Hillsborough Township Public Schools
Mathematics Department
Selected Topics of College Math Curriculum Map

Essential Questions	Enduring Understandings	Domain	Cluster	Standard	Learning Targets	Assessment Formative and Summative	Inter-disciplinary Connections	21st Century Connections
Problem Solving and Critical Thinking **Pacing: 7 Days**						Common Unit Assessment		
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.	Creating Equations MP 2 - Reason abstractly and quantitatively	Create equations that describe numbers or relationships.	A-CED.1 - Create equations and inequalities in one variable and use them to solve problems.	Identify a pattern, use the pattern to find the next number.	Select a number. Multiply the number by 6. Add 8 to the product. Divide this sum by two. Subtract 4 from the quotient. Repeat this procedure four times and then write a conjecture that relates the result of this process to the original number selected.	RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.	CRP8. - Utilize critical thinking to make sense of problems and persevere in solving them.
How can we compare and contrast numbers?	A quantity can be represented numerically in various ways.	The Real Number System. SMP 3 – Construct viable arguments and critique the reasoning of others.	Use properties of rational and irrational numbers.	N.RN.3 - Reason quantitatively and use units to solve problem.	Understand and use inductive and deductive reasoning.	Give an example of a decision that you made recently. Describe your reasoning process and tell whether you used inductive or deductive reasoning.	RST.11.12.2 - Determine the central ideas, themes or conclusions of a text; summarize complex concepts, processes of information presented in a text by paraphrasing them in simpler but still accurate terms.	CRP4. - Communicate clearly and effectively and with reason.
How can we use mathematical models to describe physical relationships?	Mathematical models can be used to describe and quantify physical relationships.	Creating Equations SMP 4 – Model with mathematics.	Create equations that describe numbers or relationships.	A-CED.2 - Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Use different problem solving methods.	A car rents for $220 per week plus $0.25 per mile. How much would it cost per person for a group of three people traveling for two weeks?		9.2.12.B.1 - Prioritize financial decisions by systematically considering alternatives and possible consequences.
Set Theory **Pacing: 16 Days**						Common Unit Assessment		

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How can attributes be used to classify data/objects?	Grouping by attributes (classification) can be used to answer mathematical questions.	MP 1 - Make sense of problem and persevere in solving them.			Determine a set and set notation.	*Use the formula for the number of subsets of a set with n elements to solve. Write out each subset.* According to the U.S. Census Bureau, the most ethnically diverse U.S. cities are New York, Los Angeles, Miami, Chicago, Washington D.C., Houston, San Diego, and Seattle. If you decide to visit some, all, or none of these cities, how many travel options do you have?	RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	CRP8. - Utilize critical thinking to make sense of problems and persevere in solving them.
How do operations affect sets?	Set theory can be used for representing, organizing, and interpreting non-continuous data.	SMP 2 – Reason abstractly and quantitatively.			Perform set operations.	Given A= {1,2,3,4,5} B={1,2,3,6,8} C={2,3,4,6,7} Find $A \cup (B \cap C)$; $(A \cup B) \cap (A \cup C)$; $A \cap (B \cup C')$	RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.	
How can we use mathematical models to describe physical relationships?	Mathematical models can be used to describe and quantify physical relationships.	SMP 2 – Reason abstractly and quantitatively.			Create and use Venn Diagrams.	Students will survey their peers in class and create a Venn Diagram that represents all the data. Example: who will attend spirit night, who will attend prom, who will attend both, neither?		9.1.12.B.1 - Present resources and data in a format that effectively communicates the meaning of the data and its implications for solving problems, using multiple

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								perspectives.
How can we use mathematical models to describe sentences?	Mathematical models can use symbols to describe English sentences.	MP 3 - Construct viable arguments and critique the reasoning of others.			Logic-Represent sentences symbolically and understand their relationships to one another.	Express the statement in symbolic form: "I am registered and a citizen, or I do not vote."		CRP4. - Communicate clearly and effectively and with reason.
How do operations affect sets?	To analyze information objectively and to avoid arriving at conclusions that are untrue.	SMP 3 – Construct viable arguments and critique the reasoning of others.			Construct truth tables and use them to draw conclusions about the validity of a statement.	*Determine if the argument is valid or not valid by constructing a truth table.* All mammals are warm blooded. All dogs are warm blooded. Therefore, all dogs are mammals.		CRP4. - Communicate clearly and effectively and with reason.
Number Representation and Calculation **Pacing: 11 Days**						Common Unit Assessment		
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 Real Number System SMP 2 – Reason abstractly and quantitatively.	Extend the properties of exponent to rational exponent.	N.RN.1,2 - Explain how the meaning of rational exponent follows from extending the properties of integer exponents.	Evaluate an exponential expression.	Evaluate 7^2	RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.	CRP11. - Use technology to enhance productivity.
How can we compare and contrast numbers?	A quantity can be represented numerically in various ways.	The Real Number System. SMP 2 – Reason abstractly and quantitatively.	Use properties of rational and irrational numbers.	N.RN.3 - Reason quantitatively and use units to solve problem.	Convert Hindu-Arabic numerals to and from expanded form.	Write 3407 in expanded form: 3407 = (3 x 10^3)+(4x10^2)+(0x10^1)+(7x1)	RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments taking measurements, or performing technical	

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						tasks; analyze the specific results based on explanations in the text.		
How can we compare and contrast numbers?	A quantity can be represented numerically in various ways.	The Real Number System. SMP 3 – Construct viable arguments and critique the reasoning of others.	Use properties of rational and irrational numbers.	N.RN.3 - Reason quantitatively and use units to solve problem.	Understand and use the Babylonian and Mayan numeration systems	Describe one way the Babylonian system is similar to the Hindu-Arabic system and one way that it is different. Do the same for the Mayan system.	RST.11.12.2 - Determine the central ideas, themes or conclusions of a text; summarize complex concepts, processes of information presented in a text by paraphrasing them in simpler but still accurate terms.	CRP4. - Communicate clearly and effectively and with reason.
How can we compare and contrast numbers?	A quantity can be represented numerically in various ways.	The Real Number System. MP 7 - Look for and make sure of structure.	Use properties of rational and irrational numbers.	N.RN.3 - Reason quantitatively and use units to solve problem.	Change numerals in bases other than ten to base ten.	Convert 4726_{eight} to base ten.		
					Change base ten numerals to numerals in other bases.	Convert the base ten numeral 299 to a base eight numeral.		
					Understand and use the Egyptian system, the Roman system, the traditional Chinese system and the Ionic Greek system.	Look at the back of a U.S. one-dollar bill. What date is written in Roman numerals along the base of the pyramid with an eye? What is the date's significance?		
Number Theory and the Real Number System **Pacing: 18 Days**						Common Unit Assessment		
How can we compare and contrast numbers?	A quantity can be represented numerically in various ways.	The Real Number System MP 7 - Look	Use properties of rational and irrational numbers.	N.RN.3 - Reason quantitatively and use units to solve problem	Show the divisibility of natural numbers.	Find the least common multiple and greatest common factor of 144 and 300 using prime factorization, show all	RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific	

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		for and make sure of structure.				work.	words and phrases as they are used in a specific scientific or technical context.	
How can we compare and contrast numbers?	Numeric fluency includes both the understanding of and the ability to appropriately use numbers.	Seeing Structure in Expressions.

SMP 3 – Construct viable arguments and critique the reasoning of others. | Interpret the structure of expressions. | A.SSE.1 - Interpret expressions that represent a quantity in terms of its context. | Apply the Order of Operations on integers. | Show all work step by step. Check the answer with a peer.
$10^2 - 100 \div 5^2 \cdot 2 - (-3)$ | RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. | |
| What makes a computational strategy both effective and efficient? | Computational fluency includes understanding the meaning and the appropriate use of numerical operations. | The Real Number System

MP 5 - Use appropriate tools strategically | Reason quantitatively and use units to solve problems. | N.Q.1 - Use units as a way to understand problems and to guide the solution of multi-step problem. | Perform arithmetic operations with real numbers. | A person is investigating two employment opportunities. They both have a salary of $20,000 per year. Company A offers an increase of $1,000 per year, Company B offers a 5% more than the preceding year. Which company will pay more during the sixth year? Show how the conclusion was derived. | | 9.2.12.A.1 - Analyze the relationship between various careers and personal earning goals. |
| How do mathematical ideas interconnect and build on one another to produce a | Numeric fluency includes both the understanding of and the ability to | The Real Number System

SMP 7 – Look for and make use of | Extend the properties of exponent to rational exponent. | N.RN.1,2 - Explain how the meaning of rational exponent follows from extending the properties of integer exponents. | Learn and apply the properties of exponents. | Write each number in scientific notation and then use properties of exponents to simplify the quantity. | RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a | 9.3.ST-SM.4 - Apply critical thinking skills to review information, explain statistical analysis, and to |

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coherent whole?	appropriately use numbers.	structure.				$$\frac{480,000,000,000}{0.00012}$$	specific scientific or technical context.	translate, interpret and summarize research and statistical data.
How can change be best represented mathematically?	The symbolic language of algebra is used to communicate and generalize the patterns in mathematics	Functions SMP 7 – Look for and make use of structure.	Interpret functions that arise in applications in terms of a context.	F-IF.A.3 - Recognize that sequences are functions, whose domain is a subset of the integers.	Determine if a sequence is geometric or arithmetic and find the nth term.	Determine if the sequence is arithmetic or geometric and justify the answer. Next write the general equation and find the next three terms. a. 4, 9, 14, 19 . . . b. 2, 6, 18, 54 . . .	RST.11.12.2 - Determine the central ideas, themes or conclusions of a text; summarize complex concepts, processes of information presented in a text by paraphrasing them in simpler but still accurate terms.	9.3.ST-ET.1 - Use STEM concepts and processes to solve problems involving design and/or production.
Algebra: Equations and Inequalities **Pacing: 18 Days**						Common Unit Assessment		
	Computational fluency includes understanding the meaning and the appropriate use of numerical operations. The magnitude of numbers affects the outcome of operations on them.	Reasoning with Equations and Inequalities MP 8 - Look for and express regularity in repeated reasoning	Solve equations and inequalities in one variable.	A-REI.3 - Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Evaluate and simplify algebraic expressions.	Evaluate: $-5(x-7)^2 + 16$ when x= 4 Simplify: $-9x + 4 -5x -13$	RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.	9.3.ST-ET.5 - Apply the knowledge learned in STEM to solve problems.
How do mathematical ideas interconnect and build on one another to	A solution could be reached in various ways. Problem solving depends	Reasoning with Equations and Inequalities SMP 2 –	Solve equations and inequalities in one variable.	A-REI.3 - Solve linear equations and inequalities in one variable, including equations with coefficients	Solve linear equations and inequalities.	Solve each mathematical sentence and show each step. Verify that the answer is correct. For the inequality graph your	RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments taking	9.3.ST-SM.4 - Apply critical thinking skills to review information, explain statistical

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produce a coherent whole?	upon choosing wise ways.	Reason abstractly and quantitatively.		represented by letters.		answer on a number line. a. -3(6-4x)=5x+17 c. 21-5x>18+x	measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	analysis, and to translate, interpret and summarize research and statistical data.
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.	Reasoning with Equations and Inequalities SMP 4 – Model with mathematics.	Solve equations and inequalities in one variable.	A-REI.2 - Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	Use direct and indirect variation to solve problems.	Set up an equation and solve. a. The tax on a property with an assessed value of $65,000 is $725. Find the tax on a property with an assessed value of $100,000. b. The current in a circuit varies inversely as the resistance. The current is 20 amperes when the resistance is 5 ohms. Find the current for a resistance of 16 ohms.		9.4.12.O.(2).6 - Demonstrate the knowledge and technical skills needed to obtain and succeed in a chosen scientific and mathematical field.
What makes an algebraic algorithm both effective and efficient?	Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.	Reasoning with Equations and Inequalities SMP 3 – Construct viable arguments and critique the reasoning of	Solve equations and inequalities in one variable.	A-REI.4 - Solve quadratic equations in one variable.	Solve quadratic equations by using the quadratic formula and factoring.	Solve the quadratic equations, state your method for solving and show work. a. $3x^2$-4x=15 b. x^2-7=-4x	RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments taking measurements, or performing technical tasks; analyze the specific results based on explanations in the	9.4.12.O.(2).6 - Demonstrate the knowledge and technical skills needed to obtain and succeed in a chosen scientific and mathematical field.

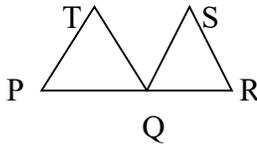| Essential Questions	Enduring Understandings	Domain	Cluster	Standard	Learning Targets	Assessment Formative and Summative	Inter-disciplinary Connections	21st Century Connections
		others.					text.	
Algebra: Graphs, Functions and Linear Systems **Pacing: 11 Days**						Common Unit Assessment		
How can we best represent and verify geometric/algebraic relationships?	Coordinate geometry can be used to represent and verity geometric/algebraic relationships.	Interpreting Functions SMP 2 – Reason abstractly and quantitatively.	Analyze functions using different representations	F-IF.7.a - Graph linear and quadratic functions and show intercepts, maxima, and minima. F-IF.7.e - Graph exponential functions, showing intercepts and end behavior.	Graph linear, quadratic and exponential equations.	Graph on the coordinate plane: a. $5x + 2y = 4$ b. $y=2^x+1$ c. $y=3x^2-12x+1$		
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.	Reasoning with Equations and Inequalities SMP 3 – Construct viable arguments and critique the reasoning of others.	Represent and solve equations and inequalities graphically.	A-REI.11 - Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are liner,	Use graphs to understand the behavior of functions.	Describe the shape of each graph. What clues in the equations help to determine the behavior of the function. $y=3x^2$, $y=3x$, $y=3* 2^x$	RST.11.12.2 - Determine the central ideas, themes or conclusions of a text; summarize complex concepts, processes of information presented in a text by paraphrasing them in simpler but still accurate terms.	9.3.ST-SM.4 - Apply critical thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data.

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				polynomial, rational, absolute value, exponential, and logarithmic functions.				
How can we use physical models to clarify mathematical relationships?	Physical models can be used to clarify mathematical relationships.	Reasoning with Equations and Inequalities MP 4 - Model with mathematics	Represent and solve equations and inequalities graphically.	A-REI.12 - Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	Use graphs as a tool to solve equations.	Find the x-intercepts and the minimum value of the function. $y = x^2 - x - 20$		9.4.12.O.(2).1 - Develop an understanding of how science and mathematics function to provide results, answers, and algorithms for engineering activities to solve problems and issues in the real world.
Mid-Term **Pacing: 1 Day**								
Consumer Mathematics and Financial Management **Pacing: 15 Days**						Common Unit Assessment		
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. MP 5 - Use appropriate tools strategically	Quantities* MP 4 - Model with mathematics	Reason quantitatively and use units to solve problems.	N-Q.1,2,3 - Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin	Use mathematical formulas to manage personal finance.	In order to start a small business, a student takes out a simple interest loan of $4,000 for 9 months at a rate of 8.25%. How much interest must the student pay? Find the future value of the loan. Show all work.	RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	9.2.12.D.3 - Justify the use of savings and investment options to meet targeted goals.

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				in graphs and data displays. Define appropriate quantities for the purpose of descriptive modeling. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.				

Pacing: Measurement
10 Days

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						Common Unit Assessment		
How can measurements be used to solve problems?	Everyday objects have a variety of attributes, each of which can be measured in many ways.	Quantities* MP 8 - Look for and express regularity in repeated reasoning	Reason quantitatively and use units to solve problems.	N-Q.1 - Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	Convert units with the metric system.	There are 10 decimeters in a meter. Explain why there are not 10 cubic decimeters in a cubic meter. How many times greater is a cubic meter that a cubic decimeter.	RST.11.12.1 - Cite specific textual evidence to support analysis of scientific and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.	9.3.ST-ET.1 - Use STEM concepts and processes to solve problems involving design and/or production.
How can measurements be used to solve problems?	What we measure affects how we measure it.	Quantities* MP 8 - Look for and express regularity in repeated reasoning	Reason quantitatively and use units to solve problems.	N-Q.2 - Define appropriate quantities for the purpose of descriptive modeling.	Use English and metric units to measure capacity.	A swimming pool has a volume of 22,500 cubic feet. How many gallons of water does the pool hold?		
How can measurements	Measurements can be used to	Quantities*	Reason quantitatively	N-Q.3 - Choose a level of accuracy	Use dimensional analysis to	A man weighs 186 pounds. Convert his		CRP2. - Apply appropriate

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be used to solve problems?	describe, compare, and make sense of phenomena	MP 8 - Look for and express regularity in repeated reasoning	and use units to solve problems.	appropriate to limitations on measurement when reporting quantities	change units of weight to and from the metric system.	weight to kilograms. For each kilogram of weight, 1.2 milligrams of a drug is to be given. What dosage should a 186-pound man be given?		academic and technical skills.
Geometry **Pacing: 7 Days**						Common Unit Assessment		
How can measurements be used to solve problems?	Measurements can be used to describe, compare, and make sense of phenomena	MP 5 - Use appropriate tools strategically			Solve problems involving angle measure.	If a transversal is perpendicular to one of two parallel lines, must it be perpendicular to the other parallel line as well? Explain.		CRP11. - Use technology to enhance productivity.
How can measurements be used to solve problems?	Measurements can be used to describe, compare, and make sense of phenomena	SMP 1 – Make sense of problems and persevere in solving them.			Solve problems involving angle relationships in triangles.	 If angle $T = 70°, S = 30°, P = $ $Q = 50°$ Find angle R.	RST.11-12.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.	CRP8. - Utilize critical thinking to make sense of problems and persevere in solving them.
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.	Modeling with Geometry SMP 4 – Model with mathematics.	Apply geometric concepts in modeling situations.	G-MG.1 - Use geometric shapes, their measures, and their properties to describe objects	Use the properties of polygons to solve problems.	A school playground is in the shape of a rectangle 400 ft long and 200 ft wide. If fencing costs $14 per yard, what will it cost to place fencing around the playground.		
How do geometric relationships	Geometric relationships provide a means	Modeling with Geometry	Apply geometric concepts in	G-MG.2 - Apply concepts of density based on area and	Solve problems using area and volume.	A circular backyard pool has a diameter of 24 feet and is 4 feet	RST.11-12.3 - Follow precisely a complex multistep	9.4.12.O.(2).4 - Use scientific and mathematical

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help to solve problems and/or make sense of phenomena?	to make sense of a variety of phenomena.	SMP 4 – Model with mathematics.	modeling situations.	volume in modeling situation (e.g., persons per square mile, BTUs per cubic foot).*		deep. One cubic foot of water has a capacity of 7.48 gallons. If water cost $2 per thousand gallons, how much, to the nearest dollar, will it cost to fill the pool? Show all work.	procedure when carrying out experiments taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	problem-solving skills and abilities to develop realistic solutions to assigned projects, and illustrate how science and mathematics impact problem-solving in modern society.
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.	Similarity, Right Triangles, and Trigonometry G-SRT SMP 4 – Model with mathematics.	Define trigonometric ratios and solve problems involving right triangles.	G-SRT.8 - Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Use trigonometric ratios to solve applied problems.	A police helicopter is flying at 800 feet. A stolen car is a sighted at an angle of depression of 72°. Find the distance of the stolen car, to the nearest foot, from a point directly below the helicopter.		9.4.12.L.(2).4 - Demonstrate knowledge of up-to-date information technology applications to facilitate handling of fire and emergency management situations.
Counting Methods and Probability Theory **Pacing: 27 Days**						Common Unit Assessment		
What is the best way to solve this? What counting strategy works best here?	Algorithms can effectively and efficiently be used to quantify and interpret discrete information.	Conditional Probability and the Rules of Probability MP 4 - Model with mathematics	Use the rules of probability to compute probabilities of compound events in a uniform probability model.	S-CP.9 (+) - Use permutations and combinations to compute probabilities of compound events and solve problems.	Compute probability using the Counting Principle, permutations and combinations.	A box contains 25 transistors, 6 of which are defective. If 6 are selected at random, find the probability that they are all defective.		9.4.12.M.(4).8 - Inspect manufacturing materials, report quality issues, and release only manufacturing materials that meet quality specifications.
How can attributes be	Experimental results tend to	Conditional Probability	Use the rules of probability	S-CP.6,7,8 - Find the	Find the probability of	A letter is randomly selected from the letters		9.3.ST-SM.4 - Apply critical

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used to classify data/objects? How can experimental and theoretical probabilities be used to make predictions and draw conclusions?	approach theoretical probabilities after a large number of trials. Grouping by attributes (classification) can be used to answer mathematical questions	and the Rules of Probability MP 4 - Model with mathematics	to compute probabilities of compound events in a uniform probability model.	conditional probability of A give B as the fraction of B's outcomes than also belong to A, and interpret the answer in terms of the model. Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model. (+) Apply the general Multiplication Rule in a uniform probability model P(A and B) = P(A)P(B/A) = P(B)P(A/B), and interpret the answer in terms of the model.	simple and compound events.	of the English alphabet. Find the probability of selecting a vowel, given that the outcome is a letter that precedes K.		thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data.
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.	Using Probability to Make Decisions MP 4 - Model with mathematics	Calculate expected values and use them to solve problems	S-MD.2 (+) - Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.	Use expected value to solve applied problems.	A construction company is planning to bid a building contract. The bid cost the company $3,000. The probability that the bid is accepted is ¼ . If the bid is accepted, the company will make $30,000 minus the cost of the bid. Find the expected value in this situation. Describe what	RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	9.3.12.AC.2 - Use architecture and construction skills to create and manage a project.

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						this value means.		
Voting and Apportionment **Pacing: 9 Days**						Common Unit Assessment		
How can experimental and theoretical probabilities be used to make prediction or draw conclusions?	The message conveyed by the data depends on how the data is collected, represented and summarized.	Statistics and Probability MP 6 - Attend to precision	Understand and evaluate random processes underlying statistical experiments.	S.IC.1 - Understand statistics as a process for making inference about population parameters based on a random sample from that population.	Understand and use various voting methods.	Analyze elections results using preference tables, plurality method, Borda count method, plurality-with-elimination method and pairwise comparison method.	RST.9-10.9 - Compare and contrast findings presented in a text to those from other sources, noting when findings support of contradict previous explanations or accounts.	9.1.4.A.5 - Apply critical thinking and problem solving skills in classroom and family settings.
How can experimental and theoretical probabilities be used to make prediction 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.	Understand and evaluate random processes underlying statistical experiments.	S.IC.2 - Decide if a specified model is consistent with results from a given data-generating process.	Understand the flaws in voting systems.	Describe majority criterion.	RST.9-10.9 - Compare and contrast findings presented in a text to those from other sources, noting when findings support of contradict previous explanations or accounts.	CRP7. - Employ valid and reliable research strategies.
Graph Theory **Pacing: 9 Days**						Common Unit Assessment		
How can we use mathematical models to describe physical relationships?	Patterns and relationships can be represented graphically, numerically, symbolically or verbally.	Interpreting function. MP 4 - Model with mathematics	Analyze functions using different representations	F.IF.7d - Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology in more complicated cases.	Understand relationships in a graph.	Using a floor plan, create a graph that models connecting relationships between rooms.		9.3.ST-ET.4 - Apply the elements of the design process.
How can change be best represented	Patterns and relationships can be	Interpreting functions	Analyze functions using different	F.IF.7d - Graph functions expressed symbolically and	Understand the definition of an Euler path and	A connected graph has 60 even vertices and no odd vertices.		CRP8. - Utilize critical thinking to make sense of

Essential Questions	Enduring Understandings	Domain	Cluster	Standard	Learning Targets	Assessment Formative and Summative	Inter-disciplinary Connections	21st Century Connections
mathematically?	represented graphically, numerically, symbolically or verbally.	SMP 3 – Construct viable arguments and critique the reasoning of others.	representations	show key features of the graph, by hand in simple cases and using technology in more complicated cases.	an Euler circuit.	Determine whether the graph has an Euler path, an Euler circuit or neither.		problems and persevere in solving them.
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.	Interpreting functions SMP 3 – Construct viable arguments and critique the reasoning of others.	Analyze functions using different representations	F.IF.7d - Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology in more complicated cases.	Understand the definitions of Hamilton paths and circuits.	Given a chart with destinations and distances, use the Nearest Neighbor Method to find the shortest route to run your errands and return home.	RST.11-12.7 - Integrate and evaluate multiple sources of information presented in diverse formats and media to address a question or solve a problem.	9.3.ST-ET.1 - Use STEM concepts and processes to solve problems involving design and/or production.
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.	Interpreting functions SMP 4 – Model with mathematics.	Analyze functions using different representations	F.IF.7d - Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology in more complicated cases.	Understand the definition and properties of a tree.	Use a tree to model the parent-child relationships in your extended family.		CRP4. - Communicate clearly and effectively and with reason.
Final Exam Pacing: 1 Day								