BHAG (Big Hairy Audacious Goal)
By the end of the course, Algebra I learners will be motivated to be competent and self-directed learners in finding solutions for real-world challenges.

Stage 1 - Desired Results

Established Goals:
A.6 Quadratic functions and equations. The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to:

A.6A determine the domain and range of quadratic functions and represent the domain and range using inequalities;
A.6B write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ($f(x) = a(x - h)^2 + k$), and rewrite the equation from vertex form to standard form $f(x) = ax^2 + bx + c$);
A.6C write quadratic functions when given real solutions and graphs of their related equations. (SS)

A.7 Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to:

A.7A graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry;
A.7C determine the effects on the graph of the parent function $f(x) = x^2$ when f(x) is replaced by af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d.

A.8 Quadratic functions and equations. The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:

A.8B write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems. (SS)

Intentional Spiraled Standards:
A.3C, A.3E

Understandings:
Students will understand that…
U1: Quadratic models are necessary to investigate, explain and make mathematical predictions in real-world and mathematical situations and to determine potential domain and range restrictions.

U2: Key features of equations have different meanings based on the mathematical situation in which they are applied

Essential Questions:
Students will keep considering…
EQ 1: How can we identify and explain the key attributes of quadratic functions mathematically and in real-world situations?
EQ 2: How are the domain and range of a quadratic function affected when given a real world situation?
EQ 3: Why is it advantageous to know the different forms of a quadratic function and how their features correlate to the

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	graph of a quadratic function? EQ 4: Compare and contrast the differences between a quadratic equation that has two, one, or zero x-intercepts and how that affects the vertex and other key features of a quadratic function. EQ 5: How can you determine the changes to quadratic graphs based on specific values in the equation?
Students will know…. ● Functions that contain an x^2 term form parabolas and are called Quadratic functions ● The different forms of a Quadratic function (i.e: standard, vertex, and factored form) ● The domain and range of Quadratic functions ● The location of x-intercepts given any Quadratic function ● The location of the vertex and the connection of the vertex to the minimum/maximum values ● How to identify and interpret the axis of symmetry ● The different transformations of a Quadratic function and their effect of the graph ● The terms x-intercepts, roots, zeros, and solutions are related to each other	*Students will be skilled at…* ● Writing Quadratics functions using any form (i.e: standard, vertex, and factored form) ● Graphing Quadratics functions using any form (i.e: standard, vertex, and factored form) ● Finding the domain and range of Quadratic functions ● Using restrictions on a Quadratic function to create a reasonable domain and range for real-world problems ● Finding the axis of symmetry using the graph or the vertex of the Quadratic function ● Identifying the transformation applied to the parent function with or without the use of a graph

Stage 2 - Assessment Evidence

Performance Tasks:	**Other Evidence:**
● "Financial Advisor" Project	● Quadratics Mat Discussion ● Key Features Scavenger Hunt ● Domain & Range Introduction Desmos ● Quadratic Transformations Desmos ● District Common Formative Assessment (DCFA) and Teacher-created quizzes ● Digital Practice (Delta Math and Quizizz) ● Daily Self-assessment/Reflection ● End of Unit Summative Assessment

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Stage 3 - Learning Plan

Learning Activities:

1. Learners will have an opportunity to demonstrate their prior knowledge of vocabulary and key features of functions from previous units of study. We will use graph #6 from Which One Doesn't Belong?. Each of the 4 graphs have a reason that could be used to justify why it does not belong. **H**
2. Using the Quadratics Mat, a whole class discussion will provide support in connecting the key features and vocabulary about Linear and Exponential Functions to the Quadratic Function (A.7A). **W, E**
3. Learners will collaborate within groups in completing the Key Features of Quadratics Scavenger Hunt. **E, R, E-2, T**
4. Learners will watch a Lesson video over Graphing Quadratics using technology and key features. **E**
5. Provide Learners with opportunity to identify the Key Features of Quadratics by Graphing through digital practice on Delta Math. **E-2**
6. Give DCFA over Graphing and Key Features of Quadratics (A.7A). **E**
7. A Desmos Activity for Learners to work through (whole class or small groups) to again connect with the prior knowledge of other functions and how to determine domain and range given multiple representations (A.7A). **W, H, R, T, O**
8. Gamified Practice using whiteboards and Instructor-paced Quizizz with small groups over Domain and Range (A.6.A). **H, T, O**
9. Whole class discussion through completion of the Quadratic Transformations Desmos activity. This will lead to connections with the vertex form of a quadratic function (A.7C). **W, R, T**
10. Learners will be given the opportunity to demonstrate their understanding through digital practice. **E, E-2**
11. Quiz over Transformations (A.7C). **E**
12. Learners will be given access to the lesson videos for the remaining concepts over Writing Equations of Quadratic Functions given a vertex and a point and given a table or graph. (A.6B, A.6C, A.8B). **E, E-2, T, O**
13. Learners will complete digital practice over Writing Equations through the use of Delta Math, Quizizz, and Google Practice Sets. **E, E-2, T, O**
14. Small groups will complete the Performance Task. It will serve as part of a review for the upcoming End of Unit Assessment (EUA). **W, H, E, E-2**
15. End of Unit Assessment created by Algebra I PLC will be given to Learners along with a Google Form for them to evaluate their own learning throughout this unit of study. **H, E-2, T**

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