Snippets of Science from Fermilab

PS 3 (3-8) Elaborate

SLIDERS: FORCE AND MOTION WITH ENERGY

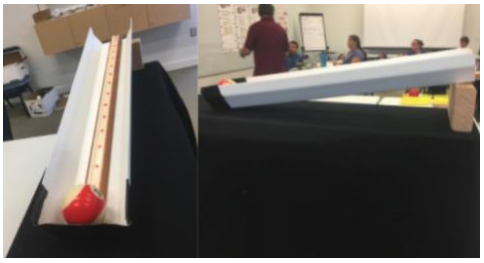
Challenge: Can you find a pattern that allows you to move an object a set distance?

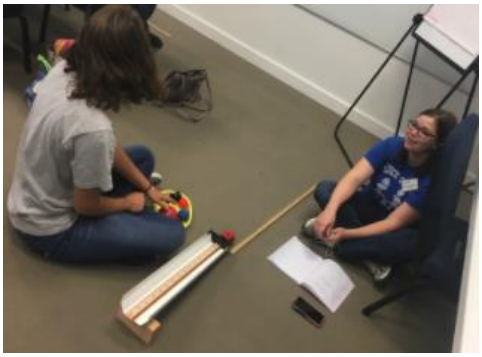
Goal: Use patterns in the data collected from a ramp system to move a toy car a set distance.

Fermilab Connection: Fermilab scientists look for patterns in data to understand more about our universe. Use the data collected from this experiment to understand how energy can affect a system and identify patterns to predict an object's movement.

Preparation

Set up a ramp system as pictured below:





Place a meter stick at the end of ramp.

Place the toy car at the duct tape barrier at the end of the ramp.

Procedure

1. Explore how the system works. Launch different-sized spheres from different energy levels (red dots on the ramp) to see how far it launches the car from the taped barrier. Practice looking for patterns.

2. Once you have an understanding of the system, the next phase is the data collection phase.

3. Take data on how far the car moves along the meter stick with different spheres, launched from different ramp heights, and launched from different energy levels. Look for patterns in your data and start to make predictions based on their analysis.

GRADE LEVEL
Grades 3–8 with modifications

MATERIALS

- Various toy cars (i.e., hot wheels)
- Meter sticks
- 60 cm rain gutters with duct tape at one end
- Molding strip with red dots marked at equal distances (or Hot Wheels tracks)
- Variety of spheres (billiard ball, golf ball, foam ball, bocce ball, etc.)
- Wood block (Can be used for three different ramp heights)

Fermilab Resources:
Click on the linked resources!

Science at Work

*Adapted from Partners for Inquiry - Golden Apple STEM Institute

Fermilab

Data Sheet:

Type of Energy Sphere	Energy Level (Release Point)	Distance Traveled (cm)

Once you have identified some patterns, complete the following table with a predetermined distance set. Select an energy sphere and energy level. How many trials does it take for you to hit the desired distance?

Type of Energy Sphere	Energy Level (Release Point)	Distance Traveled (cm)	Number of Trials to Hit Correct Distance
		20 cm	
		55 cm	
		10 cm	
		75 cm	

*Adapted from Partners for Inquiry - Golden Apple STEM Institute