High School Algebra IIA Curriculum

Course Description: The course is designed to cover the first half of the Algebra II curriculum. This course includes the study of a variety of functions (linear, quadratic higher order polynomials, exponential, absolute value, logarithmic and rational) learning to graph, compare, perform operations and manipulate them in order to solve, analyze and apply to problems. Students will use probability and statistics to evaluate outcomes of decisions. Students develop rigorous problem solving skills, logical reasoning and mathematical communication skills required for success in higher math courses and real life experiences. *Graphing calculators are required.

Scope and Sequence:

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Unit</th>
<th>Instructional Topics</th>
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</thead>
</table>
| 11 weeks  | Linear Equations, Inequalities, and Quadratics | Topic 1: Solving Linear Equations and Inequalities  
Topic 2: Write and Graph Linear Equations and Inequalities  
Topic 3: Applications Involving Linear Equations and Inequalities  
Topic 4: Systems of Equations and Inequalities  
Topic 5: Quadratics and Complex Numbers |
| 3 weeks   | Polynomials                         | Topic 1: Using Operations to Simplify Polynomials  
Topic 2: Find the Zeros of Polynomials  
Topic 3: Graph Polynomials |
| 3 weeks | Functions | Topic 1: Functions and Domain/ Range  
Topic 2: Parent Functions and Transformations  
Topic 3: Operations, Composition, and Inverse of Functions |
Unit 1: Linear Equations, Inequalities, and Quadratics

Subject: Algebra IIA
Grade: 9, 10, 11, 12
Name of Unit: Linear Equations, Inequalities and Quadratics
Length of Unit: 11 weeks
Overview of Unit: Students will solve, graph, and apply linear equations, inequalities, systems and quadratics.

Priority Standards for unit:
- Alg2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value.
- Alg2.FM.A.1: Create functions and use them to solve applications of quadratic and exponential function model problems.
- Alg2.BF.A.3: Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.

Supporting Standards for unit:
- Alg2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value.
- Alg2.REI.B.1: Create and solve systems of equations that may include non-linear equations and inequalities.
- Alg2.NQ.B.1: Represent complex numbers.
- Alg2.NQ.B.2: Add, subtract, multiply and divide complex numbers.
- ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
- ISTE-CREATIVE COMMUNICATOR.6.A - choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
- ISTE-CREATIVE COMMUNICATOR.6.B - create original works or responsibly repurpose or remix digital resources into new creations.
- ISTE-CREATIVE COMMUNICATOR.6.C - communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
<table>
<thead>
<tr>
<th>Unwrapped Concepts (Students need to know)</th>
<th>Unwrapped Skills (Students need to be able to do)</th>
<th>Bloom’s Taxonomy Levels</th>
<th>Webb's DOK</th>
</tr>
</thead>
<tbody>
<tr>
<td>equations and inequalities, including those that involve absolute value.</td>
<td>Create</td>
<td>Create</td>
<td>3</td>
</tr>
<tr>
<td>equations and inequalities, including those that involve absolute value.</td>
<td>Solve</td>
<td>Apply</td>
<td>2</td>
</tr>
<tr>
<td>applications of quadratic and exponential function model problems.</td>
<td>Create</td>
<td>Create</td>
<td>3</td>
</tr>
<tr>
<td>applications of quadratic and exponential function model problems.</td>
<td>Solve</td>
<td>Apply</td>
<td>2</td>
</tr>
<tr>
<td>the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.</td>
<td>Describe</td>
<td>Understand</td>
<td>2</td>
</tr>
</tbody>
</table>

**Essential Questions:**
1. How do you solve quadratic equations?
2. How do you graph linear equations and linear systems?
3. How do you graph quadratics and absolute value functions?
4. Why is it important to understand the difference between equations and inequalities?
5. How do you apply the knowledge of solving equations and inequalities?

**Enduring Understanding/Big Ideas:**
1. You solve a quadratic equation by factoring, completing the square, or quadratic formula.
2. You graph a linear equation by finding two points on the line or using a point and the slope. A linear system would mean you would graph multiple lines and identify the point of intersection.
3. You would graph a quadratic and an absolute value function by finding the vertex and at least one point on each side of the vertex. The form of the equation will determine the method for finding the vertex.
4. Equations have a finite amount solutions or no solution, while inequalities have either no solution or an infinite amount of solutions.
5. You must first create a model(s) that represents the information given and then solve the model.
### Unit Vocabulary:

<table>
<thead>
<tr>
<th>Academic Cross-Curricular Words</th>
<th>Content/Domain Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of Change</td>
<td>Linear</td>
</tr>
<tr>
<td>Independent</td>
<td>Inequalities</td>
</tr>
<tr>
<td>Dependent</td>
<td>Compound Inequality</td>
</tr>
<tr>
<td>Equation</td>
<td>Expression</td>
</tr>
<tr>
<td>Domain</td>
<td>Absolute Value</td>
</tr>
<tr>
<td>Range</td>
<td>Linear System</td>
</tr>
<tr>
<td>Maximum</td>
<td>Non-linear</td>
</tr>
<tr>
<td>Minimum</td>
<td>Quadratic</td>
</tr>
<tr>
<td>Slope</td>
<td>Parabola</td>
</tr>
<tr>
<td></td>
<td>Zeros</td>
</tr>
<tr>
<td></td>
<td>Roots</td>
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<tr>
<td></td>
<td>x-intercept</td>
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<tr>
<td></td>
<td>y-intercept</td>
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<tr>
<td></td>
<td>Vertex</td>
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<td></td>
<td>Reciprocal</td>
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<td></td>
<td>Coefficient</td>
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<td></td>
<td>Extraneous solution</td>
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<tr>
<td></td>
<td>Slope-intercept form</td>
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<td></td>
<td>Point-slope form</td>
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<tr>
<td></td>
<td>Consistent</td>
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<tr>
<td></td>
<td>Inconsistent</td>
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<tr>
<td></td>
<td>Complex number</td>
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<td></td>
<td>Imaginary number</td>
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<td></td>
<td>Discriminant</td>
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</tbody>
</table>

**Resources for Vocabulary Development:** textbook
Engaging Experience 1
Title: Quia Game
Suggested Length of Time: ½ of a class period
Standards Addressed
   Priority:
   • Alg2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value.

   Supporting:
   • Alg2.REI.B.1: Create and solve systems of equations that may include non-linear equations and inequalities.
   • ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

Detailed Description/Instructions: Students play the Quia game Solving Absolute Value Equations and Inequalities.

Bloom’s Levels: Apply
Webb’s DOK: 2
Topic 2: Write and Graph Linear Equations and Inequalities

Engaging Experience 1

Title: Graphing Linear Inequalities (Desmos Activity)

Suggested Length of Time: ½ of a class period

Standards Addressed

Priority:

- Alg2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value.

Supporting:

- Alg2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value.
- ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

Detailed Description/Instructions: Students will work a series of graphing challenges on desmos (Graphing Linear Inequalities) to strengthen their understanding of linear inequalities.

Bloom’s Levels: Apply

Webb’s DOK: 2
Engaging Experience 1

Title: Linear Applications Discovery Activities

Suggested Length of Time: \( \frac{1}{2} \) of a class period for each activity

Standards Addressed

Priority:

- Alg2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value.

Supporting:

- Alg2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value.

Detailed Description/Instructions: Students will complete activities 4, 5, 9, and 10 from Discovery Activities for Basic Algebra II (found in the google drive Algebra II Resources) to address applications of linear equations.

Bloom’s Levels: Apply

Webb’s DOK: 2
Engaging Experience 1

Title: National Treasure - Linear Inequalities

Suggested Length of Time: ½ of a class period

Standards Addressed

Priority:

• Alg2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value.

Supporting:

• Alg2.REI.B.1: Create and solve systems of equations that may include non-linear equations and inequalities.

Detailed Description/Instructions: Students will be given the National Treasure worksheet (found in the google drive Algebra II Resources) where they will graph a system of linear inequalities to find the location of a hidden treasure.

Bloom’s Levels: Apply

Webb’s DOK: 2
Engaging Experience 1

Title: Match and Sort

Suggested Length of Time: ½ of a class period

Standards Addressed

Priority:

- Alg2.BF.A.3: Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.

Detailed Description/Instructions: Students will be given a set of graphs, tables, and equations on cards or on desmos. Students will have to sort those items and match the appropriate graph to the table and/or equation.

Bloom’s Levels: Understand

Webb’s DOK: 2
Engaging Scenario: Applications of Quadratic Functions
The students are to develop a projectile motion model with a goal of hitting a specific target and reaching a specific height designated by the teacher. Students design this model using all knowledge of quadratic functions, including but not limited to, x-intercepts, vertex, and transformations. This may be completed on a computer program or application, calculator, or paper and pencil. Upon completion the student, whether individually or as a group will present to the class their process and final product, showing the actual graphing application to the class.

Rubric for Engaging Scenario: to be created
<table>
<thead>
<tr>
<th>Topic</th>
<th>Engaging Experience Title</th>
<th>Description</th>
<th>Suggested Length of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solving Linear Equations and Inequalities</td>
<td>Quia Game</td>
<td>Students play the Quia game <a href="#">Solving Absolute Value Equations and Inequalities</a></td>
<td>½ of a class period</td>
</tr>
<tr>
<td>Write and Graph Linear Equations and Inequalities</td>
<td>Graphing Linear Inequalities (Desmos Activity)</td>
<td>Students will work a series of graphing challenges on desmos (<a href="#">Graphing Linear Inequalities</a>) to strengthen their understanding of linear inequalities.</td>
<td>½ of a class period</td>
</tr>
<tr>
<td>Applications Involving Linear Equations and Inequalities</td>
<td>Linear Applications Discovery Activities</td>
<td>Students will complete activities 4, 5, 9, and 10 from Discovery Activities for Basic Algebra II (<a href="#">Algebra II Resources</a>) to address applications of linear equations.</td>
<td>½ of a class period for each activity</td>
</tr>
<tr>
<td>Systems of Equations and Inequalities</td>
<td>National Treasure - Linear Inequalities</td>
<td>Detailed Description/Instructions: Students will be given the National Treasure worksheet (<a href="#">Algebra II Resources</a>) where they will graph a system of linear inequalities to find the location of a hidden treasure.</td>
<td>½ of a class period</td>
</tr>
<tr>
<td>Quadratics and Complex Numbers</td>
<td>Match and Sort</td>
<td>Students will be given a set of graphs, tables, and equations on cards or on desmos. Students will have to sort those items and match the appropriate graph to the table and/or equation.</td>
<td>½ of a class period</td>
</tr>
</tbody>
</table>
Unit 2: Polynomials

Subject: Algebra IIA
Grade: 9, 10, 11, 12
Name of Unit: Polynomials
Length of Unit: 3 weeks
Overview of Unit: Students will solve and graph polynomial functions.

Priority Standards for unit:
- Alg2.APR.A.5: Identify zeros of polynomials when suitable factorizations are available, and use the zeros to sketch the function defined by the polynomial.

Supporting Standards for unit:
- Alg2.APR.A.1: Extend the knowledge of factoring to include factors with complex coefficients.
- Alg2.APR.A.2: Understand the Remainder Theorem and use it to solve problems.
- Alg2.APR.A.3: Find the least common multiple of two or more polynomials.
- Alg2.NQ.B.3: Know and apply the Fundamental Theorem of Algebra.
- ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways
- ISTE-COMPUTATIONAL THINKER.5.C - break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
- ISTE-GLOBAL COLLABORATOR.7.B - use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.
- ISTE-CREATIVE COMMUNICATOR.6.A - choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
- ISTE-CREATIVE COMMUNICATOR.6.B - create original works or responsibly repurpose or remix digital resources into new creations.
- ISTE-CREATIVE COMMUNICATOR.6.C - communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
- ISTE-CREATIVE COMMUNICATOR.6.D - publish or present content that customizes the message and medium for their intended audiences.
<table>
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<tr>
<th>Unwrapped Concepts (Students need to know)</th>
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</thead>
<tbody>
<tr>
<td>zeros of polynomials when suitable factorizations are available</td>
<td>Identify</td>
<td>Apply</td>
<td>2</td>
</tr>
<tr>
<td>the zeros to sketch the function defined by the polynomial.</td>
<td>Use</td>
<td>Apply</td>
<td>3</td>
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</tbody>
</table>

**Essential Questions:**
1. How can you identify a polynomial?
2. How does the Fundamental Theorem of Algebra help you solve for all zeros of a polynomial?
3. How do you graph a polynomial function?

**Enduring Understanding/Big Ideas:**
1. A polynomial is a list of terms that must have a positive, whole number exponent and may include a variable.
2. The Fundamental Theorem of Algebra allows you to identify the number of zeros a polynomial will produce. This leads to various methods of solving for all zeros of a polynomial.
3. To graph a polynomial function, you must identify end behavior, zeros, and relative extrema.

**Unit Vocabulary:**

<table>
<thead>
<tr>
<th>Academic Cross-Curricular Words</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Zeros</td>
<td>Polynomial</td>
</tr>
<tr>
<td>Roots</td>
<td>Greatest Common Factor</td>
</tr>
<tr>
<td>X-Intercept(s)</td>
<td>Factor by Grouping</td>
</tr>
<tr>
<td>Relative (Local) Extrema</td>
<td>Zeros</td>
</tr>
<tr>
<td></td>
<td>Roots</td>
</tr>
<tr>
<td></td>
<td>X-Intercept(s)</td>
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<tr>
<td></td>
<td>Remainder Theorem</td>
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<tr>
<td></td>
<td>Fundamental Theorem of Algebra</td>
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<td>Synthetic Division</td>
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<tr>
<td></td>
<td>End-Behavior</td>
</tr>
<tr>
<td></td>
<td>Relative (Local) Extrema</td>
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<td></td>
<td>Extraneous</td>
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<tr>
<td>Resources for Vocabulary Development:</td>
<td>Textbook</td>
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<tr>
<td>Degree of a Polynomial</td>
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<td>Leading Coefficient</td>
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<td>Conjugate</td>
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</tbody>
</table>
Engaging Experience 1

Title: Board Races

Suggested Length of Time: ½ of a class period

Standards Addressed

**Priority:**
- Alg2.APR.A.5: Identify zeros of polynomials when suitable factorizations are available, and use the zeros to sketch the function defined by the polynomial.

**Supporting:**
- Alg2.APR.A.4: Add, subtract, multiply and divide rational expressions.

**Detailed Description/Instructions:** Teacher will find multiple practice problems for the students to work either on paper, personal white board, or computer regarding addition, subtraction, multiplication, and division of polynomials. Teacher can break the class up into teams of a number deemed appropriate. One group member will be at the class whiteboard and try to earn a point of the group by getting the problem correct. The group member at the board will rotate each problem.

**Bloom’s Levels:** Apply

**Webb’s DOK:** 2
Topic 2: Find the Zeros of Polynomials

Engaging Experience 1
Title: Polynomials Review (Quizizz)
Suggested Length of Time: ¼ of a class period

Standards Addressed

Priority:
- Alg2.APR.A.5: Identify zeros of polynomials when suitable factorizations are available, and use the zeros to sketch the function defined by the polynomial.

Supporting:
- ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways

Detailed Description/Instructions: Students will log onto quizizz.com and enter the access code provided by the teacher. The teacher will use the “Polynomials Review” activity from quizizz.com. This activity allows students to find the zeros of polynomials in multiple ways including, but not limited to, factoring, long division, and graphs. It also reviews other concepts that they must be able to use to graph polynomials later in the unit.

Bloom’s Levels: Apply
Webb’s DOK: 2
Engaging Experience 1

Title: Zeros of Polynomial Functions (Desmos)

Suggested Length of Time: ½ of a class period

Standards Addressed

Priority:

- Alg2.APR.A.5: Identify zeros of polynomials when suitable factorizations are available, and use the zeros to sketch the function defined by the polynomial.

Supporting:

- ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways
- ISTE-COMPUTATIONAL THINKER.5.C - break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
- ISTE-GLOBAL COLLABORATOR.7.B - use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.

Detailed Description/Instructions: Students will use their computer and desmos.com to complete the activity “Zeros of Polynomial Functions.” This could be used as an opening exploration activity for the section or an informal assessment. Students will use this activity to find zeros using graphs and equations followed by using those zeros and their understanding of multiplicity to graph the function.

Bloom’s Levels: Apply

Webb’s DOK: 3
Engaging Scenario

**Engaging Scenario:** Roller Coaster Polynomials
The class will take part in a polynomial activity in which they are given a scenario. Throughout the scenario students must analyze polynomial functions to find degree, number of terms, zeros, extrema, domain/range, and end behavior. Analysis will lead to graphing of functions that could then be a rollercoaster. The final aspect of the activity is to design their own roller coaster. This involves students making a ride that must have at least 3 extrema, it must be at least 4 minutes long, the ride begins at 250 feet high, and goes into at least one underground tunnel. The final design of the roller coaster and aspects of the polynomial will be shared as a presentation to the class. Designed for an Accelerated Algebra II class, but may be modified as needed for Algebra II/A/B.

**Roller Coaster Activity**

**Rubric for Engaging Scenario:** to be created
## Summary of Engaging Learning Experiences for Topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Engaging Experience Title</th>
<th>Description</th>
<th>Suggested Length of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Operations to Simplify Polynomials</td>
<td>Board Races</td>
<td>Teacher will find multiple practice problems for the students to work either on paper, personal white board, or computer regarding addition, subtraction, multiplication, and division of polynomials. Teacher can break the class up into teams of a number deemed appropriate. One group member will be at the class whiteboard and try to earn a point of the group by getting the problem correct. The group member at the board will rotate each problem.</td>
<td>½ of a class period</td>
</tr>
<tr>
<td>Find the Zeros of Polynomials</td>
<td>Polynomials Review (Quizizz)</td>
<td>Students will log onto quizizz.com and enter the access code provided by the teacher. The teacher will use the “Polynomials Review” activity from quizizz.com. This activity allows students to find the zeros of polynomials in multiple ways including, but not limited to, factoring, long division, and graphs. It also reviews other concepts that they must be able to use to graph polynomials later in the unit.</td>
<td>¼ of a class period</td>
</tr>
<tr>
<td>Graph Polynomials</td>
<td>Zeros of Polynomial Functions (Desmos)</td>
<td>Students will use their computer and desmos.com to complete the activity “Zeros of Polynomial Functions.” This could be used as an opening exploration activity for the section or an informal assessment. Students will use this activity to find zeros using graphs and equations followed by using those zeros and their understanding of multiplicity to graph the function.</td>
<td>½ of a class period</td>
</tr>
</tbody>
</table>
Unit 3: Functions

Subject: Algebra IIA
Grade: 9, 10, 11, 12
Name of Unit: Functions
Length of Unit: 3 weeks
Overview of Unit: Students will identify functions, and find the domain and range. In addition, they will perform operations on functions. They will also identify parent functions and describe and graph transformations.

Priority Standards for unit:
- Alg2.BF.A.3: Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.

Supporting Standards for unit:
- Alg2.BF.A.1: Create new functions by applying the four arithmetic operations and composition of functions (modifying the domain and range as necessary).
- Alg2.IF.A.2: Translate between equivalent forms of functions.
- ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
- ISTE-KNOWLEDGE COLLECTOR.3.D - build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
- ISTE-INNOVATIVE DESIGNER.4.A - know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
- ISTE-INNOVATIVE DESIGNER.4.C - develop, test and refine prototypes as part of a cyclical design process.
- ISTE-INNOVATIVE DESIGNER.4.D - exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
- ISTE-GLOBAL COLLABORATOR.7.B - use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.
<table>
<thead>
<tr>
<th>Unwrapped Concepts (Students need to know)</th>
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<th>Bloom’s Taxonomy Levels</th>
<th>Webb's DOK</th>
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</thead>
<tbody>
<tr>
<td>The effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.</td>
<td>Describe</td>
<td>Understand</td>
<td>2</td>
</tr>
</tbody>
</table>

**Essential Questions:**
1. How do you identify a relation as a function and state the domain and range?
2. Why is it important to know parent functions?
3. How do you transform the parent functions?

**Enduring Understanding/Big Ideas:**
1. You can either check the inputs and see if they have only one output, or use the vertical line test. The domain is all the possible input values and the range is all the possible output values.
2. The parent function is the simplest form of each function and all transformations are based off of the parent graph.
3. You use the a, b, h, and k values of af(bx-h)+k to translate, reflect, stretch and/or compress each point.

**Unit Vocabulary:**

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<thead>
<tr>
<th>Academic Cross-Curricular Words</th>
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</thead>
<tbody>
<tr>
<td>Inverse</td>
<td>Relation</td>
</tr>
<tr>
<td>Domain</td>
<td>Function</td>
</tr>
<tr>
<td>Range</td>
<td>Parent function</td>
</tr>
</tbody>
</table>

**Resources for Vocabulary Development:** Textbook
Engaging Experience 1
Title: Domain and Range Matching Activities
Suggested Length of Time: ⅓ of a class period
Standards Addressed

Priority:

- Alg2.BF.A.3: Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.

Detailed Description/Instructions: Students match and sort equations and graphs with their domain and range either on desmos or with the cards in the worksheets (found in the google drive Algebra II Resources).

Bloom’s Levels: Understand
Webb’s DOK: 2
Rubric:
Engaging Experience 1

Title: Card Match

Suggested Length of Time: ⅓ of a class period

Standards Addressed

Priority:

- Alg2.BF.A.3: Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.

Detailed Description/Instructions: Students match and sort equations, graphs, and transformations on desmos or with the cards in the worksheet (found in the google drive Algebra II Resources).

Bloom’s Levels: Understand

Webb’s DOK: 2

Engaging Experience 2

Title: Desmos Transformation Activities

Suggested Length of Time: ½ of a class period for each

Standards Addressed

Priority:

- Alg2.BF.A.3: Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.

Supporting:

- ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

- ISTE-GLOBAL COLLABORATOR.7.B - use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.

Detailed Description/Instructions: Students complete desmos activities located at Desmos Transformation Activities.

Bloom’s Levels: Understand

Webb’s DOK: 2
Engaging Experience 1
Title: Operations with Functions on Quizizz
Suggested Length of Time: ½ of a class period for each

Standards Addressed

Priority:
- Alg2.BF.A.3: Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions.

Supporting:
- ISTE-EMPOWERED LEARNER1.C - use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
- ISTE-GLOBAL COLLABORATOR.7.B - use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.

Detailed Description/Instructions: Students complete the Quizizz activity as decided by the teacher on teacher.quizizz.com.

Bloom’s Levels: Understand
Webb’s DOK: 2
Engaging Scenario: Parent Function Photo Presentation
Students will be tasked in finding examples of the parents functions discussed in class outside of the classroom setting. Students will take pictures and/or videos, prepare them in a presentation and explain how the objects they found are similar or the same as desired parent functions. This presentation may be in any media for the teacher decides is appropriate for their class. Examples include, but are not limited to Google Slides, Prezi, Videos, and Microsoft Sway.

Parent Function Photo Prezi Example

Rubric for Engaging Scenario:
## Summary of Engaging Learning Experiences for Topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Engaging Experience Title</th>
<th>Description</th>
<th>Suggested Length of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functions and Domain/ Range</td>
<td>Domain and Range Matching Activities</td>
<td>Students match and sort equations and graphs with their domain and range either on desmos or with the cards in the worksheets (found in the google drive <a href="#">Algebra II Resources</a>).</td>
<td>½ of a class period</td>
</tr>
<tr>
<td><strong>Parent Functions and Transformations</strong></td>
<td>Card Match</td>
<td>Students match and sort equations, graphs, and transformations on desmos or with the cards in the worksheet (found in the google drive <a href="#">Algebra II Resources</a>).</td>
<td>½ of a class period</td>
</tr>
<tr>
<td><strong>Parent Functions and Transformations</strong></td>
<td>Desmos Transformation Activities</td>
<td>Students complete desmos activities located at <a href="#">Desmos Transformation Activities</a>.</td>
<td>½ of a class period for each</td>
</tr>
<tr>
<td>Operations, Composition, and Inverse of Functions</td>
<td>Operations with Functions on Quizizz</td>
<td>Students complete the Quizizz activity as decided by the teacher on teacher.quizizz.com.</td>
<td>½ of a class period for each</td>
</tr>
</tbody>
</table>
Unit of Study Terminology

**Appendices:** All Appendices and supporting material can be found in this course’s shell course in the District’s Learning Management System.

**Assessment Leveling Guide:** A tool to use when writing assessments in order to maintain the appropriate level of rigor that matches the standard.

**Big Ideas/Enduring Understandings:** Foundational understandings teachers want students to be able to discover and state in their own words by the end of the unit of study. These are answers to the essential questions.

**Engaging Experience:** Each topic is broken into a list of engaging experiences for students. These experiences are aligned to priority and supporting standards, thus stating what students should be able to do. An example of an engaging experience is provided in the description, but a teacher has the autonomy to substitute one of their own that aligns to the level of rigor stated in the standards.

**Engaging Scenario:** This is a culminating activity in which students are given a role, situation, challenge, audience, and a product or performance is specified. Each unit contains an example of an engaging scenario, but a teacher has the ability to substitute with the same intent in mind.

**Essential Questions:** Engaging, open-ended questions that teachers can use to engage students in the learning.

**Priority Standards:** What every student should know and be able to do. These were chosen because of their necessity for success in the next course, the state assessment, and life.

**Supporting Standards:** Additional standards that support the learning within the unit.

**Topic:** These are the main teaching points for the unit. Units can have anywhere from one topic to many, depending on the depth of the unit.

**Unit of Study:** Series of learning experiences/related assessments based on designated priority standards and related supporting standards.

**Unit Vocabulary:** Words students will encounter within the unit that are essential to understanding. Academic Cross-Curricular words (also called Tier 2 words) are those that can be found in multiple content areas, not just this one. Content/Domain Specific vocabulary words are those found specifically within the content.

**Symbols:**
- This symbol depicts an experience that can be used to assess a student’s 21st Century Skills using the rubric provided by the district.
- This symbol depicts an experience that integrates professional skills, the development of professional communication, and/or the use of professional mentorships in authentic classroom learning activities.