CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Sarah E. Seko

Project Number
S0228

Project Title
The Effect of Shape on Aerodynamic Drag

Abstract

Objectives/Goals
The objective is to determine the effect of shape on aerodynamic drag as measured in a homemade wind tunnel. After completing the first two years of work on the experiment (Phase I), the experiment was continued (Phase II) in order to accomplish the following objectives: 1) to improve the wind tunnel design, specifically to increase air velocity, 2) to devise a new method of measuring drag, 3) to calculate the drag coefficient, and 4) to gain a better understanding of the flow patterns around each object.

Methods/Materials
An eight foot long wind tunnel was constructed out of pine and plywood and powered by two box fans. Eight balsa wood objects, each with the same cross sectional area were formed. The amount of drag produced by each object was individually tested in the wind tunnel. The Drag Coefficient of each object was then calculated.

Results
The test objects ranged from a drag coefficient of 0.38 to 1.22, which represents a 31% drop in drag produced. In order from least to greatest drag produced, the objects are as follows: sphere, teardrop, sloped-diamond, sloped wedge, mini-van, wedge, diamond, and rectangular prism.

Conclusions/Discussion
The substantial difference in the amount of drag produced supports the hypothesis that if an object is designed to be streamlined, then it will produce less drag.

Summary Statement
Eight differently shaped objects were tested in a homemade wind tunnel to determine the effect of shape on the drag coefficient.

Help Received
My father aided in the construction of the wind tunnel, specifically in the use of power tools.