

Lesson Title: Quadratic Word Problems Part 2 **Date:** _____

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| <p>Subject: Algebra I or Algebra II Grade: 8, 9, or 10</p> | <p>Topic: Quadratic Word Problems Designer: Jessica Ulcickas</p> |
| <p>Stage 1 – Desired Results</p> | |
| <p>Lesson Overview: This activity walks students through two different scenarios modeled using quadratic equations. Students are required to graph the given parabolas and use the graph of each parabola in order to answer questions about the given situation. Students will have to use the graph of a parabola to identify key information about real life situations.</p> | |
| <p>Standards Addressed:</p> <p><u>CCSS.Math.Content.HSF-IF.B.4</u> For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity</i></p> <p><u>CCSS.Math.Content.HSF-IF.C.7</u> Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases</p> <p><u>CCSS.Math.Content.HSF-IF.C.7a</u> Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> | |
| <p>Enduring Understanding: Graphing quadratic functions can help someone understand different real life situations. Quadratic functions can be used to model different situations and looking at the graph can help a person to identify key information about a given situation.</p> | <p>Essential Questions: What type of situations can be modeled using quadratic equations? What type of important information can we gain by observing graphs of quadratic models?</p> |
| <p>Students will need to know: Students will need to know how to solve for the vertex of a parabola, as well as how to graph a parabola.</p> | <p>Students will be able to:</p> <ul style="list-style-type: none"> • Identify specific ordered pairs on a parabola that denote a specific situation. • Discuss the importance of a given ordered pair to a particular quadratic model. |
| <p>Stage 2 – Assessment Evidence</p> | |
| <p>Performance Tasks: In this activity:</p> | <p>Other Evidence:</p> |

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| <ul style="list-style-type: none"> • Asking students to identify how long it take a bath tub to drain. • Asking students to identify the peak profit reached based on a quadratic profit model. • Asking students to reflect on which parts of their graph may not make sense in the context of a given situation. | <ul style="list-style-type: none"> • To be decided by the teacher. |
| <p>Stage 3 – Learning Plan</p> | |
| <p>Lesson Procedure:</p> <p><u>Many Days Before:</u></p> <p>Students will be introduced to the topic of quadratics. Up to this point students will have learned how to factor and solve quadratic equations as well as how to use the quadratic formula, and to graph parabolas. It is also possible that students will have learned how to complete the square.</p> <p><u>Day Of:</u></p> <p>Students will go to the computer lab in order to complete this activity. For the duration of the activity, the teacher will monitor student progress to ensure that students complete the activity properly and do not simply click to complete. The activity will not take all class period, so the remainder of the class period will be at the discretion of the classroom teacher.</p> | <p>Required Materials:</p> <ul style="list-style-type: none"> • Computers for each student. • Scrap paper. |
| <p>Possible Discussion Questions for Students:</p> <ul style="list-style-type: none"> • Can you think of any other types of situations that may be modeled with a quadratic equation? • Why do you think there is always a | <p>Sample Answers to Discussion Questions:</p> <ul style="list-style-type: none"> • Answers may vary. • Negative numbers often don't exist in |

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| <p>portion of the graph that doesn't seem to apply to a real life scenario?</p> | <p>the context of a real world situation. It is impossible to fill a tub with a negative amount of water. It is impossible to have negative time pass. Therefore the negative portions of the graph are often disregarded.</p> |
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