

State Science and Engineering Fair of Florida Judging Policy and Criteria

I. JUDGING POLICY

A. SSEF Purpose and Structure

1. Purpose of the SSEF

- To stimulate young people's interest in science, technology, engineering, and mathematics (STEM).
- To provide an educational experience through student discourse with the Judges and the public.
- To give public recognition to talented students for the work they have done.
- To provide teachers a forum for the exchange of ideas.

2. Overall Structure of the SSEF

a. General Description of the Hierarchy

- Each student at the SSEF is a "Finalist" who has already won at a Regional Science and Engineering Fair (RSEF); his/her project has previously been certified as State Fair quality.
- The SSEF takes place annually, usually in March or April, in a different city in Florida. Each of the affiliated RSEFs sends qualified representatives.
- There are two sections in the Fair, SR= Senior (grades 9-12) and JR (grades 6-8). Each of the two Sections (SR and JR) are further apportioned into
- 13 Categories: <http://www.ssefflorida.com/judging.html> for descriptions of each category

Animal Sciences
Behavioral and Social Sciences
Biomedical and Health Sciences
Cellular/Molecular Biology and Biochemistry
Chemistry
Earth and Environmental Sciences
Engineering

NEW - Revised and Updated

Environmental Engineering
Intelligent Machines, Robotics, and System Software
Mathematics and Computational Sciences
Microbiology
Physics and Astronomy
Plant Sciences

- The 13 categories are separated into two divisions: Biological Sciences and Physical Sciences.
- Teams of two or three students are allowed to enter a project in any of the above categories.

b. Description of Projects

- Projects conform to standards of size and quality and have been approved by the RSEF and SSEF Scientific Review Committees and if necessary, a RSEF Institutional Review Board.
- Every Project is identified by section, number, and title.
- Abstracts are located on the left side of the display either on the display or in a frame.
- Finalists are required to be present at the SSEF during judging rounds (a project preview session is sometimes scheduled for Judges only).

B. Overall Significance of Judging Component of the SSEF

- The success or failure of any science fair depends to a larger extent on the quality of the judging. The organization and planning of the Judging Session is, therefore, one of the most important aspects of the Fair. *It is essential for each Judge to understand the duties and obligations for judging.*
- **Judging is considered to be the most valuable experience for the exhibitors.** The interviews that exhibitors have with the professional scientists and engineers who serve as Judges are far more important than the selection of award winners. The discussion of the project, suggestion, questions, and ideas, plus the opportunity for the Judges to become aware of the student's interest in professional fields, are some of the important outcomes of the personal interviews.
- The Judging Session exposes the students to role models in their disciplines in which they are interested. Students are required to describe their projects in the vocabulary of the discipline and, thereby, grow increasingly articulate with challenge and practice. Ideally, the student grows academically by encountering ideas from professionals. There is no substitute for this challenge.
- The Judging Session allows assisting professionals to become familiar with the work young people are capable of doing. The judging process often renews the Judges' interest in recruiting for their disciplines. Judging is an opportunity for adults to serve science and engineering education as mentors and role models.

C. Qualifications for SSEF Judges

- Adults who possess a current and thorough understanding and knowledge of one or more of the disciplines of mathematics, science, and engineering and are able to spend a minimum of one full day interviewing students and attending Category meetings are eligible to be Judges.
- Judges must prepare for judging by responding to mailings, reading instructions, and attending the scheduled on-site briefings.
- Judges must be able to commute to the Fair site and perhaps spend one or two nights in the area.
- Judges are recruited from colleges and universities, business and industry, research establishments, professional and technical societies, science-related occupations, and the community of educated professionals.
- Graduate students are encouraged to volunteer to judge because of their research orientation and academic qualification. Qualified upper-division college or university students (majoring in an appropriate discipline) may judge if they meet all specifications.
- Qualified high school teachers who volunteer to judge are asked to restrict themselves to the Junior Section of the Fair in order to avoid a potential conflict of interest. Judges who have past, present, or future involvement with the Finalists are expected to disqualify themselves as appropriate.
- Persons retired or not working in their fields may judge if they have remained current and knowledgeable.

D. Professional Conduct – Judges

- When interviewing, Judges should remember that the SSEF is not only a competition – it is also an educational and motivating experience for students.
- Most students say that they enjoy talking to the Judges, and that in many cases, it is the high point of their experience at the SSEF. Judges should initiate and encourage dialogue.
- Judges represent professional authority to the student being evaluated and, therefore, it is imperative that the Judges conduct themselves in an appropriated manner. The way in which questions are asked, suggestions offered, and constructive criticism made should always be in a tone what will provide definite encouragement for continued effort.

E. Awards

- Every Finalist will receive a Certificate of Participation.
- Numbers of awards are allocated according to a Configurative Table designed for equitable distribution of awards. The number varies with the size of the Category so that a student always has the same chance to win regardless of Category size. Multiple Place Awards are given depending on the allocated distribution according to the size of the Category.
- Personalized plaques are awarded for First, Second, Third, and Fourth Places in each Category.
- Merit and Recognition Awards are given for a number of deserving projects that do not receive Place Awards. These are for projects that ‘made the Focus Group’ but were not given Place Awards and/or projects from the Orbit Group who earn special recognition.
- Grand Awards are those presented to students named Best-in-Fair at both Senior and Junior levels. There are eight, chosen from the First Place winners, for the Senior Section - four from each Division and four chosen from the First Place winners, for the Junior Section - two from each Division. The eight Senior Section Best-in-Fairs will also be the Trip Winners to ISEF representing the State Science and Engineering Fair of Florida.
- Special Awards that are donated for a Specific Category are delegated to special Judges or to the Place Awards Judging Team for judging, unless the Donors provide their own Judges. Those Special Awards that are Cross-Category (and the Donor has not provided Judges) are judged by specialists appointed by the Special Awards Committee.
- Scholarship and Opportunity Awards are judged by their respective committees, and the winners are selected from the pool of eligible applicants.
- Donors are invited to furnish their own Judges if feasible for them to do so. It is permissible for a Special Awards Judge, who has been appointed by a Donor, to also serve as a Category Judge, especially if the award is a specific Category Special Award.

F. Confidentiality at the SSEF

- The secrecy of the judging process must remain inviolate. Some Finalists and many of their adult escorts would love to learn the outcome of judging before the Award Ceremonies. It is incumbent on each Judge to ensure that this does not happen.
- No one shall be present during the judging except Judges, the Finalists, and other persons specifically authorized by the SSEF or the FFFS Director. Everyone present must wear proper identification.
- Judges should not talk to students concerning their relative positions or ratings in the Fair. Judges should not use terms such as poor, average, good, or excellent in discussions with students.
- The Chairman of Judging, Team Captains, and Team Coordinators should be sure that trash cans in their areas are checked or emptied at the end of judging so that the Finalists will not see notes or score cards.

II. JUDGING CRITERIA

A. General Information

- We are judging the quality of the work done on a project in science, technology, engineering, or mathematics by a middle or high school student or a Team of 2/3 students, and how well the student(s) understand the project and the area in which he/she/they have been working. We are evaluating the physical display only secondarily.
- We are judging projects that involve laboratory, field, or theoretical work, and not just library research alone.
- We are judging a middle or high school student's work, and **not that of a Ph.D. candidate** or a professional. Sometimes Judges overreact to middle and high school students, either giving them far more credit than they deserve, or acting as though the work done by the student was worthless because it was not in the Nobel Prize Category.
- Of what potential significance is the project to humankind? This question may be asked when all other dialogue has been exhausted. It may or may not prove to be helpful in evaluation. However, absolutely no penalty should ensue for projects that are basic research and have no obvious immediate application.
- Emphasis should be put on ingenuity and use of homemade, everyday materials. Expensive, purchased materials should not be of advantage to contestants.
- No scientific research is totally original. It necessarily depends on work done by other investigators, and frequently is possible only with apparatus, space, time, or advice provided by others. Each exhibitor should acknowledge special assistance received from teachers, sponsors, organizations, and other sources that have significantly influenced his or her research. **Judges are asked to give attention to the individual contribution of the student. Students should be neither penalized nor rewarded for receiving help properly credited.**

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- **Judges are present to help the students in learning science and research methods**, not to demean the work of any student regardless of how poor it might be. Judges' discussion with a student should stress, for example how the project could be improved.
- In addition, the Judges must judge the project as compared with other projects at the SSEF in the same Category, and not on a predetermined standard or with projects seen elsewhere under other circumstances. Projects must be ranked with or against other projects present in their Category at the SSEF.

B. Criteria for Judging Round One

1. The objective is to sort the projects in the Category into two groups of equal numbers of students.
2. Note: Team projects are now entered into the regular science categories as part of the judging process for that particular category and should be judged as a group, not as individual members.
3. Team Criteria for Round One are the same as those for individual projects. The same questions may be asked to yield the standard Round One Evaluation Scale of 1-5 points, see above.
4. The method uses one-to-five points to evaluate the general position of the work when compared on a scale, five being highest. It is assumed that all projects in the Fair represent the best from a Regional Fair; therefore the range is as follows:
 - **Fair:** Is the project definitely not competitive? Is it in the lowest quality bracket of those assigned to judge? Should it definitely not receive a Place Award?
 - **Moderate:** Is the project low-average when compared to others at the Fair? Is it in the lower half of those seen?
 - **Average:** Could the project fairly be placed in either half? Is it in about the middle of those seen?
 - **Good:** Is the project in the top 50% of those assigned? Is it State Fair Quality (competitive)? Should it be considered further for a Place Award? (Projects scored as '4' will usually make the Focus Group.)
 - **Excellent:** Is this the best or one of the best projects seen? Is it definitely to be re-judged for a Place Award?

Sample questions:

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| <ol style="list-style-type: none"> a. Is the research question/problem fully developed? b. Is there a well developed design and methodology? c. Is the data collection, analysis, and interpretation executed appropriate? d. Is the construction and testing (of an engineering prototype) executed appropriately? e. Is there a control, if applicable? f. Are the conclusions defensible? g. Would it be significant to the field? | <ol style="list-style-type: none"> h. Where did the idea originate? i. Is there a record or log? j. Is help credited appropriately? k. Was there a literature search? l. What future work could be done on this project? m. Does the project demonstrate significant creativity? n. The Team Project demonstrated "teamwork" |
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C. Criteria for Judging ROUND TWO: FOCUS JUDGING

1. The objective is to rank the projects that are to receive Place Awards.
2. Weighted criteria for Round Two: Exhibits are judged on the following judging guidelines.

The following evaluation criteria will be used for judging. It has been extensively reviewed and revised by the Intel ISEF Judge Advisory Committee, with additional input from science, engineering and educational experts. One of the most significant changes from the previous guidelines is the use of different criteria for science and engineering projects. As shown below, both criteria have five sections as well as suggested scoring for each section. Each section includes key items to consider for evaluation both before and after the interview. Students are encouraged to design their posters in a clear and informative manner to allow pre-interview evaluation and to enable the interview to become an in depth discussion. Judges should examine the student notebook and, if present, any special forms such as Form 1C (Regulated Research Institution/Industrial Setting) and Form 2 (Qualified Scientist). Considerable emphasis is placed on two areas: *Creativity* and *Presentation*, especially the *Interview* section, and are discussed in more detail below.

Creativity: A creative project demonstrates imagination and inventiveness. Such projects often offer different perspectives that open up new possibilities or new alternatives. Judges should place emphasis on research outcomes in evaluating creativity.

Presentation/Interview: The interview provides the opportunity to interact with the finalists and evaluate their understanding of the project's basic science, interpretation and limitations of the results and conclusions.

1. If the project was done at a research or industrial facility, the judge should determine the degree of independence of the finalist in conducting the project, which is documented on Form 1C and Form 2.
2. If the project was completed at home or in a school laboratory, the judge should determine if the finalist received any mentoring or professional guidance.
3. If the project is a multi-year effort, the interview should focus **ONLY** on the current year's work. Judges should review the project's abstract and Form 7 (Intel ISEF Continuation Projects) to clarify what progress was completed this year.
4. Please note that both team and individual projects are judged together, and projects should be judged only on the basis of their quality. However, all team members should demonstrate significant contributions to and an understanding of the project.

Note the use of different criteria for science and engineering projects. As shown below, both criteria have five sections as well as suggested scoring for each section. Each section includes key items to consider for evaluation both before and after the interview. Students are encouraged to design their posters in a clear and informative manner to allow pre-interview evaluation and to enable the interview to become an in depth discussion.

Judging Criteria for Science Projects

I. Research Question (10 pts)

- clear and focused purpose
- identifies contribution to field of study
- testable using scientific methods

II. Design and Methodology (15 pts)

- well designed plan and data collection methods
- variables and controls defined, appropriate and complete

III. Execution: Data Collection, Analysis and Interpretation (20 pts)

- systematic data collection and analysis
- reproducibility of results
- appropriate application of mathematical and statistical methods
- sufficient data collected to support interpretation and conclusions

IV. Creativity (20 pts)

- project demonstrates significant creativity in one or more of the above criteria

V. Presentation (35 pts)

a. Poster (10 pts)

- logical organization of material
- clarity of graphics and legends
- supporting documentation displayed

b. Interview (25 pts)

- clear, concise, thoughtful responses to questions
- understanding of basic science relevant to project
- understanding interpretation and limitations of results and conclusions
- degree of independence in conducting project
- recognition of potential impact in science, society and/or economics
- quality of ideas for further research
- for team projects, contributions to and understanding of project by all members

Judging Criteria for Engineering Projects

I. Research Problem (10 pts)

- description of a practical need or problem to be solved
- definition of criteria for proposed solution
- explanation of constraints

II. Design and Methodology (15 pts)

- exploration of alternatives to answer need or problem
- identification of a solution
- development of a prototype/model

III. Execution: Construction and Testing (20 pts)

- prototype demonstrates intended design
- prototype has been tested in multiple conditions/trials
- prototype demonstrates engineering skill and completeness

IV. Creativity (20 pts)

- project demonstrates significant creativity in one or more of the above criteria

V. Presentation (35 pts)

a. Poster (10 pts)

- logical organization of material
- clarity of graphics and legends
- supporting documentation displayed

b. Interview (25 pts)

- clear, concise, thoughtful responses to questions
- understanding of basic science relevant to project
- understanding interpretation and limitations of results and conclusions
- degree of independence in conducting project
- recognition of potential impact in science, society and/or economics
- quality of ideas for further research
- for team projects, contributions to and understanding of project by all members

D. Criteria for Judging Round Two: ORBIT JUDGING

1. The objective is to teach, and to recognize and reward students using non-traditional criteria.
2. Sample of equivalencies:
 - How much evidence is there of enthusiasm and love for the adventure?
Mark under Creative Ability (30 points; 25/Team).
 - How much hard work was done to arrive at the conclusions?
Mark under Scientific Thought (30 points; 25/Team).
 - What is the degree of thoroughness as expressed by amount of learning the student accomplished?
Mark under Thoroughness (15 points; 12/Team).
 - How much has the student advanced in know how (use of instruments, search of literature, *etc.*)?
Mark under Skill (15 points; 12/Team).
 - Presentations: How does the student (and the total project) explain what was done?
How clear are the explanations? Is there significant presentation evidenced? Is the Hypothesis answered? How easy to understand?
Mark under Clarity (10 points).
 - Evidence of Teamwork by all members of a Team Project (16 points)