On the Fast Track

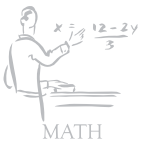
This project enables students to use knowledge and skills they have acquired throughout the unit on gravity/motion/ acceleration to deepen their understanding of these concepts. In addition, the project helps the students apply concepts physically and mentally to real world events. Finally, this project makes a connection between math and science that shows true interdependence of the disciplines.

8

GRADE LEVEL

ARTS

LANGUAGE



MATH

Misc

MISCELLANEOUS

SCIENCE

HISTORY

SOCIAL STUDIES

5

DAYS

$390

TOTAL BUDGET

Curriculum/State Standard

The curriculum standard for physical science involved by this activity is: Rate (speed) and velocity can be compared and defined operationally.

The National Education Science Standard (for Physical Science) is: As a result of their activities in grades 5-8, all students should develop an understanding of motions and forces.

Principles and Standards for School Mathematics: In grades 6-8 all students should apply appropriate techniques, tools, and formulas to determine measurements.

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Overview

The students use ratio and proportion to determine the correlation between Matchbox cars and their life-sized partners in physical measurements, speed and acceleration. They become race car drivers in a simulation that uses Matchbox cars, track, and accelerometers. After racing "down-hill", measuring, calculating, and converting, they determine the speed of their cars and visualize this speed through a film clip from "Honey, We Shrunk Ourselves".

Continued on the back...

SHOPA
Foundation for Educational Excellence

Kids In Need

THIS WINNING LESSON PLAN WAS SUBMITTED BY:

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"On the Fast Track" project continued...

Objectives

- The student will connect physical science and math.
- The students will learn how to create a simulated activity using scale models to help them determine true-life measurements.
- The student will use ratio/proportion to determine the measurements of real automobile.
- The student will run car trials and determine the speed of model car.
- The student will use proportion to determine speed of real car.
- The student will discover how to use an accelerometer.
- The student will use the accelerometer tape and a formula to determine acceleration.

Materials

For each cooperative group: Matchbox 5-car sets (these models have the correct ratio to the real automobile); road track on which the cars will run smoothly down an incline; stopwatches; acceleration timers; tape for the acceleration timers; calculators; pencil & paper

Readiness Activity

Students needed to complete the unit on gravity, motion, and acceleration so they were familiar with the vocabulary and concepts that supported this cumulative activity. They also needed to have skill in using proportion to solve problems, skill in using calculators, and knowledge of how to use a formula.

Strategies/Activities

Parts of this project are from an AIMS math/science workshop. These activities were adjusted to fit my facility and my physical science class goals. Students work in cooperative groups. They begin by choosing a Matchbox car and determining the ratio to the real-world counterpart using the numbers on the bottom of the model. They measure the width, height, and length of their model and use proportions to determine the same measurements of the real automobile. Next, they set up the track so the cars can run swiftly down an incline. They must be certain the cars run on the track and floor; they cannot be on such a steep incline or slippery floor that the wheels do not turn, the car just slides. The students use stopwatches to determine the time of five identical runs down the track and across 10 feet of floor. Timing begins at the bottom of the ramp and ends 10 feet beyond that point. They use a formula to determine speed of each run and find the average speed for their model car. Next, they use proportion to determine the downhill speed of the real automobile. The students use the accelerometers for an additional five trials and read the blue dots. Determining the distance between the dots on the acceleration tape, and following the given formula for acceleration, they draw a conclusion about the acceleration of their model car. Finally, they view the clip from the Disney movie, "Honey, We Shrunk Ourselves" and visualize the speed their model car was traveling. The clip involves the four parents in the model convertible racing around the track set up in the son's bedroom.

Culminating Activity

This project is the culminating activity for a six-week study of gravity/motion/acceleration in my physical science class. After completing the races and accompanying activities, the students discuss their reaction to the film and what it meant in relation to their findings. The students usually determine an average of 300mph for the model cars and are somewhat stunned when watching the film clip with this speed in their minds.

Evaluation

The students were evaluated as groups on being able to calculate the measurements correctly for the real-life automobile and using the formulas for speed and acceleration accurately. They also had to determine how to set up the track at the right angle for best racing, measure accurately for timing and use the stopwatch in the right way. Finally, they had to discover how to use the accelerometer and draw conclusions about what the blue dots meant. I used group observations to assess their skills and knowledge in relation to these activities.