FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

Mathematics 2

Date: December 2017 **Course Length: 2 Semesters**
Proposed Grade Level(s): 9-12 **Subject Area: Mathematics**
Grading: A - F **Credits: 5 per semester**
Prerequisite(s): "C" or better in Mathematics 1 or Integrated Math 1

Intent to Pursue 'A-G' College Prep Status Yes

A-G Course Identifier: C: Mathematics

COURSE DESCRIPTION:

The Mathematics 2 course focuses on quadratic expressions, equations, and functions and on comparing the characteristics and behavior of these expressions, equations, and functions to those of linear and exponential relationships from Mathematics I. Circles and their quadratic representations are studied in this course. The set of rational numbers is extended and students are introduced to real and complex numbers. The study of similarity leads to an understanding of right-triangle trigonometry and connects to quadratics through Pythagorean relationships.

The standards are based on the Common Core State Standards for Mathematics and include topics from the conceptual categories: Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability. Instructional time will focus on six critical areas: (1) extend the laws of exponents to rational exponents; (2) compare key characteristics of quadratic functions with those of linear and exponential functions; (3) create and solve equations and inequalities involving linear, exponential and quadratic expressions; (4) extend work with probability; (5) establish criteria for similarity of triangles based on dilations and proportional reasoning; and (6) apply the Pythagorean Theorem. Students will be prepared for the next course in mathematics and be assessed using district diagnostic tools.

The course requires weekly math lab to ensure students are meeting all of the math standards.
Class Cycle - This course will work on a cycle; one week will be a group Performance Task and the next week will be a work week.

During the Performance Task week, all three days will involve participation in the same Performance Task(s). A Performance Task involves significant interaction of students with a variety of information materials (e.g., readings, video clips, and data) and/or engagement in a problem solution, leading to a show of the students' application of knowledge and skills in writing or presentation. A key component of college and career readiness is the ability to integrate knowledge and skills across multiple content standards**.**

During the Work Week, students are required to be actively working on their course for the hour and fifteen minutes. This would be the best opportunity to bring questions that a student couldn't answer on their own or their regular teacher suggested they bring to lab.

Self-Help
One of the things we will constantly be exploring in Mathematics Lab is how to help yourself when you get stuck. We will look at utilizing calculators, Khan Academy, Math.com, reading techniques, etc.

GENERAL GOALS:

- Focus on quadratic expressions, equations, and functions, and comparing their characteristics and behavior to those of linear and exponential relationships learned in Mathematics 1.
- Use conditional probability and counting methods, including their use in making and evaluating decisions, to link probability and data.
- Study similarity to understand right triangle trigonometry, and circles, with their quadratic algebraic representations, round out the course.
- Study quadratic algebra through circles.
- Successful completion of this course indicates students are prepared to take Math 3.

COMMON CORE STATE ANCHOR STANDARDS FOR READING (K-12):

Key Ideas & Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

Craft & Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge & Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Reading Range / Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

COMMON CORE STATE ANCHOR STANDARDS FOR WRITING (K-12):

Text Types & Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

Production & Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

COMMON CORE STATE ANCHOR STANDARDS FOR SPEAKING AND LISTENING (K-12):

Comprehension & Collaboration

1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Presentation of Knowledge & Ideas

4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and ensure that the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
   Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

TEXTBOOKS AND RESOURCE MATERIALS:

Aleks (Assessment and Learning in Knowledge Spaces), University of California, Irvine (UC Regents), McGraw Hill, (2017).

DETAILED UNITS OF INSTRUCTION:

*Standards details follow beginning on page 7.

Sections	Standards*	Overview
Real Numbers	Standards of Mathematical Practices	Standards in this section are designed to be available to students who test in needing remediation on K-8 and M1 standards. During first diagnostic, students can test out of these areas.

Linear Equations and Inequalities	A.CED.1 A.CED.4 F.LE.1 F.LE.2 F.LE.3	Standards in this section are designed to be available to students who test in needing remediation on K-8 and M1 standards. During first diagnostic, students can test out of these areas. This section reviews solving linear equations and inequalities while connecting the numeric, graphic, and algebraic methods for solving linear functions. This section also guides student exploration and comprehension of different forms of linear equations.
Graphing, Functions, and Systems	F.IF.1 F.IF.2 F.IF.B.4 F.IF.B.5 F.IF.B.6 F.IF.C.7.a F.IF.C.7.b F.IF.C.9 F.BF.A.1.b F.BF.B.3 G.CO.C.1 G.CO.C.2 G.GPE.5	This section explores piecewise functions, absolute value functions, step functions, and systems. Inverses of linear functions are introduced graphically, numerically, and algebraically. Online construction tools as well as hand tools are used.
Exponents and Polynomials	A.SSE.A.1.a A.SSE.A.2 A.SSE.B.3.a A.SSE.B.3.c A.APR.A.1 A.CED.1 A.REI.B.4.b F.IF.C.8.a F.LE.B.6	Standards in this section are designed to be available to students who test in needing remediation on K-8 and M1 standards in areas of product, power, and quotient rules to prepare students for more complex quadratic functions. During first diagnostic, students can test out of these areas.
Radicals	N.RN.1 N.RN.2 N.RN.3 N.CN.1 N.CN.2	This section reviews the real number system and then moves to introducing the imaginary and ultimately the complex number system. Using the powers of exponents rules, students discover the necessity of the number *i*.
Quadratic and Exponential Functions	N.CN.C.7 A.SSE.A.1.a A.SSE.A.1.b A.SSE.B.3.a A.SSE.B.3.b A.CED.1 A.REI.B.4.a F.IF.2 F.IF.B.4 F.IF.B.5 F.IF.C.7.a F.IF.C.8.a	This section examines the graphical behavior of quadratic functions, including domain, range, increasing and decreasing, absolute maximum and absolute minimum, symmetry, and zeros. The relationship between the form of a quadratic function and the graph of a quadratic function is discussed. This section also extends operations with polynomials, including factoring quadratic trinomials. Quadratic equations are solved graphically, by factoring, and by completing the square. Additionally, this section introduces and explores the quadratic formula and systems of equations involving one or more quadratic equations are solved.

	F.IF.C.8.b F.IF.C.9 F.BF.A.1.a F.BF.A.1.b F.BF.B.3 F.LE.A.1 F.LE.A.3 F.LE.B.6	
Segments, Angles, and Triangles	G.CO.1 G.CO.5 G.CO.6 G.CO.7 G.CO.8 G.CO.9 G.CO.10 G.CO.12 G.SRT.B.5 G.SRT.C.8 G.GPE.B.4 G.GMD.6	This section focuses on proving triangle congruence theorems and using the theorems to determine whether triangles are congruent, including right triangle and isosceles triangle congruence theorems. Lessons provide opportunities for students to explore the congruence of corresponding parts of congruent triangles as well as continuing work with proof through paragraph, two column, construction, and flow charts. Proofs involving segments, angles, and parallel lines are reviewed. Students apply congruence theorems to solve problems.
Polygons, Similarity, and Transformations	G.CO.3 G.CO.4 G.CO.11 G.SRT.A.1.a G.SRT.A.1.b G.SRT.A.2 G.SRT.A.3 G.SRT.B.4 G.SRT.B.5 G.SRT.C.8.1 G.C.A.1 G.GPE.4 G.GPE.5	This section focuses on properties of squares, rectangles, parallelograms, rhombi, kites, and trapezoids. The sum of interior and exterior angles of polygons is also included. Students analyze figures on the coordinate plane. This section addresses similar triangles and establishes similar triangle theorems as well as theorems about proportionality. The section leads student exploration of the conditions for triangle similarity and opportunities for applications of similar triangles that also include the properties and theorems of 45º-45º-90º triangles and 30º-60º-90º triangles.
Area, Volume, and Circles	G.CO.13 G.C.A.2 G.C.A.3 G.C.A.4 G.C.B.5 G.GPE.1 G.GPE.2 G.GPE.4 G.GPE.5 G.GMD.1 G.GMD.3 G.GMD.4 G.GMD.5 G.MG.1 G.MG.2	This section reviews information about circles, and then focuses on angles and arcs related to a circle, chords, and tangents. This section explores inscribed and circumscribed polygons as well as circles. Students determine relationships between central angles, arcs, arc lengths, areas of parts of circles. This section also explores three-dimensional figures including the formulas for a volume of a cone, sphere, and pyramid as well as the cross sections that create these shapes including real-world models. Online construction tools as well as hand tools are used.
Sequences,	A.REI.C.7	This section investigates compound probability.

Probability, and Conics	S.CP.A.1 S.CP.A.2 S.CP.A.3 S.CP.A.4 S.CP.A.5 S.CP.B.6 S.CP.B.7 S.CP.B.8 S.CP.B.9 S.MD.B.6 S.MD.B.7	Students explore various probability models and calculate compound probabilities with independent and dependent events in a variety of problem situations. Compound probability concepts are also presented using two-way frequency tables and conditional probability. The counting strategies include permutations and combinations. The last lesson focuses on geometric probability and expected value. This section also explores circles, polygons, and parabolas on the coordinate plane. Key characteristics are used to write equations for these geometric figures.
Trigonometry	G.SRT.B.5 G.SRT.C.6 G.SRT.C.7 G.SRT.C.8	This section introduces students to trigonometric ratios using right triangles. Lessons provide opportunities for students to discover and analyze these ratios and solve application problems using them.

SUBJECT AREA CONTENT STANDARDS TO BE ADDRESSED:

Standards for Mathematical Practice

The eight *Standards for Mathematical Practice* describe the attributes of mathematically proficient students and expertise that mathematics educators at all levels should seek to develop in their students. The Standards for Mathematical Practice represent a picture of what it looks like for students to *do mathematics*. Mathematical practices provide a vehicle through which students engage with and learn mathematics with a focus on reading, writing, and explaining. The Standards for Mathematical Practice along with the Standards for Mathematical Content (which follow this section), prescribe that students experience mathematics as a coherent, relevant, and meaningful subject.

SMP 1: Make sense of problems and persevere in solving them.
SMP 2: Reason abstractly and quantitatively.
SMP 3: Construct viable arguments and critique the reasoning of others.
SMP 4: Model with Mathematics.
SMP 5: Use appropriate tools strategically.
SMP 6: Attend to precision.
SMP 7: Look for and make use of structure.
SMP 8: Look for and express regularity in repeated reasoning.

Mathematics Content Standards

Number and Quantity

The Real Number System

Extend the properties of exponents to rational exponents.

N-RN.1: Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.

N-RN.2: Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Use properties of rational and irrational numbers.

N-RN.3: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

The Complex Number System

Perform arithmetic operations with complex numbers.

N.CN.1: Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real.

N.CN.2: Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

N.CN.7: Solve quadratic equations with real coefficients that have complex solutions.

Algebra

Seeing Structure in Expressions

Interpret the structure of expressions.

A-SSE.1: Interpret expressions that represent a quantity in terms of its context.

A-SSE.1a: Interpret parts of an expression, such as terms, factors, and coefficients.

A-SSE.1b: Interpret complicated expressions by viewing one or more of their parts as a single entity.

A-SSE.3a: Factor a quadratic expression to reveal the zeros of the function it defines.

A-SSE.3b: Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

A-SSE.3c: Use the properties of exponents to transform expressions for exponential functions.

Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials.

A-APR.1: Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Creating Equations

Create equations that describe numbers or relationships.

A-CED.1: Create equations and inequalities in one variable including ones with absolute value and use them to solve problems.

A-CED.4: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

Reasoning with Equations and Inequalities

Solve equations and inequalities in one variable.

A-REI.4b: Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.

Solve systems of equations.

A-REI.7: Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

Functions

Understand the concept of function and use function notation.

F-IF.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If 'f' is a function and 'x' is an element of its domain, the f(x) denotes the output of 'f' corresponding to the input 'x'. The graph of 'f' is the graph of the equation y = f(x).

F-IF.2: Use function notation, and evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

Interpret functions that arise in terms of applications in terms of the concepts.

F-IF.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

F-IF.5: Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

F-IF.6: Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Analyze functions using different representations.

F-IF.7: Graph functions expressed symbolically and show key features for the graph, by hand in simple cases and using technology for more complicated cases.

F-IF.7a: Graph linear and quadratic functions and show intercepts, maxima, and minima.

F-IF.7b: Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F-IF.8a: Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

F-IF.8b: Use the properties of exponents to interpret expressions for exponential functions.

F-IF.9: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables or by verbal descriptions).

Building Functions

Build a function that models a relationship between two quantities.

F-BF 1: Write a function that describes a relationship between two quantities.

F-BF 1a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

F-BF 1b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

Build new functions from existing functions.

F-BF 3: Identify the effect on the graph of replacing by $F(x) by\ f(x)+k, kf(x), f(kx), f(x+k)$and for specific values of *k*, (both positive and negative); find the value of given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Linear, Quadratic, and Exponential Models

Construct and compare linear, quadratic, and exponential models and solve problems.

F-LE 1: Distinguish between situations that can be modeled with linear functions and with exponential functions.

F-LE.1a: Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

F-LE.1b: Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

F-LE.1c: Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F-LE.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or tow input-output pairs (include reading these from a table).

F-LE.3: Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial functions.

Interpret instructions for functions in terms of the situation they model.

F-LE.6 : Apply quadratic functions to physical problems, such as the motion of an object under the force of gravity.

<u>Geometry</u>

Congruence

Experiment with transformations in the plane.

G-CO.1: Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO.2: Represent transformations in the plane using, e.g. transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g. translation versus horizontal stretch).

G-CO.3: Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G-CO.4: Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G-CO.5: Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g. graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Understand congruence in terms of rigid motions.

G-CO.6: Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G-CO.7: Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G-CO.8: Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Prove geometric theorems.

G-CO.9: Prove theorems about lines and angles.

G-CO.10: Prove theorems about triangles.

G-CO.11: Prove theorems about parallelograms.

Make geometric constructions.

G-CO.12: Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment, copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

G-CO.13: Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Similarity, Right Triangles, and Trigonometry

Understand similarity in terms of similarity transformations.

G-SRT.1: Verify experimentally the properties of dilations given by a center and a scale factor:

G-SRT.1a: Dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

G-SRT.1b: The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G-SRT.2: Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G-SRT.3: Use the properties of similarity transformations to establish the Angle-Angle (AA) criterion for two triangles to be similar.

Prove theorems involving similarity.

G-SRT.4: Prove theorems about triangles.

G-SRT.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Define trigonometric ratios and solve problems involving right triangles.

G-SRT.6: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G-SRT.7: Explain and use the relationship between the sine and cosine of complementary angles.

G-SRT.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

G-SRT.8.1: Derive and use the trigonometric ratios for special right triangles (30°, 60°, 90°and 45°, 45°, 90°).

Circles

Understand and apply theorems about circles.

G-C.1: Prove that all circles are similar.

G-C.2: Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

G-C.3: Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

G-C.4: Construct a tangent line from a point outside a given circle to the circle.

Find arc lengths and areas of sectors of circles.

G-C.5: Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Expressing Geometric Properties with Equations

Translate between the geometric description and the equation for a conic section.

G-GPE.1: Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

G-GPE.2: Derive the equation of a parabola given a focus and a directrix.

Use coordinates to prove geometric theorems algebraically.

G-GPE.4: Use Coordinates to prove simple geometric theorems algebraically.

G-GPE.5: Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a given line that passes through a given point).

Geometric Measurement and Dimension

Explain volume formulas and use them to solve problems.

G-GMD.1: Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.

G-GMD.3: Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

G-GMD.4: Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

G-GMD.5: Know that the effect of a scale factor k greater than zero on length, area, and volume is to multiply each by k, k^2 and k^3, respectively; determine length, area and volume measures using scale factors.

G-GMD.6: Verify experimentally that in a triangle, angles opposite longer sides are larger, sides opposite larger angles are longer, and the sum of any two side lengths is greater than the remaining side length; apply these relationships to solve real-world and mathematical problems.

Modeling with Geometry

Apply geometric concepts in modeling situations.

G-MG.1: Use geometric shapes, their measures, and their properties to describe objects.

G-MG.2: Apply concepts of density based on area and volume in modeling situations.

<u>Statistics and Probability</u>

Conditional Probability and the Rules of Probability

Understand independence and conditional probability and use them to interpret data.

S-CP.1: Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

S-CP.2: Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S-CP.3: Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

S-CP.4: Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.

S-CP.5: Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

Use the rules of probability to compute probabilities of compound events in a uniform probability model.

S-CP.6: Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.

S-CP.7: 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.

S-CP.8: 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.

S-CP.9: Use permutations and combinations to compute probabilities of compound events and solve problems.

Using Probability to Make Decisions

Use probability to evaluate outcomes of decisions.

S.MD.6: Use probabilities to make fair decisions.

S.MD.7: Analyze decisions and strategies using probability concepts.

DISTRICT ESLRs TO BE ADDRESSED:

When students successfully complete this secondary mathematics course, they will be:

- **Self-directed Learners** who will be able to use notes and a textbook to assist them in continuing their learning outside of the classroom setting.
- **Efficient Communicators** who can explain mathematical concepts to others and use mathematics to organize and explain data.
- **Quality Producers** who understand the importance of neat, organized work that demonstrates their thinking and understanding of the solution they've formed to solve a problem.
- **Constructive Thinkers** who are able to attack problems with organization, logic, and mathematical skills they've developed in a systematic fashion.
- **Collaborative Workers** who can work in a variety of settings in culturally diverse groups. They will be able to form and use study groups to strengthen their own understanding in addition to providing the same service for classmates.
- **Responsible Citizens** who accept the consequences of their actions and who demonstrate their understanding of their role in the learning process.