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2019 Technology Integration Workshop

Unit Title: Quadratic Functions

Grade Level: ***(example: 9, 10, 11, 12 or 7-8) 9***

Subject Area: ***(example: Science, Physics; English, Short Stories) Math***

Duration/Length/Number of class periods: ***(example: 5 class periods) 10 class periods***

Description:
Students will find and identify the vertex, axis of symmetry, and zero(s) given Quadratic Functions and Quadratic Graph.

Established Goals (National, State, Local):
9.2.1.5 Parabolas - Identify the vertex, axis of symmetry, intercepts and zero(s) from the given functions

9.2.1.6 Graph of a Function - Identify the vertex, axis of symmetry and zero(s) from the given graph

What Enduring Understandings are desired?
Students will recognize the different parts of a parabola.
Students will be able to explain the transformation of a parabola graph.
Students will be able to find the different parts of a parabola given a quadratic equation
Students will be able to make the connection between parabolas and quadratic equations.
Students will inquire about the role of the Quadratic Formula

What Essential Questions will be considered?
How does the constants a, h, k affect the parabola?
Why are there two forms (Vertex Form and Standard Form) for the same equation? Is one better than the other?
What is the relationship between a parabola graph and a quadratic equation?
How is the Quadratic Formula related to parabolas and Quadratic equations?

Students will know / be able to:
- Identify the **Vertex, Zero(s),** and the **Axis of Symmetry** from a **Graph**
- Find the **Vertex, Zero(s),** and the **Axis of Symmetry** from an **Equation**

Description	*Units must include at least one of each formative, summative, introductory activity and learning activity. Check the appropriate box; one per row.*	Formative	Summative	Introductory Activity	Learning Activity	Student Technology	Teacher Technology Used	ISTE Standards

					Used		
Day 1 **Inquiry Activity**: Students answer questions with a partner on "Quiz" how changing a, h, and k ($y = a(x-h)^2 + k)$ changes the graph Students answer questions on how changing a,b, and c ($y = ax^2 + bx + c)$ changes the graph			x		iPad		1b, 4a, 4b
Inquiry Activity: In Groups, Students input $y = a(x-h)^2 + k$ into Desmos. Change the values of a, h, and k. Students input $y = ax^2 + bx + c$ into Desmos. Change the values of a, b, and c. Students redo Inquiry "Quiz"	x		x	x	iPad		1b, 4a, 4b
Guided Notes: Teacher led note taking. Make sure everyone is on the same page with the constants			x	x	x	Laptop Projector	2c
Quadratic Graphing Activity: Given coordinate points, students plot the points to draw the graph. Then students find the constants a, h, and k $y = a(x-h)^2 + k$ so that the two graphs are the same. Given coordinate points, students plot the points to draw the graph. Then students find the constants a, b, and c $y = ax^2 + bx + c$ so that the two graphs are the same. Students work in pairs or groups	x			x	iPad		1c
Day 2 **Inquiry Kahoot:** Students have to find the vertex and axis of symmetry of each graph. Each question will be repeated numerous times in a row.			x		iPad	Laptop Projector	4a, 4b, 4d
Guided Notes: Teacher led note taking. Define and draw vertex and axis of symmetry			x	x	iPad	Laptop Projector	2c
Axis of Symmetry Inquiry: Given three quadratic equations in Standard Form, students attempt to figure out how I found the Axis of Symmetry.. Students should look for patterns and see if it works for all three problems. Students work in partners or groups			x	x		Laptop Projector	4a, 4b, 4c 5c
Guided Notes: Teacher led note taking. Axis of Symmetry is found by using -b/2a				x	iPad	Laptop Projector	2c
Guided Practice: Finding Axis of Symmetry of a Quadratic Equation	x			x	iPad	Laptop Projector	1c
Day 3 **Math Review: Finding Axis of Symmetry of a Quadratic Equation**	x					Laptop	1c

						Projector	
Vertex Inquiry: Given three quadratic equations in Standard Form, students attempt to figure out how I found the Vertex. Students are also given the Axis of Symmetry. Students should look for patterns and see if it works for all three problems. Students work in partners or groups			**x**	**x**		**Laptop Projector**	**4a, 4b, 4c** 5c
Guided Notes: Teacher led note taking. Vertex - 1) Find Axis of Symmetry. 2) Plug into original equation for x. Vertex is the ordered pair.			**x**	**x**		**Laptop Projector**	**2c**
Guided Practice: Finding Vertex of a Quadratic Equation	**x**			**x**			**1c**
Exit TIcket: Students submit one problem for review							**1c**
Day 4 **Math Review:** Identifying **Vertex, Axis of Symmetry,** and **Zeros** of graphs and equations	**x**						**1c**
Matching: Given equations and graphs, students identify the vertex, axis of symmetry, and zeros of both graphs and equations. Students then match the graphs and equations. Students should understand that parabolas and quadratic equations are the same.				**x**			**1b, 1c**
Kahoot: Questions will be the same questions on the matching activity	**x**				**iPad**	**Laptop Projector**	**1c**
Day 5							

Materials, tools and resources: iPad, Laptop, Projector. Files are in Google Drive
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Additional credit given to