



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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Project Title
How Does Angle of Attack Affect the Distance a Glider Can Fly?

Abstract

Objectives/Goals
OBJECTIVE: Our objective was to see if the angle of attack affects the distance a glider can fly. That was our question that we based our experiment on, throughout the science fair. Our hypothesis, says that the angle measured at +2 degrees would fly the farthest. A little bit of information about angle of attack. Angle of attack is the angle at which the wing is angled at on the fuselage. It is basically rotating the wing up and down.

Methods/Materials
MATERIALS & METHODS: To do the experiments, we used a foam glider (with a wingspan of 6ft). To make the experiment consistent, we designed and built a launch system that is basically the same as an aircraft carrier's but smaller. The launch system was made of a foldable table, a 2 x 4, a clamp and a bungee cord. We taped out and measured the All Saints Day School gym and launched it from one end to the other. The one that flew the farthest was the angle measured at 0°.

Results
RESULTS: Our graph shows us that the angle measurement of -8° flew 2.9 m, +8° flew 3.7m, -5° flew 4.3°, +5° flew 6.3 m, -2° flew 6.3 m, +2° flew 10.3 m, and 0° flew 14.6m.

Conclusions/Discussion
DISCUSSIONS:
From this collected data, we determined that -8° decreased the flight the most (2.9meters), and 0° allowed the glider to fly the farthest (14.6 meters). Our Hypothesis said that we thought that a +5° increase in the angle of attack would allow the glider to fly the farthest. However, it appears that we were incorrect in our assumptions. 0°, which is the angle our glider came set at, allowed the glider to fly the farthest. So, it seems that too high an increase of degrees in the angle of attack causes the glider to stall and decreases the flight distance greatly, while too great a decrease of degrees in the angle of attack causes the glider to nosedive into the ground immediately after launch, also decreasing the flight distance greatly. Our increase of +5° was too much, and that is why it didn't fly far. Perhaps a more slight and subtle increase in degrees would increase the flight distance.

Summary Statement
We built a glider out of a kit, modified the angle of attack, and flew it to see which angle flew the best.

Help Received
Taylor's brother supplied us with a trigonometry formula to find the different angles.