CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY

Name(s)
Katie G. Eberle

Project Number
J0109

Project Title
The Study of Sails

Abstract

Objectives/Goals
The objective is to determine, for a fixed surface area, what sail shape, a triangle, square, rectangle or trapezoid will produce the fastest run for a "Land Yacht."

Methods/Materials
A Land Yacht was constructed using a common skateboard, a PVC mast, a wood-dowel boom and window cord. Four sails, all with areas of 400-square inches were cut out of 2-mil plastic. A 7-foot long test course was set up on a smooth concrete floor inside an enclosed building. A fixed fan was used to produce a constant wind. The yacht was run 5 times with each sail shape and each run was timed. The high and low times were dropped and the remaining 3 were averaged.

Results
The yacht with the trapezoid shaped sail travelled across the test course in the fastest time.

Conclusions/Discussion
I concluded that the shape of a sail affects the speed of a vessel going down wind. However, I wondered why most sail boats have triangular sails. I think that a triangular sail must be easier to handle than a trapezoid sail. Also, a triangular sail must make it easier to maneuver a boat in real life where there are cross winds and head winds. An optimum sail is one that gives a vessel both speed and maneuverability.

Summary Statement
My project is about determining if sail shape affects a vessel's speed.

Help Received
My mother helped me buy material, build the yacht, run the fan during the testing and type the report.