

Subject: Science

Grade: Twelfth - Physics

Standard: #9 Common Themes

**Key Concept:** The basic idea of mathematical modeling is to find a mathematical relationship that behaves in the same ways as the objects or processes under investigation.

**Generalization:** Mathematical modeling and physics principles can help us understand the physics of amusement park rides.

**Background:**

As an end of the year celebration, the physics class is going to spend a day at the regional amusement park. The teacher wants to provide some in-class experience and physics review before the trip. Based on an end-of-book test covering a variety of topics, the teacher has formed two groups. Low scorers are those who scored 75% or less on the test. Both groups are directed to the following website: [www.learner.org/exhibits/parkphysics](http://www.learner.org/exhibits/parkphysics).

This lesson is tiered in *content* according to *readiness*.

**Tier I: *Low Scorers***

These students will investigate Free Fall rides. They should read all material presented, including following the information in the sidebars to other sites. They should also perform the weightless water trick. This material deals mainly with Newton's Third Law of Motion.

**Tier II: *High Scorers***

These students will investigate Roller Coaster rides. They should read all material presented, including following the information in the sidebars to other sites. In addition, they should do the Design a Roller Coaster activity and follow this additional link for another activity:  
[www.glenbrook.k12.il.us/gbssci/phys/mmedia/index.html](http://www.glenbrook.k12.il.us/gbssci/phys/mmedia/index.html)

Assessment:

Teacher observation and student interviews during the investigation will serve as formative assessments. Students will have various pieces of documentation from their activities that should be shared and discussed with the rest of the class prior to the trip. Accuracy of data, results, and conclusions can also be used for summative assessment. All students should be able to explain both phenomena based on their own experiences and listening to explanations from the other group.