



## Colorado Science and Engineering Fair

## 2024 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: Snow Force: Testing which avalanche control method is most effective.

Finalist's Name: Lucia Montello

School and City: Eagleview Middle School, Colorado Springs.

Sponsor's Name: Jenine Winslow

Category: Earth & Environmental Sciences (EAEV)

Division: Junior (6th - 8th grades)

Abstract (250 words or less):

About 100,000 avalanches occur annually in the Western United States. Avalanches pose dangers to alpine road systems and can often be fatal to humans. Furthermore, avalanches are not merely snow events. They can generate winds capable of destroying roofs and even breaking windows of buildings. To safeguard humans, buildings, and roads we require impactful methods to control avalanches.

The approach I employed for this project involved constructing a wooden box with three closed sides, an open end, and an open top. The box was hinged to a table and filled with salt. I then executed the experimental technique, by lifting the box to initiate a release. I measured the angle of release and recorded the data. This process was repeated for all the methods assessed.

The results of the project indicated that snow packing was the least effective method, with an average release angle of  $35.67^\circ$ . Enhanced topography proved to be the second most effective, with an average release angle of  $40.67^\circ$ . The most effective method observed was a retaining fence, with an average release angle of  $54.33^\circ$ .

It is worth noting that salt was used instead of snow in this experiment to maximize repeatability. So, the results may have varied if real snow had been employed. Additionally, there is no clear "winner" in this project, as each method could be suitable for different circumstances: Snow packing may prove most useful for ski resorts, enhanced topography for wide, open slopes, and retaining fences for steep chutes and couloirs.

*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: 3/3/24

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.