CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J0110

Project Title
The Answer Is Blowing in the Wind: How Shape Affects Drag

Abstract

Objectives/Goals
In this project, I wanted to see whether the shape of an object affected the amount of drag it had. My hypothesis was that a teardrop shape would have the least amount of drag.

Methods/Materials
To prove my hypothesis, I needed a wind tunnel, manila folders (to make models), 1/8 inch alder and a wind speed meter (to calibrate the wind tunnel).
For testing, I first mounted a model on a piece of alder and set it in the test rig before closing the test hatch and turning the wind tunnel to medium speed. By sliding a piece of splitshot along the ruler, I found how many millimeters (mm) it takes to balance the test rig. After recording the number of millimeters and repeating this four times, I repeated the experiment with the other shapes. Finally I calculated the amount of force.

Results
The object with the least amount of drag was the teardrop (with the point facing into the wind). The rectangle side of the rectangular prism had the most drag. The teardrop had 0.0019 N/cm squared of drag. The circle had the most drag with 0.00741 N/cm squared. The average amount of drag was 0.0025 N/cm squared, with a median of 0.00237 N/cm squared and a mode of 0.00233 N/cm squared.

Conclusions/Discussion
After testing, results showed that my hypothesis was correct. However, I did not expect the teardrop with the point facing into the wind to have the least amount of drag; I expected the opposite. The teardrop model I used was more streamlined than the otherother models, resulting in less drag. These results also prove my research was correct. As for errors, the most likely places would be in any inconsistencies in the airflow as well as mistakes in the math. All in all, this experiment proved both my hypothesis and research correct.
This data could best be applied in streamiling vehicles. Once a vehicle is streamlined, it performs much better,as well as getting better gas mileage. Therefore, a teardrop shaped car would have the least amount of drag. Planes would also benifit from streamlining, another place to use this data.

Summary Statement
In this experiment, I found how shape affects the amount of drag on an object.

Help Received
Father helped build wind tunnel