



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: Breathe Easy: Comfort-Focused Respirators for Wildland Firefighters

Finalist's Name: Tyler Wickham

School and City: Golden High School, Golden

Sponsor's Name: Mr. Sean Jones

Category: Engineering

Division: Senior (grades 9 - 12)

Abstract (250 words or less):

Wildland firefighters can work for up to 18 hour shifts in forested areas, inhaling high levels of smoke without the use of proper respiration devices, instead preferring to use protection only when absolutely necessary. The constant inhalation of smoke has the effect of firefighters contracting asthma, heart problems, and lung cancer, while the problem is only being exaggerated with the increase of fires due to climate change.

Given that the nature of these diseases are preventable, I decided to create a cost-effective mask design to solve the largest problem related to the current masks used: comfort, that is tailored to wildland firefighter's' specific needs and preferences.

I designed my own mask using Solidworks that takes the most practical elements from each mask and compiled it into one, keeping in mind weight and cost, the two most important factors for its viability. To collect data, I constructed an Arduino sensor that measures humidity and temperature, which will be averaged with the weight to rank my mask among the other designs.

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.**