TOWNSHIP OF UNION PUBLIC SCHOOLS

Algebra II/Honors Algebra II

Adopted: December 19, 2023

Unit 1

Unit Title: Unit 1 Linear Functions

Grade level: 10th-11th **Timeframe:** 15 Days

Guiding Questions

- How can you use a linear function to model and analyze a real life situation?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

- **A-CED.A.2** - Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- **A.CED.A.3** - Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
- **F-IF.A.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 on_eelement of the range. If f is a function and xis an element of its domain, then f(x) denotes the output

  off corresponding to the input x. The graph off is the graph of the equation y = f(x).

Highlighted Career Ready Practices and 21st Century Themes/Skills

- **(CR) 9.4.12.Cl.3:** Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.l).
- **(CR) 9.4.12.TL.4:** Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.l.AL.IPERS.6).

Social-Emotional Learning Competencies

- **(CHPE) 2.1.12.EH.l:** Recognize one's personal traits, strengths, and limitations and identify how to develop skills to support a healthy lifestyle

New Jersey Social and Emotional Learning Competencies and Sub-Competencies

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A.CED.A.2; A.CED.A.3; F-IF.A.1	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-IF.A.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, thenf(x) denotes the output off corresponding to the input x.The graph off is the graph of the equation y = f(x).	Make sense and look for structure.	Write the equation of a linear function by looking at a graph, or by various given information.	Teacher Generated Worksheets, eMath Generated example problems	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** eMath Instruction	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Model with mathematics.	Have students create a scatter plot and identify correlation. If a positive or negative correlation exists, students will write a line of best fit.	Create a table of values where the student heights(in inches) are the domain and the length of their feet (in inches) are the range. Find the line of best fit to make predictions.	Appendix A for Modifications
A.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.	Look for and make sense of structure.	Visualize solutions of systems of linear equations in three variables. Solve systems of linear equations in three variables algebraically. Solve real life problems.	A theater charges $75 for a seat in section A, $55 for each seat in section B, & $30 for a lawn seat. There are three times as many seats in section B as in section A. The revenue for selling 23,000 seats is $870,000. How many seats in each section?	Appendix A for Modifications

Benchmark Assessment 1

Benchmark Assessment	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
A.CED.A.2; A.CED.A.3; F-IF.A.1	Appendix A for Modifications

Summative Assessments

Summative Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections

Common Assessment 1: A.CED.A.2, F-IF.A Common Assessment 2: A.CED.A.3 A-CED.A.2 - Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. Real-world Relationship Modeling: Present students with real-world scenarios and ask them to create equations in two or more variables to represent the relationships between quantities. Have them graph the equations on coordinate axes and interpret the meaning of the graphs. Equation and Graph Matching Task: Provide a set of equations in two or more variables along with corresponding graphs. Ask students to match each equation with its correct graph. This assesses their ability to visually interpret relationships. Modeling Project: Assign a modeling project where students choose a scenario, create equations to represent relationships, and graph them. This could involve scenarios from science, economics, or other fields. A.CED.A.3 - Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. Systems of Equations Modeling:	Appendix A for Modifications

	Present students with modeling scenarios that involve multiple constraints. Ask them to represent these constraints using systems of equations or inequalities, and interpret the solutions in the context of the problem. Mathematical Modeling Scenario Analysis: Provide students with a complex modeling scenario and ask them to identify the constraints, represent them mathematically, and analyze the solutions in terms of viability or nonviability. Interactive Simulation Task: Use interactive simulations or online platforms that allow students to explore and model real-world situations with constraints. Students can manipulate the constraints and observe the impact on the solutions. F-IF.A.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, then f(x) denotes the output corresponding to the input x. The graph of f is the graph of the equation y = f(x). Function Understanding Assessment: Assess students' understanding of functions by providing them with various input-output scenarios. Ask them to identify the domain, range, and determine whether the relationships represent functions. Graphical Representation Task: Present students with graphs and ask them to identify whether they represent functions. Additionally, have them interpret features of the graph in terms of the domain and range. Real-world Function Application:	

Provide real-world situations where quantities are related by functions. Ask students to identify the domain, range, and interpret the meaning of function notation in the given context.	

Interdisciplinary Connections

Interdisciplinary Connections	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
• **(ELA) NJSLSA.SLl.** 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. • **(SS) 6.1.12 .HistoryCA.5.a:** Assess the effectiveness of public education in fostering national unity and American values and in helping people meet their economic needs and expectations.	Appendix A for Modifications

Unit 2

Unit Title: Unit 2 Quadratic Functions

Grade level: 10th-11th **Timeframe:** 26 Days

Guiding Questions

- How can you use a quadratic function to model and analyze a real life situation?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

- **F-BF.B.3** - Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(x+k), f(kx) //HONORS for specific values of k (both positive and negative); Experiment with cases and illustrate an explanation on the effects on the graph using technology.
- **F-IF.B.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-C-7c** - Graph polynomial functions, identifying zeros when suitable factorizations are available.
- **F-IF-C.9** - Compare properties of two functions, each represented in a different way (algebraically, graphically, or by verbal descriptions).
- **F-IF.C.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
- **A-APR.B.3** - Identify zeros of polynomials when suitable factorizations are available, and use zeros to construct a rough graph of the function described by the polynomial.
- **A-REI.B.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.
- **N-CN.C.7** - Solve quadratic equations with real coefficients that have complex solutions.
- **N-CN.CA.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.CA.2-** Use the relation i 2 = -1 and the commutative, associative, and distributive properties to add, subtract and multiply complex numbers.

- **A-REI.D.11-** Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
- **A-CED.A.I (HONORS ONLY)** - Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

Highlighted Career Ready Practices and 21st Century Themes/Skills

- **(CR) 9.4.12.CT.2:** Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
- **(CR) 9.4.12.IL.1:** Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).

Social-Emotional Learning Competencies

- **(CHPE) 2.1.12.EH.l:** Recognize one's personal traits, strengths, and limitations and identify how to develop skills to support a healthy lifestyle

https://www.nj.gov/education/safety/wellness/selearning/docs/SELCompetencies.pdf

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-IF.B.4; F-IF.C.8a; A-APR.B.3	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-BF.B.3 - Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(x+k), f(kx)	**SMP 2** - Reason abstractly and quantitatively.	Describe transformations of quadratic functions. Write transformations of quadratic functions.	Describe the transformation of the graph and identify the vertex.	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
//HONORS for specific values of k (both positive and negative); Experiment with cases and illustrate an explanation on the effects on the graph using technology.			$f(x) = -4(x+1)^2 - 5$	
F-IF.B.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.	**SMP 3** - Construct viable arguments and critique the reasoning of others. **SMP 8** - Look for and express regularity in repeated reasoning.	Explore properties of parabolas. Find maximum and minimum values of quadratic functions.	Graph the function. Label the vertex and axis of symmetry. Identify the domain and range of the function. Will there be a maximum or minimum? How do you know? Describe where the function is increasing and decreasing. $f(x) = 2(x+5)^2 + 3$	Appendix A for Modifications
F-IF-C-7c - Graph polynomial functions, identifying zeros when suitable factorizations are available.	SMP 3 - Construct viable arguments and critique the reasoning of others.	Graph quadratic functions.	Graph the function and identify the vertex given the three forms of a quadratic. $f(x) = 3(x+4)^2 - 6,$	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
			$g(x) = -x^2 + x + 12,$ $h(x) = 2(x - 2)(x + 4)$	
F-IF-C.9 - Compare properties of two functions, each represented in a different way (algebraically, graphically, or by verbal descriptions).	**SMP 4** - Model with mathematics. **SMP 6** - Attend to precïs1on.	Explore properties of parabolas. Solve real-world problems.	The engine torque y (in foot-pounds) of one model car is given by $y = -3.75x^2 + 23.2x + 38.8$, where x is the speed (in thousands of revolutions per minute) of the engine. Find the engine speed that maximizes torque. What happens to the engine torque as the speed of the engine increases?	Appendix A for Modifications
F-IF.C.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	**SMP 4** - Model with mathematics.	Explore properties of parabolas. Solve real-world problems.	When an object is dropped, its height h (in feet) above the ground after t seconds can be modeled by the function $h = -16t^2 + h_0$, where h_0 is the initial height. If a seashell is dropped from a height of 40 ft, write an equation that models the height above water. How long is the seashell in the air?	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** eMath Instruction	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
A-APR.B.3 - Identify zeros of polynomials when suitable factorizations are available, and use zeros to construct a rough graph of the function described by the polynomial.	**SMP 4** - Model with mathematics. **SMP 8** - Look for and express regularity in repeated reasoning.	Explore properties of parabolas. Solve real-world problems.	The path of a basketball thrown at an angle of 45 degrees can be modeled by $y = -.02x^2 + x + 6$, where x represents time in seconds and y is the height of the ball. After how many seconds will the ball hit the ground?	Appendix A for Modifications
A-REI.B.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.	**SMP 2** - Reason abstractly and quantitatively.	Solve quadratic equations by graphing and algebraically.	Solve the equation both by graphing and algebraically. $3x = ¼x^2+5$	Appendix A for Modifications
N-CN.C.7 - Solve quadratic equations with real coefficients that have complex solutions.	SMP 7 - Look for and make use of structure.	Find complex solutions and zeros. Solve quadratic equations using square roots.	Find the zeros of the function. $f(x)= -½ x^2 - 24$ Solve the equation. $(x - 7)^2 = 9$	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** **eMath Instruction**	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
N-CN.CA.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.	**SMP 2** - Reason abstractly and quantitatively.	Define and use the imaginary unit i.	Solve the equation $x^2 + 16 = 0$.	Appendix A for Modifications
N-CN.CA.2- Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract and multiply complex numbers.	**SMP 8** - Look for and express regularity in repeated reasoning.	Add, subtract, and multiply complex numbers.	Simplify the expression $(2 - 3i)^2 - (4 + 5i)$.	Appendix A for Modifications
A-REI.D.11- Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	**SMP 3** - Construct viable arguments and critique the reasoning of others.	Solve quadratic equations by graphing.	Solve the system by graphing. y=x+2 $y = ½ (x + 2)^2$	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A-CED.A.I (HONORS ONLY) - Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	**SMP 4** - Model with mathematics.	Solve quadratic inequalities in one variable.	A rectangular parking lot must have a perimeter of 440 feet and an area of at least 8000 square feet. Describe the possible lengths of the parking lot.	Appendix A for Modifications

Benchmark Assessment 1

Benchmark Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
• Quarterly Test 1	Appendix A for Modifications

Summative Assessments

Summative Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
• Common Assessment 1: F-BF.B.3, F-IF.B.4 • Common Assessment 2: F-IF.C.8a, A-APR.B.3, A-REI.B.4b • Common Assessment 3: N-CN.CA.1, N-CN.CA.2 • Performance Task Unit 2	Appendix A for Modifications

Interdisciplinary Connections

Interdisciplinary Connections	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
• **(ELA) NJSLSA.SL2.** Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.	Appendix A for Modifications

Unit 3

Unit Title: Unit 3 Polynomial Functions

Grade level: 10th-11th **Timeframe:** 24 Days

Guiding Questions

- How can you use the factors of a polynomial to solve a polynomial equation?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

- F-IF.B.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. (Honors only)
- F-IF.C.7c - Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. (Honors only)
- A-APR.A.I - 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
- A-APR.C.4 - Prove polynomial identities and use them to describe numerical relationships. For example, the difference of two squares, the sum and difference of two cubes, the polynomial identity $(x^2+y^2)^2=(x^2-y^2)^2+(2xy)^2$ can be used to generate Pythagorean triples.
- A-APR.C.5 - Know and apply the Binomial Theorem for the expansion of (x+y)^n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. (Algebra 2 Honors only)
- A-APR.B.2 - Know and apply the remainder Theorem: for a polynomial p(x) and a number a, the remainder on division by x - a is p(a) = 0 if and only if (x - a) is a factor ofp(x).
- A-APR.D.6 - Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree ofb(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.
- A-SSE.A.2 - Use the structure of an expression to identify ways to rewrite it.

- A-APR.B.2 - Know and apply the remainder Theorem: for a polynomial p(x) and a number a, the remainder on division by x - a is p(a) = 0 if and only if (x - a) is a factor of p(x).
- A-APR.B.3 - Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

(Honors Only) Use the Fundamental Theorem of Algebra.

Highlighted Career Ready Practices and 21st Century Themes/Skills

- (CR) 9.4.12.Cl.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
- (CR) 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other projects and determine the strategies that contribute to effective outcomes.

Social-Emotional Learning Competencies

- **(CHPE) 2.1.12.EH.l:** Recognize one's personal traits, strengths, and limitations and identify how to develop skills to support a healthy lifestyle

https://www.nj.gov/education/safety/wellness/selearning/docs/SELCompetencies.pdf

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A-APR.C.5, A-APR.A.I, A-SSE.A.2	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-IF.B.4 - For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of	**SMP 7** - Make sense and look for structure.	(Honors Only) Identify polynomial functions.	**Describe the end behavior.** **$f(x)= -5x^4+7x^3-9x$** **$g(x)= 12 - 6x + x^5$**	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
the quantities, and sketch graphs showing key features given a verbal description of the relationship. (Honors only)				
F-IF.C.7c - Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. **(Honors only)**	**SMP 4** - Model with mathematics.	(Honors Only) Graph polynomial functions using tables and end behavior.	Graph the polynomial function. $f(x) = x^3 + x + 3$	Appendix A for Modifications
A-APR.A.I - 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	**SMP 7 - Look for and make use of structure.**	Add and subtract polynomials.	Simplify the polynomial expression. $(3x^2 - 6x + 8) + (x^3 + 5x - 9)$	Appendix A for Modifications
A-APR.C.4 - Prove polynomial identities and use them to describe numerical relationships. For example, the difference of two squares, the sum and	**SMP 6** Attend to precision	Multiply polynomials.	Simplify the expression. $(x^2 - 8)(x - 9)$	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
difference of two cubes, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.				
A-APR.C.5 - Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. **(Honors only)**	SMP 7 - Look for and make use of structure.	(Honors Only) Use Pascal's Triangle to expand binomials.	Expand the binomial: $(x+2)^5$	Appendix A for Modifications
A-APR.B.2 - Know and apply the remainder Theorem: for a polynomial p(x) and a number a, the remainder on division by x - a is p(a) = 0 if and only if (x - a) is a factor of p(x).	SMP 7 - Look for and make use of structure.	Use the remainder theorem.	Find the value of f(5) using synthetic substitution given $f(x)=4x^4+3x2-x+5$	Appendix A for Modifications
A-APR.B.3 - Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	**SMP 4** - Model with mathematics.	Factor polynomials. Find the solutions of polynomial equations and zeros of polynomial functions. Use the Rational Root Theorem. Use the Irrational Conjugates Theorem.	Identify the zeros of the polynomial. $f(x)=x(x-3)(x-6)(x+1)$. List the possible rational roots of the polynomial and then find all the real zeros. $h(x)=x^3+10x^2+3lx+30$	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A-APR.D.6 - Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.	**SMP 8** Look for and express regularity in repeated reasoning.	Use synthetic division to divide polynomials by binomials of the form (x - k). Use long division to divide polynomials by other polynomials.	The volume of a rectangular prism is given $V=2x^3+17x^2+46x+40$ with a height of (x+2) and a width of (x+4). Find the length of the prism.	Appendix A for Modifications
A-SSE.A.2 - Use the structure of an expression to identify ways to rewrite it.	**SMP 8** Look for and express regularity in repeated reasoning.	Factor polynomials.	Factor completely: a) a^3+27 b) x^3+4x^2-x-4	Appendix A for Modifications
A-APR.B.3 - Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	**SMP 6** Attend to precision.	(Honors Only) Use the Fundamental Theorem of Algebra.	Find all the zeros and construct a graph. $g(x)=x^4-x^2-6$	Appendix A for Modifications

Summative Assessments (add rows as needed)

Summative Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections

• Common Assessment 1: A-APR.A.I, A-APR.D.6 • Common Assessment 2: A-APR.B.3 • Performance Task Unit 3 F-IF.B.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. (Honors only) Verbal Description to Graph Assessment: Provide students with complex verbal descriptions of relationships between two quantities. Ask them to interpret key features, such as intercepts, intervals of increase/decrease, and points of inflection, and sketch the corresponding graphs. Graph Analysis Project (Honors): Assign an honors project where students choose a challenging real-world scenario, create a function to model it, and analyze the function's key features. Emphasize the application of advanced features in graphing technology. F-IF.C.7c - Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. (Honors only) Polynomial Function Exploration (Honors): Task honors students with exploring and graphing polynomial functions with higher degrees. Ask them to identify zeros with suitable factorizations, analyze end behavior, and discuss the implications of these features. End Behavior Analysis Project (Honors): Assign a project where honors students investigate the end behavior of various polynomial functions. Have them explain how the degree and leading coefficient affect the end behavior and justify their findings.	Appendix A for Modifications

A-APR.A.I - 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 Polynomial Operations Quiz: Assess students' understanding of polynomial operations by providing expressions to add, subtract, and multiply. Emphasize the closure of polynomials under these operations. Real-world Polynomial Application Task: Present students with real-world scenarios involving polynomial expressions. Ask them to perform operations on these expressions and interpret the results in the context of the application. A-APR.C.4 - Prove polynomial identities and use them to describe numerical relationships. For example, the difference of two squares, the sum and difference of two cubes, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples. Polynomial Identity Exploration: Challenge students to prove polynomial identities, such as the difference of two squares or the sum and difference of two cubes. Ask them to apply these identities to generate numerical relationships, such as Pythagorean triples. Identity Application Project: Assign a project where students choose a specific polynomial identity, prove it, and then apply it to create numerical relationships or solve real-world problems. A-APR.C.5 - Know and apply the Binomial Theorem for the expansion of $(x+y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined, for example, by Pascal's Triangle. (Algebra 2 Honors only)	

Binomial Theorem Application (Honors):
Assess honors students' understanding of the Binomial Theorem by providing expressions to expand and coefficients to determine. Emphasize the use of the theorem in the context of algebraic expressions.

Pascal's Triangle Connection Task (Honors):
Explore the connection between the coefficients obtained from the Binomial Theorem and Pascal's Triangle. Ask honors students to explain how the coefficients are determined and demonstrate the connection.

A-APR.B.2 - Know and apply the remainder Theorem: for a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.
Remainder Theorem Quiz:
Assess students' understanding of the Remainder Theorem by providing polynomials and asking them to find the remainder when divided by a given factor. Emphasize the connection between remainders and factors.

Polynomial Factorization Exploration:
Challenge students to explore the factorization of polynomials using the Remainder Theorem. Provide them with polynomials and ask them to identify factors based on remainders.

A-APR.B.3 - Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. (Honors Only) Use the Fundamental Theorem of Algebra.
Graph Construction and Fundamental Theorem Application (Honors):
Task honors students with constructing rough graphs of polynomials by identifying zeros. Emphasize the application of the Fundamental Theorem of Algebra in determining the number of zeros.

Advanced Polynomial Graphing Project (Honors): Assign a project where honors students choose a polynomial function, factor it, identify zeros, and construct a detailed graph. Emphasize the application of advanced graphing techniques and the Fundamental Theorem of Algebra.	

Interdisciplinary Connections

Interdisciplinary Connections	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
(ELA) NJSLSA.Wl. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	Appendix A for Modifications

Unit 4

Unit Title: Unit 4 Rational Exponents and Radical Functions

Grade level: 10th-11th **Timeframe:** 22 Days

Guiding Questions

- How can you use a rational exponent to represent a power involving a radical?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

- N-RN.A.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.A.2 - Rewrite expressions involving radicals and rational exponents using the properties of exponents.
- F-IF.C.7b - Graph square root, cube root, and piecewise-defined functions and absolute value functions.
- F-BF.B.3 - Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x) ... f(x+k) for specific values of k (both positive and negative); ... Experiment with cases and illustrate an explanation on the effects on the graph using technology.
- A-REI.A.2 - Solve simple radical equations in one variable, and give examples showing how extraneous solutions may arise.
- *A-CED.AA* - Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
- F-BF.B.4a - Solve an equation of the form f(x) = c for a simple function that has an inverse and write an expression for the inverse.

Highlighted Career Ready Practices and 21st Century Themes and Skill

- **(CR) 9.4.12.TL.1:** Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W 11-12.6.).
- **(CS)** 8.2.12.ITH.3: Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.

Social-Emotional Learning Competencies

- **(CHPE) 2.1.12.EH.I:** Recognize one's personal traits, strengths, and limitations and identify how to develop skills to support a healthy lifestyle

https://www.nj.gov/education/safety/wellness/selearning/docs/SELCompetencies.pdf

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A.CED.A.2; A.CED.A.3; F-IF.A.1	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
N-RN.A.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	**SMP 7** - Make sense and look for structure.	Find nth roots of numbers. Solve equations using nth roots.	Solve for **x.** $x^3=125$ $x^2-64=0$ $x^4=81$	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** **eMath Instruction**	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
N-RN.A.2 - Rewrite expressions involving radicals and rational exponents using the properties of exponents.	SMP8- Look for and express regularity in repeated reasoning.	Evaluate expressions with rational exponents. Use properties of rational exponents to simplify expressions with rational exponents. Use properties of radicals to simplify and write radical expressions in simplest form.	Simplify: $\sqrt{270}$ $\left(\frac{3x}{2x^3}\right)^{\frac{1}{2}}$	Appendix A for Modifications
F-IF.C.7b - Graph square root, cube root, and piecewise-defined functions and absolute value functions.	**SMP 7** - Look for and make use of structure.	Graph radical functions.	Graph f(x)=$\sqrt{x}$ State the domain and range of the graph.	Appendix A for Modifications
F-BF.B.3- Identify the effect on the graph by replacing f(x) with f(x)+k, f(x+k), and k*f(x) for specific values of k (positive and negative).	**SMP6** -Attend to precision	Graph transformations of radical functions.	Graph f(x)=$\sqrt{x}$ Shift the function two units left and four units down and write the new function rule.	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A-REI.A.2- Solve simple radical equations in one variable and show how extraneous solutions may arise.	**SMP 7** - Look for and make use of structure.	Solve equations and inequalities containing radicals and solve equations containing rational exponents.	Solve $\sqrt{2x-5} = x-4$	Appendix A for Modifications
A-CED.A.4- Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	**SMP 7** - Look for and make use of structure.	Explore inverses of functions.	Solve for n. $pV = nRT$.	Appendix A for Modifications
F-BF.B.4a- Solve an equation of the form f(x)=c for a simple function f that has an inverse and write an expression for the inverse.	**SMP 7** - Model with mathematics.	Find and verify inverses of nonlinear functions. Solve real life problems using inverses.	How long will it take an element to decay by half if there are 945 grams of the element?	Appendix A for Modifications

Summative Assessments (add rows as needed)

Summative Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections

• Common Assessment 1: N-RN.A.2, F-IF.C.7b • Common Assessment 2: A.REI.A.2 N-RN.A.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 Exponent Properties Explanation: Ask students to write an explanation detailing how the definition of rational exponents follows from extending the properties of integer exponents. Encourage them to provide examples and highlight the relationship between radicals and rational exponents. Radical to Exponent Notation Conversion Task: Provide expressions involving radicals and ask students to rewrite them using rational exponents. Assess their understanding of the notation conversion and the application of exponent properties. N-RN.A.2 - Rewrite expressions involving radicals and rational exponents using the properties of exponents. Expression Transformation Quiz: Prepare a quiz with expressions involving radicals and rational exponents. Real-world Application Project:	Appendix A for Modifications

Assign a project where students encounter real-world scenarios modeled with expressions involving radicals and rational exponents.

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

Function Graphing Assessment:

Provide students with various functions, including square root, cube root, piecewise-defined, and absolute value functions. Ask them to graph these functions, emphasizing key features such as intercepts, symmetry, and behavior.

Function Graphing Exploration:

Task students with exploring the effects of changing parameters on the graph of square root, cube root, piecewise-defined, and absolute value functions.

F-BF.B.3 - Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x) ... f(x+k) for specific values of k (both positive and negative); ... Experiment with cases and illustrate an explanation on the effects on the graph using technology.

Graph Transformation Analysis:

Present students with a function and ask them to analyze the effects on the graph when replacing f(x) with f(x) + k, kf(x), f(x+k), for specific values of k.

A-REI.A.2 - Solve simple radical equations in one variable, and give examples showing how extraneous solutions may arise.

Radical Equation Solving Quiz:

Assess students' ability to solve simple radical equations in one variable. Include examples that may lead to extraneous solutions. Ask students to identify and explain why certain solutions are extraneous. Application of Radical Equations Task: Present real-world scenarios modeled with radical equations. Ask students to solve these equations and discuss the practical implications of extraneous solutions. A-CED.AA - Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. Real-world Formula Application Project: Assign a project where students encounter real-world problems requiring the rearrangement of formulas. Ask them to identify the quantity of interest and rearrange the formula accordingly. F-BF.B.4a - Solve an equation of the form $f(x) = c$ for a simple function that has an inverse and write an expression for the inverse. Function Equation Solving Task: Present students with simple functions and ask them to solve equations of the form $f(x) = c$. Assess their ability to find the inverse function and express it algebraically. Inverse Function Expression Writing Quiz: Assess students' understanding of inverse functions by providing functions and asking them to write expressions for the inverses. Emphasize the relationship between the original function and its inverse.	

Interdisciplinary Connections

Interdisciplinary Connections	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
(ELA) NJSLSA 4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Appendix A for Modifications

Unit 5

Unit Title: Unit 5 Exponential and Logarithmic Functions

Grade level: 10th-11th **Timeframe:** 20 Days

Guiding Questions

- What are some of the characteristics of the graphs of exponential functions?
- How can the properties of exponents be used to derive the properties of logarithms?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

- F-IF.C.7.e- Graph exponential and logarithmic functions, showing intercepts and end behavior.

- F-IF.C.8.b- Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)t$, $y = (0.97)t$, $y = (1.01)12t$, $y = (1.2)t/10$, and classify them as representing exponential growth or decay.

- F-BF.B.3- Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology

- A-SSE.A.2- Use the structure of an expression to identify ways to rewrite it.

- F-LE.A.4- Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to $abet = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

Highlighted Career Ready Practices and 21st Century Themes and Skill

- (CR) 9.1.12.PB.6: Describe and calculate interest and fees that are applied to various forms of spending, debt and saving.
- (CR) 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem

(e.g., 7.1.AL.IPERS.6).

- (CS)• 8.2.12.IIB.3: Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.

Social-Emotional Learning Competencies

- **CHPE. 2.1.12.EH.1: Recognize one's personal traits, strengths, and limitations and identify how to develop skills to support a healthy lifestyle.**

https://www.nj.gov/education/safety/wellness/selearning/docs/SELCompetencies.pdf

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-BF.B.3	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-IF.C.7.e- Graph exponential and logarithmic functions, showing intercepts and end behavior.	**SMP 4** - Model with mathematics.	Graph exponential growth and decay functions, and logarithmic functions. Explain the inverse relationships between the two.	Graph $y = 2^x$ and $y = log\, x$	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** eMath Instruction	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
F-IF.C.8.b- Use the properties of exponents to interpret expressions for exponential functions.	**SMP** 4-Model with mathematics.	Use exponential models to solve real-life problems.	You deposit $9000 in an account that pays 1.46 % annual interest. Find the balance after three years when the interest is compounded quarterly.	Appendix A for Modifications
F-BF.B.3- Identify the effect on the graph by replacing f(x) with f(x)+k, f(x+k), and k*f(x) for specific values of k (positive and negative).	**SMP3-**Construct viable arguments and critique the reasoning of others.	Graph transformations of exponential and logarithmic functions.	Graph $y = 10^x$ and $y = log\ x$. Find the domain and range of each and discuss similarities and differences of each.	Appendix A for Modifications
A-SSE.A.2- Use the structure of an expression to identify ways to rewrite it.	**SMP 8** - Look for and express regularity in repeated reasoning.	Use the properties of logarithms to expand or condense logarithmic expressions.	Write the expression as a single logarithm. $4\log_5 y - \log_5 3 - \log_5 x$	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** **eMath Instruction**	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
F-LE.A.4- Understand the relationship between exponents and logarithms.	**SMP 6-** Attend to precision.	Evaluate logarithms using properties of logarithms and change of base theorem. Solve logarithmic and exponential equations. (Honors) Solve exponential and logarithmic inequalities.	Evaluate $log_3 6 - log_3 2$ Evaluate $log_7 19$ using change of base. Solve $log(x - 9) + log(x - 3) = 2$	Appendix A for Modifications

Summative Assessments (add rows as needed)

Summative Assessment	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**

• Common Assessment 1: F-IF.C.7.e, F-BF.B.3 • Common Assessment 2: F-LE.A.4, A-SSE.A.2, F-IF.C.8.b Performance Task Unit 5 F-IF.C.7.e - Graph exponential and logarithmic functions, showing intercepts and end behavior. Graphing Exponential and Logarithmic Functions Quiz: Provide students with various exponential and logarithmic functions and ask them to graph these functions, highlighting intercepts and end behavior. Function Transformation Project: Assign a project where students choose different exponential and logarithmic functions, experiment with transformations (such as shifts and stretches), and create graphs illustrating the effects on intercepts and end behavior. F-IF.C.8.b - Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)^t, y = (0.97)^t, y = (1.01)^{12t}, y = (1.2)^{t/10}, and classify them as representing exponential growth or decay. Exponential Function Analysis Quiz: Provide students with expressions representing exponential functions and ask them to interpret the properties of exponents, including percent rate of change. Real-world Exponential Modeling Task: Present students with real-world scenarios modeled by exponential functions. Ask them to analyze and interpret the percent rate of change, determining whether the situation represents growth or decay. F-BF.B.3 - Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Function Transformation Analysis Quiz: Assess students' understanding of function transformations by providing graphs and asking them to identify the effects of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k. Interactive Graphing Software Exploration:	Appendix A for Modifications

Utilize interactive graphing software that allows students to manipulate functions in real-time. Ask them to experiment with different transformations and illustrate the effects on the graph using technology. A-SSE.A.2 - Use the structure of an expression to identify ways to rewrite it. Expression Rewriting Challenge: Provide students with complex expressions and ask them to identify ways to rewrite them based on the structure of the expression. Expression Transformation Quiz: Assess students' understanding of expression transformation by providing expressions and asking them to rewrite them in alternative forms. Emphasize the identification of equivalent expressions. F-LE.A.4 - Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to ab^ct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. Exponential to Logarithmic Conversion Quiz: Present students with exponential equations and ask them to express the solutions as logarithmic expressions. Logarithmic Evaluation using Technology Task: Assign a task where students use technology to evaluate logarithmic expressions derived from exponential models. Emphasize the application of logarithmic concepts in solving real-world problems.	

Interdisciplinary Connections

Interdisciplinary Connections	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
• (ELA) NJSLSA:W6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others. • (S) HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. • (S) HS-PS4-5 Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. • (S) HS-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. (SS) 6.1.12.HistoryCA.5.a: Assess the effectiveness of public education in fostering national unity and American values and in helping people meet their economic needs and expectations. (SS) 6.1.12.EconNE.6.a: Analyze the impact of money, investment, credit, savings, debt, and financial institutions on the development of the nation and the lives of individuals.	Appendix A for Modifications

Unit 6

Unit Title: Unit 6 Rational Functions

Grade level: 10th-11th **Timeframe:** 22 Days

Guiding Questions

- How do the four basic operations apply when we simplify and solve rational equations?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

- **A-CED.A.I** - Create equations in one variable and use them to solve problems.
- **A-CED.A.2** - Create equations in two or more variables to represent relationships between quantities.
- **A-CED.A.3** - Represent constraints by equations, and interpret solutions as viable or nonviable options in modeling context.
- **A.CED.A.4** - Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
- **A-APR.D.6** - Rewrite simple rational expressions in different forms; write a(x)/b(x) in forms q(x) + r(x)/b(x), where a9x), b(x), q(x) and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using long division.
- **F-BF.B.3** - Identify the effect on replacing f(x) by f(x) + k, kf(x), and f(x + k) for specific values of k (both positive and

negative). Experiment with cases and illustrate an explanation of the effects on the graph using technology.

- **A-APR.D.6** - Rewrite simple rational expressions in different forms; write a(x)/b(x) in forms q(x) + r(x)/b(x), where a9x), b(x), q(x) and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, or the for the more complicated example, a computer algebra system.
- **A-APR.D.7** - Understand that rational expressions form a system analogous to the rational numbers, closed under multiplications, and division by a nonzero rational expression; multiply, and divide rational expressions.
- **A-REI.A.I** - Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A-REI.A.2 Solve simple rational equations in one variable, and give examples showing how extraneous solutions may arise.

Highlighted Career Ready Practices and 21st Century Themes and Skill

- **CRP 9.4.12.TL.3:** Analyze the effectiveness of the process and quality of collaborative environments

Social-Emotional Learning Competencies

- **CHPE: 2.1.8.EH.2: Analyze how personal attributes, resiliency, and protective factors support mental and emotional health.**

https://www.nj.gov/education/safety/wellness/selearning/docs/SELCompetencies.pdf

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A-CED.A.I **A-CED.A.A**	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A-CED.A.I - Create equations in one variable and use them to solve problems.	SMP 7-Make sense and look for structure.	Classify direct and inverse variations.	Ask students to give examples of two quantities that vary directly and two that vary directly.	Appendix A for Modifications
A-CED.A.2 - Create equations in two or more variables to represent relationships between	**SMP8** Look for and express regularity in repeated reasoning.	Write inverse variation equations	Y varies inversely with x. y= 15 when x=5. Write an equation. What is y when x=8?	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
quantities.				
A-CED.A.3 - Represent constraints by equations, and interpret solutions as viable or nonviable options in modeling context.	**SMP** 7-Look for and make use of structure.	Solve real-life problems.	It takes two people 10 days to paint a house. It takes 4 people 5 days to paint a house. If the number of days varies inversely with the number of people, how long would it take 6 people to paint the house?	Appendix A for Modifications
A.CED.A.4 - Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	**SMP4** Model with mathematics.	Use inverses of functions.	The function $C = 50m + 1000$ m represents the average cost c (in dollars) of making m models using a 3-D printer. How many models must be printed for the average cost c to be $90?	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** eMath Instruction	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
A-APR.D.6 - Rewrite simple rational expressions in different forms; write a(x)/b(x) in forms q(x) + r(x)/b(x), where a(x), b(x), q(x) and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using long division	**SMP** 7-Look for and make use of structure.	Divide rational expressions. **(Honors Only)** Graph Rational Functions. Identify the asymptotes and transformations when rewritten.	Find the quotient $(4x - 16)/(5x^2 - 20x)$ $(x^2 - 2x)/(x^2 - 6x + 8)$ Graph: $f(x) = \frac{2x+1}{x-3}$	Appendix A for Modifications
A-APR.D.7 - Understand that rational expressions form a system analogous to the rational numbers, closed under multiplications, and division by a nonzero rational expression; multiply, and divide rational expressions.	**SMP** 7-Look for and make use of structure.	Multiply rational expressions. Simplify rational expressions.	Multiply. $\frac{1}{x} * \frac{1}{x-2}$	Appendix A for Modifications
A-REI.A.1- Explain each step in solving a simple equation as following from the equality of numbers asserted in the previous step,	**SMP3-** Construct a viable argument and critique the reasoning of others	Solve rational equations by cross multiplying.	Solve. $\frac{1}{x} = \frac{5}{x+6}$	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
starting from the assumption that the previous equation has a solution. Construct a viable argument to justify a solution method.				
A-REI.A.2- Solve simple rational equations in one variable and give examples showing how extraneous solutions may arise.	**SMP 8-** Look for and express regularity in repeated reasoning.	Solve rational equations using the least common denominator.	Solve $\frac{x-3}{x^2-25}+\frac{1}{x+5}=\frac{1}{x-5}$	Appendix A for Modifications

Summative Assessments (add rows as needed)

Summative Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
• Common Assessment 1: A-CED.A.I, A-CED.A.2 • Common Assessment 2: A-APR.D.7 • Common Assessment 3: A-REI.A. • Performance Task Unit 6	Appendix A for Modifications

Interdisciplinary Connections

Interdisciplinary Connections	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
(ELA) NJSLSA:W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Appendix A for Modifications

Unit 7

Unit Title: Unit 7- Sequences and Series

Grade level: 10th-11th **Timeframe:** 16 Days

Guiding Questions

- Can a pattern be identified in the sequence of numbers?
- Is the sequence arithmetic, geometric or neither?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

- F-IF.A.3 - Recognize that sequences are functions whose domain is a subset of the integers.
- F-BF.A.2 - Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate them
- F-BF.A.la - Determine an explicit expression, a recursive process, or steps for calculation from context.

Highlighted Career Ready Practices and 21st Century Themes and Skill

- **(CR) 9.4.12.TL.3:** Analyze the effectiveness of the process and quality of collaborative environments.
- **(CS) 8.2.12.ITH.3:** Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.

Social-Emotional Learning Competencies

- **CHPE. 2.1.12.EH.1: Recognize one's personal traits, strengths, and limitations and identify how to develop skills to support a healthy lifestyle.**

https://www.nj.gov/education/safety/wellness/selearning/docs/SELCompetencies.pdf

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-IF.A.3	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-IF.A.3 - Recognize that sequences are functions whose domain is a subset of the integers.	**SMP 6-** Attend to precision.	Use sequence notation to write terms of sequences. Write a rule for the nth term of a sequence. Sum the terms of a sequence to obtain a series and use summation notation.	Describe the pattern, write the next term, graph the first five terms, and write a rule for the nth term. 3, 8, 15, 24, ... Find the sum. $\sum_{i=1}^{10} 4(i-1)$ For the sequence above, would it be possible to find the	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
		Evaluate recursive rules for sequences.	infinite sum? Explain your answer. Given $a_1 = 7$ and $a_n = a_{n-1} + 3$ write the first 5 terms of the sequence.	
F-BF.A.2 - Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate them	**SMP 6-** Attend to precision	Write rules for arithmetic & geometric sequences. Find sums of finite arithmetic & geometric series.	Write a recursive rule for the sequence. Then write an explicit rule and find the 25th term of the sequence. 5, 9, 13, 17, 21, ... Find the sum of the first 40 terms in the sequence above.	Appendix A for Modifications
F-BF.A.la - Determine an explicit expression, a recursive process, or steps for calculation from context.	**SMP 8** - Look for and express regularity in repeated reasoning.	Write recursive rules for sequences.	Write a recursive rule for the sequence. 2,14, 98, 686, 4802, ...	Appendix A for Modifications

Summative Assessments (add rows as needed)

Summative Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections

• Common Assessment 1: F-IF.A.3, F-BF.A.2 • Common Assessment 2: F-BF.A.2 Performance Task Unit 7 F-IF.A.3 - Recognize that sequences are functions whose domain is a subset of the integers. Sequence Identification Quiz: Provide students with a set of sequences, some presented explicitly and others implicitly. Ask them to recognize and identify which ones represent functions with domains that are subsets of the integers. Real-world Sequence Modeling: Present students with real-world scenarios that can be modeled using sequences. Ask them to identify the relevant sequences, recognize them as functions with integer domains, and explain their reasoning. F-BF.A.2 - Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate them. Sequence Formula Writing Task: Assign a task where students need to generate arithmetic and geometric sequences to model specific situations. Ask them to write both recursive and explicit formulas for these sequences.	Appendix A for Modifications

Application of Sequences Project: Have students choose a real-world application that can be modeled using sequences (e.g., population growth, financial investments). Ask them to identify relevant sequences, write formulas, and explain how these sequences can be used to model the situation. F-BF.A.1a - Determine an explicit expression, a recursive process, or steps for calculation from context. Contextual Recursive Process Identification: Present students with contextual problems that can be solved using recursive processes. Ask them to identify and describe the recursive process based on the given context. Calculation Steps from Context: Provide students with real-world problems that require specific steps for calculation. Ask them to determine the explicit expressions or sequences of steps needed to solve the problems based on the given context.	

Interdisciplinary Connections

Interdisciplinary Connections	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
(ELA) NJSLSA:W-1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	Appendix A for Modifications

Unit 8

Unit Title: Unit 8-Trigonometric Ratios and Functions

Grade level: 10th-11th **Timeframe:** 20 Days

Guiding Questions

- How can you find a trigonometric function of an acute angle?
- How can the Unit Circle be used to define the trigonometric functions of any angle?
- How can sinusoidal graphs be used to model natural phenomena?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

- F-TF.A.1 - Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
- F-TF.A.2 - Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measure of angles traversed counterclockwise around the unit circle.
- F-TF.B.5 - Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.
- F-IF.C.7e - Graph trigonometric functions, showing period, midline and amplitude.
- F-BF.B.3 - Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx) and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs.

- F-TF.C.8 - Prove the Pythagorean identity $\sin^2(x) + \cos^2(x) = 1$ and use it to find sin(x), cos(x) or tan(x) given the sin(x), cos(x) or tan(x) and the quadrant of the angle. (Algebra 2 Honors only)

Highlighted Career Ready Practices and 21st Century Themes and Skill

- **(CR) 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas.**

- **(CR) 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).**

- **(CS) 8.2.12.ITH.3: Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.**

Social-Emotional Learning Competencies

- **CHPE. 2.1.12.EH.1: Recognize one's personal traits, strengths, and limitations and identify how to develop skills to support a healthy lifestyle.**

https://www.nj.gov/education/safety/wellness/selearning/docs/SELCompetencies.pdf

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
A.CED.A.2; A.CED.A.3; F-IF.A.1	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
F-TF.A.1 - Understand radian measure of an angle as the length of an arc on the unit circle subtended by the angle.	**SMP 2-** Reason abstractly and quantitatively. SMP5- Use the appropriate tools strategically.	Evaluate trigonometric functions of acute angles. Draw angles in standard position. Find coterminal angles. Measure angles in radians.	Triangle ABC is a right triangle with m<C=90. If $\sin A = \frac{3}{5}$, find the remaining 5 trig functions. For $\theta = 230$ and θ is measured in degrees, - sketch the angle in standard position. - convert to radians.	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** eMath Instruction	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
			- Find one positive and one negative coterminal angle.	
F-TF.A.2 - Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measure of angles traversed counterclockwise around the unit circle.	**SMP 2** - Reason abstractly and quantitatively. SMP4- Model with mathematics.	Evaluate trigonometric functions of any angle. Find and use reference angles to evaluate trigonometric functions.	Evaluate the function without using a calculator. $sec\ 135°$ $cot\ -\frac{\pi}{4}$	Appendix A for Modifications
F-TF.B.5-Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	**SMP 1-** Make sense of problems and persevere in solving them.	Solve real life problems.	The tide at a beach has a high tide of 8 ft above the mean waterline and a low tide of 3 ft above the mean waterline. The time between high tides is 12 hrs. Write a sinusoid modeling this situation.	Appendix A for Modifications
F-IF.C.7e - Graph trigonometric functions, showing period, midline and amplitude	**SMP 2** - Reason abstractly and quantitatively.	Explore characteristics or sine and cosine functions. Explore characteristics of tangent and cotangent functions. (Honors Only)	Find the amplitude and period of the function. Then graph. y=½ cos½x Using a graphing utility, graph y=tan x and y=cot	Appendix A for Modifications

SLO – WALT We are learning to/that	Student Strategies	Formative Assessment	Activities and Resources eMath Instruction	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
			x. Have students describe what they see.	
F-BF.B.3- Identify the effect on the graph by replacing f(x) with f(x)+k, f(x+k), and k*f(x) for specific values of k (positive and negative).	**SMP** 6-Attend to precision.	Transform graphs of sine and cosine.	For y = sin x, transform the equation with an amplitude of 5, moved up 3 units and reflected over the x-axis.	Appendix A for Modifications
F-TF.C.8 - Prove the Pythagorean identity $\sin^2(x) + \cos^2(x) = 1$ and use it to find sin(x), cos(x) or tan(x) given the sin(x), cos(x) or tan(x) and the quadrant of the angle. (Algebra 2 Honors only)	**SMP 2** - Reason abstractly and quantitatively.	Use trigonometric identities to evaluate trigonometric functions and simplify trigonometric expressions. Verify trigonometric identities.	Simplify the expression: $\cos x - \cos x \sin^2 x$	Appendix A for Modifications

Summative Assessments (add rows as needed)

Summative Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections

- Common Assessment 1: F-TF.A.1, F-TF.A.2, F-TF.B.5
- Common Assessment 2: F-IF.C.7e, F-BF.B.3

Performance Task Unit 8

F-TF.A.1 - Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

Assessment Idea: Radian Measure Matching

Prepare a set of angle measures in both degrees and radians.

Ask students to match each degree measure with its corresponding radian measure based on their understanding of radian measure as the length of the arc on the unit circle.

F-TF.A.2 - Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measure of angles traversed counterclockwise around the unit circle.

Assessment Idea: Unit Circle Explanation

Require students to explain, in writing or through a presentation, how the unit circle in the coordinate plane allows for the extension of trigonometric functions to all real numbers.

Evaluate their ability to articulate the relationship between angles, radian measure, and the unit circle, emphasizing the counterclockwise traversal.

F-TF.B.5 - Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

Assessment Idea: Trigonometric Modeling Task

Appendix A for Modifications

Provide students with a set of real-world scenarios representing periodic phenomena (e.g., waves, sound, or light).

Ask them to choose appropriate trigonometric functions that model the given phenomena with specified amplitude, frequency, and midline.

F-IF.C.7e - Graph trigonometric functions, showing period, midline, and amplitude.

Assessment Idea: Trigonometric Function Graphing Challenge

Present students with various trigonometric functions and ask them to graph these functions, highlighting the period, midline, and amplitude.

Assess their understanding of how these parameters affect the shape and characteristics of the trigonometric graphs.

F-BF.B.3 - Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs.

Assessment Idea: Function Transformation Analysis

Provide students with graphs of trigonometric functions and ask them to identify the effects of various transformations, such as $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$.

Evaluate ability to recognize how these transformations impact the amplitude, frequency, and phase shift of trigonometric functions.

Interdisciplinary Connections

Interdisciplinary Connections	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
• (ELA) NJSLSA.SL1. 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. • (S) HS-PS4-5 Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. (S) HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	Appendix A for Modifications

Unit 9

Unit Title: Unit 9-Statistics and Data Analysis

Grade level: 10th-11th **Timeframe:** 15 Days

Guiding Questions

- What are the considerations when undertaking a statistical study?

Standards

Standards (Taught and Assessed)

Standards Taught and Assessed

S-1D.A.4 - Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

S-IC.A.2 - Decide if a specified model is consistent with results from a given data generating process, e.g. using simulation.

S-IC.A.1 - Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
S-IC.B.3 - Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S-IC.B.6 - Evaluate reports based on data.

S-IC.B.4 - Use data from a sample survey to estimate a population mean or proportion; develop a margin or error through the use of simulation models for random sampling.

S-IC.B.5 - Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

Highlighted Career Ready Practices and 21st Century Themes and Skill

- (CR) 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas.
- (CR) 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).
- (CS) 8.2.12.ITH.3: Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.

Highlighted Career Ready Practices and 21st Century Themes and Skill

- (CR) 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).
- (CS) 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.
- (CS) 8.2.12.ITH.3: Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.

https://www.nj.gov/education/safety/wellness/selearning/docs/SELCompetencies.pdf

Instructional Plan

Pre-Assessment and Reflection

Pre-Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
S-IC.A.2	Appendix A for Modifications

Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** eMath Instruction	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
S-ID.A.4-Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	**SMP 7-** Make sense and look for structure.	Calculate probabilities using normal distributions. Use z-scores and the standard normal tables to find probabilities.	A study finds that the weights of infants at birth are normally distributed with a mean of 3270 grams and a standard deviation of 600 grams. An infant is randomly chosen.	Appendix A for Modifications
S-IC.A.2-Decide if a specified model is consistent with results from a given data generating process, i.e. simulation.	**SMP4-** Model with mathematics.	Distinguish between populations and samples.	Identify the population and the sample. A survey of 4464 shoppers in the US found that they spent an average of $407.02 from Thursday through Sunday of a recent Thanksgiving weekend.	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** eMath Instruction	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
S-IC.A.1-Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	**SMP7-**Look for and make use of structure.	Describe experiments.	A company's researchers want to study the effects of adding shea butter to their existing conditioner. They monitor 30 customers who use just conditioner and 30 customers who use both,	Appendix A for Modifications
S-IC.B.3-Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	**SMP6-**Attend to precision	Recognize how randomization applies to experiments and observational studies.	Explain if this topic is better investigated through an experiment or observational study: Does vigorous exercise in older people result in longer life?	
S.IC.B.6-Evaluate reports based on data.	**SMP 7-**Look for and make use of structure.	Analyze experimental designs.	Describe how the research topic is best investigated and design a plan: A farmer wants to know whether a new fertilizer affects the weight of the fruit produced by a strawberry plant.	Appendix A for Modifications

SLO – WALT **We are learning to/that**	**Student Strategies**	**Formative Assessment**	**Activities and Resources** **eMath Instruction**	**Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**
S.IC.B.4-Use data from a sample survey to estimate a population mean or proportion, develop a margin of error through the use of simulation models for random sampling.	**SMP 7-**Look for and make use of structure.	Estimate population parameters. Find margins of errors for surveys.	A national pollster claims that 54% of US adults are married. You survey 50 people and find that 31 are married. What is the margin of error?	Appendix A for Modifications
S.IC.B.5-Use data from a randomized experiment to compare two treatments, use simulations to decide if differences between parameters are significant.	**SMP4-**Model with mathematics.	Organize data from an experiment with two samples. Resample data using a simulation to analyze a hypothesis.	Using the data collected from the two groups, students should create tables and histograms to compare results.	Appendix A for Modifications

Summative Assessments (add rows as needed)

Summative Assessment	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
• Common Assessment 1: **S-IC.A.1** • Common Assessment 2: **S-1D.A.4** • Common Assessment 3: **S-IC.B.5** Performance Task Unit 9	Appendix A for Modifications

Interdisciplinary Connections

Interdisciplinary Connections	Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections
• **(S) HS-LS3-1 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.** **(ELA) NJSLSA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.**	Appendix A for Modifications