



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: Wind Turbine Efficiency: Which Blade Design Works the Best?

Finalist's Name: Benjamin Knight

School and City: Corwin International Magnet School, Pueblo

Sponsor's Name: Maribel Sena

Category: Energy

Division: Junior (grades 6 - 8)

Abstract (250 words or less):

The purpose of this project was to determine which blade design was the most efficient and generated the most energy. I hypothesized that the pinwheel-shaped blade design would make the most energy because it had a larger surface area to catch the wind.

The experiment involved 3D printing a wind turbine base and then making three different turbine blade designs out of cardstock. The designs I chose were a curved rectangle, a pinwheel shape, and a curved triangle. I attached a fishing line and a washer to the turbine axle, and then I measured how long it took each blade design to spin and wind up the washer to the axle.

The data I collected did not support my hypothesis because the curved rectangular blades spun more than twice as fast as the other two designs. The most efficient design took an average of 6.972 seconds to wind up the washer, whereas the pinwheel design took 18.628 seconds, and the triangle design took 15.438 seconds.

These findings lead me to believe that the curved rectangle blades had a deep enough curve to be able to catch more air than the other two designs. The efficiency of the blades is not only determined by surface area but also by depth.

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.**