Electric Race Car Project

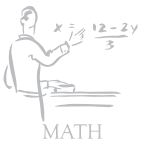
This project was amazing. It's effectiveness was in motivating students to learn engineering principles with an immediate application of building a car. The most exciting part was watching the frames getting welded together and students seeing what they have created on paper turn into a reality.

10-12

GRADE LEVEL

ARTS

LANGUAGE



MATH

Misc

MISCELLANEOUS

SCIENCE

HISTORY

SOCIAL STUDIES

3-9

MONTHS

$1500

TOTAL BUDGET

Curriculum/State Standard

This project ties together several state standards including: Scientific Inquiry, Physical Science (chemical and physical properties), Unifying Scientific Concepts and Processes, and Communication.

Overview

While studying engineering concepts, students designed, modeled, built, and raced a one person electric car. This car then participated in the PGE Electron Ran race series held in Oregon.

Objectives

- The students will work in teams of 4-6 to design an electric race car and build a 1/12th scale model of the design.
- The students will present the team's design to the class as an Oregon Certificate of Initial Mastery Speech Task.
- The students will choose and build one, or more, of the designs.
- The students will race the completed full sized race car(s).

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Kids In Need

THIS WINNING LESSON PLAN WAS SUBMITTED BY:

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"Electric Race Car" project continued...

Materials

frame material - steel tubing

drivetrain - electric motor (1+hp), controller, potentiometer, cabling, gears for motor and rear wheel (we used go cart chains/gears)

wheels - We used aluminum moped wheels with internal drum brakes. They were heavy, but sturdy.

batteries - two lead-acid car batteries with a combined weight of less than 64 lbs.

other components - brake light, car seat, rear view mirrors

Strategies/Activities

Research and design - During this time students studied other electric cars, frame designs, how batteries work, gearing, efficiency, steering, braking, shell design, ergonomics and other topics related to vehicle design. The end product was a drawing of the team's electric car.

Build a scale model - Each team built a 1/12th scale model of their design with working steering, shell, and room for the necessary parts of the car. The models were tested in a wind tunnel as a study in aerodynamics.

Design selection - The class developed design criteria to help in selecting the design to construct. Each group then presented their design and the class rated the designs according to the criteria.

Build the car - Based on the design selected above, students built the car.

Race the car - The car was then raced in the PGE sponsored Electron Run race series.

Culminating Activity

Competing in the PGE sponsored Electron Run race series. Results can be seen on the web at http://www.pge-edsvcs.com/index.htm Look under Electron Run Welcome, then 2002 Race Results and Calendar (for future race locations), and look for Car #2.

Evaluation

Throughout the class there were several small assignments checking students' understanding, but below are the major evaluations.

1) Each group's final design was evaluated with a slightly modified Oregon Certificate of IInitial Mastery Problem Solving Scoring Guide.
2) The presentations were evaluated using the Oregon Certificate of Initial Mastery Speech Scoring Guide.
3) The performance of the car was measured by the number of miles the car completed in one hour using two car batteries.