

# Overview – Clarkson University Roller Coaster Design Curriculum

This 16-25 day unit requires the application of high school physics concepts and basic engineering processes for the design and testing of a model roller coaster.

The key principles covered in this curriculum include:

- Frictional Forces (static and kinetic)
- Free body diagrams
- Energy (potential and kinetic)
- Conservation of Energy
- Linear and rotational kinematics
- Scaled drawing
- Sensors and data acquisition
- The role of STEM professions in the design of roller coasters

The curriculum is divided into 9 separate lessons:

<b>Lesson</b>	<b>Days</b>
Lesson 1 - Introduction to Roller Coaster Design	1
Lesson 2 - Work, Force, Friction	1-2
Lesson 3 - Understanding Energy	1
Lesson 4 – Kinematics	1-2
Lesson 5 - Rotational Kinematics	1-2
Lesson 6 - Motion Sensors*	1
Lesson 7 – Altimeters*	1-2
Lesson 8 – Scale Drawing	1-3
Lesson 9 – Design, build, test model roller coaster	8-11

\* Lesson 6 and 7 can be omitted without impairing student's ability to complete the design of their roller coaster