solution to a word problem to the algebraic solution of the word problem, identifying the sequence of operations in each solution. ● write an equation of the form px + q = r or p(x + q)=r in order to solve a word problem. ● fluently solve equations of the form px + q = r and p(x + q)= r. ● write an inequality of the form $px + q > r$, $px + q < r$, $px + q \geq r$ or $px + q \leq r$ to solve a word problem. ● graph the solution set of the inequality. ● interpret the solution to an inequality in the context of the problem.

fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* 7.EE.B.4b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.* *(benchmarked)		Learning Goal 2: Use variables to represent quantities in a real-world or mathematical problem by constructing simple equations and inequalities to represent problems. Learning Goal 3: Fluently solve equations; solve inequalities, graph the solution set of the inequality and interpret the solutions in the context of the problem (*Equations of the form $px + q = r$ and $p(x + q) = r$ and inequalities of the form $px + q > r$, $px + q \geq r$, $px + q \leq r$, or $px + q < r$, where p, q, and r are specific rational numbers).*
● 7.RP.A.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction* $\frac{1/2}{1/4}$ *mph, equivalently 2 mph*.	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision.	Concept(s): No new concept(s) introduced Students are able to: ● compute unit rates with ratios of fractions. ● compute unit rates with ratios of fractions representing measurement quantities. in both like and different units of measure. Learning Goal 4: Calculate and interpret unit rates of various quantities involving ratios of fractions that contain like and different units.
● 7.RP.A.2. Recognize and represent proportional relationships between	MP.1 Make sense of problems and persevere in solving them.	Concept(s): ● Proportions represent equality between two ratios.

quantities. 7.RP.A.2a. 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.RP.A.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. 7.RP.A.2c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn*. 7.RP.A.2d. Explain what a point *(x, y)* on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r)* where *r* is the unit rate.	MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. 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.	● Constant of proportionality Students are able to: ● use tables and graphs to determine if two quantities are in a proportional relationship. ● identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. ● write equations representing proportional relationships. ● Interpret the origin and (1, r) on the graph of a proportional relationship in context. ● interpret a point on the graph of a proportional relationship in context. Learning Goal 5: Determine if a proportional relationship exists between two quantities e.g. by testing for equivalent ratios in a table or graph on the coordinate plane and observing whether the graph is a straight line through the origin. Learning Goal 6: Identify the constant of proportionality (unit rate) from tables, graphs, equations, diagrams, and verbal descriptions. Learning Goal 7: Write equations to model proportional relationships in real world problems. Learning Goal 8: Use the graph of a proportional relationship to interpret the meaning of any point (x, y) on the graph in terms of the situation - including the points (0, 0) and (1, r), recognizing that r is the unit rate.
● 7.RP.A.3. Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease,*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Concept(s): ● Recognize percent as a ratio indicating the quantity *per one hundred*. Students are able to: ● use proportions to solve multistep percent problems including simple interest, tax, markups, discounts, gratuities, commissions, fees, percent increase, percent decrease, percent error. ● use proportions to solve multistep ratio problems.

percent error. *(benchmarked)	MP.6 Attend to precision. MP.7 Look for and make use of structure.	Learning Goal 9: Solve multi-step ratio and percent problems using proportional relationships (*simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)*
● 7.RP.A.3: Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.* ● 7.G.A.1: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	MP.1 Make sense of problems and persevere in solving them. 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.	Concept(s): ● Scale and proportion Students are able to: ● use ratios and proportions to create scale drawings. ● reproduce a scale drawing at a different scale. ● computing actual lengths and areas from a scale drawing. ● solve problems involving scale drawings using proportions. Learning Goal 10: Use ratio and proportion to solve problems involving scale drawings of geometric figures.

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Focus Mathematical Concepts	

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Vocabulary		
Factor	rate	ordered pair
Coefficient	unit rate	slope
Increase	equivalent ratios	rate of change
Decrease	proportions	% of change/+/-
Variable	cross-product	commission
Equation	similar	principal
Inequality	corresponding sides/angles	
Solution	x/y axis	
Inverse	interest/simple interest	
Origin	quadrant	

Instruction and Pacing		
Pretest	1 day	
One step equations (+ - x /)	1 week	
Two step equations (+ - x /)	1 week	
Inequalities	1 week	
Computing rates	1 week	
Proportions	1 week	
Corresponding shapes/scale drawings	1 week	
Coordinate plane	1 week	
Interest/commission/mark-ups/discounts/tax	2 weeks	

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
● Variables are used to represent quantities in real-world or mathematical problems ● Proportional relationships express how quantities change in relationship to each other	● Why would negative numbers be used in equations? ● Why would a variable represent a rational number? ● How can equations be used in real-world contexts? ● When are ratios and proportions used and why are they important? ● When and why do I use proportional comparisons?

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	● Prentice Hall Course 2 Mathematics Common Core Textbook ● 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
When using the "inverse" to solve an equation, students eliminate the variable	The "inverse" is used to eliminate the number from one side of an equation
Using a "cross-product" to solve a proportion means multiply straight across (like multiplying fractions)	Cross-products are multiplying proportions diagonally, like an "X"
Sales tax (and other %) are often deducted from an amount	There are certain times when % amounts get added to or deducted from original amounts

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Performance Tasks

A) Abigail has $400 in her savings account. She wants to keep at least $160 in the account. She withdraws $40 each week for food.

P art 1) Write an inequality that you could use to find out how many weeks she can make withdraws from the account

Part 2) Solve the inequality, showing your work, and determine how many weeks she can make withdraws from the account

Part 3) Draw a number line and graph the inequality

Rubric: 1 point for each correct bullet

B) A map uses a scale of 1 inch = 20 miles. Cindy measured the distance from her house to several popular amusement parks nearby. Set up a proportion for each destination to determine how many miles it is from her house, and solve each proportion.

To Six Flags, Cindy measured 5.5 inches:

To Hershey Park, Cindy measured 7 ¾ inches:

To Morey's Pier, Cindy Measured 1 1/10 inches:

Rubric: One point for each correct answer

Unit 3 Grade 7 - Statistics and Probability		
Content Standards	**Suggested Standards for Mathematical Practice**	**Transfer**
● 7.SP.A.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; 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.	MP.3 Construct viable arguments & critique the reasoning of others. MP.6 Attend to precision.	Concept(s) ● Statistics can be used to gain information about a population by examining a sample of the population. ● Generalizations about a population from a sample are valid only if the sample is representative of that population. ● Random sampling tends to produce representative samples. Students are able to: ● analyze and distinguish between representative and non-representative samples of a population. Learning Goal 1: Distinguish between representative and non-representative samples of a population (*e.g. if the class had 50% girls and the sample had 10% girls, then that sample was not representative of the population*).

● 7.SP.A.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be*.	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. MP.6 Attend to precision.	Concept(s): ● Inferences can be drawn from random sampling. Students are able to: ● analyze data from a sample to draw inferences about the population. ● generate multiple random samples of the same size. ● analyze the variation in multiple random samples of the same size. Learning Goal 2: Use random sampling to produce a representative sample. Learning Goal 3: Develop inferences about a population using data from a random sample and assess the variation in estimates after generating multiple samples of the same size.
● 7.SP.B.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable*.	MP.3 Construct viable arguments & critique the reasoning of others. MP.1 Make sense of problems and persevere in solving them. 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.	Concept(s): No new concepts introduced Students are able to: ● locate, approximately, the measure of center (mean or median) of a distribution ● visually assess, given a distribution, the measure of spread (mean absolute deviation or inter-quartile range). ● visually compare two numerical data distributions and describe the degree of overlap. ● measure or approximate the difference between the measures centers and express it as a multiple of a measure of variability. Learning Goal 4: Visually compare the means of two distributions that have similar variability; express the difference between the centers as a multiple of a measure of variability.
● 7.SP.B.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a*	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. MP.5 Use appropriate tools strategically.	Concept(s): No new concept(s) introduced Students are able to: ● using measures of center, draw informal inferences about two populations and compare the inferences. ● using measures of variability, draw informal inferences about two populations and compare the inferences. Learning Goal 5: Draw informal comparative inferences about two populations using their measures of center and measures of variability.

chapter of a fourth-grade science book.	MP.6 Attend to precision.	
● 7.SP.C.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. 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.	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.	Concept(s): ● Probability of a chance event is a number between 0 and 1. ● Probability expresses the likelihood of the event occurring. ● Larger probability indicates greater likelihood. Students are able to: ● draw conclusions about the likelihood of events given their probability. Learning Goal 6: Interpret and express the likelihood of a chance event as a number between 0 and 1, relating that the probability of an unlikely event happening is near 0, a likely event is near 1, and 1/2 is neither likely nor unlikely.
● 7.SP.C.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*	MP.2 Reason abstractly and quantitatively. MP.1 Make sense of problems and persevere in solving them. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Concept(s): ● Relative frequency ● Experimental probability ● Theoretical probability Students are able to: ● collect data on chance processes, noting the long-run relative frequency. ● predict the approximate relative frequency given the theoretical probability. Learning Goal 7: Approximate the probability of a chance event by collecting data and observing long-run relative frequency; predict the approximate relative frequency given the probability
● 7.SP.C.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. 7.SP.C.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision.	Concept(s): ● Uniform (equally likely) and non-uniform probability models *Students are able to:* ● develop a uniform probability model. ● use a uniform probability model to determine the probabilities of events. ● develop (non-uniform) probability models by observing frequencies in data that has been generated from a chance process. Learning Goal 8: Develop a uniform probability model by assigning equal probability to all outcomes; develop probability models by observing frequencies and use the models to determine probabilities of events; compare probabilities from a model to observed frequencies and explain sources of discrepancy when agreement is not good

student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected. 7.SP.C.7b. . Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*		
● 7.SP.C.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. 7.SP.C.8a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. 7.SP.C.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): ● Just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space. Students are able to: ● use organized lists, tables, and tree diagrams to represent sample spaces. ● given a description of an event using everyday language, identify the outcomes in a sample space that make up the described event. ● design simulations. ● use designed simulations to generate frequencies for compound events. Learning Goal 9: Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams, identifying the outcomes in the sample space which compose the event. Use the sample space to find the probability of a compound event. Learning Goal 10: Design and use a simulation to generate frequencies for compound events.

event. 7.SP.C.8c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*		

District/School Formative Assessment Plan	District/School Summative Assessment Plan
• 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	
		Pretest	1 day
		Populations	1 week
		Mean, median, mode, range	1 week
Sampling	representative sample	Stem and leaf plots	1 week
Random sampling	inferences	Box and whisker plots	1 week
Survey	variation/variability	Probability vs odds	1 week

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

Population	distribution		Compound events	1 week
Mean,median,mode,range	measures of center		Mean Absolute Deviation	2 weeks
Stem and leaf plots	sample spaces		Tree diagrams	1 week
Probability	Mean absolute deviation			
Events				
Compound events				
Outcome				

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
● Data change, in various contexts, both quantitative and qualitative can be identified and analyzed ● Patterns in data can provide insight into potential relationships ● The probability of an event's occurrence can be predicted with varying degrees of confidence	● How do I describe a pattern in data? ● How can the relationship between quantities be represented? ● How can change be expressed quantitatively?

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	● Prentice Hall Course 2 Mathematics Common Core Textbook ● 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
When collecting data, any random sampling of a population will result in a valid collection of data	A sample is valid only if the sample is a true representation of the population
Students often mistake probability and odds	Probability is the favorable outcome of the total changes, while odds uses the "chances against"
Using compound probability, the denominator stays the same when you don't replace the item (you pull a sock out of 7 socks, the next pull is out of 6 socks)	Using compound probability, the denominator changes when you don't replace the item

Performance Task

Tanya has a box full of marbles of which 13 are blue, 9 are purple, and 20 are red. She pulls one marble out of the box without looking. What is the probability, in Percent form, of pulling each color out of the box?

P(blue) _____ P(purple)_____ P(red) _____

Rubric: 1 point for each correct percentage

Unit 4 Grade 7 - Geometry		
Content Standards	**Suggested Standards for Mathematical Practice**	**Transfer**
● 7.G.B.4: Know the formulas for the area and circumference of a circle	MP.1 Make sense of problems and persevere in solving them.	Concept(s): ● Circumference

and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. 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.	Students are able to: ● solve problems by finding the area and circumference of circles. ● show that the area of a circle can be derived from the circumference. Learning Goal 1: Know the formulas for the area and circumference of a circle and use them to solve problems. Give an informal derivation of the relationship between the circumference and area of a circle.
● 7.G.B.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. ● 7.EE.B.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. 7.EE.B.4a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently.	MP.3 Construct viable arguments & critique the reasoning of others. 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.	Concept(s): No new concept(s) introduced Students are able to: ● use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations. ● solve mathematical problems by writing and solving simple algebraic equations based on the relationships between and properties of angles (supplementary, complementary, vertical, and adjacent. Learning Goal 2: Write and solve *simple* multi-step algebraic equations involving supplementary, complementary, vertical, and adjacent angles.
● 7.G.B.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	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.	Concept(s): No new concept(s) introduced Students are able to: ● solve real-world and mathematical problems involving area of two dimensional objects composed of triangles, quadrilaterals, and polygons. ● solve real-world and mathematical problems involving volume of three dimensional objects composed of cubes and right prisms. ● solve real-world and mathematical problems involving surface area of three-

	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	dimensional objects composed of cubes and right prisms. Learning Goal 3: Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
● 7.G.A.2. Draw (with technology, with ruler and protractor as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle	MP.3 Construct viable arguments & critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): ● Conditions for unique triangles, more than one triangle, and no triangle. Students are able to: ● draw geometric shapes with given conditions, including constructing triangles from three measures of angles or sides. ● recognize conditions determining a unique triangle, more than one triangle, or no triangle. Learning Goal 4: Use freehand, mechanical (i.e. ruler, protractor) and technological tools to draw geometric shapes with given conditions (e.g. scale factor), focusing on constructing triangles.
● 7.G.A.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): ● Cross-sections of three-dimensional objects Students are able to: ● analyze three dimensional shapes (right rectangular pyramids and prisms) by examining and describing all of the 2-dimensional figures that result from slicing it at various angles. Learning Goal 5: Describe all of the 2-dimensional figures that result when a 3-dimemsional figures are sliced from multiple angles.
● 7.EE.B.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. 7.EE.B.4a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: ● write an equation of the form px + q = r or p(x + q)=r in order to solve a word problem. ● fluently solve equations of the form px + q = r and p(x + q)= r. Learning Goal 6: Fluently solve simple equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers.

solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* *(benchmarked)		
• 7.RP.A.3. Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error* *(benchmarked)	MP.1 Make sense of problems and persevere in solving them. 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.	Concept(s): • Recognize percent as a ratio indicating the quantity *per one hundred.* Students are able to: • use proportions to solve multistep percent problems including simple interest, tax, markups, discounts, gratuities, commissions, fees, percent increase, percent decrease, percent error. • use proportions to solve multistep ratio problems. Learning Goal 7: Solve multi-step ratio and percent problems using proportional relationships (*simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error).*

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Focus Mathematical Concepts

Vocabulary	Instruction and Pacing	
	Pretest	1 day
	Angles (supplementary, complementary, vertical, adjacent)	2 weeks

Area	supplementary		2-D figures (area perimeter)	1 week
Volume	complementary		3-D figures (area, surface area, volume)	2 weeks
Surface area	vertical		2-D figures sliced from 3-D figures	2 weeks
2-D and 3-D figures	adjacent		Circles	1 week
Triangle	circumference		Review of equations, inequalities, ratios, proportions	1 week
Quadrilateral	radius			
Polygon	diameter			
Cube				
Right prism				

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
● 2-D and 3-D figures are different ● Formulas for finding area, volume, surface area are related to algebra equations	● How do you describe geometric shapes, such a triangles? ● How do you find the area of a 2-d figure? ● How do you find the volume of a 3-d figure?

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	● Prentice Hall Course 2 Mathematics Common Core Textbook ● IXL ● Teacher created materials

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

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

Common Misconceptions	Proper Conceptions
Area and volume are found the same way for all figures	There are different formulas for different measurements and figures
Pi is exactly 3.14	Pi is irrational

Performance Task

Huong covered the box to the right with sticky-backed decorating paper.

The paper costs 3¢ per square inch.

Part 1) Find the surface area of the box.

Part 2) How much money will Huong need to spend on decorating paper?

Part 3) If he Huong has $10, will he have enough money to pay for the paper, and if so, how much change will he get back?

Solution:

The surface area can be found by using the dimensions of each face to

find the area and multiplying by 2:

Front: 7 in. x 9 in. = 63 in2 x 2 = 126 in2

Top: 3 in. x 7 in. = 21 in2 x 2 = 42 in2

Side: 3 in. x 9 in. = 27 in2 x 2 = 54 in2

The surface area is the sum of these areas, or 222 in2. If each square inch of paper cost $0.03, the cost would be

$6.66. **Rubric: 1 point for each part.**

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