



Yale-New Haven
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Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2012 Volume IV: Engineering in the K-12 Classroom: Math and Science Education for the 21st-Century
Workforce

Quadratic Regressions and the Catapult Wars

Guide for Curriculum Unit 12.04.03

by William Lawrence McKinney

This curriculum unit introduces students to quadratic functions at a very theoretical level. It focuses on evaluating functions as a means of graphing and then analyzing the parabolic curve to determine key information about the function. The unit pays special attention to domain, range, intervals upon which the function increases or decreases, intercepts, maxima and minima, and the coefficients of a quadratic function in standard form: $f(x) = ax^2 + bx + c$.

Through a series of mini-lessons, students discover how the coefficients of the equation affect the overall shape of a parabola. Then, through experimentation, students discover how manipulating various components (arm length, angle of release, and torsion) of a catapult directly affects the trajectory of the projectile and consequently the equation that models its flight path. This unit plan emphasizes contextual understanding of quadratic functions as a means of improving a student's theoretical understanding.

(Recommended for Algebra 1 and Algebra 2, grades 8-11)

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