

THE SCIENCE OF ROLLER COASTERS ASSEMBLY

Designed for Participants

Grades 6th – 12th
Ages 11 – 18

Program Length

1.5 hours

Location

Disneyland® Resort

75 Participant Minimum

SYNOPSIS

Future Imagineers are invited to participate in an interactive, assembly-style experience at the *Disneyland*® Resort. Led by energetic and entertaining facilitators, students discover how the magic of storytelling and the principles of physics propel Disney roller coasters.

To begin the assembly, students are introduced to the mechanical physics concepts that underlie roller coaster design. They then draw basic roller coaster tracks of their own, to be periodically embellished as new concepts are introduced. Next, the story of Disney's roller coasters begins to unfold with the creation of the Matterhorn Bobsleds in the 1950s. Students examine the mechanisms and physics concepts that allowed early Imagineers to control the speed of their first roller coaster and lay the foundations for future attractions.

Launching forward to the 1970s, students explore the importance of gravity, potential energy, and kinetic energy in Space Mountain, a sci-fi roller coaster whose technology would ironically be surpassed by the far less futuristic Big Thunder Mountain Railroad. The Imagineers' pioneering work with linear induction motors illustrates together the importance of electromagnetism, inertia, and g-forces in coaster design.

A final leap forward carries students to the 21st century, where they learn how the Incredicoaster unites all the program's concepts to tell a captivating story. After the students successfully complete a thrilling design challenge, a special guest who has worked with these ground breaking attractions is invited onstage for a moderated question-and-answer session, ultimately inspiring the students to achieve their dreams in the sciences and beyond.

LEARNING OUTCOMES

After completing Disney's Science Assembly, participants will be able to:

- ✓ Define speed, velocity, acceleration, inertia, force, gravity, and friction
- ✓ Design a roller coaster track and describe its use of mechanical physics
- ✓ State and illustrate the Law of Conservation of Energy
- ✓ Compare and contrast different propulsion systems for roller coasters
- ✓ State Newton's First Law of Motion
- ✓ Articulate factors that may influence the attraction design process
- ✓ Describe how roller coaster design has evolved over time
- ✓ Discuss various careers associated with the study of physics