

# Judging Policy and Criteria

## I. Judging Policy

### A. SSEF Purpose and Structure

#### 1. Purpose of the SSEF

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

#### 2. Overall Structure of the SSEF

##### a. General Description of the Hierarchy

- (1) Each student at the SSEF is a "Finalist" who has already won at a Regional Science and Engineering Fair (RSEF); his or her project has previously been certified as State Fair quality.
- (2) The SSEF takes place annually, usually in April, in a different city in Florida. Each of the 38 affiliated RSEFs sends qualified representatives.
- (3) 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 14 categories: Behavioral and Social Sciences, Biochemistry, Botany, Chemistry, Computer Science, Earth and Space Science, Engineering, Environmental Sciences, Mathematics, Medicine and Health, Microbiology, Physics and Zoology. The 14 categories are separated into two divisions: Biological Sciences and Physical Sciences.
- (4) Teams of two or more students are allowed to enter a project in the Team Project Category.

##### b. Description of Projects

- (1) Projects conform to standards of size and quality and have been approved by the RSEF and SSEF Scientific Review Committees; also, if necessary, a RSEF Institutional Review Board. Every Project is identified by section, number, and title.
- (2) Abstracts are mounted in the left margin of the display (usually at table height if the project is a floor project).
- (3) 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

1. 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 obligation of judging.
2. 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.
3. 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.
4. 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**

1. 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.
2. Judges must prepare for judging by responding to mailings, reading instructions, and attending the scheduled on-site briefings.
3. Judges must be able to commute to the Fair site and perhaps spend one or two nights in the area.
4. Judges are recruited from colleges and universities, business and industry, research establishments, professional and technical societies, science-related occupations, and the community of educated and qualified professionals.
5. Graduate students are encouraged to volunteer to judge because of their research orientation and academic qualification.
6. 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.
7. Qualified upper-division college or university students (majoring in an appropriate discipline) may judge if they meet all specifications.
8. Persons retired or not working in their fields may judge if they have remained current and knowledgeable.

## **D. Professional Conduct**

1. Judges
  - a. When interviewing, Judges should remember that the SSEF is not only a competition – it is also an educational and motivating experience for students.
  - b. 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.
  - c. 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.
2. Students
  - a. Finalists are asked to dress neatly and appropriately and to demonstrate good manners at all times.
  - b. Finalists are to be at their projects during judging except for short breaks for rest room or water. Senior Section students in grades 11-12 may be summoned to Scholarship Awards or Opportunity Awards interviews. They are instructed to leave written notice if they must leave their displays.

## **E. Awards**

1. Every Finalist will receive a Certificate of Participation.
2. Categories over 34 in number are assigned two First Places. 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.
3. Personalized plaques are awarded for First, Second, and Third Places in each Category. Ribbons, small plaques, or paperweights are usually selected for Fourths.

4. There are Merit Prizes and Ribbons available 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.
5. There are Recognition Ribbons given to Orbit students who earn special recognition.
6. Grand Awards are those presented to students named Best-of-Fair at both Senior and Junior levels. There are four, chosen from the First Place winners, one from each Division in each Section. The Senior Section Best-of-Fairs will also be the Trip Winners to ISEF.
7. 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**

1. 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.
2. 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.
3. 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.
4. 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**

1. We are judging the quality of the work done on a project in science, engineering, or mathematics by a middle or high school student, and how well that student understands the project and the area in which he/she has been working. We are evaluating the physical display only secondarily.
2. We are judging projects that involve laboratory, field, or theoretical work, and not just library research alone.
3. 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 Noble Prize Category.
4. 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.
5. Emphasis should be put on ingenuity and use of homemade, everyday materials. Expensive, purchased materials should not be of advantage to contestants.
6. 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.

7. 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.
8. 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. 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:
  - a. *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?
  - b. *Moderate*: Is the project low-average when compared to others at the Fair? Is it in the lower half of those seen?
  - c. *Average*: Could the project fairly be placed in either half? Is it in about the middle of those seen?
  - d. *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.)
  - e. *Excellent*: Is this the best or one of the best projects seen? Is it definitely to be re-judged for a Place Award?
3. Sample questions:
  - a. Was the scientific method used appropriately?
  - b. Is there a sound experimental design?
  - c. Is there an analysis of data?
  - d. Is there a control, if applicable?
  - e. Are the conclusions defensible?
  - f. Would it be significant to the field?
  - g. Where did the idea originate?
  - h. Is there a record or log?
  - i. Is help credited appropriately?
  - j. Was there a literature search?
  - k. What future work could be done on this project?

## **C. Criteria for Judging Team Projects in Round One**

1. The objective in Round One is to sort the projects into two groups. However, this may not be possible before Round Two.
2. Each Team should be judged as a group, (not as individual students). Judges with the help of the Leaders are expected to match the project's research topics with their own expertise. Each project should be judged a minimum of three times by three different Judges or groups of Judges.
3. Criteria are the same as those for Category projects. The same questions may be asked to yield the standard Round One Evaluation Scale of 1-5 points, see above.

## **D. Criteria for Judging Round Two: Focus**

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 qualities. Percentages are based on the relative importance of each criterion to the perceived overall quality of the work done.

- a. Creative Ability (30% or 30 points)
- b. Scientific Thought/Engineering Goals (30% or 30 points)
- c. Thoroughness (15% or 15 points)
- d. Skill (15% or 15 points)
- e. Clarity (10% or 10 points)

3. Evaluative statements and related questions:

- a. Statements to be addressed under CREATIVE ABILITY/ORIGINALITY (30 points).
  - (1) There was a question asked.
  - (2) It was an original question and the answer was not known.
  - (3) The approach to answering the question was creative.
  - (4) The creativity of the study was within the creative ability of the student.
  - (5) The student utilized the scientific method in experimentation rather than only descriptions and observations.
- b. Statements to be addressed under SCIENTIFIC THOUGHT (30 points)
  - (1) The scope of the study was within the student's ability.
  - (2) The study was well thought out and the student showed initiative in thought and design.
  - (3) The goals and objectives for doing the study were well defined.
  - (4) The scientific literature was examined.
  - (5) A logical hypothesis was developed for the study.
  - (6) The data collected relate to the hypothesis.
- c. Statements to be addressed under THOROUGHNESS (15 points)
  - (1) The student collected all data available.
  - (2) The student identified all the controls.
  - (3) The sample sizes and population sources were carefully chosen.
  - (4) The variable of each experiment was clearly defined.
  - (5) Replications and duplications were utilized.
  - (6) The student anticipated the problems encountered.
  - (7) The student related the work to that reported in the literature.
  - (8) The data were collected in quantitative units.
  - (9) Several experiments were done, not just one.
  - (10) The study was completed or brought to a logical stopping place.
  - (11) The data were thoroughly analyzed.
- d. Statements to be addressed under SKILLS (15 points)
  - (1) The experimental protocols were handled with skill.
  - (2) The experiments were designed with care and anticipation.
  - (3) Data measurements were done precisely.
  - (4) The study was skillfully designed and not too complicated.
  - (5) Technical problems were overcome and not merely avoided.
  - (6) A detailed notebook or log was kept.
  - (7) This study was the student's alone and excessive help was not utilized.
- e. Statements to be addressed under CLARITY (10 points)
  - (1) The student is able to explain what was done.
  - (2) The student clearly understands the research.
  - (3) The student understands the meaning of the results obtained.
  - (4) The student understands where the research can lead in the future.
  - (5) It is clear to the student whether the data support or fail to support the hypothesis.
- f. Statements to be addressed under DISPLAY (Not to be used for ranking projects for Place Awards; may be used for Special Awards.)
  - (1) Is the display well organized so that the component parts of the presentation are logical?
  - (2) Is the display neat and uncluttered or are there items, pictures, machines, models, *etc.* that are not part of the science or relevant to the study performed?

- (3) Does the display stand alone—*i.e.*, can one understand the study by reading the display or is the student's presence required?
- (4) Is the display complete and are all necessary information sheets present?
- (5) Does the display communicate science or is it merely an exercise in artistry?

**E. Criteria for Judging Round Two: Orbit**

- 1. The objective is to teach, and to recognize and reward students using non-traditional criteria.
- 2. Sample of equivalencies:
  - a. How much evidence is there of enthusiasm and love for the adventure? Mark under Creative Ability (30 points).
  - b. How much hard work was done to arrive at the conclusions? Mark under Scientific Thought (30 points).
  - c. What is the degree of thoroughness as expressed by amount of learning the student accomplished? Mark under Thoroughness (15 points).
  - d. How much has the student advanced in know how (use of instruments, search of literature, *etc.*)? Mark under Skill (15 points).
  - e. 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).

**F. Criteria for Judging Team Projects in Round Two**

- 1. The objective is to rank the projects to determine which ones will receive Place Awards.
- 2. Each Team must be interviewed at least one time in Round Two. Each student on each Team must be included in the interview.
- 3. Weighted criteria for Round Two Team Projects are slightly amended from those used for Round Two Focus Judging. Note the 16% for teamwork.

a. Creative Ability	25%
b. Scientific Thought and Engineering Goals	25%
c. Thoroughness	12%
d. Skill	12%
e. Clarity	10%
f. Teamwork	<u>16%</u>
 Total	 100%