# Algebra II Curriculum

*This curricula and accompanying instructional materials have been developed to align with the NJSLS and in accordance with the NJ Department of Education's guidelines to include: Curriculum designed to meet grade level expectations, integrated accommodations and modifications for students with IEPs, 504s, ELLs, and gifted and talented students, assessments including benchmarks, formative, summative, and alternative assessments, a list of core instructional and supplemental materials, pacing guide, interdisciplinary connections, integration of 21st century skills, integration of technology, and integration of 21st Century Life and Career standards.*

## About the Standards

In 1996, the New Jersey State Board of Education adopted the state's first set of academic standards called the Core Curriculum Content Standards. The standards described what students should know and be able to do upon completion of a thirteen-year public school education. Over the last twenty years, New Jersey's academic standards have laid the foundation for local district curricula that is used by teachers in their daily lesson plans.

Revised every five years, the standards provide local school districts with clear and specific benchmarks for student achievement in nine content areas. Developed and reviewed by panels of teachers, administrators, parents, students, and representatives from higher education, business, and the community, the standards are influenced by national standards, research-based practice, and student needs. The standards define a "Thorough and Efficient Education" as guaranteed in 1875 by the New Jersey Constitution. Currently the standards are designed to prepare our students for college and careers by emphasizing high-level skills needed for tomorrow's world.

The New Jersey Student Learning Standards include Preschool Teaching and Learning Standards, as well as nine K-12 standards for the following content areas: **21st Century Life and Careers, Comprehensive Health and Physical Education, English Language Arts, Mathematics, Science, Social Studies, Technology, Visual and Performing Arts, World Languages**

The most recent review and revision of the standards occurred in 2014. However, the standards in language arts and math underwent an additional review in 2015 with adoption by the New Jersey State Board of Education in May 2016.

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| **Content Area: Mathematics** | |
| **Course Title: Algebra II** | **Grade level: 10-12** |
| **Unit 1: Complex Solutions and Modeling with Rational Exponents** | **September - December** |
| **Unit 2: Polynomials and Analysis of Nonlinear Functions** | **January - April** |
| **Unit 3: Periodic Models and the Unit Circle** | **May** |
| **Unit 4: Probability** | **June** |
| **Date Created:** | **Board Approved On:** |
| | |

**Lower Cape May Regional School District (Insert Subject/Content Area) Curriculum**
**Unit 1 Overview**

**Content Area: Mathematics**

**Unit Title: Complex Solutions and Modeling with Rational Exponents**

**Target Course/Grade Level:10-12**

**Unit Summary:**

In Unit 1:

- Perform arithmetic operations with complex numbers
- Use complex numbers in polynomial identities and equations
- Build a function that models a relationship between two quantities
- Construct & compare linear, quadratic, & exponential models
- Write expressions in equivalent forms to solve problems
- Extend the properties of exponents to rational exponents
- Analyze functions using different representations

**Interdisciplinary Connections:**

(State primary content area interdisciplinary connections for this unit here.)

**21st Century Themes, Skills, and Standards:**

**CRP2 - Apply appropriate academic and technical skills.**
**CRP4 - Communicate clearly and effectively and with reason.**
**CRP8- Utilize critical thinking to make sense of problems and persevere in solving them.**
**CRP11- Use technology to enhance productivity.**

**Learning Targets**

| CPI # | Cumulative Progress Indicators (CPI) for Unit |
|---|---|
| F.BF.A.2 | Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. |
| A.SSE.B.4 | Derive and/or explain the derivation of the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments. |

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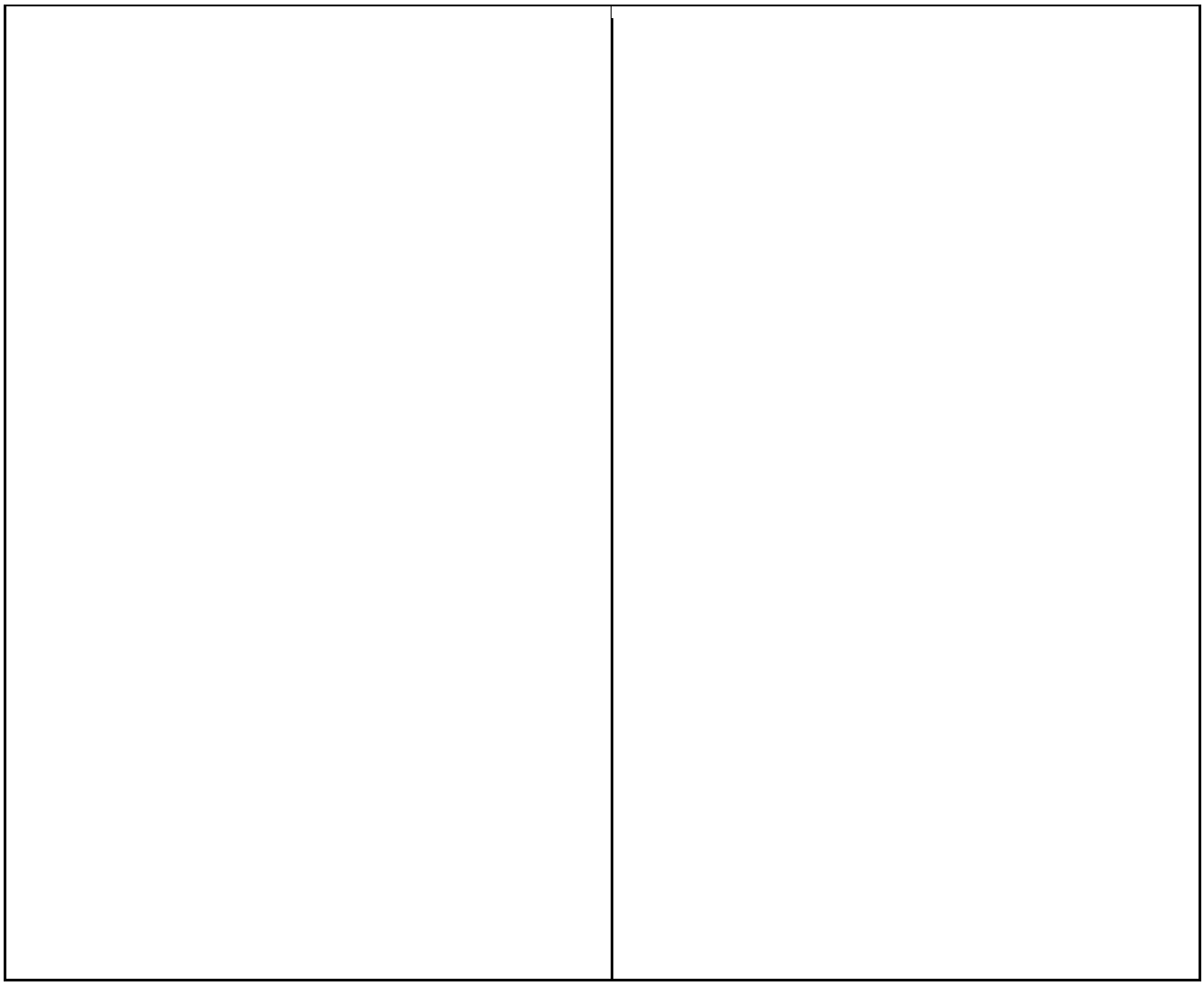
| N.RN.A.1 | Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5(^{1/3})^3$ to hold, so $(5^{1/3})^3$ must equal 5. |
| N.RN.A.2 | Rewrite expressions involving radicals and rational exponents using the properties of exponents |
| A.SSE.B.3 | Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression |
| A.SSE.B.3c | Use the properties of exponents to transform expressions for exponential functions. For example the expression $1.15^t$ can be rewritten as $(1.15^{1/12})^{12t}$ $\approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%. |

**Unit Enduring Questions:**

- What is the difference between a arithmetic and geometric sequence?
- Explain the process of rewriting expression containing rational expressions into radical form?
- Describe the property of exponents being used to simplify given exponential functions?

**Unit Enduring Understandings:**

- Add, subtract, and multiply complex numbers using the commutative, associative and distributive properties.
- Solve quadratic equations with real coefficients that have complex solutions by taking square roots, completing the square and factoring.
- Solve simple systems consisting of a linear and quadratic equation in two variables algebraically and graphically.
- Solve algebraically a system of three linear equations.
- Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
- Use the formula for the sum of a finite geometric series to solve problems [*for example, calculate mortgage payments*; derive the formula for the sum of a finite geometric series (when the common ratio is not 1)].
- Use properties of integer exponents to explain and convert between expressions involving radicals and rational exponents.
- *Use the properties of exponents to transform expressions for exponential functions, explain properties of the quantity revealed in the transformed expression or different properties of the function.*
- *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*



| **Unit Objectives:**<br>***Students will know….*** | **Unit Objectives:**<br>***Students will be able to…...*** |
|---|---|
| ● Recursion<br>● Series as a sum of a sequence<br>● derive or explain the derivation of the formula for the sum of a finite geometric series.<br>● use the formula for the sum of a finite geometric series to solve problems.<br>● Alternate, equivalent forms of an exponential expression containing rational exponents may reveal specific attributes of the function that it defines.<br>● Exponents and logarithms have an inverse relationship.<br>● Solutions to an exponential equation in one variable can be written as a logarithm. | ● distinguish between recursive and explicit formulas.<br>● represent geometric and arithmetic sequences recursively.<br>● represent geometric and arithmetic sequences with explicit formulas.<br>● translate between recursive form and explicit form of geometric and arithmetic sequences.<br>● recognize explicit formula for geometric sequences as exponential functions containing a domain in the integers only.<br>● interpret the parameters of an exponential function representing a geometric sequence.<br>● interpret the parameters of a linear function representing an arithmetic sequence.<br>● derive or explain the derivation of the formula for the sum of a finite geometric series.<br>● use the formula for the sum of a finite geometric series to solve problems.<br>● derive or explain the derivation of the formula for the sum of a finite geometric series.<br>● use the formula for the sum of a finite geometric series to solve problems.<br>● rewrite expressions containing rational exponents into radical form.<br>● rewrite expressions containing radical notation into exponential expressions containing rational exponents.<br>● use properties of exponent transform/rewrite an exponential expression for an exponential function.<br>● explain the properties of the quantity or the function.<br>● transform an exponential model represented by $ab^{ct} = d$ where $a$, $c$, and $d$ are numbers and the base $b$ is 2, 10, or $e$.<br>● write the solution to $ab^{ct} = d$ as a logarithm.<br>● use technology to evaluate logarithms having base 2, 10, or e |

**Lower Cape May Regional School District (Insert Subject/Content Area) Curriculum**
**Unit 2 Overview**

**Content Area: Mathematics**

**Unit Title: Polynomial and Analysis of Nonlinear Functions**

**Target Course/Grade Level: 10-12**

**Unit Summary:**

In Unit 2:

- Understand the relationship between zeros and factors of polynomials
- Interpret the structure of expressions
- Use polynomial identities to solve problems
- Analyze functions using different representations
- Rewrite rational expressions
- Understand solving equations as a process of reasoning and explain the reasoning
- Interpret functions in terms of the context
- Translate between the geometric description and the equation for a conic section
- Represent and solve equations and inequalities graphically

**Interdisciplinary Connections:**

- (State primary content area interdisciplinary connections for this unit here.)

**21st Century Themes, Skills, and Standards:**

**CRP2 - Apply appropriate academic and technical skills.**
**CRP4 - Communicate clearly and effectively and with reason.**
**CRP8- Utilize critical thinking to make sense of problems and persevere in solving them.**
**CRP11- Use technology to enhance productivity.**

## Learning Targets

| CPI # | Cumulative Progress Indicators (CPI) for Unit |
|---|---|
| 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), so p(a) = 0 if and only if (x – a) is a factor of p(x). |
| A.SSE.A.2 | Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$. |
| A.SSE.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. |
| A.REI.A.2 | Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. |
| A.REI.A.1 | 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. |
| 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. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. |

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

**Unit Enduring Questions:**

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**Unit Enduring Understandings:**

- Apply the Remainder Theorem in order to determine the factors of a polynomial.
- Use an appropriate factoring technique to factor polynomials. Explain the relationship between zeros and factors of polynomials, and use the zeros to construct a rough graph of the function defined by the polynomial.
- Graph polynomial functions from equations; identify zeros when suitable factorizations are available; show key features and end behavior.
- Use polynomial identities to describe numerical relationships and prove polynomial identities.
- Rewrite simple rational expressions in different forms using inspection, long division, or, for the more complicated examples, a computer algebra system.
- Solve simple rational and radical equations in one variable, use them to solve problems and show how extraneous solutions may arise. Create simple rational equations in one variable and use them to solve problems.
- For radical functions, 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
- Derive the equation of a parabola given a focus and directrix.
- Graph logarithmic functions expressed symbolically and show key features of the graph (including intercepts and end behavior).
- Find approximate solutions for f(x)=g(x), using technology to graph, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, logarithmic and exponential functions.

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## Unit Objectives:

***Students will know….***

- Polynomial division: For a polynomial $p(x)$ and a number *a:*

$p(a) = 0$ if and only if $(x – a)$ is a factor of $p(x)$

$(x – a)$ is a factor of $p(x)$ if and only if $p(a) = 0$

- Factors of polynomials can be used to identify zeros to be used to develop a rough graph of the polynomial function.
- Factors of polynomials can be used to identify zeros to be used to develop a rough graph of the polynomial function.
- Polynomial identities can be used to describe numerical relationships.
- Rational expressions can be written in different forms.
- Inverse relationships exist between roots and powers.
- Extraneous solutions do not result in true statements.
- A radical function is any function that contains a variable inside a root.
- Any point on a parabola is equidistant between the focus and the directrix.
- Logarithmic functions
- Solutions to complex systems of nonlinear functions can be approximated graphically

## Unit Objectives:

***Students will be able to…...***

- use the Remainder Theorem to determine factors of a polynomial.
- factor polynomials.
- analyze a table of values to determine where the polynomial is increasing and decreasing.
- use the zeros of the polynomial to create rough graph
- graph a polynomial function given its equation.
- identify zeros from the graph and using an appropriate factoring technique.
- show key features of the graph, including end behavior.
- use technology to graph and describe key features of the graph for complicated cases.
- show that the polynomial identity $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.
- prove polynomial identities.
- 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 $b(x)$.
- use inspection, factoring and long division to rewrite rational expressions.
- use technology to rewrite rational expressions for more complicated cases.
- use the inverse relationship between roots and powers when solving radical equations.
- identify any extraneous solutions.
- solve simple rational equations in one variable (degree of numerators and denominator is not greater than 2).
- write simple rational equations in one variable and use the rational equation to solve problems
- interpret key features of radical functions from graphs and tables in the context of the problem.
- sketch graphs of radical functions given a verbal description of the relationship between the quantities.
- identify intercepts and intervals where function is increasing/decreasing.
- determine the practical domain of a radical function.
- determine key features including intercepts; intervals where the function is increasing,

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| | decreasing, positive, or negative; relative maxima and minima; symmetries; end behavior.<br>● use the distance formula to write an equation of a parabola when the focus and directrix are given.<br>● graph logarithmic functions having base 2, 10 or e, using technology for more complicated cases.<br>● show intercepts and end behavior of logarithmic functions.<br>● find the solution to f(x)=g(x) approximately, e.g., using technology to graph the functions; include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.<br>● find the solution to f(x)=g(x) approximately, e.g., using technology to 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. |

**Lower Cape May Regional School District (Insert Subject/Content Area) Curriculum**
**Unit 3 Overview**

**Content Area: Mathematics**

**Unit Title: Periodic Models and the Unit Circle**

**Target Course/Grade Level: 10 - 12**

**Unit Summary:**

In Unit 3:

- Extend the domain of trigonometric functions using the unit circle
- Analyze functions using different representations
- Interpret functions that arise in applications in terms of the context
- Model periodic phenomena with trigonometric functions
- Prove and apply trigonometric identities
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Build a function that models a relationship between two quantities
- Build new functions from existing functions

**Interdisciplinary Connections:**

- Trigonometric concepts are used **extensively** in physics and engineering.
- Use of frequency in music and physics.

**21st Century Themes, Skills, and Standards:**

**CRP2 - Apply appropriate academic and technical skills.**
**CRP4 - Communicate clearly and effectively and with reason.**
**CRP8- Utilize critical thinking to make sense of problems and persevere in solving them.**
**CRP11- Use technology to enhance productivity.**

**Learning Targets**

| CPI # | Cumulative Progress Indicators (CPI) for Unit |
|---|---|
| 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.BF.A.1 | Write a function that describes a relationship between two quantities. |
| F.IF.C.9 | Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). |
| F.IF.C.7 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. |
| 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 measures of |

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| | angles traversed counterclockwise around the unit circle. |

| **Unit Enduring Questions:** | **Unit Enduring Understandings:** |
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| ● How do I graph a trigonometric function by hand and with the use of technology (showing period, midline, and amplitude)?<br>● What are the key features of the graph: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.<br>● What is the radian measure of an angle?<br>● What is the unit circle and how can we use it? | ● Graph trigonometric functions expressed symbolically, showing key features of the graph, by hand in simple cases and using technology for more complicated cases.<br>● Construct a function that combines, using arithmetic operations, standard function types to model a relationship between two quantities.<br>● Use the radian measure of an angle to find the length of the arc in the unit circle subtended by the angle and find the measure of the angle given the length of the arc.<br>● Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. |

| **Unit Objectives:**<br>***Students will know….*** | **Unit Objectives:**<br>***Students will be able to…...*** |
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| ● Relationship between the unit circle in the coordinate plane and graph of trigonometric functions.<br>● Functions of various types can be combined to model real world situations.<br>● Radian measure of an angle as the length of the arc on the unit circle that is subtended by the angle<br>● Relationship between degrees and radians<br>● Relationship between the unit circle in the coordinate plane and graph of trigonometric functions. | ● graph trigonometric functions, showing period, midline, and amplitude.<br>● use arithmetic operations to combine functions of varying types in order to model relationships between quantities.<br>● find the measure of the angle given the length of the arc.<br>● find the length of an arc given the measure of the central angle.<br>● convert between radians and degrees.<br>use the unit circle to evaluate sine, cosine and tangent of standard reference angles.<br>● graph trigonometric functions, showing period, midline, and amplitude. |

**Lower Cape May Regional School District (Insert Subject/Content Area) Curriculum**
**Unit 4 Overview**

**Content Area: Mathematics**

**Unit Title: Probability**

**Target Course/Grade Level: 10-12**

**Unit Summary:**

In Unit 4:

- Summarize, represent, and interpret data on a single count or measurement variable
- Understand and evaluate random processes underlying statistical experiments
- Make inferences and justify conclusions from sample surveys, experiments and observational studies
- Understand the independence and conditional probability and use them to interpret data
- Use the rules of probability to compute probabilities of compound events in a uniform probability model

**Interdisciplinary Connections:**

- History and social sciences
- Sciences, especially biology
- Engineering
- Health/physical education - sports
- Game Theory/Games of Chance
- Language Arts

**21st Century Themes, Skills, and Standards:**

**CRP2 - Apply appropriate academic and technical skills.**
**CRP4 - Communicate clearly and effectively and with reason.**
**CRP8- Utilize critical thinking to make sense of problems and persevere in solving them.**
**CRP11- Use technology to enhance productivity.**

| Learning Targets | |
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| **CPI #** | **Cumulative Progress Indicators (CPI) for Unit** |
| 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.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 |

| **Unit Enduring Questions:** | **Unit Enduring Understandings:** |
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| ● What is the purpose of (and difference among) sample surveys, experiments, and observational studies?<br>● How does randomization relate to sample surveys, experiments, and observational studies?<br>● How do I use data from a sample survey to estimate a population mean or proportion? | ● Identify the differences among and purposes of sample surveys, experiments, and observational studies, explaining how randomization relates to each.<br>● 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. |
| **Unit Objectives:**<br>***Students will know….*** | **Unit Objectives:**<br>***Students will be able to…...*** |
| ● Collecting data from a random sample of a population makes it possible to draw conclusions about the whole population.<br>● Randomly assigning individuals to different treatments allows a fair comparison of the effectiveness of those treatments.<br>● Sample surveys, experiments, and observational studies serve different statistical purposes allowing for different statistical analyses.<br>● Appropriately drawn samples of a population may be used to estimate a population mean or population proportion.<br>● Relationship between margin of error, variation with a data set, and variability in the population | ● distinguish between sample surveys, experiments, and observational studies.<br>● explain the importance of randomization in each of these processes.<br>● identify voluntary response samples and convenience samples.<br>● describe simple random samples, stratified random samples, and cluster samples.<br>● explain how under coverage, nonresponse, and question wording can lead to bias in a sample survey.<br>● conduct simulations of random sampling to gather samples.<br>● estimate population means with sample means. |

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| | ● estimate population proportions with sample proportions.<br>● calculate margins of error for the estimates.<br>● explain how the results relate to variability in the population. |

| **Lower Cape May Regional School District (Insert Subject/Content Area) Curriculum Evidence of Learning** |
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| **Specific Formative Assessments Utilized in Daily Lessons:**<br>● Misconception check, student conference, observation, self-assessment, quiz, Think-Pair-Share/Turn to Your Partner, oral questioning<br>● Big Ideas online assessments |
| **Summative Assessment Utilized throughout Units:**<br>● QBA's<br>● Benchmarks: Big Ideas Quizzes & Tests, Big Ideas online assessments |

**Modifications for ELL's, Special Education, 504, and Gifted and Talented Students:**
Teacher tutoring
Peer tutoring
Cooperative Learning Groups
Modified Assignments
Differentiated Instruction
Response to Intervention (www.help4teachers.com)
Follow all IEP and 504 modifications

**Teacher Notes:**

- As required by the NJ Department of Education, teachers in all content areas will integrate the 21st Century Life and Careers Standards. As the NJDOE indicates, "Providing New Jersey students with the life and career skills needed to function optimally within this dynamic context is a critical focus and organizing principle of K-12 public education. New Jersey has both an obligation to prepare its young people to thrive in this environment, and a vested economic interest in grooming an engaged citizenry made up of productive members of a global workforce that rewards innovation, creativity, and adaptation to change." The links below indicate the CPIs for grade ranges and need to be addressed throughout the units of study:

  Life and Career Standards

- As indicated in the NJSLS, standards and interdisciplinary connections will be integrated throughout content area curriculum. Links to relevant content standards can be found below:

  HSA.SSE.A.1, HSA.SSE.A.2, HSA.SSE.B.3, HSA.SSE.B.4, HSA.APR.A.1, HSA.APR.B.2, HSA.APR.B.3, HSA.APR.C.4, HSA.APR.C.5, HSA.APR.D.6, HSA.APR.D.7, HSA.CED.A.1, HSA.CED.A.2, HSA.CED.A.3, HSA.CED.A.4, HSA.REI.A.1, HSA.REI.A.2, HSA.REI.B.3, HSA.REI.B.4, HSA.REI.C.5, HSA.REI.C.6, HSA.REI.C.7, HSA.REI.C.8, HSA.REI.C.9, HSA.REI.D.10, HSA.REI.D.11, HSA.REI.D.12, HSF.IF.A.1, HSF.IF.A.2, HSF.IF.A.3, HSF.IF.B.4, HSF.IF.B.5, HSF.IF.B.6, HSF.IF.C.7, HSF.IF.C.8, HSF.IF.C.9, HSF.BF.A.1, HSF.BF.A.2, HSF.BF.B.3, HSF.BF.B.4, HSF.BF.B.5, HSF.LE.A.1, HSF.LE.A.2, HSF.LE.A.3, HSF.LE.A.4, HSF.LE.B.5, HSF.TF.A.1, HSF.TF.A.1, HSF.TF.A.2,

HSF.TF.A.3, HSF.TF.A.4, HSF.TF.B.5, HSF.TF.B.6, HSF.TF.B.7, HSF.TF.C.8, HSF.TF.C.9, HSS.ID.A.1, HSS.ID.A.2, HSS.ID.A.3, HSS.ID.A.4, HSS.ID.B.5, HSS.ID.B.6, HSS.ID.C.7, HSS.ID.C.8, HSS.ID.C.9, HSS.IC.A.1, HSS.IC.A.2, HSS.IC.B.3, HSS.IC.B.3, HSS.IC.B.4, HSS.IC.B.5, HSS.IC.B.6, HSS.CP.A.1, HSS.CP.A.2, HSS.CP.A.3, HSS.CP.A.4, HSS.CP.A.5, HSS.CP.B.6, HSS.CP.B.7, HSS.CP.B.8, HSS.CP.B.9, HSS.MD.A.1, HSS.MD.A.2, HSS.MD.A.3, HSS.MD.A.4, HSS.MD.B.5, HSS.MD.B.6, HSS.MD.B.7

http://www.corestandards.org/Math/

**Project-based Learning Tasks:**

- Several will be utilized throughout the curriculum - provided by Big Ideas curriculum, as well as original tasks created by the teacher

**Vocabulary:**

- In-text vocabulary should be incorporated into every unit. Word journals, vocabulary walls, and/or various other activities should be utilized by the instructor to teach vocabulary.

**The Research Process:**

- The research process must be integrated within each course curriculum. Student will be provided with opportunities to investigate issues from thematic units of study. As the NJSLS indicate, students will develop proficiency with MLA or APA format as applicable.

**Technology:**

- Students must engage in technology applications integrated throughout the curriculum.

Applicable technology utilized in this curricula are included below:
Ti-83 Calculators
Big Ideas
Kahn Academy
Youtube

**Resources:**

- Ancillary resources and materials used to deliver instruction are included below:

Various technology & math websites
Supplemental material created by the teacher as needed

**Differentiation Strategies**

Differentiation strategies can require varied amounts of preparation time. High-prep strategies often require a teacher to both create multiple pathways to process information/demonstrate learning and to assign students to those pathways. Hence, more ongoing monitoring and assessment is often required. In contrast, low-prep strategies might require a teacher to strategically create process and product choices for students, but students are allowed to choose which option to pursue given their learning profile or readiness level. Also, a low-prep strategy might be focused on a discrete skill (such as vocabulary words), so there are fewer details to consider. Most teachers find that integration of one to two new low-prep strategies and one high-prep strategy each quarter is a reasonable goal.

| **Low Prep Strategies (add to list as needed)** | |
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| **Varied journal prompts, spelling or vocabulary lists** | Students are given a choice of different journal prompts, spelling lists or vocabulary lists depending on level of proficiency/assessment results. |
| **Anchor activities** | Anchor activities provide meaningful options for students when they are not actively engaged in classroom activities (e.g., when they finish early, are waiting for further directions, are stumped, first enter class, or when the teacher is working with other students). Anchors should be directly related to the current learning goals. |
| **Choices of books** | Different textbooks or novels (often at different levels) that students are allowed to choose from for content study or for literature circles. |
| **Choices of review activities** | Different review or extension activities are made available to students during a specific section of the class (such as at the beginning or end of the period). |
| **Homework options** | Students are provided with choices about the assignments they complete as homework. Or, students are directed to specific homework based on student needs. |

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| **Student-teacher goal setting** | The teacher and student work together to develop individual learning goals for the student. |
| **Flexible grouping** | Students might be instructed as a whole group, in small groups of various permutations (homogeneous or heterogeneous by skill or interest), in pairs or individual. Any small groups or pairs change over time based on assessment data. |
| **Varied computer programs** | The computer is used as an additional center in the classroom, and students are directed to specific websites or software that allows them to work on skills at their level. |
| **Multiple Intelligence or Learning Style options** | Students select activities or are assigned an activity that is designed for learning a specific area of content through their strong intelligence (verbal-linguistic, interpersonal, musical, etc.) |
| **Varying scaffolding of same organizer** | Provide graphic organizers that require students to complete various amounts of information. Some will be more filled out (by the teacher) than others. |
| **Think-Pair-Share by readiness, interest, and/or learning profile** | Students are placed in predetermined pairs, asked to think about a question for a specific amount of time, then are asked to share their answers first with their partner and then with the whole group. |
| **Mini workshops to re-teach or extend skills** | A short, specific lesson with a student or group of students that focuses on one area of interest or reinforcement of a specific skill. |
| **Orbitals** | Students conduct independent investigations generally lasting 3-6 weeks. The investigations "orbit" or revolve around some facet of the curriculum. |
| **Games to practice mastery of information and skill** | Use games as a way to review and reinforce concepts. Include questions and tasks that are on a variety of cognitive levels. |

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| **Multiple levels of questions** | Teachers vary the sorts of questions posed to different students based on their ability to handle them. Varying questions is an excellent way to build the confidence (and motivation) of students who are reluctant to contribute to class discourse. Note: Most teachers would probably admit that without even thinking about it they tend to address particular types of questions to particular students. In some cases, such tendencies may need to be corrected. (For example, a teacher may be unknowingly addressing all of the more challenging questions to one student, thereby inhibiting other students' learning and fostering class resentment of that student.) |
| **High Prep Strategies (add to list as needed)** | |
| **Cubing** | Designed to help students think about a topic or idea from many different angles or perspectives. The tasks are placed on the six sides of a cube and use commands that help support thinking (justify, describe, evaluate, connect, etc.). The students complete the task on the side that ends face up, either independently or in homogenous groups. |
| **Tiered assignment/ product** | The content and objective are the same, but the process and/or the products that students must create to demonstrate mastery are varied according to the students' readiness level. |
| **Independent studies** | Students choose a topic of interest that they are curious about and wants to discover new information on. Research is done from questions developed by the student and/or teacher. The researcher produces a product to share learning with classmates. |
| **4MAT** | Teachers plan instruction for each of four learning preferences over the course of several days on a given topic. Some lessons focus on mastery, some on understanding, some on personal involvement, and some on synthesis. Each learner has a chance to approach the topic through preferred modes and to strengthen weaker areas |

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| **Jigsaw** | Students are grouped based on their reading proficiency and each group is given an appropriate text on a specific aspect of a topic (the economic, political and social impact of the Civil War, for example). Students later get into heterogeneous groups to share their findings with their peers, who have read about different areas of study from source texts on their own reading levels. The jigsaw technique allows you to tackle the same subject with all of your students while discreetly providing them the different tools they need to get there. |
| **Multiple texts** | The teacher obtains or creates a variety of texts at different reading levels to assign strategically to students. |
| **Alternative assessments** | After completing a learning experience via the same content or process, the student may have a choice of products to show what has been learned. This differentiation creates possibilities for students who excel in different modalities over others (verbal versus visual). |
| **Modified Assessments** | Assessments can be modified in a variety of ways – for example by formatting the document differently (e.g. more space between questions) or by using different types of questions (matching vs. open ended) or by asking only the truly essential questions. |
| **Learning contracts or Personal Agendas** | A contract is a negotiated agreement between teacher and student that may have a mix of requirements and choice based on skills and understandings considered important by the teacher. A personal agenda could be quite similar, as it would list the tasks the teacher wants each student to accomplish in a given day/lesson/unit. Both Learning contracts and personal agendas will likely vary between students within a classroom. |
| **Compacting** | This strategy begins with a student assessment to determine level of knowledge or skill already attained (i.e. pretest). Students who demonstrate proficiency before the unit even begins are given the opportunity to work at a higher level (either independently or in a group). |

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| **Literature circles** | Flexible grouping of students who engage in different studies of a piece of literature. Groups can be heterogeneous and homogeneous. |
| **Learning Centers** | A station (or simply a collection of materials) that students might use independently to explore topics or practice skills. Centers allow individual or groups of students to work at their own pace. Students are constantly reassessed to determine which centers are appropriate for students at a particular time, and to plan activities at those centers to build the most pressing skills. |
| **Tic-Tac-Toe Choice Board (sometimes called "Think-Tac-Toe"** | The tic-tac-toe choice board is a strategy that enables students to choose multiple tasks to practice a skill, or demonstrate and extend understanding of a process or concept. From the board, students choose (or teacher assigns) three adjacent or diagonal. To design a tic-tac-toe board: - Identify the outcomes and instructional focus - Design 9 different tasks - Use assessment data to determine student levels - Arrange the tasks on a tic-tac-toe board either randomly, in rows according to level of difficulty, or you may want to select one critical task to place in the center of the board for all students to complete. |

**Curriculum development Resources/Instructional Materials:**

List or Link Ancillary Resources and Curriculum Materials Here:

- Big Ideas
- Various technology & math websites
- Supplemental material created by the teacher as needed

**Board of Education Approved Text(s)**

- Big Ideas Math - Algebra 2