

DataSnap™ Impact Experience

Advanced Curriculum Overview

Designed for:

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

Length:

This 12-hour curriculum is comprised of eight 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 Egg Drop Engineering Design Challenge, bringing standards-driven content to life with easily accessible motion data.

Synopsis:

The DataSnap Impact STEM Lab and its advanced curriculum allow students to learn, explore, and develop solutions to engineering challenges while using the DataSnap Motion Sensor to conduct repeated test trials, collect data, and evaluate the effectiveness of their designs. Students will be introduced to distance, velocity, time, and more. The lessons and activities feature objectives, materials required, and approximate class time.

Curriculum Components:

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

Learning Objectives:

Lesson 1 – Distance, Time, and Velocity

- Connect the DataSnap Sensor to student devices and access collected data using the DataSnap app
- Purposefully collect height, time, and velocity data

Lesson 2 – Gravitational Acceleration

- Understand how gravity influences objects that experience freefall
- Identify freefall motion characteristics on position, velocity, and acceleration graphs
- Use real data to articulate the relationship between drop height and maximum velocity

Lesson 3 – Acceleration and Human Limits

- Understand how gravitational acceleration and G-forces are related
- Collect impact acceleration data with the DataSnap Sensor
- Calculate acceleration values

Lesson 4 – Protect the Astronaut

- Use the Engineering Design Process to guide student solution development
- Build, test, and improve a landing strategy that achieves the lowest impact acceleration
- Collect data using the DataSnap app to inform design iteration

Lesson 5 – Forces, Newton’s Laws, and Inertia

- Understand how Newton’s 3 Laws can be used to describe an object’s motions
- Describe an object’s motion when experiencing balanced or unbalanced forces
- Design and carry out an experiment that collects data to show the relationship between impact force and drop height

Lesson 6 – Impact Forces

- Understand how impact force is related to collisions in the real world
- Articulate the relationship between impact force and time of impact

Lesson 7 – Parachute Dynamics

- Articulate how parachutes work using appropriate terminology
- Identify 4 common parachute designs and their real-world applications
- Design, build, and test a parachute
- Evaluate the parachute’s effectiveness using DataSnap data

Lesson 8 – Egg Impact Safety

- Describe the Engineering Design Process
- Use the Engineering Design Process to identify, build, and test solutions to the final challenge