



Colorado Science and Engineering Fair

2024 Team 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: Fano Finesse: Spot The Plane

Team Leader's Name: Abigail Adams

Team Member 1: Julia Leary

Team Member 2:

School and City: Alamosa High School, Alamosa

Sponsor's Name: Matthew Relyea

Category: Mathematics & Computer Sciences (MACS)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

This project delves into a branch of finite Geometry called projective planes, more specifically the Fano Plane. The Fano Plane is a formation of lines that are all connected, each line having three points. The most basic form of the Fano plane contains several lines with three points comprising each. Each line represents a combination of points with one in common. After fully comprehending how this small model of a projective plane operates, the next step was to apply it to the game of choice and a larger projective space, the Affine Plane. "Spot It!", a late 2000's game seemed to be the perfect way to apply the plane to something of substance. The game "Spot It!" consists of 55 cards, 57 figures, and 8 figures to a card. In the manufacturing of "Spot It!" two cards are always removed from the deck. Using the Fano and Affine Plane, it can be determined what figures were on the missing cards. After solving this, it was important to demonstrate the Fano Plane's usefulness in quotidian events, in order to do this the mathematical integrity of the Fano-Plane was applied to an equation and tested in a proof of induction. Overall this project is meant to provide a more extensive understanding of finite geometry and how it pertains to real world situations, as well as recognize how a fun family game is created.

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

Team Leader's Signature: Abigail Adams

Date: 3/4/24

Team Member 1's Signature: Julia Leary

Date: 3/4/24

Team Member 2'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 your Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.