Disney Youth Education Series

PROPERTIES OF MOTION PHYSICS LAB

Designed for Students
Grades 6th-12th
Ages 11-18

Program Length
3 hours

Park Location
Disney California Adventure® Park

SYNOPSIS

Surrounded by the mechanical marvels of *Disney California Adventure®* Park, students discover how physics can be applied to move thrilling roller coasters through storytelling spaces.

To begin the adventure, students brainstorm ideas for a new Disney attraction that uses motion to tell story. This launches into a discussion of how Walt Disney Imagineering use mechanical physics to design their attractions. Students become acquainted with terms like potential energy, kinetic energy, velocity, and acceleration.

Hands-on experiments with everyday objects build connections between students' basic intuitions and physics concepts like Newton's laws of motion. Having developed a sense of how these concepts influence objects' motion, students are challenged to build and test functional model roller coasters of their own.

Select attraction experiences reveal the ways that inertia, centripetal acceleration, and energy affect roller coaster design. Students learn that energy takes many forms, and it can be transferred or converted in propulsion systems like linear induction motors and chain lifts. Handheld accelerometers allow students to measure and compare the g-forces experienced onboard a typical coaster.

Students ultimately use their newfound mastery of mechanical physics to revisit and rework their initial attraction concepts. The adventure concludes with an inspiring discussion of how fields like physics can help students achieve their dreams.

LEARNING OUTCOMES

After completing Properties of Motion Physics Lab, participants will be able to:

- Brainstorm and design concepts for a Disney attraction

- Describe various forms of energy

- Define speed, velocity, acceleration, inertia, force, and friction

- Discuss and measure g-forces

- State and illustrate the Law of Conservation of Energy

- State Newton's First and Third Laws of Motion

- Compare and contrast traditional propulsion systems to linear induction motors

- Articulate factors that may influence the attraction design process

- Discuss various careers associated with the study of physics

Disneyland RESORT