DOCTOR DOOM'S FEARFALL® EGG SPLAT

LESSON OVERVIEW: *STUDENTS WILL BE EXPLORING NEWTON'S LAWS THROUGH THE DESIGN AND CONSTRUCTION OF A PROTECTIVE DEVICE FOR AN EGG. THEY WILL USE THE SCIENTIFIC METHOD IN THE DESIGN CONCEPT, TESTING, AND MODIFICATION. THEY WILL ALSO BE ANALYZING THEIR RESULTS AND MAKING PREDICTIONS OF FUTURE SUCCESS AND FAILURE WITH DIFFERENT DESIGNS AND ENVIRONMENTS.*

THEIR MATH SKILLS WILL BE TESTED THROUGH THE APPLICATION OF ALGEBRAIC FORMULAS USED TO CALCULATE ACTUAL DISTANCE TRAVELED AS WELL AS PREDICTED DISTANCE BASED UPON INFORMATION PROVIDED BY THE TEACHER. THEY WILL THEN GRAPH THEIR CALCULATIONS USING A BEST-FIT LINE.

MATH STANDARDS

Algebraic Thinking: Standard 1
The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions.
(MA.D.1.3)

Algebraic Thinking: Standard 2
The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.
(MA.D.2.3.1)

Geometry & Spatial Sense: Standard 1
The student describes, draws, identifies, and analyzes two- and three-dimensional shapes.
(MA.C.1.3)

Geometry & Spatial Sense: Standard 2
The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.
(MA.C.2.3)

Data Analysis: Standard 1
The student understands and uses the tools of data analysis for managing information.
(MA.E.1.3.1)

Data Analysis: Standard 2
The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.
(MA.E.2.3)

SCIENCE STANDARD

Force and Motion: Standard 1
The student understands that types of motion may be described, measured, and predicted.
(SC.C.1.3.1)

Force and Motion: Standard 2
The student understands that the types of force that acts on an object and the effect of that force can be described, measured, and predicted.
(SC.C.2.3.1; 2.3.7)

Nature of Science: Standard 3
The student understands that science, technology, and society are interwoven and interdependent.
(SC.H.3.3.4; 3.3.6)

Materials:
student provides original materials approved by teacher. Teacher provides: stapler, glue, tape, scissors, and cardboard landing zone

Procedure:

Day 1:

1. Students brainstorm ideas for an impact-proof egg traps.
2. Rough sketch is to be drawn prior to construction and materials selected are to be approved by teacher.
3. Make materials list to be brought in on Day 2.

Day 2:

1. Using approved drawing and materials, build egg traps.
2. Final drawing is to be drawn to scale in metric. Complete list of materials used to be included.

Day 3:

1. Test apparatus. (drop height to be determined by teacher. Minimum of 8 feet suggested)
2. Time free fall and record.
3. Calculate distance (d = 1/2 gt2)

Wrap-Up

1. What would happen to the distance if the time was doubled? Quadrupled? Make a graph titled Distance with distance plotted against time. Plot your data. Recalculate your distance after doubling, tripling, and halving the time. Was your prediction correct? Explain.
2. Recalculate the distance for an egg drop on the moon, holding time constant.
3. Compare and contrast the successful and unsuccessful egg traps.

After the Thrill:

Doctor Doom's Fearfall® has many safety devices built in to keep you safe. List as many of these devices as you can remember. How do these devices work to keep you secure?