

OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT

Content Area: Mathematics

Course Title: Essentials of Algebra

Grade Level: 9, 10

Unit Plan 1
Linear Equations/Inequalities,
Absolute Value

Pacing Guide
6 weeks

Unit Plan 2
Graphs of Linear Equations,
Linear Inequalities, and
Absolute Value Equations

Pacing Guide
5 weeks

Unit Plan 3
Systems of Equations and Inequalities

Pacing Guide
4 weeks

Unit Plan 4
Exponents and Proportional Applications

Pacing Guide
3 weeks

Unit Plan 5
Polynomials

Pacing Guide
5 weeks

Unit Plan 6
Quadratics Equations

Pacing Guide
7 weeks

**Unit Plan 7
Functions and Radicals**

**Pacing Guide
2 weeks**

**Unit Plan 8
Probability**

**Pacing Guide
2 weeks**

**Unit Plan 9
Data Analysis**

**Pacing Guide
2 weeks**

Date Created: February 2012

Board Approved on: March 14, 2012

OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview

Content Area: Mathematics

Unit Title: Linear Equations/Equalities and Absolute Value

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

Manipulating expressions, equations and inequalities algebraically to evaluate expressions and solve equations and inequalities.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at:
<http://www.corestandards.org/the-standards/mathematics>

Learning Targets

Content Standards

Solve equations and inequalities in one variable

3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Create equations that describe numbers or relationships

1. 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.*
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R .*

Understand solving equations as a process of reasoning and explain the reasoning

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.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How do you translate real-life situations into equations and inequalities? • How do you solve equations and inequalities using algebra and other strategies? 	<p>Unit Enduring Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • Equation solving is working backward and undoing operations. • The solution to an inequality is a set, not just a single solution. • There is a connection between absolute value and linear equations.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • How to write algebraic expressions using variables. • How to simplify expressions using order of operations, the distributive property, and combining like terms. • How to translate expressions and statements into algebraic expressions, equations, and inequalities. • How to evaluate variable expressions. • How to check solutions of equations and inequalities. • How to use a process including properties of equality and justification to solve equations and inequalities. • The sign-change rule for multiplying or dividing both sides of a one-variable inequality by a negative number. • How to solve literal equations for given variable. • How to solve absolute value equations that contain 0, 1, or 2 solutions. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Solve a wide variety of equations and inequalities using aforementioned skills.

OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Evidence of Learning

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:
<http://www.state.nj.us/education/cccs/>

- Observation
- Homework
- Class participation
- DO-NOW
- Notebook

Summative Assessments

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- Chapter/Unit Test
- Quizzes
- Presentations
- Unit Projects
- Quarterlies and Final Exams

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum Development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- Textbook (Discovering Algebra – An Investigative Approach)
- TI-84 Graphing Calculator
- Microsoft Excel
- Teacher-made tests, worksheets, warm-ups, and quizzes
- Computer software to support unit

OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview

Content Area: Mathematics

Unit Title: Graphs of Linear Equations, Linear Inequalities, and Absolute Value Equations

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

Model real-world data by two-variable graphing. By using algebra skills, be able to predict outcomes or estimate unknown data related to given data. Apply skills from linear equations to both inequalities and absolute value graphs.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

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Learning Targets

Content Standards

Create equations that describe numbers or relationships

2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
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. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

Represent and solve equations and inequalities graphically

10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
12. Graph the solutions to a linear inequality in two variables as a halfplane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How can linear equations be used to model real world data? • How can linear graphing be used to predict outcomes? • When is it reasonable to estimate with a line of best fit? 	<p>Unit Enduring Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • The equation in multiple formats, and its application to inequalities and absolute value. • Line of fit will allow students to predict unknown values.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • Plot points & name coordinates of points on the coordinate plane. • How to calculate slope of a line using the formula $\frac{y_2 - y_1}{x_2 - x_1}$. • How to identify the slope of a line from its graph. • How to write the equation of a line given its graph or two points on the line. • How to write an equation in slope intercept form, point-slope form, and standard form. • How to represent the solution of a two-variable equation as a linear graph. • How to graph real data as a scatter plot and estimate line of best fit to predict an outcome. • How to calculate linear regression with a graphing calculator. • How to represent the solution of a two-variable inequality as a linear graph. • How to use the graphing calculator to graph equations, inequalities, and system of equations/inequalities. • How to graph absolute value equations. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Graph a wide variety of equations and inequalities using aforementioned skills. Look at graphs and determine the matching equation.

**OCEAN COUNTY MATH CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Evidence of Learning**

Formative Assessments

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**OCEAN COUNTY MATH CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview**

Content Area: Mathematics

Unit Title: Systems of Equations and Inequalities

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

Solve systems of equations and inequalities using a variety of methods.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

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Learning Targets

Content Standards

Solve systems of equations

5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Represent and solve equations and inequalities graphically

12. Graph the solutions to a linear inequality in two variables as a halfplane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How to solve systems of equations using graphing, substitution, and elimination. • Understand when each method is appropriate. • How to solve systems of inequalities using graphing, and what the intersecting region represents. 	<p>Unit Enduring Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • That the intersection of two lines provides a solution to the system. • Solving systems by graphing has its limitations. • Multiplying an entire equation by a non-zero constant does not change the value of the equation. • A real world solution to a system of equations has significance in the real world.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • How to solve systems of linear equations. • How to solve systems using substitution. • How to solve systems using elimination. • How to solve systems using graphing. • How to solve systems of linear inequalities. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Solve systems using all methods and document its real world meaning.

**OCEAN COUNTY MATH CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Evidence of Learning**

Formative Assessments

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Summative Assessments

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Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum Development Resources/Instructional Materials/Equipment Needed Teacher Resources:

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- TI-84 Graphing Calculator
- Microsoft Excel
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**OCEAN COUNTY MATH CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview**

Content Area: Mathematics

Unit Title: Exponents and Proportional Application

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

Simplify expressions involving exponents and scientific notation. Model real world problems with exponential growth and decay equations and proportional applications.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at:

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Learning Targets

Content Standards

Extend the properties of exponents to rational exponents.

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.*
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Analyze functions using different representations

8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
 - 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.*

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How does exponential change differ from linear change? • How can we apply the concept of exponential growth to real world problems? • How can we use proportional thinking to solve various problems related to mathematical problems? 	<p>Unit Enduring Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • There can still be a relationship between two numbers even if there is no linear pattern. • Proportional thinking is utilized to make educated predictions on larger populations based upon accepted facts and smaller samples. • Scientific notation can be used to represent extremely large or extremely small numbers. • Expressions involving exponents may be simplified.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • How to solve equations using proportions. • How to solve percent problems using proportions. • How to solve percent increase and decrease problems. • How to solve problems using rates. • How to apply an equation for exponential growth or decay to real-life problems. • How to rewrite expressions using rules (properties) of exponents. • How to write numbers in scientific notation or standard notation. • How to rewrite an expression with exponents as an expression with the opposite of those exponents. • How to write exponential equations that model real-world growth and decay data. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Simplify exponents using the laws of exponents. Write number in scientific notation and standard notation. Use proportional reasoning and exponential growth/decay equations to solve real world problems.

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Evidence of Learning**

Formative Assessments

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Modifications (ELLs, Special Education, Gifted and Talented)

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Curriculum Development Resources/Instructional Materials/Equipment Needed Teacher Resources:

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**OCEAN COUNTY MATH CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview**

Content Area: Mathematics

Unit Title: Polynomials

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

Students will begin working with polynomials. After naming polynomials they will perform the basic operations on two or more polynomials. Students will also factor polynomials.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at:

<http://www.corestandards.org/the-standards/mathematics>

Learning Targets

Content Standards

Perform arithmetic operations on polynomials

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

Interpret the structure of expressions

1. Interpret expressions that represent a quantity in terms of its context.
 - a. Interpret parts of an expression, such as terms, factors, and coefficients.
 - b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P .*
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 $(x^2 - y^2)(x^2 + y^2)$.*

Write expressions in equivalent forms to solve problems

3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
 - a. Factor a quadratic expression to reveal the zeros of the function it defines.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How do polynomials form a system similar to the integers? • How would we perform the basic mathematical operations on polynomials and polynomial equations? 	<p>Unit Enduring Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • Like integers, polynomials can be added, subtracted, and multiplied. • Recognize, evaluate polynomials. • Add, subtract, multiply and divide polynomials. • Factor polynomials.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • How to simplify polynomial expressions using addition, subtraction, and multiplication. • How to factor a greatest common factor from a polynomial. • How to factor a trinomial to the product of two binomials. • How to factor a polynomial using the difference of two squares. • How to identify a polynomial function and determine its degree. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Extend their study of functions to general polynomials. They investigate the notation, concepts, and properties associated with polynomials, and perform operations. Students also begin factoring polynomials.

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Evidence of Learning**

Formative Assessments

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- Observation
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Summative Assessments

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- Chapter/Unit Test
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Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
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Curriculum Development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- Textbook (Discovering Algebra – An Investigative Approach)
- TI-84 Graphing Calculator
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**OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview**

Content Area: Mathematics

Unit Title: Quadratic Equations

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

The student will be able to graph a quadratic function. The student will be able to determine the effect of 'a' of $y = ax^2$ for $a > 1$ to determine the direction of the graph, the vertex point and whether the vertex point is a maximum or a minimum point. This lesson is designed to help students solve quadratic equations by using the Quadratic Formula, factoring, and graphing. Students will identify the most efficient method for solving a quadratic equation and solve the quadratic equation.

Primary interdisciplinary connections:

Infused within the unit are connections to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career standard 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross-cultural understanding and interpersonal communication.

Technology connections:

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Learning Targets

Content Standards

Understand the relationship between zeros and factors of polynomials

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.

Analyze functions using different representations

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
 - a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
 - c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How can we model applications using quadratic functions? • How can we solve quadratic equations using the quadratic formula, factoring, or the graph of the parabola? 	<p>Unit Enduring Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • Understand what a quadratic equation is. • Be able to recognize the form of a quadratic equation. • Determine how to manually solve a quadratic equation (two methods). • Determine how to solve a quadratic equation using a TI-83.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • How to solve quadratic functions. • How to graph parabolas. • How to display and analyze projectile motion. • How to find the x-intercepts of parabolas, roots and solutions. • How to determine the vertex and general form of a quadratic. • How to utilize the zero-product property to solve equations. • How to factor and solve quadratic equations. • How to solve quadratic equations using the quadratic formula. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Solve quadratic equations by factoring or completing the square. Use the quadratic formula to find the roots of a second degree polynomial and to solve quadratic equations. Graph quadratic functions and know that their roots are the x-intercepts. Use the quadratic formula or factoring or both to determine whether the graph of a quadratic function will intersect the x-axis in zero, one or two points.

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Evidence of Learning**

Formative Assessments

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**OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview**

Content Area: Mathematics

Unit Title: Functions and Radicals

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

Students will utilize function notation when describing the relationship between 2 quantities and describe it utilizing terms such as “domain” and “range”. They will determine domain and range values for linear functions, and compare their properties with non linear functions; in particular, the behavior of exponential functions.

Students will simplify radical expressions involving constants and variables, and identify the difference between rational and irrational results.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at:

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Learning Targets

Content Standards

Understand the concept of a function and use function notation

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 of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.
2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

Interpret functions that arise in applications in terms of the context

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.*
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

Analyze functions using different representations

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
 - a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
 - b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
 - a. 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.
 - 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.*

Extend the properties of exponents to rational exponents.

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.*
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • What does $f(x)$ mean? • How do I compute domain and range values of particular functions, and how do I find when two functions have equivalent range values? • How are squares, square roots, and absolute values related to the concept of functions? • How do I simplify radical expressions without finding an <i>exact</i> final number, and how do I simplify radical quantities involving radical expressions. 	<p>Unit Enduring Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • They can describe numerical and real world relationships using function notation and identify both the domain and range for these values. Apply algebraic skills to linear functions, quadratic, absolute value, and exponential functions. They will find the point of intersection of two functions and its real world significance. • Simplify radical constants by pulling out of the radical the largest perfect square. • Simplify radical variable expressions with both even and odd exponents, and utilizing absolute value symbols when necessary.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • How to describe the domain and range of a function. • How to find the range for a particular x using evaluating skills, and find the domain of a particular y value utilizing equation solving skills. • How to graph non linear functions, especially absolute value, exponential, and quadratic models. • Given to functions, find their point of intersection on a graph and/or the domain value where their range values are identical. • How to work with composite functions; i.e. $f(g(x))$ and $g(f(x))$ • How to simplify both constant and variable radical expressions if possible. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Describe the range and domain of functions as a mathematical statement. Apply evaluating expression and equation solving skills to find domain and range values of functions. Graph functions both linear and non – linear and utilize systems by graphing methods to determine when $f(x) = g(x)$. Finally, students will compute composite function values and realize $f(g(x))$ and $g(f(x))$ are not necessarily equivalent. Utilize laws of exponents and inverse relationships to simplify both constant and variable radical expressions.

**OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Evidence of Learning**

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://www.state.nj.us/education/cccs/>

- Observation
- Homework
- Class participation
- DO-NOW
- Notebook

Summative Assessments

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- Chapter/Unit Test
- Quizzes
- Presentations
- Unit Projects
- Quarterlies and Final Exams

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum Development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- Textbook (Discovering Algebra – An Investigative Approach)
- TI-84 Graphing Calculator
- Microsoft Excel
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- Computer software to support unit

**OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview**

Content Area: Mathematics

Unit Title: Probability

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

Students will be able to conduct and draw conclusions from independent and dependent probability experiments. They will then use the concepts from simple probability and apply these concepts to compound probability experiments, utilizing permutations and combinations as a method to find the total possibilities involved in an experiment.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at:

<http://www.corestandards.org/the-standards/mathematics>

Learning Targets

Content Standards

Understand independence and conditional probability and use them to interpret data

1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).
2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*

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

7. Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.
9. Use permutations and combinations to compute probabilities of compound events and solve problems.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How is probability related to real world events? • How do independent events differ from dependent events, and what is the impact on compound probability calculations? • What is the likelihood of something happening? 	<p>Unit Enduring Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • You can determine the probability of an event using either data in an experiment or predetermined theoretical information. • Given the probability of an event occurring is x, then the probability of it not happening is $(1 - x)$, provided one or the other is certain. • Determining if order plays a part is significant in calculating the probability of an event.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • How to calculate the experimental probability of an event given trial data. • How to calculate the theoretical probability of an event without conducting a trial. • How to calculate the probability of two events happening ($P(A \text{ and } B)$) as well as the probability of one of the events happening ($P(A \text{ or } B)$), provided the events are independent. • How to calculate the total number of combinations and permutations for an experiment given the possible outcomes of events or trials. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Calculate the experimental probability of a particular outcome given the results of an experiment. Calculate the theoretical probability of an outcome given information without an actual trial. Provided events are independent, determine the likelihood both things occur or the likelihood one of the things occurs, and then utilizing complementary events to determine the probability neither occurs. Determine if order is a significant part of an experiment; after, using permutations and combinations to determine the total number of possible outcomes, knowing which is appropriate.

**OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Evidence of Learning**

Formative Assessments

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**OCEAN COUNTY MATHEMATICS CURRICULUM
SOUTHERN REGIONAL SCHOOL DISTRICT
Unit Overview**

Content Area: Mathematics

Unit Title: Data Analysis

Target Course/Grade Level: Essentials of Algebra / 9, 10

Unit Summary

Students will collect, organize, analyze, and describe data. From these data displays students will make inferences and convincing arguments based on data analysis.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st century themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at:
<http://www.corestandards.org/the-standards/mathematics>

Learning Targets

Content Standards

Summarize, represent, and interpret data on a single count or measurement variable

1. Represent data with plots on the real number line (dot plots, histograms, and box plots).
2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

Summarize, represent, and interpret data on two categorical and quantitative variables

5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

Unit Essential Questions

- How can we use graphs to display real-life data?
- How are the measures of central tendency used to predict outcomes of real-life data?

Unit Enduring Understandings

- Students will understand that...*
- Data displays can help them make informed decisions.
 - Analyzing data by making tables and graphs and looking for patterns of change will guide real world

<ul style="list-style-type: none"> • How can we compare different sets of data or different data displays of the same data? 	<p>decision making.</p> <ul style="list-style-type: none"> • Selecting an appropriate model to begin the search for answers or solutions to a question or problem is extremely important.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • How to collect, analyze, and compare different sets of data. • How to display and interpret data using appropriate graphs. • How to display data so it is misleading and not misleading. • How to find the mean, median, mode, and range on collection of data and make predictions. • How to estimate the mean. • How to use graphing calculator to display data appropriately. • How to select the appropriate measure of central tendency for selected data. • How to create and analyze scatter plot displays of a two-variable data set. • How to represent two-variable data with a matrix. • Matrix operations. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Make real-life decisions based upon educated analysis of information. Critically read data from tables, charts or graphs. Determine, for a data set, measures of central tendency, variability, and correlation. Use the data and their characteristics to draw and support conclusions. Make predictions based on data, including interpolations and extrapolations. Employ mathematical models to make inferences and predictions to answer questions and solve problems.

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