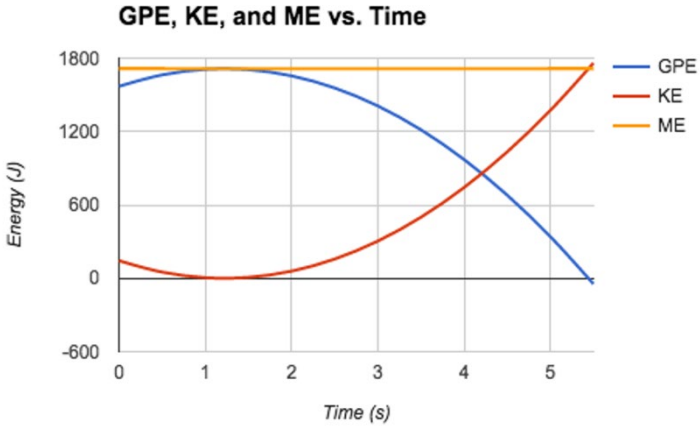
Quadratics & Energy in Motion!

An Intensive Workshop



Unlock the power of **quadratic functions** to explore **vertical motion, energy, and physics** in this interactive workshop designed for students in Algebra 1 or above! Through **interactive problem-solving**, students will learn to:

- **Apply quadratic equations** to real-world motion scenarios
- **Analyze energy transformations** using kinetic & potential energy equations
- **Graph motion data** and interpret key features like vertex, roots, and slopes
- **Use spreadsheets & graphing tools** for data analysis



With engaging activities and technology integration, students will gain a **deeper understanding of physics and algebra**, developing skills that extend beyond the classroom.



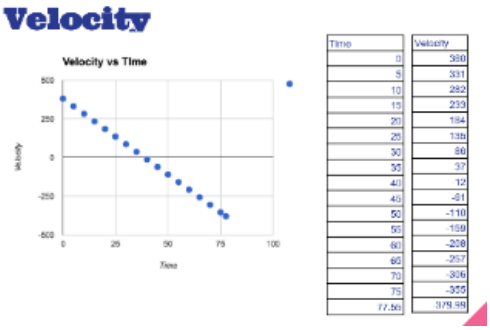
For Algebra 1 or 2 Students: Recommended for students who are fluent in linear functions and have at least elementary exposure to quadratic functions, which is typically covered in second semester Algebra 1.

For Advanced High School Students: Ideal for students who have mastered Algebra 1 or 2 and seek an intensive review of quadratic functions alongside a deeper dive into real-world applications. This workshop extends into conceptual foundations that pave the way for differential equations and integrals in Calculus. Advanced students will also tackle final presentation problems incorporating trigonometric identities for a more comprehensive mathematical challenge.

Monday	*8:30am – 10:30am*	*Optional Crash Course Review in Quadratics*
Tuesday	8:30am – 10:30am	**Session 1**: Vertical Motion and Energy Foundations
Wednesday	8:30am – 10:30am	**Session 2**: Graphing and Algebraic Solutions
Thursday	*8:30am – 10:30am*	***Session 3**: Putting it all Together and Presentation*

Session recordings will be available for any student who cannot make a particular session. Times in Mountain Standard Time)

For this online workshop, students will need a computer or tablet with access to zoom and a camera with the ability to annotate, and a google account with access to google sheets and google slides.



Winter 2027 Offerings: Mon-Thur, Jan 4-7 and Feb 1-4

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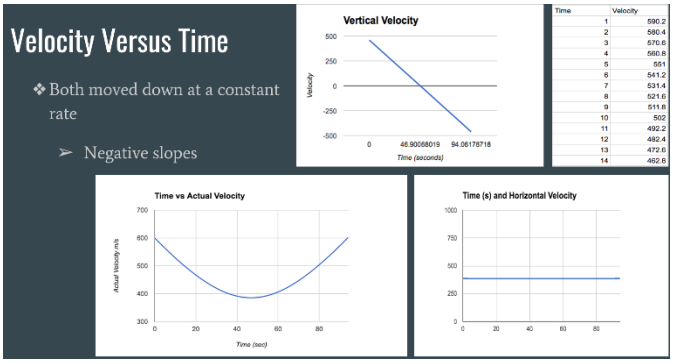
Optional Crash Course Review in Quadratics *(Monday, 8:30-10:30 MST)*

Objective: Provide a foundational review of quadratic functions and problem-solving methods.

- Hour 1: Introduction to quadratics—standard form, graphing basics, and real-world applications.
- Hour 2: Solve quadratics using graphs, factoring, completing the square, and the quadratic formula. Discuss the discriminant, real vs. imaginary solutions, and transformations.

(Students comfortable with quadratics may skip this session and begin with Session 1.)

Session 1: Vertical Motion & Energy Foundations *(Tuesday, 8:30-10:30 MST)*



Objective: Connect vertical motion and energy concepts to quadratic functions.

- Hour 1: Define & calculate potential energy (PE), kinetic energy (KE), and mechanical energy (ME). Explore energy conservation and transformations in motion.
- Hour 2: Introduce the vertical motion equation, its real-world meaning, and key quadratic features (vertex, roots, y-intercept).

Session 2: Graphing & Algebraic Solutions *(Wednesday, 8:30-10:30 MST)*

Objective: Solve motion problems algebraically and analyze energy transformations.

- Hour 1: Graphing motion—position vs. time, velocity vs. time, acceleration vs. time graphs. Identify key features like slopes, intercepts, and symmetry.
- Hour 2: Solve for time of flight, max height, and impact using quadratic methods. Explore KE, PE, and ME relationships with energy graphs.

Session 3: Putting it all Together & Presentation *(Thursday, 8:30-10:30 MST)*

Objective: Apply concepts to a real-world motion scenario and present findings.

- Hour 1: Solve an assigned motion problem, analyze time, height, energy, and create a digital presentation with graphs, equations, and real-world applications.
- Hour 2: Students present findings, discuss key takeaways, and explore applications in physics.