



Colorado Science and Engineering Fair

2025 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Taking Flight: Why are Winglets Important?

Finalist's Name: Alexander Knight

School and City: Corwin International Magnet School, Pueblo

Sponsor's Name: Maribel Sena

Category: Physics & Astronomy

Division: Junior (grades 6 - 8)

Abstract (250 words or less):

The purpose of this project was to find out if a larger winglet could lead to more efficient flight. I hypothesized that a bigger winglet would reduce the most drag because it would create the weakest vortex at the edge of the wing.

I created four paper airplanes, with different winglet sizes. I made the winglets 2.5 centimeters, 3.5 centimeters, and 4.5 centimeters from the plane body. My fourth plane had no winglets. I launched the planes using a rubber band launcher. I pulled the rubber band back the same amount each time, so the force exerted on every flight would be identical. Each plane was launched 10 times.

The data I collected did not support my hypothesis. The second largest winglets spent the most time in the air and traveled the farthest. It flew an average of 1.03 seconds and an average of 283.9 inches. I hypothesized that the most efficient plane would be the one with the largest winglets, but it hit the ground in 0.785 seconds and flew 240.6 inches. The plane with the smallest winglets flew 0.767 seconds for 189.2 inches. The plane without winglets was airborne for 0.571 seconds and flew 115.7 inches.

These findings lead me to believe that the biggest size of winglet is not always the best option. The size of the winglet may need to be proportional to the overall length of the wing, to create the most efficient flight.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature:

Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. **A signed copy of this form must be included in your notebook.**