

Roller Coaster

Grades 6+ | Students Served: 12 (teams of 4)

MIDDLE LEVEL

HIGH SCHOOL



Essential Questions

What forces are acting upon the ball at specific points on the track?

How does apparent weight vary during circular motion?

What safety precautions should be taken to prevent injury on roller coasters?

Career Connections:

- Structural Engineer
- Math or Science Teacher
- Amusement Park Repair Technician
- Astronaut

STEM Connections

Science

- Kinetic and potential energy
- Angular velocity

Technology

- Attributes of design
- Problem solving

Engineering

- Iterative design
- Testing

Math

- Measurements
- Estimations



Sample Activity

May the Force Be with You

Challenge

Students work in teams to determine the best roller coaster track design for a ball to travel the entire course when released.

- Prior to forming the track, students brainstorm and sketch the possible track designs to test. Decide on one track design.
- Have students construct the roller coaster using the track and track stands provided.
- They test the track design by releasing the ball at the beginning of the track and then record the track distance traveled.
- The track is modified as needed and students record results.
- After the most effective track design is selected, students sketch a free-body diagram of the forces exerted at the different places on the coaster track.

Discussion

What changes were made to the track design? How did that affect the force traveled by the ball? How are potential and kinetic energy involved in this activity?