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Central Utah STEM Fair Judging Procedure and Policy

Revised and accepted: March 2018

At the Central Utah STEM Fair students compete against other students in their division, and in categories of their own choosing, selected during online registration. Elementary students in grades 5-6 compete in the Elementary Division, separated by school District into Elementary Day I and Elementary Day II. Students in grades 7-8 compete in the Junior Division and students in grades 9-12 compete in the Senior Division, with no separation by District.

The Elementary Division categories are as follows:

- Chemistry
- Computer Science
- Earth & Environmental Science
- Engineering
- Life Science
- Physics, Astronomy, & Mathematics
- Product Testing & Consumer Science

The Junior and Senior Division categories are as follows:

- Animal & Plant Sciences
- Behavioral & Social Science
- Biology & Biochemistry
- Biomedical, Medicine, & Health Sciences
- Chemistry
- Earth & Environmental Science
- Energy: Chemical & Physical
- Engineering: Civil & Environmental
- Engineering: Electrical & Computer Science
- Engineering: Materials & Mechanical
- Physics, Astronomy, & Mathematics

Students may compete as individuals or in teams of up to three members. Student projects are eligible for three different types of awards; Category Awards, Special Awards and Grand Awards.

Category Awards Judging

At CUSF students are required to present their experimental results on a project display board and will be interviewed by a minimum of 3 category judges. The category judges are assigned to each division and category based upon their experience and science background. Senior division category judges have a PhD or are professionals and or graduate students with an equivalent number of years of experience in their respective fields. College students or other individuals with strong science backgrounds are invited to judge the Elementary and Junior division projects.

Each project is judged on its own merits according to the following criteria:

Science Projects:

Research Question
Design & Methodology
Execution: Data Collection, Analysis & Interpretation
Creativity
Presentation

Engineering Projects:

Research Problem
Design & Methodology
Execution: Construction & Testing
Creativity
Presentation

When scoring a project, judges will look at the project display board and will read through all of the written material displayed on the board. They will also look through project notebooks and other pertinent items on display. The written material and data will help them understand what the student has done. The judging interview then follows, in which judges may ask questions for clarification and ensure the student understands all terms, graphs, data, and aspects of the project they completed.

Each judge will award a score (ranging from 1 to 100) to each of their assigned projects and those scores will be entered into a programmed Microsoft Excel Spreadsheet. All judges have a natural bias. Some individuals score higher or lower than other individuals when considering the same project in a category. In order to remove bias from the judging process the judge scores are statistically normalized and projects are ranked using the programmed Microsoft Excel Spreadsheet. Judges remain anonymous as they are only identified by number.

As an individual judge's scores are entered, a mean score and a standard deviation are calculated for each judge. A "Z" score is then calculated for each score a project receives from each judge. This is done by subtracting the judge's mean from the project score and dividing it by the standard deviation. An average Z-score is calculated for each project by averaging the Z-scores from all of the judges who scored each project. The projects are then ranked based upon the Z-score averages. The project with the highest Z-score average ranks highest in the category.

Scores for students are not released under any circumstance.

Grand Awards Judging – Senior Division Intel ISEF Travelers

A team of 5-10 judges serve as Grand Award judges. These individuals are given the responsibility to select the winners who will advance on to compete at the Intel International Science & Engineering Fair. They are divided into teams and assigned categories. The judging process for grand awards begins the evening when students set up their projects at the fair. The first part of the process consists of the judges reading through all the project abstracts. If a student does not submit an abstract they are automatically withdrawn from qualifying for the Intel ISEF. The judges rank the projects based on the abstracts and then they look through all of the display boards and project notebooks. They then rank the projects again.

The next step includes interviewing all of the students in their assigned areas. The projects are then ranked again. Once the category judge results are in the grand award judges compare their lists with the top projects in each of the categories and consult with each other and the category judges about possible discrepancies. They re-rank the top 10-20

projects and go back to re-interview students during the final judging portion of the fair. During this time students are interviewed by other members of the grand awards team. After the interviews the judges meet again and finalize the top projects that will represent CUSF at the Intel ISEF. Four projects will be selected to advance on. The winning projects will generally represent first place winners in their respective categories. It is possible for a first place winner and a second place winner in the same category to be selected to advance onto the Intel ISEF. The second place winner must have a project that is judged to be better than any of the other first place category winners.

There are many other grand awards such as college scholarships and cash prizes that are also awarded at the fair. These awards are given to students based on criteria and student eligibility for the award and final ranking of projects based on the category judge scores.

Grand Awards Judging – Elementary and Junior Divisions

There is one category grand champion prize awarded in each Elementary Division category. These awards are given to the highest ranked project in each category based on the category judge's scores. There are six grand champion prizes awarded in the Junior Division. These awards are given to the top overall ranked projects in the Junior Division based on the category judge's scores.

Special Awards Judging

Special Awards are prizes awarded at the fair by specific organizations or groups. They provide an award and have special criteria that have to be met by the student and the project in order to win a specific special award. Special Award judges are representatives from the various organizations or are volunteers who are given specific criteria to look for while judging projects for the award. Some of the special awards judging takes place without the students present at their project and some of the judging includes an interview with the students.