Boonton School District

Course Title:	Senior Math	**Grade Level(s):**	**12**		
Curriculum Area / Level:	Mathematics	**Credits:**	**5**		
Course prerequisites and/or co-requisites:	Algebra I, Geometry, & Algebra II				
Course Description:	This course will reinforce key mathematical concepts including solving quadratic and simultaneous equations. Students will use projects and explore practical applications of mathematics. The curriculum also includes new topics, such as geometric solids, probability and statistics.				
Created by:	Evan Levy	**Date:**	7/15/16	**BOE Approval:**	9/26/16
District Equity Statement:	As required by state law, it is the policy of Boonton School District not to discriminate on the basis of race, color, creed, religion, sex, ancestry, national origin, social or economic status, pregnancy, or physical handicap in its educational programs or activities and to maintain a learning environment that is free from sexual harassment. Courses of study and instructional materials shall be designed and selected in order to eliminate discrimination and promote understanding, sex equity, and mutual respect among people. No course offering, including but not limited to physical education, health, technology education, vocational, home economics, music and adult education, shall be limited on the basis of race, color, creed, religion, sex, ancestry, national origin, social or economic status, pregnancy, or physical handicap. Furthermore, there shall be no discrimination against students as to any educational activity or program because of pregnancy, childbirth, pregnancy-related disabilities, actual or potential parenthood, or family or marital status. If a student requests to be excluded or a physician certifies that such is necessary for her physical, mental, or emotional well-being, she must be provided with adequate and timely opportunity for instruction to continue or make up her schoolwork without prejudice or penalty.					

Division of Umbrella & Mini Units	
Umbrella Unit 1 Topic / Name: **Problems and Application of Algebraic Principles**	**Mini Units** **1A. Problem Solving Using Quadratics** **1B. Problem Solving Using Inequalities** **1C. Coordinate Geometry and Trigonometry**
Umbrella Unit 2 Topic / Name: **Statistics and Data Analysis**	**Mini Units** **2A. Gathering Data** **2B. Using Data to Make Predictions** **2C. Creating Data Analysis**
Umbrella Unit 3 Topic / Name: **Financial Literacy**	**Mini Units** **3A. Financial Responsibility** **3B. Career Readiness**
Umbrella Unit 4 Topic / Name: **Extensions of Mathematics**	**Mini Units** **3A. Mathematical Applications in Careers** **3B. Project-Based Learning**

UMBRELLA UNIT 1	
Title:	Problem Solving involving Quadratics (Accuplacer Prep)
Duration:	9 weeks
Essential Questions:	How do multiple representations of an equation relate? What characteristics of a line are important to analyze? How are quadratic functions used to solve problems? How can we identify a problem involving quadratic functions? How do quadratics illustrate the rise and fall of certain real-life examples in the STEM field? How can we use probability to help make real-life decisions? How can concepts of trigonometry applied in real world applications?
Summative Assessments: **(Assessment at the end the learning period)**	Multiple choice, open ended questioning
Formative Assessments: **(Ongoing assessments during the learning period)**	Accuplacer Review: https://accuplacer.collegeboard.org/students Quizzes on each subtopic, real world applications, Khan Academy differentiated quizzes https://www.khanacademy.org/math/algebra-home/algebra/quadratics https://www.khanacademy.org/math/geometry-home/trigonometry
Differentiation:	Visual and dynamic approach using Desmos graphing utility, graphing calculator TI-84, using multiple

	representations (tables, graphs, equations), Flipped Classroom using Khan Academy and EdPuzzle ● Kuta Software: modifies question types and provides graphic organizers while providing unique problems for both advanced and struggling learners ● Khan Academy: Provide differentiated quizzes through Khan which modifies problems based on students' accuracy and progress ● Kahoot: Assess students and reinforce concepts for struggling learners through interactive quizzes ● Periodic performance tasks from the Big Ideas Algebra 2 and Geometry textbooks for advanced learners ● Modified quizzes and problem sets for struggling learners from the Big Ideas textbook ● Chapter Summary Organizers from Big Ideas textbooks
TECHNOLOGY STANDARD (STANDARD 8)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
8.2.12.B.3	**Analyze the full costs, benefits, trade-offs and risks related to the use of technologies in a potential career path.**
21ST CENTURY LIFE AND CAREER (STANDARD 9)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
9.1.12.C.2	**Compare and compute interest and compound interest and develop an amortization table.**
9.3.12.BM.1	**Utilize mathematical concepts, skills and problem solving to obtain necessary information for decision-making in business.**
9.3.12.FN.1	**Utilize mathematical concepts, skills and problem solving to obtain necessary information for decision-making in the finance industry.**
9.3.ST.2	**Use technology to acquire, manipulate, analyze and report data.**
9.3.ST-ET.2	**Display and communicate STEM information.**
9.3.ST-ET.3	**Apply processes and concepts for the use of technological tools in STEM.**

MINI UNIT 1A	
Title:	**Algebra Foundations and Quadratics**
Duration:	**3 weeks**
Overview:	**Arithmetic, applications of elementary algebra, properties of quadratic equations, factoring, solving, analyzing the role of quadratics in real world applications**

Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Arithmetic skills and number sense including mental math	5.NBT.B.7 5.NF
The role of absolute value when ordering quantities on a number line	6.NS.C.7
The benefits of using standard form when factoring and solving polynomials	HSA-REI.B.4
Factoring skills and applications in the real world	HSA-REI.B.4
Effective solving methods for finding solutions	HSA-REI.B.4
Multiple representations of quadratic functions	HSF-IF.C.9
Function notation f(x) denotes the output of f corresponding to the input x	HSF-IF.A.1
Properties of quadratic functions	HSF-IF.C.9
Applications of quadratic equations	HSF-IF.B.4
Complex solutions are in the form a + bi where a and b are real numbers while i is the imaginary number	HSN-CN.C.7

Essential Outcomes - Upon completion of this course students will know (procedural):	Alignment to Standards
How to add, subtract, multiply, and divide integers, fractions, and decimals	5.NBT.B.7 5.NF.A.1
How to find a tip at a restaurant (15%, 20%, etc.)	4.NF.C.7
Ordering of absolute value of numbers	6.NS.C.7
How to rewrite quadratic equations in standard form	HSA-REI.B.4
How to factor quadratic equations or declare an equation as unfactorable	HSA-REI.B.4
How to solve quadratic equations for x-intercepts	HSA-REI.B.4
How to solve quadratic equations with complex solutions	HSN-CN.C.7
How to find coordinates of quadratic functions using multiple representations of quadratic functions including tables, graphs, and equations	HSF-IF.C.9
How to apply properties of quadratic equations by adding, subtracting, and multiplying	HSF-IF.C.9
How to solve quadratic equations given context in real-life situations	HSF-IF.B.4 HSA-SSE.A.1
How to rewrite expressions to change the structure (For example: factoring out the GCF of a polynomial)	HSA-SEE.A.2
How to add, subtract, and multiply polynomials with various coefficients	HA-APR.A.1
How to find a pattern from a finite series	HSA-SEE.B.4
How to find zeros of polynomials algebraically and	HSA-APR.B.3

graphically	
How to rewrite rational expressions (For example: factoring the numerator and denominator and simplifying)	HSA-APR.D.6
How to find domain and range of functions	HSF-IF.B.5
How to graph various functions (including quadratics, roots, exponential, rational, logarithmic, and polynomial functions) by hand in simple cases and using a TI-84	HSF-IF.C.7
How to compare characteristics of functions using tables, graphs, and words	HSF-IF.C.9
How to follow the steps of a recursive formula	HSF-BF.A.1
How to identify transformations in functions (For example: f(x) + 3 is a vertical shift)	HSF-BF.B.3
How to find the inverse of a function	HSF-BF.B.4
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
Real-life connections between multi-step problems and real world issues	7.EE.B.3
Absolute value is the distance from the value zero	6.NS.C.7
The relationship between the degree and the number of solutions	HSA-REI.B.4
The relationship between factors and multiples of quadratic equations	HSA-REI.B.4
The role of solutions of quadratic equations and its relationship with intercepts on a coordinate plane	HSA-REI.B.4

The conceptually equivalent representation of a quadratic function through the use of a table, a graph, and an equation	HSF-IF.C.9
Properties of quadratic functions and its effect on maximum points, minimum points, intercepts, and changes in directions	HSF-IF.C.9
The connection between quadratic functions and occurrences in business, science, engineering, and other STEM fields	HSF-IF.B.4
The equivalency between rewritten forms of polynomials	HSA-SEE.A.2
The resulting solution from performed operations (e.g. adding results to a sum)	HA-APR.A.1
Relationships between ordered quantities in a pattern from a finite series	HSA-SEE.B.4
The role of zeros of polynomials and the connection between its location on a graph, its coordinate on a table, and its application in real world context (e.g. profits hit rock bottom)	HSA-APR.B.3
The equivalency between rewritten forms of rational functions	HSA-APR.D.6
The relationship between domain and undefined areas on a graph and the relationship between range and possible outputs on a graph	HSF-IF.B.5
Visual patterns of types of graphs and relationships with functions	HSF-IF.C.7
Relationships between coordinates, graphs, and descriptions of the behavior of graphs of functions	HSF-IF.C.9

Patterns produced from recursive formulas and its ability to predict future occurrences	HSF-BF.A.1
The effect of transformations on the behavior of functions	HSF-BF.B.3
The composition of the inverse of the function itself results to the single variable. (For example: f^-1(f(x)) = x)	HSF-BF.B.4
Resources Mini Unit 1A:	Big Ideas Textbook Algebra 2 Quadratics Accuplacer Test Preparation Materials found online: accuplacer.collegeboard.org ● Kuta Software: modifies question types and provides graphic organizers while providing unique problems for both advanced and struggling learners ● Khan Academy: Provide differentiated quizzes through Khan which modifies problems based on students' accuracy and progress ● Kahoot: Assess students and reinforce concepts for struggling learners through interactive quizzes ● Periodic performance tasks from the Big Ideas Algebra 2 and Geometry textbooks for advanced learners ● Modified quizzes and problem sets for struggling learners from the Big Ideas textbook ● Chapter Summary Organizers from Big Ideas textbooks

MINI UNIT 1B		
Title:	Systems of Equations, Inequalities, and Exponents (Accuplacer Prep)	
Duration:	3 weeks	
Overview:	Solving, graphing, and rewriting systems of equations, inequalities, and equations involving exponents	
Essential Outcomes - Upon completion of this course students will know (declarative):		**Alignment to Standards**

Linear equations and inequalities describe relationships between numbers and variables	HSA-CED.A.1 HSA-REI.B.3
Systems of equations with two or more variables describe relationships between at least two variables and numbers	HSA-CED.A.2
The graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane	HSA-REI.D.10
Points of intersection derive from where the two or more lines meet at the same location	HSA-REI.D.11
The definition of exponents and exponents can be represented as both as integers and rational expressions	HSN-RN.A.2 8.EE.A.1
Square root and cube root symbols are used to represent solutions to the equations x^2=p and x^3=p where p is a positive rational number	8.EE.A1-2
Matrices describe an array of quantities	HSN-VM.C.10
Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
How to create and solve linear equations and inequalities	HSA-CED.A.1 HSA-REI.B.3
How to solve systems of equations with two or more variables	HSA-CED.A.2 HSA-REI.C.6-7
How to approximate and/or find solutions of systems of equations and inequalities using technology such as a TI-84 or Desmos and by hand	HSA-CED.A.2 HSA-REI.C.6-7
How to expand the use of exponents from exponents as	HSN-RN.A.2

integers to rational exponents and radicals	
How to use square and cube roots when solving problems with functions	8.EE.A1-2
How to perform operations with numbers expressed in scientific notation	8.EE.A.4
How to find the slope and intercept of a linear equation	HSS-ID.C.7
How to operate with matrices and apply basic principles	HSN-VM.C.10
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
Linear equations and inequalities can help solve real world problems	HSA-CED.A.1 HSA-REI.B.3
There are multiple ways to solve systems of equations (Substitution, elimination) and there can be one solution, infinite solutions, or no solutions	HSA-CED.A.2-4
Solving an equation stems from conclusions derived from previously completed steps	HSA-REI.A.1 HSA-REI.C.5
The graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane often forming a curve which could be a line	HSA-REI.D.10
Why the x-coordinates of the points of intersection of two equations/inequalities are the solutions of the equations/inequalities	HSA-REI.D.11
The relationship between rational exponents and their equivalent radical form	HSN-RN.A.1
Roots and powers of exponents are inverses of each	8.EE.A1-2

other and can help solve equations	
Given a real world context, slope represents rate of change and the y-intercept of a linear model represents a constant value	HSS-ID.C.7
A matrix is an array of quantities	HSN-VM.C.10
Resources Mini Unit 1B:	Big Ideas Textbook Algebra 1 Systems of Equations and Inequalities Accuplacer Test Preparation Materials found online: accuplacer.collegeboard.org https://www.khanacademy.org/math/algebra-home/algebra/quadratics ● Kuta Software: modifies question types and provides graphic organizers while providing unique problems for both advanced and struggling learners ● Khan Academy: Provide differentiated quizzes through Khan which modifies problems based on students' accuracy and progress ● Kahoot: Assess students and reinforce concepts for struggling learners through interactive quizzes ● Periodic performance tasks from the Big Ideas Algebra 2 and Geometry textbooks for advanced learners ● Modified quizzes and problem sets for struggling learners from the Big Ideas textbook ● Chapter Summary Organizers from Big Ideas textbooks

MINI UNIT 1C	
Title:	**Coordinate Geometry and Trigonometry**
Duration:	**3 weeks**
Overview:	**Finding ratios of side lengths, finding angles use trigonometric ratios**
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Types of angles (supplementary, complementary, etc.)	HSG-CO.A.4

Types of lines (parallel, perpendicular, transversal, etc.)	HSG-CO.A.4
Classifications of 2D Polygons and 3D shapes	HSG-GMD.B.4
Distance is always positive and can be calculated using visual methods and numerical methods (Distance Formula, Pythagorean Theorem, etc.)	HSG-GPE.B.7
Area/Perimeter/Circumference/Volume can be found when using coordinates and the Distance Formula	HSG-GPE.B.7
The definition of congruence can be used in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and angles are congruent respectively.	HSG-CO.B.7
Multiple ways to transform shapes on a plane by taking points in the plane as input and assign other points as outputs	HSG-CO.A.2
Types of trigonometric ratios: sine, cosine, tangent and their relation to reference angles (if time permits, introduce the existence of radians)	HSG-SRT.C.7 HSF-TF.A.1
Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
How to draw the rotations and reflections that carry onto itself given a rectangle, parallelogram, trapezoid, or regular polygon	HSG-CO.A.5
Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of ideas and corresponding pairs of angles are congruent	HSG-CO.B.7
How to use volume formulas for cylinders, pyramids, cones, and spheres to solve problems	HSG-GMD.A.3

How to use coordinates to prove simple geometric theorems algebraically	HSG-GPE.B.4
How to use coordinates to compute perimeters and areas of polygons using the distance formula	HSG-GPE.B.7
How to solve real-world problems involving area, volume, and surface area of 2D and 3D objects	7.G.B.6
How to use trigonometric ratios and/or the Pythagorean Theorem to solve various problems involving angles and sides	HSG-SRT.C.7-8
If time permits: How to solve problems involving radian measure	HSF-TF.A.1
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
Conceptual definitions of angles, lines, and various shapes	HSG-CO.A.1
How to describe the rotations and reflections that carry onto itself given a rectangle, parallelogram, trapezoid, or regular polygon	HSG-CO.A.3
Explain how to angles are congruent	HSG-CO.B.7
Explain how two triangles or polygons are similar using their properties	HSG-SRT.A.2
Use geometric shapes, their measures, and properties to describe objects in the real world	HSG-MG.A.1
Identify and describe relationships among angles, radii, and chords of a circle	HSG-C.A.2
The relationship between the ratios of the sine, cosine,	HSG-SRT.C.7

and tangent of specified angles	
Resources Mini Unit 1C:	Big Ideas Textbook Algebra 1 Systems of Equations and Inequalities Accuplacer Test Preparation Materials found online: accuplacer.collegeboard.org https://www.khanacademy.org/math/geometry-home/trigonometry ● Kuta Software: modifies question types and provides graphic organizers while providing unique problems for both advanced and struggling learners ● Khan Academy: Provide differentiated quizzes through Khan which modifies problems based on students' accuracy and progress ● Kahoot: Assess students and reinforce concepts for struggling learners through interactive quizzes ● Periodic performance tasks from the Big Ideas Algebra 2 and Geometry textbooks for advanced learners ● Modified quizzes and problem sets for struggling learners from the Big Ideas textbook ● Chapter Summary Organizers from Big Ideas textbooks

UMBRELLA UNIT 2	
Title:	Statistics and Data Analysis
Duration:	9 weeks
Essential Questions:	What is data and how can it be collected? What are various sampling methods and when are they most appropriate? What are the types of bias? How can bias be reduced when collecting data? What are measures of center and spread that can be computed for a set of data? How can values from different settings be appropriately compared using z-scores? How should an experiment appropriately be conducted? What are the steps of a controlled experiment? What is the difference between an observational study and an experiment? Why is randomization essential to conduct a statistical test for inference? How can statisticians use surveys to analyze data? What are important center and spread to describe for a set of data? How do we determine if points of data are outliers? What effect does an outlier have on data? When should we remove outliers? How can a distribution of data be described? How does context affect the ethics relating to data analysis? How can we use sampling to draw inferences about data? How can we compare two populations using statistical calculations and inference? How can we determine if statistical models are appropriate based on the data?
Summative Assessments: **(Assessment at the end the learning period)**	Student-created surveys and statistical reports Statistical inference reports based on a topic chosen by student
Formative Assessments: **(Ongoing assessments during the**	Drafts of surveys, weekly progress reports of data collection, weekly descriptive statistics calculations

learning period)	
Differentiation	Students choose the topic of their survey and statistical report. EdPuzzle: Students complete flipped classroom activities where they explore statistical topics and answer related questions. PowerPoints and notetaking guides available ● Kuta Software: modifies question types and provides graphic organizers while providing unique problems for both advanced and struggling learners ● Khan Academy: Provide differentiated quizzes through Khan which modifies problems based on students' accuracy and progress ● Kahoot: Assess students and reinforce concepts for struggling learners through interactive quizzes ● Periodic performance tasks from the Big Ideas Algebra 2 and Geometry textbooks for advanced learners ● Modified quizzes and problem sets for struggling learners from the Big Ideas textbook ● Chapter Summary Organizers from Big Ideas textbooks
TECHNOLOGY STANDARD (STANDARD 8)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
8.2.12.G.1	**Analyze the interactions among various technologies and collaborate to create a product or system demonstrating their interactivity.**
8.2.12.B.3	**Analyze the full costs, benefits, trade-offs and risks related to the use of technologies in a potential career path.**
8.1.12.F.2	**Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address educational, career, personal, and social needs.**
8.1.12.B.1	**Design and pilot a digital learning game to demonstrate knowledge and skills related to one or more content areas or a real world situation.**
8.1.12.A.1	**Construct a spreadsheet, enter data, and use mathematical or logical functions to manipulate data, generate charts and graphs and interpret the results.**
8.1.4.A1-5	**Demonstrate effective input of text and data using an input device. Create a document with text formatting and graphics using word processing. Create and present a multimedia presentation that**

	includes graphics. Create a simple spreadsheet, enter data, and interpret the information. Determine the benefits of a wide range of digital tools by using them to solve problems.
21ST CENTURY LIFE AND CAREER (STANDARD 9)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
9.2.12.C.1	**Review career goals and determine steps necessary for attainment.**
9.2.12.C.2	**Modify Personalized Student Learning Plans to support declared career goals.**
9.2.12.C.9	**Analyze the correlation between personal and financial behavior and employability.**
9.3.ST.2	**Use technology to acquire, manipulate, analyze and report data.**
9.3.ST-ET.1	**Use STEM concepts and processes to solve problems involving design and/or production.**
9.3.ST-ET.2	**Display and communicate STEM information.**
9.3.ST-ET.3	**Apply processes and concepts for the use of technological tools in STEM.**
9.3.ST-ET.4	**Apply the elements of the design process.**
9.3.ST-ET.5	**Apply the knowledge learned in STEM to solve problems.**
9.3.ST-ET.6	**Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner.**
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.**

MINI UNIT 2A	
Title:	**Gathering Data**
Duration:	**3 weeks**
Overview:	**Observation, Descriptive Statistics, Data Collection**

Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
The difference between a population and a sample	HSS.IC.A.1
The difference between a parameter and a statistic	HSS.IC.A.1
The difference between descriptive statistics and inferential statistics	HSS.IC.B.3
Methods of data collection: census, sample surveys, and experiments	HSS.IC.B.3
The process of conducting simple random samples, stratified samples, cluster samples, convenience samples, and systematic samples	HSS.IC.B.3-4
The difference between an observational study and a well-designed experiment	HSS.IC.B.3-4
The process of applying a blocking system to an experiment	HSS.IC.B.3
Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
How to determine a population and a sample	HSS.IC.A.1
How to define a parameter and a statistic based on an observational study	HSS.IC.A.1

How to assign treatments, control groups, and random assignments	HSS.IC.B.3
How to conduct a census, sample surveys, and experiments	HSS.IC.B.3
How to conduct simple random samples, stratified samples, cluster samples, convenience samples, and systematic samples	HSS.IC.B.3-4
How to conduct an observational study and a well-designed experiment	HSS.IC.B.3-4
How to implement an experiment using a randomized block design	HSS.IC.B.3
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
Conclusions drawn from observational studies, experiments, and surveys depend on how the data are collected	HSS.IC.B.6
Randomized selection is an essential component of sampling	HSS.IC.B.3
Why convenience samples and volunteer surveys usually lowers the reliability of the information of a population	HSS.IC.B.4
The importance of treatments, control groups, and randomization in an experiment	HSS.IC.B.5
Role of context in a statistical experiment	HSS.IC.B.6
How bias can negatively affect an experiment	HSS.IC.B.5
How blocking can categorize participants in an	HSS.IC.B.3

experiment and reduce lurking variables (For example: giving medicine to one group and a placebo to another group)	
Resources Mini Unit 2A:	Practice of Statistics 4th edition chapter 4 textbook resources found from AP Statistics resources* *This course does not need to include hypothesis testing. The focus on statistics should include gathering data, predicting data, and analyzing data using measures of center, spread, and regression. Students should incorporate the use of the STAT-CALC function on the TI-84 calculator. (Found in Google Drive folder: https://drive.google.com/open?id=1WA9IFHPuwoYWfoFr3g-rWkAKzTPZJDXaEmL0wTkrScI) https://www.khanacademy.org/math/probability ● Kuta Software: modifies question types and provides graphic organizers while providing unique problems for both advanced and struggling learners ● Khan Academy: Provide differentiated quizzes through Khan which modifies problems based on students' accuracy and progress ● Kahoot: Assess students and reinforce concepts for struggling learners through interactive quizzes

MINI UNIT 2B	
Title:	**Using Data to Make Predictions**
Duration:	**3 weeks**
Overview:	**Regression lines, correlation, predicting data**
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Patterns in scatterplots	HSS.ID.B.6
Visual patterns detected in correlation and linearity	HSS.ID.C.9
The components of a least-squares regression line	HSS.ID.C.7

including its intercept and slope	
The impact of outliers and influential points in a set of data	HSS.ID.B.6.B
Applications of regression	HSS.ID.B.6
Technological representations of regression	HSS.ID
Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
How to describe patterns in scatterplots	HSS.ID.B.6
Find and describe correlation and linearity	HSS.ID.C.9
Draw and label a least-squares regression line	HSS.ID.C.7
Find and describe outliers and influential points	HSS.ID.B.6.B
Apply properties of regression to real world scenarios	HSS.ID.B.6
Use technological applications such as the TI-84 and Desmos.com to graph regression lines	HSS.ID
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
The relationship between two numerical variables can be described in terms of form, strength, and direction	HSS.ID.B.6
The correlation coefficient measures strength and direction of a linear relationship	HSS.ID.C.9
The difference between correlation and causation	HSS.ID.C.7
How a line describes the relationship between two numerical variables	HSS.ID.B.6.B

How a least squares regression line makes predictions about values given real world data and how it is risky to use this line to predict values for variables outside of the range of data	HSS.ID.B.6
The importance of appropriately using graphing software to analyze correlation	HSS.ID
Resources Mini Unit 2B:	Practice of Statistics 4th edition chapter 3 textbook resources found from AP Statistics resources* *This course does not need to include hypothesis testing. The focus on statistics should include gathering data, predicting data, and analyzing data using measures of center, spread, and regression. Students should incorporate the use of the STAT-CALC function on the TI-84 calculator. (Found in Google Drive folder: https://drive.google.com/open?id=1WA9IFHPuwoYWfoFr3g-rWkAKzTPZJDXaEmL0wTkrScI) https://www.khanacademy.org/math/probability

MINI UNIT 2C	
Title:	**Creating Data Analysis**
Duration:	**3 weeks**
Overview:	Calculating descriptive statistics, analyzing statistical models, and forming conclusions based on inference
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Measures of center and spread: mean, median, mode, range, standard deviation, interquartile range	6.SP.B.4 6.SP.A.3 HSS-ID.A.1
The difference between categorical and quantitative variables	HSS-ID.B.5

Types of possible shapes of a distribution	HSS-ID.A.3
Visual organizers of quantitative and qualitative data: dot plots, scatterplots, histograms, bar charts, box plots, pie charts	6.SP.B.4 HSS-ID.A.1
Outliers and unusual patterns of distributions and their impact of a set of data	6.SP.B.5
The process of random sampling	7.SP.A.2
The meaning of expected value and its relation to mean	7.SP.C.6
The connection between slope, intercepts, and a graph depicting correlation	8.SP.A.3
Representations of lines of best fit based on direction (positive, negative, etc.)	HSS-ID.B.6-7
Technological applications using statistics such as the TI-84 and online applets	HSS-ID.C.8
The difference between correlation and causation	HSS-ID.C.9
Statistical questioning methods about distributions of data	6.SP.A
Statistical models including visual aids such as tables, lists, and tree diagrams	7.SP.A.1-2 7.SP.C.8
The importance of inference tests and its role in battling claims in the STEM field	HSS-IC.A.1
Probability relates to chance and all calculations are between 0 and 1 inclusively	HSS-MD.B.6
Types of bias (response, wording, etc.)	HSS-IC.B.6

Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
How to evaluate random processes underlying statistical experiments	HSS-IC.A.1
How to decide which statistical model is most appropriate (For example: based on the chance of obtaining heads when flipping a coin, would a result of 3 heads out of 7 make you question the model?)	HSS-IC.A.2
How to label a scenario as an observational study or an experiment	HSS-IC.B.3
How to summarize data in reports using measures of center and spread	HSS-IC.B.6
How to use probability to make fair decisions (For example: using randomization to choose numbers)	HSS-MD.B.6
How to find statistical five number summarizes using a graphing calculator	6.SP.B.5 HSS-ID.C.8
How to recognize a statistical question about variability in a data set (For example: How old are students in Boonton High School?)	6.SP.A.1
How to answer a question about a data set's distribution using shape, center, and spread	6.SP.A.2
How to recognize that mean and median summarize all of its values with a single number while a measure of variation describes how its values vary with a single number	6.SP.A.3
How to display numerical data using plots such as dot plots, histograms, and box plots	6.SP.B.4 HSS-ID.A.1

How report numerical data sets given a real world context	6.SP.B.5
How to generate multiple random samples from an experiment	7.SP.A.2
How to measure the difference between two populations' center and spread	7.SP.B.3
How to calculate the probabilities of events assuming that the likelihood is between 0 and 1	7.SP.C.5
How to calculate expected value of long-term events	7.SP.C.6
How to use probability models to count frequencies and determine chance processes	7.SP.C.7
How to use tree diagrams and other visual aids to organize compound events and find associated probabilities	7.SP.C.8
How to construct scatterplots involving two quantities	8.SP.A.1
How to determine if a scatterplot is linear, curved, or randomly scattered	8.SP.A.2
How to calculate slope of a least squares regression line	8.SP.A.3
How to compare measures of center and spread of two populations based on each shape of distribution (For example: comparing mean and range based on two population's bell curves)	HSS-ID.A.2
How to compare differences in probabilities based on populations represented from multiple two-way tables	HSS-ID.B.5
How to make a line of best fit based on a scatterplot	HSS-ID.B.6

How to calculate correlation and define causation	HSS-ID.C.9
How to use data to estimate a population proportion or mean	HSS-IC.B.4
How to use data from two randomized experiments to compare two treatments	HSS-IC.B.5
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
Statistics can be used to gain information about a population by examining a sample representative of the population and making appropriate generalizations	7.SP.A.1
Methods involving drawing inferences about a population with an unknown characteristic of interest	7.SP.A.2
Methods involving drawing inferences based on comparisons of two populations	7.SP.B.4
Possible explanations justifying a poor experimental result such as bias and other lurking variables	7.SP.C.7
Statistics is a process for making inferences about population parameters based on a random sample from that population	HSS-IC.A.1
Whether a specific probability/statistics model is appropriate for a given set of data in context	HSS-IC.A.2
Recognize the differences among the purpose of sample surveys, experiments, and observational studies	HSS-IC.B.3
The significance of parameters in a given data set based on the results of two treatments in an experiment	HSS-IC.B.5

Inference and conclusions based on evaluating reports on surveys, experiments, and observational studies	HSS-IC.B.6
Decision making skills based on the use of probability and fairness	HSS-MD.B.6
Analyze decisions and strategies using probability concepts in real world applications	HSS-MD.B.7
Interpretation of differences in shape, center, and spread in the context of data sets	HSS-ID.A.3
Relationships between variables based on regression lines	HSS-ID.B.6
How to interpret the slope as rate of change and the intercept as the constant term of a linear model in the context of a real world application	HSS-ID.C.7
Interpret correlation in a real world context using technology	HS-ID.C.8
Resources Mini Unit 2C:	Practice of Statistics 4th edition chapter 1, 2, 5 textbook resources found from AP Statistics resources* *This course does not need to include hypothesis testing. The focus on statistics should include gathering data, predicting data, and analyzing data using measures of center, spread, and regression. Students should incorporate the use of the STAT-CALC function on the TI-84 calculator. (Found in Google Drive folder: https://drive.google.com/open?id=1WA9IFHPuwoYWfoFr3g-rWkAKzTPZJDXaEmL0wTkrScI) https://www.khanacademy.org/math/probability

UMBRELLA UNIT 3	
Title:	**Financial Literacy**
Duration:	**9 weeks**
Essential Questions:	Why is it important to be financially responsible? What type of goals should be set when dealing with money? What type of research should be conducted when purchasing a car? What steps should be made when financing your education? What are important steps to follow when determining a career path? Why does securing credit matter for the future? What steps should be made when selecting banks and credit cards? How can debt be prevented and how can you responsibility use your paychecks? How can you protect your identity and financial possessions?
Summative Assessments: **(Assessment at the end the learning period)**	Multiple choice and open ended tests End of year project about student's career goal
Formative Assessments: **(Ongoing assessments during the learning period)**	Weekly financial literacy lessons EdPuzzle videos and quizzes Khan Academy videos

Differentiation	Khan Academy videos: students can choose specific videos to help them improve their understanding of topics based on their own strengths and weaknesses.
TECHNOLOGY STANDARD (STANDARD 8)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
8.1.12.A.1	**Construct a spreadsheet, enter data, and use mathematical or logical functions to manipulate data, generate charts and graphs and interpret results.**
8.1.12.A.4	**Create a personalized digital portfolio that contains a resume, exemplary projects and activities reflecting personal and academic interests, achievements, and career aspirations.**
8.1.12.C.1	**Develop an innovative solution to a complex local or glocal problem/issue in collaboration with peers and experts and present ideas for feedback in an online community.**
8.1.12.E.2	**Predict the impact on society of unethical use of digital tools based on research with peers and experts in the field.**
8.1.12.F.1	**Select and use specialized databases for advanced research to solve real world applications.**
8.1.12.F.2	**Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address educational, career, personal, and social needs.**
8.2.12.B.3	**Analyze the full costs, benefits, trade-offs and risks related to the use of technologies in a potential career path.**
8.2.12.C.1	**Analyze the ethical impact of a product, system, or environment worldwide and report findings in a web-based publication for further comment and analysis.**
8.2.12.F.1	**Determine and use the appropriate application of resources in the design, development, and creation of a technological product or system.**
21ST CENTURY LIFE AND CAREER (STANDARD 9)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**

9.1.12.A.1	**Differentiate among the types of taxes and employee benefits.**
9.1.12.A.2	**Differentiate between taxable and nontaxable income.**
9.1.12.A.3	**Analyze the relationship between various careers and personal learning goals.**
9.1.12.A.4	**Identify a career goal and develop a plan and timetable for achieving it, including educational/training requirements, costs, and possible diet.**
9.1.12.A.6	**Summarize the financial risks and benefits of entrepreneurship as a career choice.**
9.1.12.A.7	**Analyze and critique various sources of income and available resources and how they may substitute for earned income.**
9.1.12.A.9	**Analyze how personal and cultural values impact spending and other financial decisions.**
9.1.12.A.10	**Demonstrate how exemptions and deductions can reduce taxable income.**
9.1.12.A.11	**Explain the relationship between government programs and services and taxation.**
9.1.12.B.1	**Prioritize financial decisions by systematically considering alternatives and possible consequences.**
9.1.12.B.2	**Compare strategies for saving and investing and the factors that influence how much should be saved or invested to meet financial goals.**
9.1.12.B.3	**Construct a plan to accumulate emergency “rainy day” funds.**
9.1.12.B.4	**Analyze how income and spending plans are affected by age, needs, and resources.**
9.1.12.B.5	**Analyze how changes in taxes, inflation, and personal circumstances can affect a personal budget.**
9.1.12.B.6	**Design and utilize a simulated budget to monitor progress of financial plans.**
9.1.12.B.7	**Explain the meaning of income tax, describe how it is calculated, and analyze its impact on one’s personal budget.**
9.1.12.B.8	**Describe and calculate interest and fees that are applied to various forms of spending, debt, and saving.**
9.1.12.C.2	**Compare and compute interest and compound interest and develop an amortization table using**

	business tools.
9.1.12.C.4	**Compare and contrast the advantages and disadvantages of various types of mortgages.**
9.1.12.C.6	**Explain how predictive modeling determines “credit scores.”**
9.1.12.D.1	**Calculate short- and long-term returns on various investments (e.g., stocks, bonds, mutual funds, IRAs, deferred pension plans, and so on).**
9.1.12.D.3	**Summarize how investing builds wealth and assists in meeting long- and short-term financial goals.**
9.1.12.D.4	**Assess factors that influence financial planning.**
9.1.12.D.5	**Justify the use of savings and investment options to meet targeted goals.**
9.1.12.D.6	**Analyze processes and vehicles for buying and selling investments.**
9.1.12.D.9	**Relate savings and investment results to achievement of financial goals.**
9.1.12.D.13	**Determine the impact of various market events on stock market prices and on other savings and investments.**
9.1.12.D.14	**Evaluate how taxes affect the rate of return on savings and investments.**
9.1.12.D.15	**Analyze how savings, retirement plans, and other investment options help to shift current income for purposes of tax reporting and filing.**
9.1.12.E.1	**Evaluate the appropriateness of different types of monetary transactions (e.g., electronic transfer, check, certified check, money order, gift card, barter) for various situations.**
9.1.12.E.2	**Analyze and apply multiple sources of financial information when prioritizing financial decisions.**
9.1.12.E.3	**Determine how objective, accurate, and current financial information affects the prioritization of financial decisions.**
9.1.12.E.10	**Determine reasons for the increase of identity theft worldwide and evaluate the extent to which victims of identity theft are successful in fully restoring their personal identities.**
9.1.12.F.6	**Explain the concept and forms of taxation and justify the use of taxation to fund public activities and**

	initiatives.
9.1.12.G.1	**Analyze risks and benefits in various financial situations.**
9.2.12.C.1	**Review career goals and determine steps necessary for attainment.**
9.2.12.C.2	**Modify Personalized Student Learning Plans to support declared career goals.**
9.2.12.C.3	**Identify transferable career skills and design alternate career plans.**
9.2.12.C.4	**Analyze how economic conditions and societal changes influence employment trends and future education.**
9.2.12.C.5	**Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.**
9.2.12.C.6	**Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.**
9.2.12.C.9	**Analyze the correlation between personal and financial behavior and employability.**
9.3.12.FN.1	**Utilize mathematical concepts, skills and problem solving to obtain necessary information for decision making in the finance industry.**
9.3.12.FN.2	**Utilize tools, strategies and systems to plan, monitor, manage and maintain the use of financial resources.**
9.3.12.FN.12	**Access, evaluate and disseminate financial information to enhance financial decision-making processes.**
9.3.12.FN.14	**Employ financial risk-management strategies and techniques used to minimize business loss.**
9.3.GV-MGT.3	**Utilize fiscal management skills to manage budget and allocation processes to ensure that resources are applied in a manner consistent with the department or agency's vision, mission and goals.**
9.3.MK.5	**Describe career opportunities and the means to achieve those opportunities in each of the Marketing Career Pathways.**
9.3.ST.2	**Use technology to acquire, manipulate, analyze and report data.**

9.3.ST.3	**Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.**
9.3.ST.4	**Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.**
9.3.ST.5	**Demonstrate an understanding of the breadth of career opportunities and means to those opportunities in each of the Science, Technology, Engineering & Mathematics Career Pathways.**
9.3.ST.6	**Demonstrate technical skills needed in a chosen STEM field.**
9.3.ST-ET.2	**Display and communicate STEM information.**
9.3.ST-ET.3	**Apply processes and concepts for the use of technological tools in STEM.**
9.3.ST-ET.5	**Apply the knowledge learned in STEM to solve problems.**
9.3.ST-ET.6	**Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner.**
9.3.ST-SM.1	**Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.**
9.3.ST-SM.2	**Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.**
9.3.ST-SM.3	**Analyze the impact that science and mathematics has on society.**
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.**

MINI UNIT 3A	
Title:	**Financial Responsibility**
Duration:	**4 weeks**
Overview:	**Being responsible with money through saving and investments, earning credit, choosing banks and credit cards, protecting identity, planning important purchases**

Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Methods involved in financial planning (Budgeting)	HSA-SSE.B.3 HSF-IF.B.4
Goal setting techniques	L.9-10.1
Concepts frequently discussed involved in finance (Stocks, Retirement, Bonds, etc.)	HSA-SSE.B.3 6.RP.A.2
The role of credit in finance and the importance of maintaining “good” credit	HSF-IF.B.4 6.RP.A.2 6.NS.C.5
Purchasing methods in the real world	HSF-IF.B.4 7.RP.A.2
Methods that lead to reducing debt/interest	HSA-SSE.B.3 HSF-IF.B.4 6.RP.A.2
All of the steps involved in the research process	RST.6-8.7 RST.6-8.8
Multiple representations that illustrate growth and decay (graphs, equations, numbers, words)	HSF-LE.A.1
Types of functions representing real-life situations	HSF-IF.A.2

Cost benefit analysis procedures	HSA-CED.A.3
The difference between existing expenses that are reasonable and unreasonable	HSA-CED.A.3
Types of graphic organizers: Tables, charts, and graphs	HSF-IF.B.4
Multiple possible outcomes of a real-life scenario	HSS-CP.B.9
Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
How to conduct a cost benefit analysis	HSA-CED.A.3
How to record and organize expenses	HSA-CED.A.3
How to organize gains, losses, and interest using a chart	HSF-IF.B.4
How to use permutations and combinations to count multiple possible scenarios	HSS-CP.B.9
How to integrate quantitative and qualitative information expressed in words or visually though a diagram, model, etc.	RST.6-8.7
How to distinguish among facts using reasoned judgement and well-established research findings	RST.6-8.8
How to protect your identity using reasoning and research	RST.6-8.8
How to conduct short research projects to answer a question	WHST.6-8.7
How to translate quantitative or technical information expressed in words in a text into visual	RST.9-10.7

form or mathematically into words or an equation	
How to cite strong and thorough textual evidence to support analysis of what the text says explicitly	RI.11-12.1
How to determine the meaning of words and phrases as they are used in a text including figurative, connotative, and technical meanings	RI.11-12.4
How to write routinely over extended time frames and shorter time frames for research, revision, and reflection	W.11-12.10
How to use technological software to graph functions representing changes in profits	HSF-IF.C.7
How to compare changes in two different functions in real world context	HSF-IF.C.9
How to create linear and exponential functions representing models in context	HSF.LE.B.5
How to create scatter plots representing models in context	HSS-ID.B.6
How to create equivalent forms of exponential functions representing interest	HSA-SSE.B.3
How to use function notation when representing real-life situations	HSF-IF.A.2
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
Ways to make effective decisions based on the results of a cost benefit analysis	HSA-CED.A.3
Ways to revise financial planning based on	HSA-CED.A.3

expenses	
Ways to interpret expressions that represent a quantity in terms of its context	HSA-SSE.A.1
Ways to form connections between formulas such as the for the sum of a finite geometric series and real world models (For example: these formulas can calculate mortgage payments)	HSA-SSE.B.4
Why specific intercepts exist and how they can connect to the rise and fall of profits	HSA-REI.D.11
Reasoning behind ccurrences about exponential growth and decay (Examples: money gains and losses)	HSF-LE.A.4
Reasoning behind financial highs and lows in the market based on statistical analyses of samples of populations	HSS-IC.A.1
Well-supported conclusions with facts and calculations	HSS-IC.B.6
Ways to analyze, revise, and reflect upon major decisions in life based on strategies using probability	HSS-MD.B.7
Ways to analyze profits and losses as maximum and minimum points in terms of functions	HSF-IF.B.4
Applicable relationships between variables in a financial situation	HSF-IF.B.5
The impact of rate of change in financial situations	HSF-IF.B.6
The purpose of using function notation when representing real-life situations	HSF-IF.A.2

The impact interpret gains, losses, and interest displayed from a chart	HSF-IF.B.4
Ways to make decisions about financial planning based on credit score	6.NS.C.5
Best possible scenario based on analyzing existing permutations and combinations	HSS-CP.B.9
Resources Mini Unit 3A:	**All lessons:** https://www.practicalmoneyskills.com/foreducators/lesson_plans/highschool.php **Supplemetary activities:** https://drive.google.com/open?id=0Bw8I61k3JdMxaVVQT0RZQldfYVU

MINI UNIT 3B	
Title:	**Career Readiness**
Duration:	**5 weeks**
Overview:	**Applying skills learned from the financial literacy unit, researching career paths in and out of the STEM field, drafting, editing, and revising a research paper/project**

Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Research techniques relating to the STEM field	RST.11-12.7
Critical Thinking techniques supported by evidence	WHST.11-12.9
The importance of citations and the difference between MLA and APA	RI.11-12.1
Summarizing techniques when gathering a large amount of data	RI.11-12.2
Why sequential ideas/patterns can lead to successful	RI.11-12.3

research	
How logical thinking skills can lead to a well-organized research paper	W.11-12.1
Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
How to conduct short research projects to answer a question or to elaborate on a topic	WHST.11-12.7
How to gather relevant information using print and digital sources	WHST.11-12.8
How to draw evidence from informational texts to support analysis, reflection, and research	WHST.11-12.9
How to cite strong and thorough textual evidence to support analysis of researched text	RI.11-12.1
How to write arguments to support claims	W.11-12.1
How to use technology to gather written texts about the STEM field	W.11-12.6
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
How to translate quantitative or technical information expressed in words in a text into a visual form and translate information expressed visually or mathematically into words	RST.9-10.7
How to synthesize researched findings in order to answer a self-generated question (For example: analyzing research about a possible STEM career and its potential benefits)	WHST.9-10.7

How to determine two or more central ideas of a text and summarize essential concepts	RI.11-12.2
How to analyze a complex set of ideas or sequences	RI.11-12.3
How to construct a viable logical/mathematical argument	HSA-REI.A.1
How to analyze real-world applications and connect them to real world careers	HSF-IF.B.4
Resources Mini Unit 3B:	**STEM materials:** http://stemcareer.com/tag/research/ http://www.careerwise.mnscu.edu/careers/stemcareers https://www.sciencepioneers.org/students/stem-websites http://www.pathwaystoscience.org/index.aspx http://www.napequity.org/professional-development/counselor-training/stem-careers-students/ **Research materials:** http://www.crlsresearchguide.org/ https://owl.english.purdue.edu/owl/resource/560/01/ https://drive.google.com/open?id=0Bw8I61k3JdMxMGQtcWVpaF9mUTA

UMBRELLA UNIT 4	
Title:	**Extensions of Mathematics: Project-Based Learning**
Duration:	**9 weeks**
Essential Questions:	Why is it important to be financially responsible? What type of goals should be set when dealing with money? How can matrices help organize, transform, and interpret data? How can probability and statistics help you make important decisions for your career in and out of the STEM field? What type of expenses are inevitable when running a business? How can you maximize profit when running a business? How can you incorporate knowledge of functions and other algebraic concepts when exploring career in the STEM field? What type of research should be conducted when purchasing a car? What steps should be made when financing your education? What are important steps to follow when determining a career path? Why does securing credit matter for the future? What steps should be made when selecting banks and credit cards? How can debt be prevented and how can you responsibility use your paychecks? How can you protect your identity and financial possessions?

Summative Assessments: **(Assessment at the end the learning period)**	Project-based learning activities
Formative Assessments: **(Ongoing assessments during the learning period)**	Quizzes and written reports Project updates with the clas EdPuzzle videos and quizzes Khan Academy videos
Differentiation:	Khan Academy videos: students can choose specific videos to help them improve their understanding of topics based on their own strengths and weaknesses. Students can choose ideas for their projects regarding financial decisions and applications of mathematics, probability, and statistics
TECHNOLOGY STANDARD (STANDARD 8)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
8.1.12.A.1	**Construct a spreadsheet, enter data, and use mathematical or logical functions to manipulate data, generate charts and graphs and interpret results.**
8.1.12.A.4	**Create a personalized digital portfolio that contains a resume, exemplary projects and activities reflecting personal and academic interests, achievements, and career aspirations.**
8.1.12.C.1	**Develop an innovative solution to a complex local or glocal problem/issue in collaboration with peers and experts and present ideas for feedback in an online community.**
8.1.12.E.2	**Predict the impact on society of unethical use of digital tools based on research with peers and experts in the field.**
8.1.12.F.1	**Select and use specialized databases for advanced research to solve real world applications.**

8.1.12.F.2	**Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address educational, career, personal, and social needs.**
8.2.12.B.3	**Analyze the full costs, benefits, trade-offs and risks related to the use of technologies in a potential career path.**
8.2.12.C.1	**Analyze the ethical impact of a product, system, or environment worldwide and report findings in a web-based publication for further comment and analysis.**
8.2.12.F.1	**Determine and use the appropriate application of resources in the design, development, and creation of a technological product or system.**
21ST CENTURY LIFE AND CAREER (STANDARD 9)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
9.1.12.A.1	**Differentiate among the types of taxes and employee benefits.**
9.1.12.A.2	**Differentiate between taxable and nontaxable income.**
9.1.12.A.3	**Analyze the relationship between various careers and personal learning goals.**
9.1.12.A.4	**Identify a career goal and develop a plan and timetable for achieving it, including educational/training requirements, costs, and possible diet.**
9.1.12.A.6	**Summarize the financial risks and benefits of entrepreneurship as a career choice.**
9.1.12.A.7	**Analyze and critique various sources of income and available resources and how they may substitute for earned income.**
9.1.12.A.9	**Analyze how personal and cultural values impact spending and other financial decisions.**
9.1.12.A.10	**Demonstrate how exemptions and deductions can reduce taxable income.**
9.1.12.A.11	**Explain the relationship between government programs and services and taxation.**
9.1.12.B.1	**Prioritize financial decisions by systematically considering alternatives and possible consequences.**
9.1.12.B.2	**Compare strategies for saving and investing and the factors that influence how much should be saved or**

	invested to meet financial goals.
9.1.12.B.3	**Construct a plan to accumulate emergency “rainy day” funds.**
9.1.12.B.4	**Analyze how income and spending plans are affected by age, needs, and resources.**
9.1.12.B.5	**Analyze how changes in taxes, inflation, and personal circumstances can affect a personal budget.**
9.1.12.B.6	**Design and utilize a simulated budget to monitor progress of financial plans.**
9.1.12.B.7	**Explain the meaning of income tax, describe how it is calculated, and analyze its impact on one’s personal budget.**
9.1.12.B.8	**Describe and calculate interest and fees that are applied to various forms of spending, debt, and saving.**
9.1.12.C.2	**Compare and compute interest and compound interest and develop an amortization table using business tools.**
9.1.12.C.4	**Compare and contrast the advantages and disadvantages of various types of mortgages.**
9.1.12.C.6	**Explain how predictive modeling determines “credit scores.”**
9.1.12.D.1	**Calculate short- and long-term returns on various investments (e.g., stocks, bonds, mutual funds, IRAs, deferred pension plans, and so on).**
9.1.12.D.3	**Summarize how investing builds wealth and assists in meeting long- and short-term financial goals.**
9.1.12.D.4	**Assess factors that influence financial planning.**
9.1.12.D.5	**Justify the use of savings and investment options to meet targeted goals.**
9.1.12.D.6	**Analyze processes and vehicles for buying and selling investments.**
9.1.12.D.9	**Relate savings and investment results to achievement of financial goals.**
9.1.12.D.13	**Determine the impact of various market events on stock market prices and on other savings and investments.**
9.1.12.D.14	**Evaluate how taxes affect the rate of return on savings and investments.**

9.1.12.D.15	**Analyze how savings, retirement plans, and other investment options help to shift current income for purposes of tax reporting and filing.**
9.1.12.E.1	**Evaluate the appropriateness of different types of monetary transactions (e.g., electronic transfer, check, certified check, money order, gift card, barter) for various situations.**
9.1.12.E.2	**Analyze and apply multiple sources of financial information when prioritizing financial decisions.**
9.1.12.E.3	**Determine how objective, accurate, and current financial information affects the prioritization of financial decisions.**
9.1.12.E.10	**Determine reasons for the increase of identity theft worldwide and evaluate the extent to which victims of identity theft are successful in fully restoring their personal identities.**
9.1.12.F.6	**Explain the concept and forms of taxation and justify the use of taxation to fund public activities and initiatives.**
9.1.12.G.1	**Analyze risks and benefits in various financial situations.**
9.2.12.C.1	**Review career goals and determine steps necessary for attainment.**
9.2.12.C.2	**Modify Personalized Student Learning Plans to support declared career goals.**
9.2.12.C.3	**Identify transferable career skills and design alternate career plans.**
9.2.12.C.4	**Analyze how economic conditions and societal changes influence employment trends and future education.**
9.2.12.C.5	**Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.**
9.2.12.C.6	**Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.**
9.2.12.C.9	**Analyze the correlation between personal and financial behavior and employability.**
9.3.12.FN.1	**Utilize mathematical concepts, skills and problem solving to obtain necessary information for decision making in the finance industry.**

9.3.12.FN.2	**Utilize tools, strategies and systems to plan, monitor, manage and maintain the use of financial resources.**
9.3.12.FN.12	**Access, evaluate and disseminate financial information to enhance financial decision-making processes.**
9.3.12.FN.14	**Employ financial risk-management strategies and techniques used to minimize business loss.**
9.3.GV-MGT.3	**Utilize fiscal management skills to manage budget and allocation processes to ensure that resources are applied in a manner consistent with the department or agency's vision, mission and goals.**
9.3.MK.5	**Describe career opportunities and the means to achieve those opportunities in each of the Marketing Career Pathways.**
9.3.ST.2	**Use technology to acquire, manipulate, analyze and report data.**
9.3.ST.3	**Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.**
9.3.ST.4	**Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.**
9.3.ST.5	**Demonstrate an understanding of the breadth of career opportunities and means to those opportunities in each of the Science, Technology, Engineering & Mathematics Career Pathways.**
9.3.ST.6	**Demonstrate technical skills needed in a chosen STEM field.**
9.3.ST-ET.2	**Display and communicate STEM information.**
9.3.ST-ET.3	**Apply processes and concepts for the use of technological tools in STEM.**
9.3.ST-ET.5	**Apply the knowledge learned in STEM to solve problems.**
9.3.ST-ET.6	**Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner.**
9.3.ST-SM.1	**Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.**

9.3.ST-SM.2	**Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.**
9.3.ST-SM.3	**Analyze the impact that science and mathematics has on society.**
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.**

MINI UNIT 4A	
Title:	**Mathematical Applications in Careers**
Duration:	**3 weeks**
Overview:	**Recognizing and applying mathematical procedures and concepts in order to explore career paths**

Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Measurements conversions	MD.A.1
Data representations	MD.B.2
Types of objects in real life involving volume	MD.C.3
Expected value	MD.A.3
Outcomes of decisions involving probability	MD.A.4
Possible outcomes of a decision by assigning probabilities to payoff values and finding expected values	MD.B.5

Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions	MD.A.1
Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values	MD.B.5
Find the expected payoff for a game of chance	MD.B.5
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
Evaluate and compare strategies on the basis of expected values	MD.B.5
Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game)	MD.B.7
Resources Mini Unit 4A:	Big Ideas Algebra 2 textbook Khan Academy videos: https://www.khanacademy.org/math/precalculus/precalc-matrices/intro-to-matrices/v/introduction-to-the-matrix EdPuzzle differentiated videos http://www.aeseducation.com/careercenter21/career-readiness-lesson-plans/ http://breitlinks.com/careers/career_activities.htm

	http://www.k12.wa.us/secondaryeducation/careercollegereadiness/CareerReady.aspx https://www.teachervision.com/careers/teacher-resources/6637.html (Check Math Activities section)

MINI UNIT 4B		
Title:	**Applications of Mathematics and STEM**	
Duration:	**6 weeks**	
Overview:	**Forming connections between mathematical concepts learned and career options in the real world, analyzing data, applying arithmetic and solving skills to interpret real world problems, using matrices to manipulate real world data**	
Essential Outcomes - Upon completion of this course students will know (declarative):		**Alignment to Standards**
Marketability of products based on mathematical reasoning		S.ID.5
Applications of matrices in business		HSN-VM.6
Ways to model matrices in the real world such as velocity		HSN-VM.A.3
Adding a negated matrix is equivalent to subtracting a matrix from another		HSN-VM.B.4
Scalar multiplication uses the Distributive Property also commonly used in Algebra courses		HSN-VM.B.5
Multiplication with matrices is not commutative unlike multiplication with all numbers and variables		HSN-VM.C.9

Zero and identity matrices have similar properties as 0 and 1 in the real number system	HSN-VM.C.10
Matrices can be transformed through multiplication since one matrix's values are being manipulated and resulting to a new output	HSN-VM.C.11
The effect expenses can have on a business (ex. restaurant) given a set of data	S.IC.5
Statistics is a process for making inferences about population parameters based on a random sample from that population	S.IC.1
To recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages	6.SP.1
A set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape	6.SP.2
Essential Outcomes - Upon completion of this course students will know (procedural):	**Alignment to Standards**
How to research the marketability of different types of stuffed animals and present their proposals to the CEO	S.ID.5
How to use matrices to represent and manipulate data, e.g, to represent payoffs or incidence relationships in a network	HSN-VM.6
How to multiply matrices by scalars to produce new matrices, e.g, as when all of the payoffs in a game are	HSN-VM.7

doubled	
How to add, subtract, and multiply matrices of appropriate dimensions (using a graphing calculator)	HSN-VM.8
How to represent a system of linear equations as a single matrix equation in a vector variable	A.REI.8
How to summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies) and recognize possible associations and trends in the data	S.ID.5
How to represent data on two quantitative variables on a scatter plot, and describe how the variables are related	S.ID.6
How to decide if a specified model is consistent with results from a given data-generating process, e.g, using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?	S.ID.2
How to conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration	8.W.7
How to present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation	8.SL.4
How to integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest	8.SL.5

How to gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation	8.W.8
How to display numerical data in plots on a number line, including dot plots, histograms, and box plots	6.SP.4
How to weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values	S.MD.5
Essential Outcomes - Upon completion of this course students will know (conceptual):	**Alignment to Standards**
Unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties	HSN-VM.C.9
The zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers	HSN-VM.C.10
How to write arguments to support claims with clear reasons and relevant evidence	8.W.1
How to interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers)	S.ID.3
When analyzing the relationship between two variables in a STEM-related scenario, there are major differences between causation and correlation	S.ID.9
The importance of decision making during difficult	S.MD.5

situations in a career using critical thinking skills, probability, and statistics	
Resources Mini Unit 4B:	**Project Based Learning:** http://bie.org/ **Project-Based Learning Idea 1 (CEO of Business/Matrices):** http://wveis.k12.wv.us/teach21/public/project/Guide.cfm?upid=3362&tsele1=2&tsele2=118 **Project-Based Learning Idea 2 (Running a restaurant):** http://bie.org/object/video/my_restaurant_project **Project-Based Learning Idea 3 (Picking a cellphone plan):** http://wveis.k12.wv.us/teach21/public/project/Guide.cfm?upid=3521&tsele1=2&tsele2=106

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