Board Approved August 2017

DEPARTMENT: Mathematics COURSE: Algebra II

Week	Marking Period 1	Week	Marking Period 3
1	Review Linear Equations & Functions	19	Rational Functions & Relations
2	Review Systems of Equations	20	Rational Functions & Relations
3	Quadratic Functions & Relations	21	HSPA Prep
4	Quadratic Functions & Relations	22	HSPA Prep
5	Quadratic Functions & Relations	23	Rational Functions & Relations
6	Quadratic Functions & Relations	24	Rational Functions & Relations
7	Polynomials & Polynomial Functions	25	Conics
8	Polynomials & Polynomial Functions	26	Conics
9	Polynomials & Polynomial Functions	27	Conics
Week	**Marking Period 2**	**Week**	**Marking Period 4**
10	Polynomials & Polynomial Functions	28	Conics
11	Inverse & Radical Functions & Relations	29	Sequences & Series
12	Inverse & Radical Functions & Relations	30	Sequences & Series
13	Inverse & Radical Functions & Relations	31	Sequence & Series
14	Inverse & Radical Functions & Relations	32	Statistics & Probability
15	Exponential & Logarithmic Functions & Relations	33	Statistics & Probability
16	Exponential & Logarithmic Functions & Relations	34	Trigonometry
17	Exponential & Logarithmic Functions & Relations	35	Trigonometry
18	Exponential & Logarithmic Functions & Relations	36	Trigonometry

ALGEBRA II

Time Frame	**Standard- 5 days Block- 3 days**

Topic

Review of Linear Equations and Functions

Essentials Questions

- How can mathematical ideas be represented?
- How are equations, inequalities, and their graphs used to solve real-world problems?
- Why are relations and functions represented in multiple ways?
- How does the graph of a given function or relation reflect its characteristics?
- How is a scatterplot used to analyze trends?

Enduring Understandings

- Linear functions can be used to model real-world situations.
- Algebraic properties govern the fluent manipulation of symbols in expressions, equations, and inequalities.
- Linear functions can be represented verbally, numerically, graphically, and analytically to understand patterns and relationships.
- Rates of change can be represented mathematically and graphically.

Alignment to NJSLS

F.FI.4, F.FI.5, F.FI.6, F.FI.7b, F.FI.9, A.SSE.1b, A.CED.2, A.CED.3, F.BF.3

Key Concepts and Skills

RELATIONS AND FUNCTIONS

- Analyze relations and functions
- Use relations and functions

LINEAR RELATIONS AND FUNCTIONS

- Identify linear relations and functions
- Write linear equations in standard form

RATE OF CHANGE AND SLOPE

- Find the rate of change
- Determine the slope of a line

WRITING LINEAR EQUATIONS

- Write an equation of a line given the slope and a point on the line
- Write an equation of a line parallel or perpendicular to a given line

SCATTERPLOTS AND LINES OF REGRESSION

- Use scatterplots and prediction equations
- Model data using lines of regression

SPECIAL FUNCTIONS

- Write and graph piece-wise functions
- Write and graph step and absolute value functions

PARENT FUNCTIONS AND TRANSFORMATIONS

- Identify and use parent functions
- Describe transformations of functions

GRAPHING LINEAR AND ABSOLUTE VALUE INEQUALITIES

- Graph linear inequalities
- • Graph absolute value inequalities

Learning Activities

ALGEBRA II

CBL Activities- Matching the Graph
Time vs Distance
Piecewise Functions
Height vs Weight Scatterplots
Rubber Band Lab
Bridges & Pennies Lab
Use communicators or dry eraser board sets to graph linear equations

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

Social Studies- use scatter plots and lines of best fit to make predictions
Science- Rubber Band Lab, Conversion between Fahrenheit and Celsius, Water pressure vs depth

Technology Integration

8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
Graphing Calculators
Computer Software- Green Globs
Calculator Based Range- Motion Detectors
Responders

ALGEBRA II

Time Frame	Standard- 5 days Block- 2 days

Topic

Review of Systems of Equations and Inequalities

Essential Questions

- How can you find the solution to a math problem?
- How many solutions does the system have?
- Which method of solving a system works best in a given situation?
- How do you decide which region to shade in an inequality?
- Why do some systems have one solution, no solution, or an infinite number of solutions?
- What are some real-world applications to solving systems of equations?
- What type of real life situation can be modeled with a system of linear equations?

Enduring Understandings

- Graphs and equations are alternative (and often equivalent) ways for depicting and analyzing families of linear functions. A variety of families of functions and methods can be used to model and solve real world situations.
- Creating a graph is not the same as interpreting the information displayed.

Alignment to New Alignment to NJSLS

A.CED.3, A.REI.11

Key Concepts and Skills

SOLVING SYSTEMS OF EQUATIONS

- Solve systems of linear equations graphically
- Solve systems of linear equations algebraically

SOLVING SYSTEMS OF INEQUALITIES BY GRAPHING

- Solve systems of linear equations graphically
- Determine the coordinates of the vertices of a region formed by the graph of a system of inequalities

*OPTIMIZATION WITH LINEAR PROGRAMMING

- Find the maximum and minimum values of a function over a region
- Solve real-world optimization problems using linear programming

*SYSTEMS OF EQUATIONS IN THREE VARIABLES

- Solve systems of equations in three variables
- Solve real-world problems using systems of linear equations in three variables

ORGANIZING DATA WITH MATRICES

- Organize and display data using matrices and spreadsheets
- Analyze data in matrices
- Perform algebraic operations with matrices

MULTIPLYING MATRICES

- Multiply matrices
- Use the properties of matrix multiplication

- Use a graphing calculator to explore operations with matrices

*SOLVING SYSTEMS OF EQUATIONS USING CRAMER'S RULE

- Evaluate determinants
- Solve systems of linear equations by using Cramer's Rule

*SOLVING SYSTEMS OF EQUATIONS USING INVERSE MATRICES

- Find the inverse of a 2X2 matrix
- Write and solve matrix equations for a system of equations

*AUGMENTED MATRICES

- Using a graphing calculator and the augmented matrix for a system of equations to solve the system

Learning Activities

Linear Programming Activity- Riders and Rovers
Matrices Activity using graphing calculator- solving systems, determinants, inverses
Matrix "Eggsperiment"
Adding Matrices
Green Globs Activity

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

Business- optimize profit, comparing profits between two plans

Technology Integration

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Graphing Calculators
Computer Software- Green Globs
Responders

ALGEBRA II

Time Frame	Standard- 20 days Block- 10 days

Topics

Quadratic Functions and Relations

Essential Questions

- Why do we use different methods to solve math problems?
- Where in real life do we solve quadratic equations?
- How do you know if an equation is quadratic?
- How do you know which method to use when solving quadratic equations?
- When is it more efficient to use standard form over vertex form (and vice versa) when graphing a parabola?
- When do we use quadratic functions to solve everyday problems?
- What can we learn about the graph of a quadratic equation?

Enduring Understandings

- There are several strategies to solve quadratic equations.
- Simplifying expressions and solving equations allow us to take a complex situation and make it simple.
- Quadratic functions model real-world phenomena.
- Using previous knowledge to help you solve problems allows you to grow.
- Mathematical models can be used to describe physical relationships; these relationships are often non-linear.

Alignment to NJSLS

A.CED.3, A.REI.11, N.CN.1, N.CN.7, N.CN.8, N.CN.9

Key Concepts and Skills

GRAPHING QUADRATIC FUNCTIONS

- Graph quadratic functions
- Find and interpret the maximum and minimum values of a quadratic function
- Using a graphing calculator to model data points for which the curve of best fit is a quadratic function

SOLVING QUADRATIC EQUATIONS BY GRAPHING

- Solve quadratic equations by graphing
- Estimate solutions of quadratic equations by graphing
- Use a graphing calculator to solve quadratic equations

SOLVING QUADRATIC EQUATIONS BY FACTORING

- Write quadratic equations in intercept form
- Solve quadratic equations by factoring

COMPLEX NUMBERS

- Perform operations with pure imaginary numbers
- Perform operations with complex numbers
- Graph complex numbers on a complex plane and determine the absolute value of complex numbers

*COMPLETING THE SQUARE

- Solve quadratic equations by using the square root property

- Solve quadratic equations by using completing the square

THE QUADRATIC FORMULA AND THE DISCRIMINANT

- Solve quadratic equations by using the quadratic formula
- Use the discriminant to determine the number and type of roots of a quadratic equation

TRANSFORMATIONS OF QUADRATIC GRAPHS

- Use the graphing calculator to investigate changes to parabolas
- Write a quadratic function in the form $y=a(x-h)^2+k$
- Trans form graphs of quadratic functions of the form $y=a(x-h)^2+k$

*QUADRATIC INEQUALITIES

- Graph quadratic inequalities in two variables
- Solve quadratic inequalities in one variable

Learning Activities

Use Algebra Tiles to review trinomial patterns
Solve quadratic equations by finding the zeros on the graphing calculator
Green Globs- Transformations
Use graphing calculators- Quad reg & Stat Plot
Use of communicators or dry eraser board sets

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X X	**Creativity**	X X	**Critical Thinking**	X X	**Communication**	X X	**Collaboration**
X X	**Life & Career Skills**		**Information Literacy**		**Media Literacy**		

Interdisciplinary Connections

Financial Literacy- insurance rates function of age and the number of accidents
Physics- quadratic functions relating velocity, height, etc.

Technology Integration

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Graphing Calculators
Computer Software- Green Globs
Responders

ALGEBRA II

Time Frame	**Standard- 14 days Block- 7 days**

Topic

Polynomials and Polynomial Functions

Essential Questions

- Why is math used to model real-world situations?
- How do we use polynomial patterns to make real-world predictions?
- How can I use the remainder and factor theorems to solve polynomials?

Enduring Understandings

- The arithmetic of rational expressions is governed by the same rules as the arithmetic of rational numbers.
- Defining and solving the problem begins by selecting the appropriate procedural tool.
- The characteristics of polynomial functions and their representations are useful in solving real-world problems.
- The domain and range of polynomial functions can be extended to include the set of complex numbers.

Alignment to NJSLS

A.CED.1, A.REI.11, A.APR.2, A.APR.3, A.APR.4, F.FI.7c, N.CN.9

Key Concepts and Skills

SOLVING POLYNOMIAL EQUATIONS

- Factor polynomials
- Solve polynomial equations by factoring
- * Prove polynomial identities

THE REMAINDER AND FACTOR THEOREMS

- Evaluate functions by using synthetic substitution
- Determine whether a binomials is a factor of a polynomial by using synthetic substitution

ROOTS AND ZEROES

- Determine the number and type of roots for a polynomial equation
- Find the zeroes of a polynomial function
- Use a graphing calculator to analyze polynomial functions

RATIONAL ZERO THEOREM

- Identify possible rational zeros of a polynomial function
- Find all the rational zeros of a polynomial function

Learning Activities

Algebra Tile Activity to divide polynomials
Dividing Polynomials Lab

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
x	Life & Career		Information		Media Literacy		
	Skills		Literacy				

ALGEBRA II

Interdisciplinary Connections
Business- forecast sales trends, develop profit margins Science- projectile motion
Technology Integration
8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge. Graphing Calculators Computer Software- Green Globs Responders

Time Frame	**Standard- 20 days Block- 10 days**

ALGEBRA II

Topic

Inverses and Radical Functions and Relations

Essential Questions

- How can you choose a model to represent a set of data?
- How do we apply mathematical principles?
- What makes an algebraic algorithm both effective and efficient?
- How do operations affect numbers?

Enduring Understandings

- Algebraic representations can be used to generalize patterns in mathematics
- Patterns and relationships can be represented graphically, numerically, symbolically, or verbally

Alignment to NJSLSCore Standards

F.IF.4, F.IF.7b, F.IF.9, F.BF.1b, F.BF.3, F.BF.4a, A.SSE.2, A.REI.2, A.REI.11

Key Concepts and Skills

OPERATIONS ON FUNCTIONS

- Find the sum, difference product, and quotient of functions
- Find the composition of functions

INVERSE FUNCTIONS AND RELATIONS

- Find the inverse of a function or relation
- Determine whether two functions or relations are inverses
- Compare a function and its inverse using a graphing calculator

SQUARE ROOT FUNCTIONS AND INEQUALITIES

- Graph and analyze square root functions
- Graph square root inequalities

Nth ROOTS

- Simplify radicals
- Use a calculator to approximate radicals
- Use a graphing calculator to graph nth root functions

OPERATIONS WITH RADICAL EXPRESSIONS

- Simplify radical expressions
- Add, subtract, multiply, and divide radical expressions

RATIONAL EXPONENTS

- Write expressions with rational exponents in radical form and vice versa
- Simplify expressions in exponential or radical form

SOLVING RADICAL EQUATIONS AND INEQUALITIES

- Solve equations containing radicals
- Solve inequalities containing radicals
- Use a graphing calculator to solve radical equations and inequalities

Learning Activities

Miras to show inverse is the reflection over y=x

Green Globs activity- square root function
Sketch and graph a given function- state domain and range
Use communicators or dry eraser board set

Assessments

ALGEBRA II

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

Physics- radical functions- boat speeds and waterline page 372 #38
Science- height vs distance on the horizon

Technology Integration

8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
Graphing Calculators
Computer Software- Green Globs
Responders

Time Frame	**Standard- 20 days Block- 10 days**

Topic

Exponential and Logarithmic Functions and Relations

ALGEBRA II

Essential Questions

- How can you make good decisions?
- What factors can affect good decision making?
- What is the difference between exponential growth and decay?
- Why do we need "e"?
- How are logs and exponents related?
- When graphing y=ab×+c, what does a, b, and c do to the graph?
- How do you solve a log problem with a base other than 10?

Enduring Understandings

- nth roots are inverses of power functions.
- Understanding the properties of power functions and how inverses behave explains the properties of nth roots.
- Computing with rational exponents is no different from computing with integral exponents.
- Exponential and logarithmic functions behave the same as other functions with respect to graphical transformations.
- Two special logarithmic functions are the common log and natural log. These special functions occur often in nature.

Alignment to NJSLS Standards

F.BF.1b, F.BF.3, F.IF.7e, F.IF.8b, A.REI.11, A.CED.1, F.LE.4, A.SSE.2

Key Concepts and Skills

GRAPHING EXPONENTIAL FUNCTIONS

Graph exponential growth functions

Graph exponential decay functions

SOLVING EXPONENTIAL EQUATIONS AND INEQUALITIES

- Solve exponential equations
- Solve exponential inequalities
- Use graphing calculator to solve exponential equations by graphing or by using the table feature

LOGARITHMS AND LOGARITHMIC FUNCTIONS

- Evaluate logarithmic expressions
- Graph logarithmic functions
- Use a graphing calculator to find an equation of the best fit for exponential and logarithmic functions

SOLVING LOGARITHMIC EQUATIONS AND INEQUALITIES

- Solve logarithmic equations
- Solve logarithmic inequalities

PROPERTIES OF LOGARITHMS

- Simplify and evaluate expressions using the properties of logarithms
- Solve logarithmic equations using the properties of logarithms

COMMON LOGARITHMS

- Solve exponential equations and inequalities using common logarithms
- Evaluate logarithmic expressions using the Change of Base formula
- Use the graphing calculator to solve exponential and logarithmic equations and inequalities

BASE e AND NATURAL LOGARITHMS

- Evaluate expressions involving the natural base and natural logarithm
- Solve exponential equations and inequalities using natural logarithms

USING EXPONENTIAL AND LOGARITHMIC FUNCTIONS

- Use a spreadsheet to display the growth of an investment over time
- Use logarithms to solve problems involving exponential growth and decay
- Use logarithms to solve problems involving logistic growth

Learning Activities

M & M Lab- exponential decay
Compound Interest Activity
Population Growth Activity

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

Physics- growth and decay
Business- Compound Interest, depreciation values
Social Studies- population growth
Science- ph scale and Richter scale
Biology- immunity created when vaccinated because of antibodies developing

Technology Integration

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Graphing Calculators
Computer Software- Green Globs
Responders

ALGEBRA II

Time Frame	Standard- 20 days Block- 10 days

Topic

Rational Functions and Relations

Essential Questions

- Why are graphs useful?
- How do we decide which method is most appropriate when solving rational equations?
- When are asymptotes used to graph rational functions?

Enduring Understandings

- Mastering a procedure is not the same as mastering the concept.
- Simplified expressions are essential in being able to solve equations.
- Domain affects graphing and solving of rational functions.

Alignment to NJSLS

A.APR.6, A.APR.7, A.CED.1, A.CED.2, F.BF.3, F.IF.9, A.REI.2, A.REI.11

Key Concepts and Skills

MULTIPLYING AND DIVIDING RATIONAL EXPRESSIONS

- Simply rational expressions
- Simplify complex fractions

ADDING AND SUBTRACTING RATIONAL EXPRESSIONS

- Determine the LCM of polynomials
- Add and subtract rational expressions

GRAPHING RECIPROCAL FUNCTIONS

- Determine properties of reciprocal functions
- Graph transformations of reciprocal functions

GRAPHING RATIONAL FUNCTIONS

- Graph rational functions with vertical and horizontal asymptotes
- *Graph rational functions with oblique asymptotes and point discontinuity
- Use a graphing calculator to explore the graphs of rational functions

VARIATION FUNCTIONS

- Recognize and solve direct and joint variation problems
- Recognize and solve inverse and combined variation problems

SOLVING RATIONAL EQUATIONS AND INEQUALITIES

- Solve rational equations
- Solve rational inequalities
- Use a graphing calculator to solve rational equations by graphing or by using the table feature

Learning Activities

“Inverse Variation” Lab
Wind Chiems
Paint Puzzler
Harvir Needs a Car

Assessments

Quizzes & Common Chapter Tests Homework,
Classwork

ALGEBRA II

Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

Science- Ohm's Law(current/voltage)
Science- Water pressure (diameter vs flow rates)
Social Studies & Health- Cost of health care vs population with flu

Technology Integration

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Graphing Calculators
Computer Software- Green Globs
Responders

ALGEBRA II

Time Frame	**Standard- 20 days Block- 10 days**

Topic

Conic Sections

Essential Questions

- How does mathematics help us to describe the physical world?
- How are conics useful?

Enduring Understandings

- To be able to identify symmetries from graphs of conic sections.
- A conic section is the intersection of a plane and a cone.
- Conic sections model physical phenomena such as motion of the planets and reflective properties of light and sound

Alignment to NJSLS

A.CED.2, A.CED.4, A.SSE.1b, F.IF.9, A.REI.11

Key Concepts and Skills

MIDPOINT AND DISTANCE FORMULAS

- Find the midpoint of a segment on the coordinate plane
- Find the distance between two points on the coordinate plane

PARABOLAS

- Derive the equation of the parabola given focus and directrix
- Write the equations of parabolas in standard form
- Graph parabolas CIRCLES
- Use a graphing calculator to examine the characteristics of a circle and its equations
- Write equations of circles
- Graph circles ELLIPSES
- Determine how the graph of an ellipse is affected by changing the location of the foci
- Write the equations of ellipses
- Graph ellipses

HYPERBOLAS

- Write equations of hyperbolas
- Graph hyperbolas

IDENTIFYING CONIC SECTIONS

- Write equations of conic sections in standard form
- Identify conic sections from their equations
- Identify characteristics of quadratic relations
- Write equations of quadratic relations

*SOLVING LINEAR-NONLINEAR SYSTEMS

- Solve linear-nonlinear systems using a graphing calculator
- Solve systems of linear-nonlinear equations algebraically and graphically
- Solve systems of linear-nonlinear inequalities graphically

Learning Activities

Wax paper folding- parabola
"Norm Parabola" Story
Build an Ellipse Activity
Conic Section Lab

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

Science- Planetary Motion/Comet Path/Telescope Lenses

Technology Integration

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Graphing Calculators
Computer Software- Green Globs
Responders

ALGEBRA II

Time Frame	**Standard- 16 days** **Block- 8 days**

Topic

Sequences and Series

Essential Questions

- Where are patterns found in the real world?
- How can recognizing patterns help you solve real-world problems?
- What type of patterns can be modeled mathematically?
- How can you classify a sequence?

Enduring Understandings

- Sequences and series are models of linear and exponential functions.
- Arithmetic and geometric sequences and series model real life phenomena.
- We can use these models to solve problems.

Alignment to NJSLS

F.IF.4, F.IF.5, F.IF.6, A.CED.4, A.SSE.1.b, A.SSE.4, A.APR.5

Key Concepts and Skills

SEQUENCES AS FUNCTIONS

- Relate arithmetic sequences to linear functions
- Relate geometric sequences to exponential functions

ARITHMETIC SEQUENCES AND SERIES

- Use arithmetic sequences
- Find sums of arithmetic sequences

GEOMETRIC SEQUENCES AND SERIES

- Use geometric sequences
- Find sums of geometric sequences

INFINITE GEOMETRIC SERIES

1. * Approximate the area under a curve over a specified interval, using the sum of rectangular areas under the curve
2. Find sums of infinite geometric series
3. Write repeating decimals as fractions
4. *Use a graphing calculator to investigate limits of sequences

RECURSION AND ITERATION

- Recognize and use special sequences
- Iterate functions
- *use a spreadsheet to analyze the payments, interest, balance on a loan

THE BINOMIAL THEOREM

- Use Pascal's Triangle to expand powers of binomials
- Use the Binomial Theorem to expand powers of binomials

PERMUTATIONS AND COMBINATIONS

- Use combinations and Pascal's Triangle to determine the ways the prizes of a game can be chosen

*PROOF BY MATHEMATICAL INDUCTION

- Prove statements by using mathematical inductions • Disprove statements by finding a counterexample

Learning Activities

Arithmetic Sequence Lab
Sum of Arithmetic Sequence Lab
Family Probability Lab

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

Science- Total distance traveled by a bouncing ball
Science- Rabbit Population- Fibonacci

Technology Integration

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Graphing Calculators
Computer Software- Green Globs
Responders

Time Frame	Standard 15 days	Block 7 days

ALGEBRA II

Topic

Statistics & Probability

Essential Questions

How does technology influence and enhance experimental studies? How does analysis of data inform and influence decisions?

Enduring Understandings

The study of statistics includes observational studies, sample surveys, and experimental design.
Describing center, spread, and shape is essential analysis of both univariate and bivariate data.
Probability is indispensable for analyzing data; data is indispensible for estimating probabilities.

Alignment to NJSLS

S.IC.1, S.IC.2, S.IC.3, S.IC.4, S.IC.5, S.IC.6, S.ID.4, S.MD.6, S.MD.7

Key Concepts and Skills

Designing a Study

- Classify study types
- Design statistical studies

Distribution of Data

- Use the shape of distributions to select appropriate statistics
- Use the shape of distributions to compare data

Probability Distribution

- Construct a probability distribution
- Analyze a probability distribution and its summary statistics

*The Binomial Distribution

- Identify and conduct a binomial experiment
- Find probabilities using binomial distributions

The Normal Distribution

- Use the Empirical Rule to analyze normally distributed variables
- Apply the standard normal distribution and z-values

*Confidence Intervals & Hypothesis Testing

- Find confidence intervals for normally distributed data
- Perform hypothesis tests on normally distributed data

Learning Activities

Random Sampling Simulation
Graphing Calculator Lab- Margin of Error and Sample Size
Describe Distribution using a Histogram
Describe a situation using a Box-and-Whisker Plot
Compare Data using a Histogram
Compare Data using a Box-and-Whisker Plot
Construct a Probability Distribution
Construct a Theoretical and Experimental Probability Distribution
Real World Example of expected value and standard deviation
Identify and design a Binomial Experiment
Real World Example of Finding Probabilities Real
World Examples of Confidence Interval

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Projects
Journal Writing & Portfolios

ALGEBRA II

21st Century Skills							
X	Creativity	X	Critical Thinking	X	Communication		Collaboration
X	Life & Career	X	Information		Media Literacy		
	Skills		Literacy				

Interdisciplinary Connections
Social Sciences, Business

Technology Integration
8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge Graphing calculators TI-Smartview Emulator Computer Software Internet activities Responders

Time Frame	**Standard- 15 days** **Block- 7 days**

Topic
Trigonometry

ALGEBRA II

Essential Questions

- How can I make connections to angles to determine basic trigonometric values?
- How can I evaluate trigonometric functions at any domain value by connecting experiences with special right triangles gained in Geometry?
- How can I select and apply trigonometric functions to solve problems in contexts that model cyclical behavior?

Enduring Understandings

- Build new functions from existing functions
- Model periodic phenomena with trigonometric functions
- Analyze functions using different representations
- Extend the domain of trigonometric functions using the unit circle

Alignment to NJSLS

F.TF.1, F.TF.2, F.TF.5, F.TF.8

Key Concepts and Skills

- Draw and find angles in standard position
- Convert between degree measures and radian measures
- Find values of trigonometric functions for general angles
- Find values of trigonometric functions by using reference angles
- Find the values of trigonometric functions based on the unit circle
- Use the properties of periodic functions to evaluate trigonometric functions
- * Use trigonometric identities to find trigonometric values
- *Use trigonometric identities to simplify expressions

Learning Activities

- Construct a color coded unit circle
- Define trigonometric functions using x, y, and r
- Ferris Wheel Problem
- Tide Problem
- Spaghetti Lab
- Graphing calculator activity discovering properties of periodic functions

Assessments

Quizzes & Common Chapter Tests
Homework, Classwork
Journal Writing & Portfolios

21st Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
	Life & Career Skills		Information Literacy		Media Literacy		

Interdisciplinary Connections

Science- revolutions per minute, predicting weather, monitoring volcanoes
Physics- velocity, distance

Technology Integration

ALGEBRA II

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*Advanced and Honors only