DataSnap™ Projectile Experience

Advanced Curriculum Overview

Designed for:

- High school students in engineering, robotics, manufacturing, or STEM/science courses

Length:

This eight-hour curriculum is comprised of six lessons. With supplemental materials, this curriculum can be adapted to a longer block of time. You can also select individual lessons or activities to use in your current curriculum.

Goal:

To modernize the classic catapult activity, bringing standards-driven content to life with easily accessible projectile motion data.

Synopsis:

The DataSnap Projectile STEM Lab and its advanced curriculum allow students to learn, explore, create, and validate predictive data models that describe a catapult's performance. Students will create a data-smart catapult and experiment with its pull-back angle, elastic bands, launch arm length, and launch angle as they learn about force and work, energy, velocity, and Newton's Laws. The lessons and activities feature objectives, materials required, and approximate class time.

Curriculum Components:

- Curriculum
- Student materials
- Slide presentations
- Stident Engineering Workbook

Learning Objectives:

Lesson 1 – Making Your Catapult Data-Smart

- Understand simple catapult and projectile motion concepts
- Construct a catapult
- Conduct 3 data-gathering trials
- Access and view data with the DataSnap Motion Sensor

Lesson 2 – Pull-Back Angle - Force and Work

- Understand how force and work apply to catapults
- Collect, graph, and analyze data on pull-back angle to develop a predictive model
- Test and evaluate a predictive model

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Lesson 3 – Elastic Bands and Energy

- Describe how elastic potential energy, kinetic energy, and the conservation of energy apply to catapults
- Collect, graph, and analyze data on the number of elastic bands to develop a predictive model
- Test and evaluate a predictive model

Lesson 4 – Launch Arm Length and Velocity

- Describe how angular velocity, momentum, and inertia apply to catapults
- Collect, graph, and analyze data on launch cup position to develop a predictive model
- Test and evaluate a predictive model

Lesson 5 – Launch Angle and Newton's First Law

- Describe how launch angle and Newton's First Law apply to catapults
- Collect, graph, and analyze data on launch angle to develop a predictive model
- Test and evaluate a predictive model

Lesson 6 – Strategapult Competition

- Understand how to optimize a catapult's properties to produce the intended outcome
- Quickly strategize, predict, and execute a successful launch

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