DEPARTMENT Mathematics COURSE Foundations of Algebra II

Curriculum Development Timeline

School: Ocean Township High School

Course: Foundations of Algebra II

Department: Mathematics

Board Approval	Supervisor	Notes
August 2022	Gerard Marrone	Born Date

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DEPARTMENT Mathematics COURSE Foundations of Algebra II

Township of Ocean Pacing Guide			
Week	Marking Period 1	**Week**	Marking Period 2
1	Linear Equations & Functions	6	Quadratic Equations & Functions
2	Linear Equations & Functions	7	Quadratic Equations & Functions
3	Linear Equations & Functions	8	Quadratic Equations & Functions
4	Linear Equations & Functions	9	Quadratic Equations & Functions
5	Linear Equations & Functions	10	Quadratic Equations & Functions
Week	Marking Period 3	**Week**	Marking Period 4
11	Polynomials & Factoring	16	Data Analysis & Statistics
12	Polynomials & Factoring	17	Data Analysis & Statistics
13	Polynomials & Factoring	18	Data Analysis & Statistics
14	Polynomials & Factoring	19	Data Analysis & Statistics
15	Polynomials & Factoring	20	Data Analysis & Statistics

Core Instructional & Supplemental Materials including various levels of Texts
Core Instruction: Big Ideas Textbook Algebra 1 & Algebra 2 Supplemental: PARCC Released Questions, 3-Acts Math, Illuminations, Desmos, Kuta, and IXL Special Education Supplemental: IXL Math, Prodigy and Video Tutor-bigideasmath.com

Time Frame	5 Weeks
Topic	
Unit 1: Linear Equations & Functions	
Alignment to Standards	
6.EE.A . Apply and extend previous understandings of arithmetic to algebraic expressions 7.EE.A Use properties of operations to generate equivalent expressions. 7.EE.B B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	

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8.EE.B.6 Find slopes and y-intercepts of linear equations.
8.F.B.4 Write and graph equations of lines in slope-intercept form.
8.F.B.4 Write equations of lines, using a slope
A-SSE.A. Interpret the structure of expressions
A-SSE.B. Write expressions in equivalent forms to solve problems
A-CED.A. Create equations that describe numbers or relationships
A-REI.A Understand solving equations as a process of reasoning and explain the reasoning
A-REI.B Solve equations and inequalities in one variables
A-REI.C Solve systems of equations
F-IF.A. Understand the concept of a function and use function notation
F-IF.B Interpret functions that arise in application in terms of the context
F-IF.C Analyze functions using difference representations
F-LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions
F-LEB.B Interpret expression for functions in terms of the situation they model
A-REI.C Solve system of equations
A-REI.D. Represent and solve equation and inequalities graphically

Learning Objectives and Activities

Students will be able to:

- Identify and discuss parts of an expression
- Create and evaluate algebraic expressions
- Manipulate expressions to highlight key features and equivalent forms
- Solve real-world problems using their knowledge of expressions
- Solve equations and explain the reasoning behind their process
- Create equations for real-world problems
- Determine if a relation is a function
- Understand the rules of functions
- Analyze the change in x-value and how it changes the y-value
- Evaluate functions
- Utilize function notation
- Identify linear functions
- Interpret unit rate as slope
- Find slope from two points, a graph, an application and an equation
- Graph in slope intercept form
- Graph in point-slope form
- Graph in standard form
- Interpreting graphs of functions
- The student will be able to solve a system of linear equations by graphing, and the algebraic methods of substitution and elimination (including multiplying a row), and recognize when one method is superior to another.
- Some systems have no solution, some infinite solutions.

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- To be able to solve a real world problem by writing the system in algebraic form, then finding the solution by various methods.

Activites:

- If pants are on sale for $65.75 each and t-shirts for $30 each. Given I buy 4 pairs of pants and 6 t-shirts. How much would I spend?
- My mom is twice my age. Five years ago, she was 5 more than twice my age. How old am I? The result will be the same on both sides, meaning that I could be any age for this problem.
- If pants are on sale for $65.75 each and t-shirts for $30 each. You buy 3 t-shirts and “x” amount of pants and spend $353 in total. How many pairs of pants did you purchase?
- Using algebra tiles and a scale to show that what you do to one side of an equation you must do to the other sides.
- Use communicators.
- Variables and patterns activities
- Graphing equations using a graphing calculator
- Calculator activities
- Popcorn Graphs
- Slope Investigation with Graphing Calculator and/or Desmos
- TI 83 – tables, graphs p380
- Worksheets
- Partner lab activity – pilot rescue mission
- Modeling real world problems
- 3 Act Math

Assessments

Formative:

- Daily Practice Problems
- IXL Practice
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards
- Teacher Observation
- Class Discussion on Mathematical Methods
- Graphing Organizers
- Big Ideas: Performance Tasks Alg 1

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Alternative:

- Kahoot
- Quizizz
- Individual or group productive struggle assessment during introductory lessons

- Explore Learning Gizmos

Interdisciplinary Connections

Science: MS-PS3-1: In comparing and interpreting graphs of functions students will construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

Career Readiness, Life Literacies, and Key Skills

9.1.8.C.1: When applying linear functions to variable rates and constant rates students will compare and contrast credit cards and debit cards and the advantages and disadvantages of using each.

Key Skills:

- Understand mathematical language such identifying coefficients, variables, constants, like terms, collecting/combining like terms, distribution, and more
- Equivalent expressions
- Translate verbal sentences into algebraic expressions/equations
- Distinguish the difference between an expression and an equation
- Solve equations with various and multifaceted steps
- Identify errors in solve equations and explain reasoning behind mistakes
- Verify solutions to equations
- Identify functions
- Represent real life problems using functions
- Analyze functions and relate to real world applications
- Graph in slope intercept form
- Graph in point slope form
- Graph in standard form
- Graph systems of linear equations
- Understand the solution to a system in context of problems

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.

- Students will access Big Ideas online ebook to further investigate lesson concepts and demonstrate understanding of standards.
- Students will use graphing calculators to use math tools strategically and attend to precision.
- Students will use internet based game sites such as Quizzizz, Kahoot and Quizlet live to reflect on their learning progress.

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- Supplemental instruction and math games will be presented using IXL Math and Video Tutor-bigideasmath.com.
- Students will use Desmos in order to discover new concepts involving graphing and functions.
- Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

Career Education

CRP2: Apply appropriate academic and technical skill
CRP4: Communicate clearly and effectively with reason.
CPR6: Demonstrate creative and innovation
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11: Use technology to enhance productivity

Time Frame	5 weeks

Topic

Unit 2: Quadratic Equations & Functions

Alignment to Standards

HSA-CED.A.2, HSF-BF.A.1a Create and graph quadratic functions of different forms.
HSF-IF.C.7a Graph quadratic functions and show key features of the graph.
HSF-BF.B.3 Translate, reflect, stretch, and shrink graphs of quadratic functions.
HSA-SSE.B.3a, HSA-APR.B.3 Use intercept form to find zeros of quadratic functions.
HSF-IF.C.8a Use factoring to write equivalent forms of a quadratic function to show zeros, extreme values, and symmetry of the graph.
HSF-IF.C.9 Compare properties of two quadratic functions each represented in a different way.
HSA-CED.A.2 Create quadratic equations to represent relationships between quantities.
HSN-RN.A.2 Simplify expressions and perform operations using properties of radicals.
HSF-IF.B.4, HSA-REI.B.4a, HSA-REI.B.4b Solve quadratic equations by graphing, using square roots, completing the square, and using the Quadratic Formula.
HSF-IF.B.4 For quadratic functions, interpret key features of graphs and tables.
HSS-ID.B.6a Write quadratic equations to model data.
HSA-CED.A.1 Create quadratic equations and use them to solve real-life problems.
HSA-CED.A.4 Rearrange formulas to highlight a quantity of interest.

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HSA-SSE.B.3b Find maximum and minimum values of quadratic functions by completing the square.
HSF-IF.C.8a Use completing the square to write equivalent forms of a quadratic function to show zeros, extreme values, and symmetry of the graph.
HSA-REI.C.7 Solve nonlinear systems of equations graphically and algebraically.
HSA-REI.D.11 Solve nonlinear equations by graphing each side of the equation.
HSN-CN.C.7 Solve quadratic equations with real and imaginary solutions.
HSN-CN.A.1 Understand the imaginary unit i.
HSA-REI.D.11 Solve nonlinear systems algebraically and graphically.
HSA-REI.D.11 Solve quadratic equations by graphing each side of the equation

Learning Objectives and Activities

Objectives:
Students will be able to:

- Graph quadratic functions in standard form
- Graph quadratic functions in vertex form
- Graph quadratic functions in factored form (intercept form)
- Solve by factoring
- Solve by graphing
- Solve by square roots
- Solve by quadratic formula
- Solve by completing the square
- Use the discriminant to determine the number of solutions
- Solve systems of quadratic and linear equations
- Understand what it means to have an imaginary solution

Assessments

Formative:

- Daily Practice Problems
- IXL Practice
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards
- Teacher Observation
- Class Discussion on Mathematical Methods
- Graphing Organizers
- Big Ideas: Performance Tasks Alg 1

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Alternative:

- Kahoot

- Quizizz
- Individual or group productive struggle assessment during introductory lessons
- Explore Learning Gizmos

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

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.

- Students will access Big Ideas online ebook to further investigate lesson concepts and demonstrate understanding of standards.
- Students will use graphing calculators to use math tools strategically and attend to precision.
- Students will use internet based game sites such as Quizzizz, Kahoot and Quizlet live to reflect on their learning progress.
- Supplemental instruction and math games will be presented using IXL Math and Video Tutor-bigideasmath.com.
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Career Education

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Time Frame	5 weeks

Topic

Unit 3: Polynomials & Factoring

Alignment to Standards

HSA-SSE.A.1a Interpret coefficients, constants, and factors of polynomial expressions.
HSA-APR.A.1 Add, subtract, multiply, and divide polynomials.
HSA-APR.B.3 Identify roots of polynomials when suitable factorizations are available.
HSA-REI.A.1, HSA-REI.B.4b Solve polynomial equations by factoring and using the Zero-Product Property.
HSF-IF.C.7c Graph polynomial functions and show key features of the graph.
HSF-IF.B.4 Identify zeros of polynomial functions. Find turning points and identify local maximums and local minimums of graphs of polynomial functions.
HSA-SSE.A.2, HSA-SSE.B.3a Factor polynomials using the GCF, factor polynomials of the forms x2 + bx + c and ax2 + bx + c, and factor the difference of two squares and perfect square trinomials.
HSA-SSE.A.2 Identify ways to rewrite polynomial expressions.
HSN-CN.C.7 Solve quadratic equations with real and imaginary solutions.
HSN-CN.A.2 Add, subtract, and multiply complex numbers.
HSA-APR.A.1, HSA-APR.D.6 Add, subtract, multiply, and divide polynomials.
HSA-APR.B.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a graph of the function
HSA-SSE.A.2 Factor polynomials with integer coefficients completely.
HSA-APR.B.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a graph of the function.
HSA-CED.A.2 Create and graph equations of polynomial functions.

Learning Objectives and Activities

Objectives:
Students will be able to:

- Simplify expression containing exponents
- Add, subtract, multiply and divide polynomials
- Use long division and synthetic division to divide polynomials
- Make the connection that factoring and distribution are inverses
- Decide what is the best method in order to factor
- Factor polynomials by various methods
- Identify zeros when factoring completely and from graphs
- Simplify expressions containing complex numbers

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- Graph polynomial functions
- Describe the end behaviors of a function
- Use the factor theorem
- Find all the zeroes of a polynomial function

Activites:

- Factoring Relay Game
- Spreadsheet Activity- Prentice Hall Algebra 1 textbook p. 494
- www.hippocampus.org
- Algebra Tiles Activity p. 504
- Using Models to Factor
- Small group practice
- Derive 5
- Communicators

Assessments

Formative:

- Daily Practice Problems
- IXL Practice
- Math Scavenger Hunt/Trail
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- Teacher Observation
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- Big Ideas: Performance Tasks Alg 1

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Alternative:

- Kahoot
- Quizizz
- Individual or group productive struggle assessment during introductory lessons
- Explore Learning Gizmos

Interdisciplinary Connections

ELA: W.9-10.1: When students are justifying their reasoning on short answer and extended constructed response questions they write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Career Readiness, Life Literacies, and Key Skills

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Career Education

CRP6: Demonstrate creativity and innovation.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them

Time Frame	5 weeks

Topic

Unit 4: Data Analysis & Statistics

Alignment to Standards

HSS-ID.A.3 Find and compare the mean, median, and mode of a data set
HSS-ID.A.3 Determine how an outlier affects the measures of center of a data set.
HSS-ID.A.3 Find the range and standard deviation of a data set.
HSS-ID.A.3 Identify the effects of data transformations on measures of center and measures of variation.

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HSS-ID.A.1, HSS-ID.A.3 Make and interpret box-and-whisker plots for data sets, and use box-and-whisker plots to compare data sets.
HSS-ID.A.2 Describe shapes of distributions, use them to determine which measures of center and variation best represent a data set, and compare shapes of distributions.
HSS-ID.B.5 Make and use two-way tables to recognize associations and trends in data.
HSN-Q.A.1, HSS-ID.A.1 Classify data as qualitative or quantitative, choose and create appropriate data displays, and analyze misleading data displays.
HSS-ID.A.4 Calculate probabilities using normal distributions.
HSS-IC.A.1, HSS-IC.B.3 Recognize bias in sampling and survey questions, and analyze methods of collecting data.
HSS-IC.A.2 Analyze the accuracy of a hypothesis using simulations.
HSS-IC.B.6 Evaluate reports based on data.
HSS-IC.B.4 Approximate margins of error for surveys.
HSS-IC.B.5 Resample data using a simulation to analyze a hypothesis.

Learning Objectives and Activities

Objectives:
SWBAT:

- Find and compare data using the mean, median, mode and range of data
- Understand the outlier in your data
- Find the standard deviation of a data set
- Use the graphing calculator, make a scatter plot and find regressions
- Predict values using lines of regressions
- Calculate the probability of simple and compound events

Activitres

- Graphing calculator activity (such as height vs. shoe size)
- Statistics packet
- Graphing calculator overhead
- www.mathtopia.com

Assessments

Formative:

- Daily Practice Problems
- IXL Practice
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards
- Teacher Observation
- Class Discussion on Mathematical Methods
- Graphing Organizers

Summative:

- Celebration of Knowledge and Mid-unit Quizzes

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- Topic Tests

Benchmark:

- Cumulative final exam with multiple choice, short answer and extended construct response questions

Alternative:

- Kahoot
- Quizizz
- Individual or group productive struggle assessment during introductory lessons
- Explore Learning Gizmos

Interdisciplinary Connections

Science: HS-LS3-3: In this statistics unit students will apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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Modifications (ELL, Special Education, At Risk Students, Gifted & Talented, & 504 Plans)

ELL:

- Work toward longer passages as skills in English increase
- Use visuals
- Introduce key vocabulary before lesson
- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary
- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:

- Allow extra time to complete assignments or tests
- Guided notes and/or scaffold outline for written assignments
- Work in a small group
- Allow answers to be given orally or dictated
- Use large print books, Braille, or books on CD (digital text)
- Follow all IEP modifications

At-Risk Students:

- Guided notes and/or scaffold outline for written assignments
- Introduce key vocabulary before lesson
- Work in a small group
- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities

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- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns