

Hillsborough Township Public Schools
 Mathematics Department
 Grade 7 Curriculum Map

Essential Questions	Enduring Understandings	Domain	Cluster	Standard	Learning Targets	Assessment Formative and Summative	Inter-disciplinary Connections	21 st Century Connections
Unit 1 - Integers and Rational Numbers						2 common unit tests, mathematical reflections, quizzes		
Pacing – 27 days								
What makes a computational strategy both effective and efficient?	The magnitude of numbers affects the outcome of operations on them.	The Number System SMP1-Make sense of problems and persevere to in solving them SMP 5-Use appropriate tools strategically	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	7.NS.2.d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0's or eventually repeats.	Develop an understanding that rational numbers consist of positive numbers, negative numbers and zero.	Give an example of a rational number and an irrational number.		
How do mathematical ideas interconnect and build on one another to produce a coherent whole?	Numeric fluency includes both the understanding of and the ability to appropriately use numbers	The Number System SMP1-Make sense of problems and persevere to in solving them SMP 5-Use appropriate tools strategically	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7.NS.1.b 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.	Use appropriate notation to indicate positive and negative number, to locate rational numbers on a number line, and to understand the relationship between a rational number and its opposite (additive inverse)	How do you locate the opposite of a given number on a number line?	2.1.8.B.2 Identify and defend healthy ways for adolescents to lose, gain, or maintain weight.	9.2.8.B.9 Create debit and credit balance sheets and income and cash statements.
How can we compare and	Numeric fluency includes both	The Number System	Apply and extend previous understandings	7.NS.1.b Understand $p + q$ as the number located a	Compare and order rational numbers	How do you decide which of two numbers is		9.2.8.B.9 Create debit and credit

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contrast numbers?	the understanding of and the ability to appropriately use numbers.	SMP1-Make sense of problems and persevere to in solving them	of operations with fractions to add, subtract multiply, and divide rational numbers.	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.		greater if both are positive, both are negative or one is positive and one is negative?		balance sheets and income and cash statements.
How do mathematical ideas interconnect and build on one another to produce a coherent whole?	Numeric fluency includes both the understanding of and the ability to appropriately use numbers.	SMP 5-Use appropriate tools strategically			Understand that absolute value is the distance from zero on a number line	What two numbers have an absolute value of 10? Why? Give an example of two numbers that would have the same absolute value. Prove it using a number line.		
How do mathematical ideas interconnect and build on one another to produce a coherent whole?	Numeric fluency includes both the understanding of and the ability to appropriately use numbers	The Number System SMP 2 – Reason abstractly and quantitatively SMP 3 – Construct viable arguments and critique the reasoning of others	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7.NS.1a - Describe situations in which opposite quantities combine to make 0. <i>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?</i>	Understand the relationship between a positive or negative number and its opposite (additive inverse)	Give a real life example in which opposite quantities combine to make zero.		9.2.8.B.1 Construct a simple personal savings and spending plan based on various sources of income.
What makes a computational strategy both effective and efficient?	Computational fluency includes understanding the meaning and the appropriate	The Number System SMP 7 – Look for and make use of structure	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and	7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers: represent	Develop algorithms for adding integers.	Describe in your own words how to add two numbers with the same sign and how to add two		9.1.8.B.1 Use multiple points of view to create alternative solutions.

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	use of numerical operations	SMP 8 – Look for and express regularity in related reasoning	divide rational numbers.	addition and subtraction on a horizontal or vertical number line diagram		numbers with different signs.		
How do operations affect numbers?	Numeric fluency includes both the understanding of and the ability to appropriately use numbers	The Number System SMP 3 – Construct viable arguments and critique the reasoning of others SMP 8 – Look for and express regularity in related reasoning	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7. NS.1.d Apply properties of operations as strategies to add and subtract rational numbers.	Observe that the commutative property holds for addition of rational numbers.	How can you use the commutative property to make an expression such as $25 + 19 + 75 + 11$ easier to solve?		
What makes a computational strategy both effective and efficient?	Computational fluency includes understanding the meaning and the appropriate use of numerical operations	The Number System SMP 7 – Look for and make use of structure SMP 8 – Look for and express regularity in related reasoning	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7.NS.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 diagram	Develop algorithms for subtracting integers.	Describe in your own words how to subtract two numbers with the same sign and how to subtract two numbers with different signs.		
How do operations affect numbers?	Numeric fluency includes both the understanding of and the ability to	The Number System SMP 7 – Look for and make use of structure	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and	7.NS.1.d Apply properties of operations as strategies to add and subtract rational numbers.	Observe that the commutative property does not hold for subtraction of rational numbers.	Does $2 - 5 = 5 - 2$? Explain.		9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive

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	appropriately use numbers	SMP 8 – Look for and express regularity in related reasoning	divide rational numbers.					behaviors that impact critical thinking and problem-solving skills.
How do mathematical ideas interconnect and build on one another to produce a coherent whole?	A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways.	The Number System SMP 7 – Look for and make use of structure SMP 8 – Look for and express regularity in related reasoning	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7.NS.1.c Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	Understand and use the relationship between addition and subtraction to simplify computation by changing subtraction problems to addition or vice versa.	Give two equivalent expressions for the following situation: In the morning the temperature is 52° . By noon, the temperature drops 12° .		9.1.8.B.1 Use multiple points of view to create alternative solutions.
What makes a computational strategy both effective and efficient?	In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures.	The Number System SMP 5-Use appropriate tools strategically SMP 6 – Attend to precision	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7.NS.1.c Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	Understand and use the relationship between addition and subtraction.	Choose two addends. Write two addition sentences. Use the two addition sentences to create related subtraction sentences.		9.1.8.B.1 Use multiple points of view to create alternative solutions.
What makes a	Computational fluency	The Number System	Apply and extend previous	7.NS.2.a Understand that multiplication is	Develop and use algorithms for	Describe in your own words how		9.1.8.A.2

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computation al strategy both effective and efficient?	includes understanding the meaning and the appropriate use of numerical operations	SMP 2 – Reason abstractly and quantitatively SMP 4-Model with mathematics SMP 5-Use appropriate tools strategically	understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	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.	multiplying integers	to multiply two numbers with the same sign and how to multiply two numbers with different signs. When multiplying more than two factors, how do you determine the sign of the product?		Implement problem-solving strategies to solve a problem in school or the community.
What makes a computation al strategy both effective and efficient?	Computational fluency includes understanding the meaning and the appropriate use of numerical operations	The Number System SMP 2 – Reason abstractly and quantitatively SMP 5-Use appropriate tools strategically	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7.NS.2.b 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 $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.	Develop and use algorithms for dividing integers	Describe in your own words how to divide two numbers with the same sign and how to divide two numbers with different signs.		9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.
What makes a	In many cases, there are	The Number System	Apply and extend previous	7. NS.2.c Apply properties of	Understand and use the	Use 3, -5 and -15 to create two		9.1.8.B.1 Use multiple points

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computation al strategy both effective and efficient?	multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures.	SMP 2 – Reason abstractly and quantitatively SMP 5-Use appropriate tools strategically SMP 6 – Attend to precision	understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	operations as strategies to multiply and divide rational numbers.	relationship between multiplication and division.	multiplication and two division equations.		of view to create alternative solutions. -
What makes a computation al strategy both effective and efficient?	Computational fluency includes understanding the meaning and the appropriate use of numerical operations	The Number System SMP1-Make sense of problems and persevere to in solving them SMP 2 – Reason abstractly and quantitatively SMP 6 – Attend to precision	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.	Explore the use of the order of operations to order computation in both mathematical and real world problems.	Sally thought the answer to the problem $2 + 5 \times 4$ was 28. Is Sally correct? Explain.	7.1.IM.B.2 Give and follow a series of oral and written directions, commands, and requests for participating in age- and level-appropriate classroom and cultural activities in familiar and some unfamiliar situations.	9.1.8.C.1 Determine an individual’s responsibility for personal actions and contributions to group activities.
What makes a computation al strategy both effective and efficient?	In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated	The Number System SMP 2 – Reason abstractly and quantitatively SMP 4-Model with mathematics	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7. NS.2.c Apply properties of operations as strategies to multiply and divide rational numbers.	Understand and use the distributive property to factor and expand expressions.	Describe how the Distributive Property relates addition and multiplication. Give a numerical examples.		

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	with different cultures.	SMP 5-Use appropriate tools strategically						
Unit 2 – Two-Dimensional Geometry						Mathematical reflections, quizzes		
Pacing – 18 days								
How can spatial relationships be described by careful use of geometric language?	Geometric properties can be used to construct geometric figures.	Geometry SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics SMP 8 – Look for and express regularity in related reasoning	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	7.G.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.	Use facts about complementary, vertical, and adjacent angles to write and solve simple equations for an unknown angle in a figure	Draw a model displaying a pair of complementary angles, a pair of supplementary angles and a pair of vertical angles.		9.1.8.B.1 Use multiple points of view to create alternative solutions.
How can spatial relationships be described by careful use of geometric language?	Geometric properties can be used to construct geometric figures.	Geometry SMP 3 – Construct viable arguments and critique the reasoning of others SMP 7 – Look for and make use of structure	Draw, construct, and describe geometrical figures and describe the relationship between them.	7.G.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.	Draw possible triangles when given three measures of their angles or sides noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	How many different triangles can be drawn that have the angle measurements of 35, 55, and 90 degrees?		9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

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Unit 3 – Understanding Similarity						Common unit test, mathematical reflections, quizzes		
Pacing – 21 days								
How can we best represent and verify geometric/algebraic relationships?	Coordinate geometry can be used to represent and verify geometric/algebraic relationships.	Geometry SMP1-Make sense of problems and persevere to in solving them SMP 5-Use appropriate tools strategically	Draw, construct, and describe geometrical figures and describe the relationship between them.	7.G.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.	Use algebraic rules to produce similar figures on a coordinate grid and understand the role multiplication plays in similarity relationships.	Write an algebraic rule that produces a larger similar figure and one that produces a smaller but not similar figure. What does the scale factor tell you about how the figure changes?	8.1.8.A.2 Plan and create a simple database, define fields, input data, and produce a report using sort and query.	9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.
How can we best represent and verify geometric/algebraic relationships?	Coordinate geometry can be used to represent and verify geometric/algebraic relationships.	Geometry SMP1-Make sense of problems and persevere to in solving them SMP 5-Use appropriate tools strategically	Draw, construct, and describe geometrical figures and describe the relationship between them.	7.G.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.	Understand the role multiplication plays in similarity relationships.	When a figure is transformed to make a similar figure, some features change and some stay the same. What does the scale factor tell you about how the figure changes?	1.3.5.D.4 Differentiate drawing, painting, ceramics, sculpture, printmaking, textiles, and computer imaging by the physical	9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.
What situations can be analyzed using transformations and symmetries?	Shape and area can be conserved during mathematical transformations.	Geometry SMP1-Make sense of problems and persevere to in solving them	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	7.G.6 Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of	Understand the relationships of angles, side lengths, perimeters, and areas of similar polygons.	What does the scale factor between two similar figures tell you about the corresponding angles and side lengths, the	properties of the resulting artworks, and experiment with various art media and art mediums to create original works of art.	9.1.8.B.1 Use multiple points of view to create alternative solutions.

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		SMP 5-Use appropriate tools strategically		triangles, quadrilaterals, polygons, cubes and right prisms.		perimeters, and the areas?		
How can we best represent and verify geometric/algebraic relationships?	Reasoning and/or proof can be used to verify or refute conjectures or theorems in geometry	Geometry SMP1-Make sense of problems and persevere to in solving them SMP 5-Use appropriate tools strategically	Draw, construct, and describe geometrical figures and describe the relationship between them.	7.G.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.	Use ratios of corresponding sides within a figure to determine whether two figures are similar.	How does the ratio of two side lengths within one figure compare to the ratio of the corresponding side lengths in the other figure?		9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.
How can we best represent and verify geometric/algebraic relationships?	Reasoning and/or proof can be used to verify or refute conjectures or theorems in geometry	Geometry SMP1-Make sense of problems and persevere to in solving them SMP 5-Use appropriate tools strategically	Draw, construct, and describe geometrical figures and describe the relationship between them.	7.G.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.	Use ratios to identify similar triangles. Use ratios of corresponding sides or scale factors to find missing lengths in similar figures.	Draw a picture of a pair of similar triangles. How can you use ratios to prove their similarity?	2.5.4.C.2 Apply specific rules and procedures during physical activity and explain how they contribute to a safe active environment.	9.1.8.B.1 Use multiple points of view to create alternative solutions.
Unit 4 - Ratios, Rates, Proportions, and Percent Pacing - 25 Days						Common Assessment, Mathematical reflections, quizzes		
How can we compare and contrast numbers?	Numeric fluency includes both the understanding	Ratios and Proportional Relationships	Analyze proportional relationships and use them to solve real-world and	7.RP.2 Recognize and represent proportional relationships between quantities.	Use the language of ratios	What is the ratio of boys to girls in your math class?		

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	of and the ability to appropriately use numbers	SMP 6 – Attend to precision	mathematical problems.					
How can we decide when to use an exact answer and when to use an estimate?	Context is critical when using estimation	The Number System SMP1-Make sense of problems and persevere to in solving them SMP 2 – Reason abstractly and quantitatively	Apply and extend previous understandings of operations with fractions to add, subtract multiply, and divide rational numbers.	7.NS.2.d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0's or eventually repeats.	Understand what it means to divide in a rate situation.	3 peppers cost \$1.50. Find two different unit rates to express the relationship between peppers and price. Explain what each unit rate tells.		9.2.8.B.7 Develop a system for keeping and using financial records.
How do mathematical ideas interconnect and build on one another to produce a coherent whole?	A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways	Ratios and Proportional Relationships SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2 Recognize and represent proportional relationships between quantities.	Apply proportional reasoning to solve for the unknown part when one part of two equal ratios is unknown	Set up and solve a proportion for the following: Dogs outnumber cats by a ratio of 9 to 8. If there are 180 dogs, how many cats are there?		9.2.8.B.8 Explain the concept of cash flow and construct cash flow statements.
How can we compare and contrast numbers?	A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways	Ratios and Proportional Relationships SMP1-Make sense of problems and persevere to in solving them	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.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,	Introduce and formalize the meaning of unit rate and computation strategies for computing unit rates.	How are unit rates useful? How is finding a unit rate similar to solving a proportion?		9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical

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		SMP 3 – Construct viable arguments and critique the reasoning of others		if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as a complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.				thinking and problem-solving skills.
How can measurements be used to solve problems?	Everyday objects have a variety of attributes, each of which can be measured in many ways	Ratios and Proportional Relationships SMP 3 – Construct viable arguments and critique the reasoning of others SMP 4-Model with mathematics	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.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 $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as a complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.	Compute unit rates associated with ratios of fractions, including quantities measured in like or different units	How can you find a unit rate when given a rate?		9.2.8.E.4 Compare the value of goods or services from different sellers when purchasing large quantities and small quantities.
What makes a computational strategy both effective and efficient?	Computational fluency includes understanding the meaning and the appropriate use of numerical operations	Ratios and Proportional Relationships SMP1-Make sense of problems and persevere to in solving them SMP 3 – Construct viable arguments and	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2.b Identify the constant of proportionality (unit rate) in tables, graphs, equations diagrams, and verbal descriptions of proportional relationships.	Recognize that constant growth in a table, graph, or equation is related to proportional situations.	How can you recognize a proportional relationship from a table or graph?	6.1.8.C.3.b Summarize the effect of inflation and debt on the American people and the response of state and national governments during this time.	9.2.8.B.1 Construct a simple personal savings and spending plan based on various sources of income.

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		critique the reasoning of others SMP 7 – Look for and make use of structure						
What makes a computational strategy both effective and efficient?	Computational fluency includes understanding the meaning and the appropriate use of numerical operations	Ratios and Proportional Relationships SMP1-Make sense of problems and persevere to in solving them SMP 6 – Attend to precision	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.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.	Set up and solve proportions that arise from real-world applications, such as finding discounts and markups and converting measurement units.	Suppose there is a 5% discount on a television that was originally priced at \$450. What would the discounted price be after applying a 7% sales tax?	2.1.8.B.4 Analyze the nutritional values of new products and supplements.	9.2.8.B.1 Construct a simple personal savings and spending plan based on various sources of income.
How do operations affect numbers?	A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways	Ratios and Proportional Relationships SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2 Recognize and represent proportional relationships between quantities.	Set up and solve proportions that arise in applications	Write and solve four different proportions for a given situation.		9.2.8.B.7 Develop a system for keeping and using financial records.
Unit 5 – Linear Relationships						Common unit test, mathematical		
Pacing – 29 Days								

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						reflections, quizzes		
How can change be best represented mathematically?	The symbolic language of algebra is used to communicate and generalize the patterns in mathematics	Ratios and Proportional Relationships SMP1-Make sense of problems and persevere to in solving them SMP 2 – Reason abstractly and quantitatively	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2.c 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 $t = pn$.	Write one step equations to represent relationships between variables	Describe how the dependent variable changes as the independent variable changes in a linear relationship.		9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.
How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	Patterns and relationships can be represented graphically, numerically, symbolically, or verbally	Ratios and Proportional Relationships SMP1-Make sense of problems and persevere to in solving them SMP 7 – Look for and make use of structure	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2.d 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.	Analyze data in tables and graphs to make predictions about values between and beyond given data values	On a time vs. distance graph, what information does the point $(2, 30)$ represent?		9.2.8.E.2 Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards.
How can we use mathematical models to describe physical relationships?	Mathematical models can be used to describe and quantify physical relationships	Ratios and Proportional Relationships SMP 4-Model with mathematics	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2.d 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	Translate information about linear relations given in a table, a graph, or an equation to one of the other forms	How do changes in one variable affect changes in a related variable? How are these changes captured in a table, graph, or equation?	8.1.8.A.4 Generate a spreadsheet to calculate, graph, and present information.	9.2.8.E.3 Evaluate the appropriateness of different types of monetary transactions (e.g., electronic transfer, check,

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		SMP 7 – Look for and make use of structure		(1,r) where r is the unit rate.				certified check, money order, gift card, barter) for various situations.
How are patterns of change related to the behavior of functions?	Patterns and relationships can be represented graphically, numerically, symbolically, or verbally	Ratios and Proportional Relationships SMP 4-Model with mathematics SMP 5-Use appropriate tools strategically	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2.d 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.	Understand the connections between linear equations and patterns in the tables and graphs of those relations, including rate of change, and x- and y-intercepts	If an equation has a constant of proportionality of 5, what does this represent on the graph?	8.1.8.A.4 Generate a spreadsheet to calculate, graph, and present information.	9.2.8.E.4 Compare the value of goods or services from different sellers when purchasing large quantities and small quantities.
How can we best represent and verify geometric/algebraic relationships?	Reasoning and/or proof can be used to verify or refute conjectures or theorems in geometry	Ratios and Proportional Relationships SMP 2 – Reason abstractly and quantitatively SMP 8 – Look for and express regularity in related reasoning	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2.a 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.	Decide whether two quantities are in a proportional relationship	How can you tell from looking at a graph of a relationship if that relationship is proportional?	8.1.8.A.4 Generate a spreadsheet to calculate, graph, and present information.	9.2.8.B.1 Construct a simple personal savings and spending plan based on various sources of income.
How can we best represent and verify geometric/algebraic relationships?	Coordinate geometry can be used to represent and verify geometric/algebraic relationships.	Ratios and Proportional Relationships SMP1-Make sense of problems and	Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.2.d Explain what a point (x,y) on the graph of a proportional relationship means in terms of the situation, with special attention to	Explain what any point (x,y), including (0,0) and (1.r) where r is a unit rate, on a graph of a proportional relationship	How can you determine from the graph of a proportional relationship what the unit rate is?	8.1.8.A.5 Select and use appropriate tools and digital resources to accomplish a variety of tasks	9.1.8.A.4 Design and implement a project management plan using one or more problem-

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		persevere to in solving them SMP 4-Model with mathematics SMP 7 – Look for and make use of structure		the points (0,0) and (1,r) where r is the unit rate.	means in terms of the situation		and to solve problems.	solving strategies.
How are patterns of change related to the behavior of functions?	Mathematical models can be used to describe and quantify physical relationships.	Expressions and Equations SMP1-Make sense of problems and persevere to in solving them SMP 3 – Construct viable arguments and critique the reasoning of others SMP 5-Use appropriate tools strategically	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (while numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any from, convert between forms as appropriate; and assess the reasonableness of answers using mental computations and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional 1/10 of	Write equations to represent situations	The group admission price for an amusement park is \$60 plus \$12 per person. What equation relates the total group price to the number of people in the group?	MS-PS2-5: Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.

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				her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.				
What makes a computational strategy both effective and efficient?	Computational fluency includes understanding the meaning and the appropriate use of numerical operations	Expressions and Equations SMP1-Make sense of problems and persevere to in solving them SMP 3 – Construct viable arguments and critique the reasoning of others SMP 5-Use appropriate tools strategically	Use properties of operations to generate equivalent expressions.	7.EE.1 Apply properties of operations as strategies to add, subtract, factor and expand linear expressions with rational coefficients.	Apply the properties of operations to add, subtract, factor, and expand algebraic expressions	How would you simplify the expression $25j + 11.5(2 + j)$? What properties are demonstrated by simplifying this expression?		9.1.8.B.1 Use multiple points of view to create alternative solutions.
How can we compare and contrast numbers?	A quantity can be represented numerically in various ways.	Expressions and Equations	Use properties of operations to generate	7.EE.2 Understand that rewriting an expression in different forms in a	Understand that writing an equivalent expression in a	Write a one-step expression for deducting 20%	6.1.8.C.3.b Summarize the effect of inflation and debt on the	9.1.8.B.1 Use multiple points of view to create

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	Problem solving depends upon choosing wise ways	SMP1-Make sense of problems and persevere to in solving them SMP 3 – Construct viable arguments and critique the reasoning of others	equivalent expressions.	problem context can shed light on the problem and how the quantities in it are related. For example, $z + 0.05a = 1.05a$ means that increase by 5% is the same as "multiply by 1.05."	problem context can shed light on how quantities in the problem are related	from a given value.	American people and the response of state and national governments during this time.	alternative solutions.
How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?	Algebraic representation can be used to generalize patterns and relationships	Expressions and Equations SMP1-Make sense of problems and persevere to in solving them SMP 5-Use appropriate tools strategically	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	7.EE.4.a 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 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?	Write two step equations to represent relationships between variables	What decisions do you need to make when you write an equation to show the relationship between variables?	MS-ETS1-3: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	9.2.8.B.7 Develop a system for keeping and using financial records.
How can patterns, relations, and	Algebraic representation can be used to generalize	Expressions and Equations	Solve real-life and mathematical problems using	7.EE.4.b Solve word problems leading to inequalities of the form $px + q > r$ or	Solve word problems leading to one and two-step inequalities	Write a real-life word problem to model		9.1.8.B.1 Use multiple points of view to create

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functions be used as tools to best describe and help explain real-life situations.	patterns and relationships.	SMP1-Make sense of problems and persevere to in solving them SMP 3 – Construct viable arguments and critique the reasoning of others SMP 5-Use appropriate tools strategically	numerical and algebraic expressions and equations.	$px + q < r$, 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.	and graph the solution on a number line	$2x - 15 > 85$. Graph the solution on a number line.		alternative solutions.
Unit 6 – Probability and Expected Value Pacing – 21 days						Common unit test, mathematical reflections, quizzes		
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	Grouping by attributes (classification) can be used to answer mathematical questions	Statistics and Probability SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics	Investigate chance processes and develop, use and evaluate probability models.	7.SP.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	Use data results to calculate the long-term average of a game of chance	Spin a spinner that is equally sectioned (blue, red, and yellow) 10 times and record the results. Based on your results, if you were to continue the simulation 100 times, what would be the		9.4.12.O.20 Conduct technical research to gather information necessary for decision-making.

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		SMP 7 – Look for and make use of structure		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.		expected probability of landing on red?		
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	The results of a statistical investigation can be used to support or refute an argument	Statistics and Probability SMP 3 – Construct viable arguments and critique the reasoning of others SMP 4-Model with mathematics	Investigate chance processes and develop, use and evaluate probability models.	7.SP.7 Develop a probability model and use it to find probabilities of events. Compare probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	Interpret experimental and theoretical probabilities and the relationship between them and recognize that experimental probabilities are better estimates of theoretical probabilities when they are based on larger numbers	In an experiment, are 30 trials as good as 500 trials to predict the chances of a result? Explain.	8.2.8.B.1 Design and create a product that addresses a real-world problem using the design process and working with specific criteria and constraints.	9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	Grouping by attributes (classification) can be used to answer mathematical questions	Statistics and Probability SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics SMP 7 – Look for and make use of structure	Investigate chance processes and develop, use and evaluate probability models.	7.SP.7.a 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 student is selected at random from a class, find the probability that Jane will be selected and	Distinguish between outcomes that are uniform and not uniform by collecting data and analyzing experimental probabilities	What does it mean for results to be uniform?		

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				the probability that a girl will be selected				
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	Experimental results tend to approach theoretical probabilities after a large number of trials	Statistics and Probability SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics SMP 7 – Look for and make use of structure	Investigate chance processes and develop, use and evaluate probability models.	7.SP.7.b 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?	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	How do you find the experimental probability that a particular result will occur? Why is it called the experimental probability?	8.2.8.B.1 Design and create a product that addresses a real-world problem using the design process and working with specific criteria and constraints.	9.2.8.E.7 Recognize the techniques and effects of deceptive advertising.
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	Experimental results tend to approach theoretical probabilities after a large number of trials	Statistics and Probability SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics	Investigate chance processes and develop, use and evaluate probability models.	7.SP.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	Understand that the probability of an event is the likelihood of the event occurring and is represented by a value between zero and one	What is the expected probability of tossing a coin 20 times and having it land heads-up all 20 times?		9.4.12.O.20 Conduct technical research to gather information necessary for decision-making.

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		SMP 7 – Look for and make use of structure		an event that is neither unlikely nor likely, and probability near 1 indicates a likely event.				
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	Experimental results tend to approach theoretical probabilities after a large number of trials	<p>Statistics and Probability</p> <p>SMP 3 – Construct viable arguments and critique the reasoning of others</p> <p>SMP 7 – Look for and make use of structure</p>	Investigate chance processes and develop, use and evaluate probability models.	7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	Use an area model to analyze the theoretical probabilities for two-stage outcomes	Describe how you can use an area model to determine the probability of a situation that involves two actions.	8.2.8.B.1 Design and create a product that addresses a real-world problem using the design process and working with specific criteria and constraints.	9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	Grouping by attributes (classification) can be used to answer mathematical questions	<p>Statistics and Probability</p> <p>SMP1-Make sense of problems and persevere to in solving them</p> <p>SMP 2 – Reason abstractly and quantitatively</p> <p>SMP 4-Model with mathematics</p> <p>SMP 6 – Attend to precision</p>	Investigate chance processes and develop, use and evaluate probability models.	7.SP.8.c 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?	Generate frequencies for simple and compound events by designing and using a simulation	Explain how to use a simulation to determine the probability of a situation that involves to actions.	8.2.8.B.1 Design and create a product that addresses a real-world problem using the design process and working with specific criteria and constraints.	9.1.8.B.1 Use multiple points of view to create alternative solutions.

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How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	Experimental results tend to approach theoretical probabilities after a large number of trials	Statistics and Probability SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics	Investigate chance processes and develop, use and evaluate probability models.	7.SP.8.a Understand that, just as in simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	Analyze situations that involve two or more stages called compound events	Determine the theoretical probability of a coin landing on heads and a die landing on an even number.	5.3.8.E.1 Organize and present evidence to show how the extinction of a species is related to an inability to adapt to changing environmental conditions using quantitative and qualitative data.	9.4.12.O.20 Conduct technical research to gather information necessary for decision-making.
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	Grouping by attributes (classification) can be used to answer mathematical questions	Statistics and Probability SMP1-Make sense of problems and persevere to in solving them SMP 4-Model with mathematics SMP 7 – Look for and make use of structure	Investigate chance processes and develop, use and evaluate probability models.	7.SP.8.b 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 event	Represent sample spaces for simple and compound events and find probabilities using organized lists, tables, tree diagrams, area models, and simulations	Show all possible outcomes for rolling two dice	8.1.8.E.1 Gather and analyze findings using data collection technology to produce a possible solution for a content-related or real-world problem.	9.2.8.E.7 Recognize the techniques and effects of deceptive advertising.
Unit 7 – Three Dimensional Measurement Pacing – 20 days						Common unit test, mathematical reflections, quizzes		
How can measurements be used to	Measurements can be used to describe, compare, and	Geometry SMP1-Make sense of	Solve real-life and mathematical problems	7.G.4 Know the formulas for the area and circumference of a circle and use	Use the area and circumference of a circle to solve problems and give	How would you find the area of a circle given its circumference?	6.1.8.B.1.b Analyze the world in spatial terms, using	9.1.8.A.4 Design and implement a project

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solve problems?	make sense of phenomena	problems and persevere to in solving them SMP 2 – Reason abstractly and quantitatively SMP 3 – Construct viable arguments and critique the reasoning of others	involving angle measure, area, surface area, and volume.	them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	an informal derivation of the relationship between a circle’s area and its circumference		historical maps to determine what led to the exploration of new water and land routes.	management plan using one or more problem-solving strategies.
How do geometric relationships help to solve problems and/or make sense of phenomena	Geometric relationships provide a means to make sense of a variety of phenomena.	Geometry SMP1-Make sense of problems and persevere to in solving them SMP 2 – Reason abstractly and quantitatively SMP 3 – Construct viable arguments and critique the reasoning of others	Draw, construct, and describe geometrical figures and describe the relationship between them.	7.G.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.	Visualize three-dimensional shapes and the effects of slicing those shapes by planes	What shapes would result from making one cut through a rectangular prism?	1.3.8.D.1 Incorporate various art elements and the principles of balance, harmony, unity, emphasis, proportion, and rhythm/movement in the creation of two- and three-dimensional artworks, using a broad array of art media and art mediums to enhance the expression of creative ideas (e.g., perspective, implied space,	9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

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							illusionary depth, value, and pattern).	
How can spatial relationships be described by careful use of geometric language?	Geometric properties can be used to construct geometric figures	Geometry SMP1-Make sense of problems and persevere to in solving them SMP 2 – Reason abstractly and quantitatively SMP 6 – Attend to precision	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	7.G.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	Solve problems involving surface areas and volumes of solid figures	Describe a general strategy for finding the volume and surface area of any prism. Give examples.		9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.
How do geometric relationships help to solve problems and/or make sense of phenomena?	Geometric relationships provide a means to make sense of a variety of phenomena	Geometry SMP1-Make sense of problems and persevere to in solving them SMP 5-Use appropriate tools strategically SMP 8 – Look for and express regularity in related reasoning	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	7.G.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	Understand that rectangular prisms may have the same volume but different surface areas	Give the dimensions for two different rectangular prisms that both hold 36 cubes but have different surface areas.		9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.
How can measurements be used to solve problems?	Everyday objects have a variety of attributes, each of which can	Geometry SMP1-Make sense of problems and	Solve real-life and mathematical problems involving angle	7.G.6 Solve real-world and mathematical problems involving area, volume, and	Predict which rectangular prism with a common volume will have the smallest	For a given number of cubes (30) what arrangement will give the prism	8.2.8.B.1 Design and create a product that addresses a real-world problem	9.1.8.B.1 Use multiple points of view to create alternative

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	be measured in many ways	persevere to in solving them SMP 5-Use appropriate tools strategically SMP 8 – Look for and express regularity in related reasoning	measure, area, surface area, and volume.	surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms	surface area and refine a strategy for finding the surface area of a rectangular prism	that least amount of surface area and the greatest amount of surface area?	using the design process and working with specific criteria and constraints.	solutions.
Unit 8 – Making Comparisons and Predictions Pacing – 19 days						Common unit test, mathematical reflections, quizzes		
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	The results of a statistical investigation can be used to support or refute an argument.	Statistics and Probability SMP1-Make sense of problems and persevere to in solving them SMP 3 – Construct viable arguments and critique the reasoning of others SMP 4-Model with mathematics SMP 6 – Attend to precision	Draw informal comparative inferences about two populations.	7.SP.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 chapter of a fourth-grade science book.	Use measures of center, measures of spread, and data displays for more than one random sample to compare and draw conclusions about more than one population	How can you use measures of center and measures of variability to compare samples?	8.1.8.E.1 Gather and analyze findings using data collection technology to produce a possible solution for a content-related or real-world problem.	9.1.8.D.2 Demonstrate the ability to understand inferences.

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How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	The results of a statistical investigation can be used to support or refute an argument.	<p>Statistics and Probability</p> <p>SMP1-Make sense of problems and persevere to in solving them</p> <p>SMP 3 – Construct viable arguments and critique the reasoning of others</p> <p>SMP 4-Model with mathematics</p> <p>SMP 6 – Attend to precision</p>	Draw informal comparative inferences about two populations.	7.SP.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. For 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.	Compare summary statistics of multiple samples drawn from either the same population or from two different populations and explain how the samples vary.	How can you use box plots, medians, and IQRs to compare samples? Give an example.	2.1.8.A.1 Assess and apply health data to enhance each dimension of personal wellness	9.1.8.D.2 Demonstrate the ability to understand inferences.
How can experimental and theoretical probabilities be used to make predictions	The message conveyed by the data depends on how the data is collected, represented, and summarized.	<p>Statistics and Probability</p> <p>SMP1-Make sense of problems and persevere to in solving them</p>	Use random sampling to draw inferences about a population.	7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population	Explain how different sampling plans influence the reliability of sample statistics and resulting conclusions and predictions	What is the best way to produce a sample that will support valid inferences about the population? How does the sample size affect how	2.6.8.A.2 Use health data to develop and implement a personal fitness plan and evaluate its effectiveness.	9.2.12.E.3 Evaluate how media, bias, purpose, and validity affect the prioritization of consumer

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or draw conclusions?		SMP 3 – Construct viable arguments and critique the reasoning of others SMP 4-Model with mathematics SMP 6 – Attend to precision		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.		accurate predictions about the population sampled will be?		decisions and spending.
How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	The message conveyed by the data depends on how the data is collected, represented, and summarized.	Statistics and Probability SMP1-Make sense of problems and persevere to in solving them SMP 3 – Construct viable arguments and critique the reasoning of others SMP 4-Model with mathematics SMP 6 – Attend to precision	Use random sampling to draw inferences about a population.	7.SP.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 forms from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the	Use the randomly generated frequencies for events to draw conclusions	How can you use samples to draw conclusions about the populations from which they are selected?	8.1.8.E.1 Gather and analyze findings using data collection technology to produce a possible solution for a content-related or real-world problem.	9.1.8.D.2 Demonstrate the ability to understand inferences.

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				estimate or prediction might be.				