

Physics - An Invitation to Adventure

This project is effective because the students learn the physics concepts while studying about amusement park rides - a strong interest of young adolescents. It is also effective because the seventh graders get the experience of being the teacher when working with the fifth graders.

Curriculum/State Standard

NYS Math Science and Technology Standards:
1 - Analysis, Inquiry and Design;
3 - Mathematics;
4 - Physical Setting;
7 - Interdisciplinary Problem Solving

Overview

Seventh grade students studied the concepts of motion, forces, and energy by building and experimenting with simple roller coasters. They then shared what they had learned by developing and implementing short lessons on those same physics topics with fifth graders.

Objectives

- The student will collect and analyze data from lab exercises and completed roller coasters.
- The student will apply concepts of motion, forces, and energy to a design problem.
- The student will work cooperatively to prepare and give an oral presentation.

Materials

Required: pipe wrap insulation, masking tape, marbles, stop watches, plastic cup, tag board
Optional: K-Nex roller coaster physics sets

Readiness Activity

The students construct lab stations using the K-Nex kits (other materials could be easily substituted). They will use the apparatus to conduct lab investigations into energy, forces, and motion. Using the information from the labs, students will construct a roller coaster out of pipe wrap insulation. Once finished, the students will calculate the speed of the marble on the coaster, label points of acceleration, deceleration, potential and kinetic energy, and create force diagrams for gravity and friction.

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7

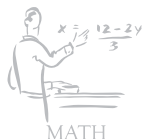
GRADE LEVEL



ARTS



LANGUAGE



MATH

Misc

MISCELLANEOUS



SCIENCE



HISTORY



SOCIAL STUDIES

2-4

WEEKS

\$767

TOTAL BUDGET

“Physics - An Invitation to Adventure” project continued...

Strategies/Activities

7th grade students conduct lab investigations to learn about speed, acceleration, gravity, friction, kinetic, and potential energy.

7th grade students apply physics concepts to building and analyzing a roller coaster made out of pipe wrap insulation.

7th grade students create short lessons on physics concepts to share with 5th graders. Lessons must include instruction on concepts and follow-up activity.

7th graders travel to elementary schools and present lessons to 5th graders. After lessons, 7th graders help 5th graders construct an insulation roller coaster.

Culminating Activity

To culminate the project, the students will create presentations for fifth grade students that include information on kinetic energy, potential energy, and speed. The presentations will include both an instructional component and an activity (such as a mini-lab, game, word search, etc.). After the presentations are completed, groups of students will travel to each elementary school and share the presentations with the fifth graders. After the instruction and activity, the older students will help the younger students create and test simpler versions of the insulation roller coasters.

Evaluation

The 7th graders were given an objective test on physics concepts, design and analysis of roller coasters were graded, as was lesson presented to 5th graders.

5th grade students fill out evaluations on presentations by 7th graders that were included as part of the older students' grades.

5th grade students and teachers and 7th graders were asked to evaluate the program: Was it fun? Was it educational? Is it something that should be continued in the future?