Trinity Area School District
Template for Curriculum Mapping

Course: Advanced Algebra with Trigonometry **Grade(s): 12**	**Overview of Course** (Briefly describe what students should understand and be able to do as a result of engaging in this course)**:** **This course is designed to illustrate how mathematics can be applied to the daily lives of students in practical and interesting ways. The course will enable students to develop problem–solving skills and foster critical thinking skills. The course will use technology, in particular, the TI–83 Plus Graphing Calculator.** **Topics covered are: arithmetic sequences, geometric sequences, inductive reasoning, deductive reasoning, Venn diagrams, set concepts, set operations, compound statements and connectives, truth tables, number base conversion, simple interest, compound interest, annuities, stocks, bonds, probability (permutations, combinations, sampling, frequency distributions, normal distributions), linear and quadratic equations (solving, writing, graphing), and systems of linear equations with 2 and 3 variables.** **In addition, the course introduces students to trigonometry. The trigonometric topics covered are: graphs (sine, cosine, tangent, cosecant, secant, cotangent), unit circle, right triangle trigonometry, inverse trigonometric functions (solving and graphing), trigonometric identities, and verify trigonometric identities through proofs.**

Overarching Big Ideas, Enduring Understandings, and Essential Questions
(These "spiral" throughout the entire curriculum.)

Big Idea (A Big Idea is typically a noun and always transferable within and among content areas.)	**Standard(s) Addressed** (What Common Core Standard(s) and/or PA Standard(s) addresses this Big Idea?)	**Enduring Understanding(s)** (SAS refers to Enduring Understandings as "Big Ideas." EUs are the understandings we want students to carry with them after they graduate. EUs will link Big Ideas together. Consider having only one or two EUs per Big Idea.)	**Essential Question(s)** (Essential Questions are broad and open ended. Sometimes, EQs can be debated. A student's answer to an EQ will help teachers determine if he/she truly understands. Consider having only one or two EQs per Enduring Understanding.)
Algebra	**CC.2.1.HS.C.3 Write functions or sequences that model relationships between two quantities.** **CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.**	**The order of operations is imperative to follow to properly solve a problem.** **Rational numbers are expressed as a quotient of 2 integers, where the denominator is not 0.**	**Why does mathematics have to agree on order of operations?** **What are the differences between rational and irrational numbers?**

	CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems. **CC.2.2.HS.D2 Write expressions in equivalent forms to solve problems.** **CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.** **CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms.** **CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.** **CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.**	**Irrational numbers are expressed as numbers whose decimal representations are neither terminating nor repeating.** **It is possible to find any term in an arithmetic or geometric sequence, when given the appropriate information.** **Inductive reasoning is used when arriving at a general conclusion based on observations.** **Deductive reasoning is the process of proving a scientific conclusion from one or more general statements.** **When solving word problems, not only is it helpful to draw a diagram of the problem, it is helpful to write out all valuable pieces of data and interpret them.**	**How are sequences used to model mathematical ideas and real-world situations?** **What is the difference between arithmetic and geometric sequences?** **When is it appropriate to use estimation and/or approximation?** **How is inductive reasoning vs. deductive reasoning used to reach conclusions?** **Where should a problem solving process start?**
Trigonometry	**CC.2.1.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.** **CC.2.1.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.** **CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.** **CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.** **CC.2.3.HS.A.8 Apply geometric concepts to model and solve real world problems.**	**The six trigonometric functions of sine, cosine, tangent, cosecant, secant, cotangent can be used to find other trigonometric function values.** **When given a trigonometric function's value, all six trigonometric functions can be calculated.** **Angles that are measured in radians and degrees can be equivalent angles.** **Reference angles are helpful when drawing an angle, especially when the angle is large.**	**How are angles related?** **What is standard position for an angle?** **In what way can knowledge of triangles, trigonometry, and ratios help you in any way?** **How are trigonometric functions evaluated for any angle?** **How are the trigonometric function values used to calculate other trigonometric values for the same angle?** **Which trigonometric functions can be derived from another trigonometric function?**

	CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles. **CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.** **CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.**	**The unit circle is used to define both the x value and the y value when determining the six trigonometric functions.** **Domain and range values are determined by the location on the unit circle.** **A graph could have the following characteristics transform (change or move) by altering a value in the sine or cosine equation: domain, range, period, x-intercept, y-intercept, minimum, and maximum.** **Trigonometric identities can be established by using other trigonometric identities via trigonometric proofs.**	**How can circles be used to understand similar triangle relationships?** **How can a trigonometric identity or property be verified algebraically?** **How are trigonometric identities used to solve a trigonometric problem?**
Logic and Problem Solving	**CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.** **CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.** **CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.** **CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.** **CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.** **CC.2.1.HS.C.6 Interpret functions in terms of the situations they model.**	**When solving word problems, not only is it helpful to draw a diagram of the problem, it is helpful to write out all valuable pieces of data and interpret them.** **Venn diagrams can be used to represent sets in a visual way.** **Equivalent mathematical statements can be expressed in multiple ways (different wording, graphically, etc.) and have identical meanings.** **Mathematical statements can be expressed symbolically.** **It is possible to create many scenarios and situations when creating truth tables.**	**When is it appropriate to use estimation and/or approximation?** **Where should a problem solving process start?** **What problem solving strategy works best in a given problem situation?** **What is the relationship between solving problems and computation?** **Which naming methodology is appropriate for specific circumstances?** **What is the logical progression of** statements **in a mathematical expression?**

	CC.2.4.HS.B.1 Summarize, represent, and interpret data on two categorical and quantitative variables.	**Truth tables are used to graphically illustrate true and false mathematical statements.**	**How applicable are math symbols in the real world?** **What is an industrial application of truth tables?**

Big Ideas, Enduring Understandings, and Essential Questions Per Unit of Study (These do NOT "spiral" throughout the entire curriculum, but are specific to each unit.)							
Month of Instruction (In what month(s) will you teach this unit?)	**Title of Unit**	**Big Idea(s)** (A Big Idea is typically a noun and always transferable within and among content areas.)	**Standard(s) Addressed** (What Common Core Standard(s) and/or PA Standard(s) addresses this Big Idea?)	**Enduring Understanding(s)** (SAS refers to Enduring Understandings as "Big Ideas." EUs are the understandings we want students to carry with them after they graduate. EUs will link Big Ideas together. Consider having only one or two EUs per Big Idea.)	**Essential Question(s)** (Essential Questions are broad and open ended. Sometimes, EQs can be debated. A student's answer to an EQ will help teachers determine if he/she truly understands. Consider having only one or two EQs per Enduring Understanding.)	**Common Assessment(s)*** (What assessments will all teachers of this unit use to determine if students have answered the Essential Questions?)	**Common Resource(s)* Used** (What resources will all teachers of this unit use to help students understand the Big Ideas?)
August – September	**Number Theory**	**Composite Numbers**	**CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.** **CC.2.1.HS.F.4 Use units as a way to understand problems and to guide**	**Prime Factorization can be used to break any number down into its most basic, prime numbers. It also can be used to calculate the smallest number that is divisible by all of the original numbers.**	**How to determine the prime factorization for a number?** **How can factors be used in solving problems?** **Why does mathematics have to**	**Participation Homework Quizzes/Tests In-Class Work Projects (possible)**	**Textbook On-Line Resources** **<u>Terms</u> Number Theory Natural Numbers Factors Prime Factorization**

			the solution of multi-step problems. **CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.** **CC.2.1.HS.F.7 Apply concepts of complex numbers in polynomial identities and quadratic expressions to solve problems**	**The order of operations is imperative to follow to properly solve a problem.**	**agree on order of operations?**		
August – September	**Number Theory**	**Rational and Irrational Numbers**	**CC.2.1.HS.F.2 Apply properties of rational and irrational to solve real world or mathematical problems.** **CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.** **CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms.**	**Rational numbers are expressed as a quotient of 2 integers, where the denominator is not 0.** **Irrational numbers are expressed as numbers whose decimal representations are neither terminating nor repeating.** **The process of rationalizing denominators simplifies statements with square roots.**	**What are rational numbers?** **How can we tell if two rational numbers are equal?** **What are some ways of working with rational numbers that make sense?** **What are irrational numbers?** **What are the differences between**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources** **<u>Terms</u>** **Rational Number** **Irrational Number** **Perfect Square**

			CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.		**rational and irrational numbers?** **How do I rationalize imaginary denominators?** **How do I rationalize complex denominators?**		
August – September	**Number Theory**	**Scientific Notation**	**CC.2.1.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.** **CC.2.1.HS.C.3 Write functions or sequences that model relationships between two quantities.**	**Scientific notation is a good method to write very large and very small numbers.** **It is possible to divide and multiply in scientific notation, which minimizes the calculations necessary to solve the problem.**	**Why is scientific notation useful?** **How does multiplying a number by a power of 10 affect the placement of the decimal?** **How can a number that is in standard notation be written in scientific notation and vice versa?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources**
September – October	**Number Theory**	**Arithmetic and Geometric Sequences**	**CC.2.1.HS.C.3 Write functions or sequences that model relationships between two quantities.** **CC.2.2.HS.D.9 Use reasoning to solve**	**It is possible to find any term in an arithmetic or geometric sequence, when given the appropriate information.**	**How are sequences used to model mathematical ideas and real-world situations?** **What is the difference between arithmetic**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **<u>Terms</u>** **Arithmetic Sequence** **Common Difference** **Geometric Sequence** **Common Ratio**

			equations and justify the solution method.	Compare and contrast the common difference and common ratio. It is possible to find the sum of many arithmetic and geometric sequences.	and geometric sequences? How does sigma notation relate to sequences? How are the terms of sequences generated?		<u>On-Line Resources</u> http://www.superteachertools.com/jeopardy/usergames/Jan201204/game1327893923.php
September – October	Reasoning	Inductive and Deductive Reasoning	CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.	Inductive reasoning is used when arriving at a general conclusion based on observations. Deductive reasoning is the process of proving a scientific conclusion from one or more general statements.	How is inductive reasoning used to reach conclusions? How is deductive reasoning used to reach conclusions?	Participation Homework Quizzes/Tests In-Class Work Projects (possible)	Textbook On-Line Resources <u>Terms</u> Inductive Reasoning Deductive Reasoning Conjecture
September – October	Reasoning	Problem Solving	CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. CC.2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.	Estimation is a powerful tool to use when solving problems. When solving word problems, not only is it helpful to draw a diagram of the problem, it is helpful to write out all valuable pieces of data and interpret them.	When is it appropriate to use estimation and/or approximation? How important is estimation in real-life situations? Where should a problem solving process start? What problem solving strategy works best in	Participation Homework Quizzes/Tests In-Class Work Projects (possible)	Textbook On-Line Resources

			CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. **CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.**		**a given problem situation?** **What is the relationship between solving problems and computation?**		
October – November	**Set Theory**	**Set Concepts**	**CC.2.1.HS.C.6 Interpret functions in terms of the situations they model.** **CC.2.4.HS.B.1 Summarize, represent, and interpret data on two categorical and quantitative variables.** **CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.** **CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.**	**There are multiple methods to represent sets, which all follow the same general guidelines for representation.** **There is a difference between equivalent sets and equal sets.** **The cardinality of finite sets can be determined, but the cardinality of infinite sets is infinite.** **Sets may exist within other sets, which may or may not be the same set.** **Sets may be combined (union of sets) or intersected (intersection of sets).**	**Which methodology for set-naming is appropriate?** **Is there really a difference between equivalent sets and equal sets?** **How are finite sets and infinite sets different?** **How does the cardinality of sets affect the definition of the set?** **How are sets inter-twined in an effective and effective manner?** **What other methods can be used to represent sets?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources** **<u>Terms</u>** **Set** **Elements** **Cardinal Number** **Equivalent Sets** **Finite Sets** **Infinite Sets** **Subsets** **Empty Set** **Universal Set** **Venn Diagrams** **Union of Sets** **Intersection of Sets**

				Venn diagrams can be used to represent sets in a visual way.			
November	**Trigonometric Theory**	**Angles**	**CC.2.1.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.** **CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.** **CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles.** **CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.** **CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.** **CC.2.3.HS.A.8 Apply geometric concepts to model and solve real world problems.**	**It is possible to convert angles from degrees into radians.** **It is possible to convert angles from radians to degrees.** **Angles can be graphed in either degrees or radians.** **The distance of the arc of a circle can be found by multiplying the radius by the angle (in radians).**	**How are angles related?** **How can I convert angles from degrees to radians, and vice-versa?** **Why do mathematicians use radians in place of degrees, when measuring angles?** **What is an arc?** **What is a sector?** **How are arcs and sectors related?** **What is standard position for an angle?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **Terms** **Initial Side** **Terminal Side** **Subtend** **Arc Length** **On-Line Resources** **http://www.mangahigh.com/en_us/maths_games/shape/trigonometry/use_trigonometry_to_find_angles**

November – December	**Trigonometric Theory**	**Right Triangle Trigonometry**	**CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.** **CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.** **CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles.**	**The six trigonometric functions of sine, cosine, tangent, cosecant, secant, cotangent can be used to find other trigonometric function values.** **The trigonometric functions of sine, cosine, tangent, cosecant, secant, cotangent can be used to find a missing side of a triangle.**	**In what way can knowledge of triangles, trigonometry, and ratios help you in any way?** **Why would knowledge of triangle trigonometry be of any use to a pilot, a navigator, and a surveyor?** **Is there a way to determine the area and/or angles of any triangle when given only the lengths of the three sides?** **Why does any trigonometric value of any angle of a specific triangle remain the same regardless of the unit of measure?**	**Participation Homework Quizzes/Tests In-Class Work Projects (possible)**	**Textbook On-Line Resources http://www.slidermath.com/rpoly/Trigapps.shtml http://www.teachmaths-inthinking.co.uk/activities/sine-cosine-model-waves.htm https://www.explorelearning.com/index.cfm?method=cResource.dspExpGuide&ResourceID=286**
December – January	**Trigonometric Theory**	**Computing the Values of Trigonometric Functions**	**CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.**	**The six trigonometric functions can be used to solve problems without the use of a calculator.**	**Is it possible to add, subtract, multiply, and divide trigonometric functions?**	**Participation Homework Quizzes/Tests In-Class Work Projects (possible)**	**Textbook On-Line Resources Terms Coterminal Angles**

			CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. **CC.2.3.HS.A.8 Apply geometric concepts to model and solve real world problems.**	**When given a point on the terminal side of an angle, all six trigonometric functions can be calculated.** **A specific quadrant can be determined when given the positive or negative value of two of the six trigonometric functions.**	**How are trigonometric functions evaluated for any angle?** **How are the trigonometric function values used to calculate other trigonometric values for the same angle?** **Does standard position make a difference when determining terminal sides of an angle?** **How do plots on a coordinate plane help to determine the specific quadrant for a trigonometric function?**		
December – January	**Trigonometric Theory**	**Trigonometric Functions of General Angles**	**CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.** **CC.2.3.HS.A.8 Apply geometric concepts to model and solve real world problems.**	**Reference angles are helpful when drawing an angle, especially when the angle is large.** **When given a trigonometric function's value, all six trigonometric functions can be calculated.**	**How are reference angles and given angles different?** **How are reference angles and coterminal angles different?** **Which trigonometric functions can be derived from another**	**Participation Homework Quizzes/Tests In-Class Work Projects (possible)**	**Textbook On-Line Resources**

			CC.2.3.HS.A.9 Extend the concept of similarity to determine arc lengths and areas of sectors of circles. **CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.** **CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.**		**trigonometric function?**		
January	**Trigonometric Theory**	**Unit Circle**	**CC.2.1.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.** **CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.** **CC.2.3.HS.A.8 Apply geometric concepts to model and solve real world problems.** **CC.2.3.HS.A.9 Extend the concept of similarity to determine arc**	**The unit circle is used to define both the x value and the y value when determining the six trigonometric functions.** **Domain and range values are determined by the location on the unit circle.**	**How is standard position used in conjunction with the unit circle?** **How can circles be used to understand similar triangle relationships?** **How can the coordinates of a circle of radius = 1 centered on the origin be used to evaluate all trigonometric function values?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **Terms** **Domain** **Range** **Period** **On-Line Resources** **http://www.purposegames.com/game/unit-circle-quiz** **http://www.purposegames.com/game/unit-circle-quiz** **http://www.purposegames.com/game/angles-of-the-unit-circle-radians-quiz**

			lengths and areas of sectors of circles. **CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.** **CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.**				
January	**Trigonometric Theory**	**Sine and Cosine Graphs**	**CC.2.1.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.** **CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.** **CC.2.3.HS.A.8 Apply geometric concepts to model and solve real world problems.** **CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.**	**A graph could have the following characteristics transform (change or move) by altering a value in the sine or cosine equation: domain, range, period, x-intercept, y-intercept, minimum, and maximum.**	**How are the graphs sine, cosine, and tangent graphs transformed and translated?** **How can the domain and range be defined for the 6 trigonometric functions?** **Is there a restrictive domain for all trigonometric functions?** **How are the trigonometric functions' graphs evaluated based on the unit circle?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources** **http://www.mathsisfun.com/algebra/trig-interactive-unit-circle.html**

					Why do some, but not all, of the trigonometric functions have asymptotes?		
January – February	**Trigonometric Theory**	**Trigonometric Identities**	**CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.** **CC.2.3.HS.A.8 Apply geometric concepts to model and solve real world problems.** **CC.2.3.HS.A.11 Apply coordinate geometry to prove simple geometric theorems algebraically.** **CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.**	**Trigonometric identities can be established by using other trigonometric identities via trigonometric proofs.** **It is possible to establish specific trigonometric identities via trigonometric proofs using the following classifications of trigonometric identities and formulas: Quotient identities, Reciprocal identities, Pythagorean identities, Even-Odd identities, Sum and Difference formulas, Double-Angle formulas, Half-Angle formulas, Product-to-Sum formulas, and Sum-to-Product formulas.**	**How are trigonometric identities used to solve a trigonometric problem?** **Is it possible to simplify a trigonometric statement using trigonometric identities and properties?** **Is it possible to rewrite trigonometric identities out of fraction form?** **How can a trigonometric identity or property be verified algebraically?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources**
February	**Logic**	**Quantified Statements**	**CC.2.1.HS.C.3 Write functions or sequences that model**	**Equivalent mathematical statements can be expressed in multiple ways (different wording,**	**What is the logical progression of** statements **in a**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work**	**Textbook** **On-Line Resources** **Terms**

			relationships between two quantities. **CC.2.1.HS.C.6 Interpret functions in terms of the situations they model.** **CC.2.1.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.**	**graphically, etc.) and have identical meanings.** **Mathematical statements can be expressed symbolically.**	**mathematical expression?** **How does symbolically expressing statements assist in the progression of solving?** **How applicable are math symbols in the real world?**	**Projects (possible)**	**Statement** **Negation** **Quantified Statement** **Compound Statement** **Connectives** **If-Then Statements** **If-And-Only-If Statements**
February – March	**Logic**	**Truth Tables**	**CC.2.1.HS.C.3 Write functions or sequences that model relationships between two quantities.** **CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.**	**Truth tables are used to graphically illustrate true and false mathematical statements.** **It is possible to create many scenarios and situations when creating truth tables.**	**How can truth tables be used to determine the flow of logic?** **How are truth tables used?** **What is an industrial application of truth tables?** **What is meant by a truth value?** **How do truth tables relate to the real world?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources** **<u>Terms</u>** **Conditional Statement** **Biconditional Statement**

March	**Logic**	**Number Bases**	**CC.2.1.HS.C.3 Write functions or sequences that model relationships between two quantities.** **CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.**	**The most commonly used and understood base is base 10.** **It is possible to convert to number bases other than base 10, and vice-versa.**	**What are number bases and how do they affect our calculations?** **What advantage is there when converting into different number bases?** **Why are there other number bases?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources**
March – April	**Financial Management**	**Income Taxes**	**CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.** **CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.**	**Taxes of all different types can impact consumers' daily spending decisions.** **Personal income tax is a confusing series of steps to follow. Multiple individual income tax scenarios are calculated and solved.** **Percent increase and percent decrease are compared and contrasted through examples.**	**What is income tax?** **How do I complete income tax forms?** **What affects how income taxes are determined?** **How do laws affect income tax amounts?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources** **http://www.remappingdebate.org/map-data-tool/new-interactive-tool-puts-tax-rates-historical-context** **http://interactive.taxfoundation.org/taxcalc/#calculator**
March – April	**Financial Management**	**Simple Interest**	**CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.**	**Present value and future value are compared and contrasted through examples.**	**What is the difference in the future value of an ordinary annuity and the present value**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **On-Line Resources** **Terms** **Present Value**

			CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.	**Simple interest is used to determine values of loans and savings.**	**of an ordinary annuity?** **How does present value increase or decrease as compared with the value far in the future?** **What do the various parts of the simple interest formula mean?** **How does value increase with simple interest?**		**Future Value** **Discounted Loan** **Simple Interest**
April	**Financial Management**	**Compound Interest**	**CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.** **CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.**	**Compound interest is used to determine values of loans and savings.** **Continuously compounding interest is used to determine values of loans and savings.** **Effective annual yield is calculated.**	**What do the various parts of the compound interest formula mean?** **How does value increase with compound interest compared to simple interest?** **How is continuously compounded interest different than compound interest?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Projects (possible)**	**Textbook** **Terms** **Compound Interest** **Effective Annual Yield** **On-Line Resources** **http://www.investor.gov/tools/calculators/compound-interest-calculator**

					Which gives a larger return: simple interest, compound interest, or continuously compounded interest?		
April	**Financial Management**	**Stocks and Bonds**	**CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.** **CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.**	**Annuities are equal payments paid over time at equal time periods and their values can be computed with a formula.** **Calculate the values of stocks, and bonds.** **Price-to-earnings (PE) ratios are used to evaluate a stock's value.** **Stock market project where the students research a company, invest fictitious money to buy the company's stock, and then give a presentation on their company.**	**How does one purchase annuities?** **Are stocks and/or bonds a good idea to use as investments?** **What does the price-to-earnings ratio truly mean and should it be used to determine which stocks to buy?** **How does a specific stock fare over time compared with holding the money as cash?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work** **Stock Market Investment Project**	**Textbook** **<u>Terms</u>** **Annuity** **Stock** **Shareholder** **Trading** **Stock Exchange** **Dividends** **Capital Gain** **Bonds** **Portfolio** **Price-to-Earnings Ratio** **<u>On-Line Resources</u>** **http://finance.yahoo.com/** **http://www.google.com/finance** **https://nyse.nyx.com/**
May	**Financial Management**	**Cost of Home Ownership**	**CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations**	**Mortgages are detailed and explained with the multiple elements in a mortgage: interest rate,**	**How does the interest rate and taxes impact a monthly mortgage amount?**	**Participation** **Homework** **Quizzes/Tests** **In-Class Work**	**Textbook** **<u>Terms</u>** **Installment Buying**

			and apply to polynomials. CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.	escrow, taxes, points, etc. Loan amoritization schedules are created by the students for multiple home buying examples.	How is escrow used when buying a home? What do points do to an interest rate for a mortgage? How much additional cash will be spent over the long-term of the mortgage (assume 30 years) than if the home was just purchased in cash?	Projects (possible)	Installment Loan Fixed Interest Loan Mortgage Down Payment Fixed-Rate Mortgage Variable-Rate Mortgage Points Escrow Account Amoritized On-Line Resources http://www.freddiemac.com/homeownership/calculators/
May	Probability Theory	Permutations and Combinations	CC.2.4.HS.B.1 Summarize, represent, and interpret data on two categorical and quantitative variables. CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables. CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data. CC.2.4.HS.B.4 Recognize and evaluate random	Permutations and combinations are compared and contrasted. The fundamental counting principle can be used to compute permutations and combinations. The factorial of a number is when a number is multiplied by the number and all of the numbers less than itself down to 1.	Are permutations and combinations different? What determines if a permutation or combination formula is used? When do you multiply with the fundamental counting principle? How do you determine the number of different ordered arrangements of n distinct objects?	Participation Homework Quizzes/Tests In-Class Work Projects (possible)	Textbook Terms Fundamental Counting Principle Permutation Combination Factorial On-Line Resources http://stattrek.com/online-calculator/combinations-permutations.aspx

			processes underlying statistical experiments.				
May	Probability Theory	Basic Probability	CC.2.4.HS.B.1 Summarize, represent, and interpret data on two categorical and quantitative variables. CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables. CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.	Theoretical and experimental probability are compared and contrasted. Formulas for mutually exclusive events and not mutually exclusive events are slightly different. The wording of a probability example makes a large difference when determining the odds of an event occurring.	What is experimental probability vs. theoretical probability? What is a sample space? How can a tree diagram be used to find the probability? What is meant by replacement and without replacement? What is meant by mutually exclusive vs. not mutually exclusive events?	Participation Homework Quizzes/Tests In-Class Work Projects (possible)	Textbook On-Line Resources <u>Terms</u> Sample Space Event Theoretical Probability Empirical Probability Complement Mutually Exclusive Event Independent Event Dependent Event
May	Probability Theory	Conditional Probability	CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data. CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in	Independent and dependent events are compared and contrasted.	What is meant by independent vs. dependent events? Does data gathering make a difference when determining between independent vs. dependent events?	Participation Homework Quizzes/Tests In-Class Work Projects (possible)	Textbook <u>Terms</u> Conditional Probability <u>On-Line Resources</u> http://gwydir.demon.co.uk/jo/probability/calcdice.htm

			a uniform probability model.		**How prevalent is conditional probability in the real world?**		