CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Christopher D. Toubia

Project Number
31684

Project Title
The Study of the Effect of Wing Shapes on Their Drag and Lift Coefficients

Abstract

Objectives/Goals
Through the testing of different cross-sectional airfoil shapes, an ideal wing shape can be found that can be used to optimize the aerodynamic advantage of airplanes today, the new technology being designed to produce more lift while reducing drag.

Methods/Materials
Wind Tunnel: 20x20, 3100 CFM [cubic feet per minute] floor fan with reverse blow; 8x8x16 in. rectangular plastic enclosure; 2 # 16 in. long plastic funnel shape with 8x8 in. squared small end; 1/8 in. thick polycarbonate plastic material; 5 boxes of straws.
Styrofoam, Aluminum Foil, 48 in. long, ¼ in. diameter plastic rod, Any 40 g base, rounded, Spring Scale - increments of 1 oz., Weight measure, Smoke machine, Silicon Adhesive, Scissors, String, Sand Paper.

Results
Drag (N) Lift (N)
Teardrop 0.0588 0.147
Rectangle 0.1078 0.0882
Oval 0.0343 0.1176
Triangle 0.0686 0.0196
Curved Diamond 0.0294 0.0588

Coefficient of Lift
Teardrop 0.0002
Rectangle 0.00009614
Oval 0.00016
Triangle 0.0000267
Curved Diamond 0.00008

Coefficient of Drag
Teardrop 0.004699
Rectangle 0.003204
Oval 0.001869
Triangle 0.00299
Curved Diamond 0.0016

Summary Statement
The study of the effect of the shapes of airfoils on their drag and lift and drag and lift coefficients.

Help Received
Father helped build and perform experiment.